



**AN APPLICATION TO VARY ENVIRONMENTAL
PERMIT NO. RP3133PP FOR THE THORNHAUGH
LANDFILL SITE OPERATED BY AUGEAN SOUTH
LIMITED TO CHANGE THE RESTORATION PROFILE
OF THE EXISTING PERMITTED SITE**

**ENVIRONMENTAL SETTING AND INSTALLATION
DESIGN (ESID) REPORT**

UPDATE TO THE 2014 ESID REPORT

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Appendix ESID B A copy of the 2024 Environmental Statement

Appendix ESID C A copy of Planning Permission Planning reference 24/00210/MMFUL dated 26 September 2024 together with the approved plans

This report has been prepared by MJCA with all reasonable skill, care and diligence, and taking account of the Services and the Terms agreed between MJCA and the Client. This report is confidential to the client and MJCA accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by MJCA beforehand. Any such party relies upon the report at their own risk.

1. Introduction

Report context

- 1.1** MJCA is commissioned by Augean South Limited (Augean) to prepare an application (the Application) to vary Environmental Permit reference EPR/RP3133PP (the Permit) to change the restoration profile for the Thornhaugh Landfill Site (the site), Thornhaugh, Peterborough, PE8 6NS. This report comprises an update to the Environmental Setting and Installation Design (ESID) report for the site which was submitted to the Environment Agency in October 2014 to support application reference EPR/RP3133PP/V006 to vary the Permit (the 2014 ESID). The structure of the 2014 ESID report is based on a template produced by the Environment Agency entitled "Conceptual Model, Environmental Setting and Installation Design Report" Version 1 dated March 2010.
- 1.2** This variation application is made in order to incorporate the changes to the consented restoration profile for the site as a result of the integration of the restoration proposals for the site with the former mineral extraction site at Cooks Hole Quarry immediately to the south of the site. As a result of the changes to the restoration profile, an additional depth of waste will be placed over some of the landfill area compared with that currently consented.
- 1.3** Accordingly, substantially the 2014 ESID remains valid and a copy of the 2014 ESID is provided at Appendix ESID A to this report. The text, figures and tables together with some appendices for the 2014 ESID are provided but the most voluminous appendices comprising data files and site investigation reports are not included. All of the contents of the 2014 ESID including all the appendices are already held by the Environment Agency (EA), but further copies can be provided if required.
- 1.4** A summary of the main changes to the information in the 2014 ESID which are relevant to this variation application is provided in this ESID update report.

Application context

- 1.5** The site is operated by Augean and is permitted for the deposition of non-hazardous commercial and industrial waste, stable non-reactive hazardous waste

(SNRHW), asbestos and gypsum together with other high sulphate bearing wastes. The site is centred approximately at National Grid Reference (NGR) TF 04876 00139. The site location and the Environmental Permit boundary for the site are shown on Figure ESID 1. There are no proposals to change the permit boundary or the boundary of the landfill area as part of this variation application.

1.6 The permitted waste types specified in Schedule 3 to the Permit and the annual waste input limits specified in Table S1.5 of the Permit will not change as a result of this variation application.

1.7 As explained in Section 2 of this ESID report, the following changes are proposed in respect of the operation of the landfill site and are the subject of this variation application:

- An increase in depth of waste over some areas of the landfill as consented by the revised restoration contours in the planning permission reference 24/00210/MMFUL granted on 26 September 2024.
- The removal of Pre-Operational Measure PO5 which is included in Table S1.4 of the current version of the permit comprising a requirement for cap infiltration testing.
- To implement the recommendation from the Hydrogeological Risk Assessment Review submitted to the Environment Agency in December 2024 to amend Table S3.4 'Groundwater - emissions limits and monitoring requirements' of the Permit.

1.8 There are no changes to the types of wastes received at the site, the general principles of the site containment design, the principles of the site operations including leachate and landfill gas management and site monitoring. There are no changes to the boundary of the site. The variation will not add any additional activities to Table S1.1 of the Permit.

2. The background to the changes to the site restoration profile and other changes applied for

- 2.1** The Permit boundary is shown on Figure ESID 1. Thornhaugh Landfill site is located directly adjacent to Cooks Hole Quarry which also is owned by Augean. Cooks Hole Quarry (Cooks Hole) is a mineral extraction site which has been active since the 1950s; mineral extraction is now completed at Cooks Hole. The previously approved restoration scheme for Cooks Hole was to areas of partly low levels and partly original ground levels comprising agricultural grassland with some tree and shrub planting. The previously approved restoration scheme for Thornhaugh Landfill Site was to a generally domed profile planted with a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland.
- 2.2** A planning application was submitted by Augean to Peterborough City Council in February 2024 for the revision of the restoration schemes for the Thornhaugh and Cooks Hole sites to provide an integrated, coherent landform for both sites. The restoration scheme extends the habitats from Thornhaugh to Cooks Hole so that a wider mix of biodiverse habitats is available across both sites. The amended restoration profile was consented through the grant of planning permission reference 24/00210/MMFUL on 26 September 2024.
- 2.3** An Environmental Impact Assessment was carried out in accordance with The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) to support the planning application. A copy of the associated Environmental Statement which was submitted with the planning application is provided at Appendix ESID B to this report. The text, figures and tables for the Environmental Statement are provided but the voluminous appendices comprising detailed assessment reports are not included. If copies of any of these appendices are required by the Environment Agency, they can be provided.
- 2.4** A copy of planning permission reference 24/00210/MMFUL together with the approved drawings is provided at Appendix ESID C to this report.
- 2.5** The previously consented landfill phases on Thornhaugh Landfill Site are shown on Figure ESID 2. The previously consented restoration levels for the domed area of Thornhaugh Landfill Site are shown on Figure ESID 3. The recently consented

revised contours for the integrated restoration of the Thornhaugh and Cooks Hole sites is shown on Figure ESID 4. The elevation of the highest point of the restoration landform at Thornhaugh (71.5m Above Ordnance Datum (AOD)) has not changed as a result of the consented changes to the restoration profile.

- 2.6** Cross sections through the previously and currently consented restoration profiles for both sites are shown on Figure ESID 5 and are shown in more detail for Thornhaugh Landfill Site in Figure ESID 6. The footprint of the landfill site will not change and no new landfill cells additional to those that are already permitted are created as a result of the revised restoration profile shown in the cross sections. The recently consented phasing of the restoration operations at the Thornhaugh Landfill and Cooks Hole Quarry sites is shown on Figure ESID 7.
- 2.7** The net void for waste which will be available as a result of the changes to the restoration profile in the landfill area will depend on a number of variables. These include the volume of waste remaining to be excavated principally from Phases 1 and 2 which, in accordance with the current Permit, need to be redeposited in engineered landfill cells and the volume of wastes such as construction and demolition and mineral wastes which are suitable for recovery and use off site. Based on information available from site investigations and the design of the site restoration, the currently consented void remaining at Thornhaugh Landfill Site (at early 2024) is approximately 1,310,000m³ and the maximum additional waste void created at Thornhaugh as a result of the recently consented development is approximately 920,000m³. This provides a total remaining waste void of approximately 2,230,000m³.
- 2.8** In addition to this ESID report, this variation application includes a Hydrogeological Risk Assessment review addendum report (HRA, Appendix F to the Application Report), a stability risk assessment update (SRA, Appendix G to the Application Report), a landfill gas risk assessment (LFGRA, Appendix E to the Application Report) and an environmental risk assessment (ERA, Appendix D to the Application Report) together with completed variation application forms and attachments as necessary (Appendix A to the Application Report). To avoid repetition, this ESID report includes cross references where appropriate to information contained in the

risk assessment reports or other reports provided as part of the Application rather than repeating the information in the ESID report.

2.9 In accordance with the relevant parts of the variation application form (Part C3, Table 3) it is necessary to give consideration to the design and operation of the landfill with reference to the relevant technical standards. The European Commission has not produced a best available techniques reference document (BREF) for landfill. Instead, the Landfill Directive (1999/31/EC) ¹ and the associated Council Decision (2003/33/EC) ² provide certain technical standards for landfill sites which are implemented in England and Wales through the Environmental Permitting (England and Wales) Regulations 2016 (as amended) '2016 EPR'. In the absence of a Sector Guidance Note for the landfill sector the Environment Agency (EA) published "How to comply with your environmental permit. Additional guidance for: Landfill (EPR 5.02)" in March 2009 together with Landfill Technical Guidance provided on gov.uk which is regularly updated. There are no changes as part of this variation application to the principles of the site design and engineering, the waste acceptance and disposal procedures or other site operational controls compared with those already implemented and consented. These principles are described in the 2014 ESID together with the other reports and documents provided and referenced.

2.10 It is important to recognise that the proposed changes to the current permitted landfill activities principally comprise the operation of an additional landfill void in an existing consented landfill area thereby to continue the existing landfill activities that have been on-going at the installation since December 2003.

Site history

2.11 The site history is as set out in the 2014 ESID.

2.12 The most recent variation to the Permit was for the addition of 5 hazardous waste codes for deposit in the Stable Non-Reactive Hazardous Waste Cell and the inclusion of three improvement conditions into table S1.3 under variation number EPR/RP3133PP/V007 that was issued on 10 July 2024.

¹ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

² Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II of Council Directive 1999/31/EC

Installation details

- 2.13** The site remains centred approximately on National Grid Reference (NGR) TF 04876 00139 approximately 1.2km to the west south west of the village of Thornhaugh, approximately 2km to the west north west of the village of Wansford and approximately 2.3km west north west of the River Nene at its closest point. The site is accessed via the A47 which runs adjacent to the northern boundary of the site. The location of the site is shown on Figure ESID 1. The boundary of the landfill is shown on Figure ESID 1. The permitted installation comprises an operational non-hazardous landfill and associated infrastructure including a weighbridge, welfare facilities, waste reception, site offices, wheel wash (and associated water tank), a car park, drum handling area, road sweeper bay, diesel and oil storage areas, hi-pod storage area, a landfill gas flare, engineering materials, restoration materials and aggregates. Leachate management and flaring of landfill gas are included as DAAs to the primary landfill activity at the installation. Ponds are located in the south west corner of the site in Phase 4A, south west of Phase 5 and a surface water collection pond is located east of Phase 7A. The landfill gas flare is located in the centre of the site. Infrastructure at the landfill site will be relocated progressively with the landfill gas flare moved to the eastern corner of the site as the landfilling proceeds.
- 2.14** Phase 4A which is located in the south west of the site is managed as Thornhaugh Quarry County Wildlife Site (CWS), which provides a nature conservation habitat for great crested newts under an existing licence issued by Natural England. Because of its nature conservation status, Phase 4A will not be progressed as a landfill phase although it is included in the Permit boundary.
- 2.15** The access to the site and the site boundaries and surroundings are as described in the 2014 ESID.
- 2.16** Two watercourses, Thornhaugh Beck and Wittering Brook, are located in the vicinity of the site. Thornhaugh Beck flows generally easterly to the south of the southern site boundary approximately 260m from the site at its closest point. The geology, hydrogeology and hydrology at and around the site is as described in the 2014 ESID.

- 2.17** The Environmental Statement prepared in February 2024, a copy of which is presented at Appendix ESID B to this report, concludes in respect of potential effects on ecology and nature conservation:

The proposed restoration of the sites will create a mosaic of habitat including woodland, scrub, grassland, scattered trees, a network of hedgerows, waterbodies and areas of open mosaic habitats. The restoration scheme will provide new and enhanced links to existing habitats and will extend the capacity of Bedford Purlieus to support notable species. The restoration scheme will contribute to the conservation aims of Nature Recovery Networks within the wider Rockingham Forest area. The proposed new and extended habitats will generate significant Biodiversity Net Gain substantially in excess of the 10% specified in the Environment Act 2021'.

Removal of pre-operational condition PO5

- 2.18** This variation application includes a request for the removal of pre-operational condition PO5 from the Permit relating to the capping of Phase 7A which states that:

'Prior to commencement of capping in Phase 7A the operator shall submit to the Environment Agency detailed written proposals to monitor or verify through other measures which may include experimentation or calculation the cap infiltration in Phase 7A and obtain the Environment Agency's written approval to them.'

- 2.19** As explained in the HRA review addendum presented at Appendix F to the Application Report, pre-operational condition PO5 was included in the Permit to reflect changes made in a previous Permit Variation to allow a reduced basal liner system thickness formed from 0.5m of low permeability clay, a Geosynthetic Clay Liner (GCL) and a 2mm high density polyethylene (HDPE) geomembrane, rather than a 1m of low permeability clay and a 2mm HDPE geomembrane. This change relied on the site being capped with a GCL and having a long-term low cap infiltration rate reliant on the GCL, and PO5 was added to address EA concerns in respect of the potential for the deterioration of a 6mm thick GCL cap over the

lifetime of Phase 7A. Subsequently the reduced basal liner thickness design was only constructed in Phase 7A and 4B South, with all previous and subsequent phases employing the 1m of low permeability clay and 2mm HDPE geomembrane basal liner design.

- 2.20** In addition, the design of the cap has changed to a 1m clay cap using materials that the operator has substantial experience working with and achieving low hydraulic conductivity conditions as detailed in extensive CQA testing providing significant confidence in the performance of the cap. As detailed above, the 1m clay cap will be constructed over a 0.3m thick clay subgrade layer placed over the completed and profiled waste surface and a 0.3m granular layer formed from site derived sand will be placed over the cap to provide a drainage and protection layer. Restoration soils will then be placed over the cap system to a thickness of between 1m and 1.5m. Due to the significant change to the cap design and confidence in the long-term performance of the capping material it is considered that the pre-operational measure is no longer relevant.
- 2.21** Notwithstanding the lack of relevance of pre-operational measure PO5, it is wholly impractical to monitor infiltration through a low permeability 1m clay cap due to the very nature of the material; any measurable infiltration through the cap would take a disproportionately long time (decades) and there would be inherent difficulties determining the difference between condensation or leakage due to monitoring equipment compared with infiltration. As a result it is considered that PO5 has been addressed and discharged and is no longer relevant or appropriate, and it is requested that pre-operational measure PO5 is removed from the varied Permit.

Changes to Table S3.4 ‘Groundwater – emission limits and monitoring requirements’

- 2.22** Minor amendments are proposed to aspects of the monitoring regime at the site as described in the HRA review addendum at Appendix F to the Application Report. The changes are to implement the recommendations from the Hydrogeological Risk Assessment Review submitted to the Environment Agency in December 2024 and from the 2025 HRA review addendum to amend Table S3.4 ‘Groundwater – emission limits and monitoring requirements’ in the Permit.

- It is requested that lead (a hazardous substance) is added to Table S3.4 and the Environmental Assessment Limit (EAL) for lead is included as the compliance limit.
- The EAL for Trichloroethene (TCE) and consequently the compliance limit for TCE should be amended from 0.00002mg/l to 0.0002mg/l consistent with the UKTAG limit of quantification.
- MTBE has been replaced by the hazardous substance xylene in the 2025 HRA review addendum LandSim models. It is requested that MTBE is removed from Table S3.4 and replaced with xylene. The EAL for xylene should be inserted as the compliance limit for xylene in Table S3.4.
- It is requested that monitoring point reference TH09 is changed to TH08 and monitoring point reference TH05 is changed to TH06 Table S3.4 as part of this Permit variation to correct errors in the current Permit.

3. Source term characterisation

The development of the installation

Historical development

- 3.1 The historical uses of the land in and round the site are as described in the 2014 ESID.

Site planning, licensing and permitting history

- 3.2 The planning history of the site dates from 27 June 1957 and is as described in the 2014 ESID for the period prior to the grant of the most recent planning permission in September 2024.

Potential pollutant sources and pollution incidents

- 3.3 A summary of the results of the site investigations undertaken at and in the vicinity of the site is provided in the 2014 ESID.

Installation engineering

- 3.4 The installation engineering will continue to be agreed with the Environment Agency prior to the commencement of works in each phase as part of the CQA Plan preparation.

Groundwater management

- 3.5 The base of the low permeability liner to the landfill will be at least 1m above the maximum recorded groundwater level. Accordingly, it is not necessary to install a groundwater management system.

Basal lining system

- 3.6 Details of the basal lining system are summarised in Table ESID 1.

Side slope lining system

- 3.7 Details of the side slope lining system are summarised in ESID 1.

Capping system

- 3.8** Details of the capping system are summarised in Table ESID 1.
- 3.9** It is concluded in the updated Stability Risk Assessment provided at Appendix G to the Application Report that based on the qualitative and risk screening assessments, together with the results of the analyses for stability, the designed slopes show factors of safety that meet or exceed the relevant target factors of safety at all stages of the development of the future landfill phases.

Restoration and aftercare

- 3.10** The recently consented restoration scheme for the site is shown on Figure ES4.3 to the Environmental Statement provided at Appendix ESID B to this report. It comprises a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland habitats. These proposals are subject to a 30 year closure programme as part of planning permission reference 24/00210/MMFUL granted on 26 September 2024.

Leachate management and monitoring infrastructureLeachate generation, management and monitoring

- 3.11** The principles of leachate management and monitoring remain as described in the 2014 ESID. The objective of the leachate management system is to maintain leachate at a level not exceeding 1.5m above the top of the basal liner.
- 3.12** The leachate monitoring and extraction locations will remain generally as currently agreed and will be extended through any additional layers of waste placed as part of this variation application. The post closure monitoring will be agreed with the Environment Agency prior to closure of the landfill.
- 3.13** Any change to the control levels and compliance limits for the leachate during the managed phase of the site will be agreed with the Environment Agency. Following the completion of the managed phase leachate pumping will cease. The time at which the leachate level is allowed to rise will be agreed with the Environment Agency.

Landfill gas management and monitoring infrastructureLandfill gas generation

- 3.14** The potential for landfill gas generation in existing phases and the proposed additional landfill areas is discussed in detail in the LFGRA which is provided at Appendix E to the Application Report. In summary, based on the low organic content hence low potential for the generation of landfill gas of wastes accepted currently and proposed to be accepted at the site the landfill gas generation rates in future phases are predicted to be low.

Landfill gas management and landfill gas monitoring infrastructure

- 3.15** Landfill gas management and monitoring will continue as described in the 2014 ESID. Based on the low predicted landfill gas generation rates there are no proposals to collect landfill gas from future phases of the site to be landfilled.

Groundwater management and monitoring infrastructureGroundwater management and monitoring infrastructure

- 3.16** Groundwater management and monitoring will continue as described in the 2014 ESID. There is no groundwater management system in place at the site as the landfilling operations are all above the water table. The post closure monitoring will be agreed with the Environment Agency prior to completion of landfilling.
- 3.17** Control levels and trigger levels have been set for groundwater quality in the existing groundwater monitoring boreholes at the site. The current trigger levels, now referred to as compliance limits, that are relevant to the installation are set out in Table S3.4 of the Permit. The most recent HRA review was carried out and submitted to the Environment Agency in December 2024. Based on the results of the 2024 HRA review it was concluded that Thornhaugh Landfill Site remains compliant with Schedule 22 to the Environmental Permitting (England and Wales) Regulations 2016. Based on the results of the 2025 HRA review addendum presented at Appendix F to the Application report, it is concluded that based on the changes proposed to the site restoration profile, Thornhaugh Landfill Site remains

compliant with Schedule 22 to the Environmental Permitting (England and Wales) Regulations 2016.

- 3.18** A few changes are requested to Table S3.4 of the Permit as a result of the HRA reviews as explained in more detail in the 2024 and 2025 HRA reviews and summarised in section 2 of this ESID.

Surface water management and monitoring system

Surface water management

- 3.19** The principles of the Surface Water Management Plan (SWMP) remain as described in the 2014 ESID. The proposed variation to the waste depths includes no changes to the general arrangement of the consented surface water management infrastructure at the Thornhaugh site. The surface water at Thornhaugh will continue to be managed in the existing surface water management system. Leachate and any potentially contaminated surface water will continue to be managed separately to surface water consistent with the current Environmental Permit in respect of the Thornhaugh landfilling operations.
- 3.20** An assessment of surface water drainage and flood risk assessment for the restored site, together with the adjacent Cooks Hole site is presented at Section 11 of the February 2024 Environmental Statement provided at Appendix ESID B to this report. The layout of the proposed surface water management scheme is shown on Figure ESID 8 and has been agreed through the planning process.
- 3.21** The changes to the site restoration profile does not alter or affect the surface water features that are present in Phase 4A comprising Thornhaugh Quarry CWS and which are inhabited by great crested newts.

Surface water monitoring

- 3.22** To monitor the effectiveness of the containment and leachate control systems together with the surface water management system, monitoring of surface water quality will continue to be carried out as described in the 2014 ESID.

Particulate matter monitoring

- 3.23** Monitoring of the effectiveness of the measures in place at the landfill to minimise the risk of the emission of significant quantities of particulate matter including asbestos fibres remains as described in the 2014 ESID.

Post closure controls

- 3.24** The management of leachate, landfill gas, groundwater and surface water during the life of the landfill is described in the 2014 ESID. The results of the recent 2024 HRA review and the HRA review addendum submitted with this variation application demonstrate that the landfill design for all phases at the site will comply with Annex I of the Landfill Directive. Where the design deviates from the defaults set out in Annex I of the Landfill Directive the HRA demonstrates that the design complies with the regulations regarding the protection of groundwater in Schedule 22 of the 2016 EPR and the Groundwater Daughter Directive³ hence complies with the Landfill Directive. It is concluded that the site will comply with the regulations regarding the protection of groundwater in Schedule 22 of the 2016 EPR.
- 3.25** To determine the effectiveness of the landfill design and operational procedures in controlling leachate and landfill gas during the post closure period environmental monitoring will continue at the landfill. The monitoring scheme will be designed in accordance with guidance available at the time, the results of monitoring during the operational period and the associated risk assessments. The scheme will include the monitoring of surface water quality, groundwater levels, leachate levels, groundwater quality and leachate quality together with the monitoring of landfill gas. The programme of monitoring will be agreed with the Environment Agency prior to closure of the landfill.
- 3.26** The principal purpose of the monitoring scheme will be to identify at an early stage the migration of landfill gas or the migration of contaminants from leachate which could result in pollution of the environment in terms of groundwater or surface water or harm to human health.

³ Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration

- 3.27** A topographic survey of the landfill will be undertaken annually during the post closure period to monitor settlement. Monitoring of the settlement will continue until the results of the monitoring show that there is no longer any significant residual settlement of the waste.
- 3.28** Permit surrender will be acceptable when the concentrations of contaminants in the leachate are such that without active management there is no significant risk to groundwater quality from the migration of leachate and when without active management the generation of landfill gas presents no significant risk to the environment or to human health. Leachate and landfill gas will be monitored until the completion criteria are reached. Hydrogeological completion criteria remain as discussed in Section 2.7 of the 2014 HRA and landfill gas completion criteria remain as discussed in Section 2.6 of the 2014 LFGRA.

4. Pathway and receptor term characterisation

Climate

- 4.1** The climate in the vicinity of the site remains as described in the 2014 ESID.

Geology

- 4.2** The local and regional geology at and in the vicinity remains as described in the 2014 ESID.

Man-made subsurface migration pathways

- 4.3** The potential man made subsurface migration pathways at and in the vicinity of the site remain as described in the 2014 ESID.

Hydrology

- 4.4** The hydrology at and in the vicinity of the site remains as described in the 2014 ESID. The watercourse closest to the site is the Thornhaugh Beck which flows generally from west to east approximately 260m to the south of the site at its closest point. A second watercourse, Wittering Brook originates in the vicinity of Home Farm House close to and north of the A47 and the site. A spring, referred to as Cook's Hole Spring, which discharges to the Thornhaugh Beck is located approximately 220m to the south of the site.

Hydrogeology

- 4.5** Details of the hydrogeology comprising the aquifer characteristics, groundwater flow direction and groundwater quality at and in the vicinity of the site remain as described in the 2014 ESID and in more detail in the HRA.
- 4.6** In summary the groundwater in the vicinity of the site is supported by the basal aquitard (Whitby Mudstone Formation) and groundwater is present in the Northampton Sand Formation, Grantham Formation and in places in the base of the Lincolnshire Limestone. Generally the groundwater flow direction beneath the site is to the east towards and in the direction of flow of the Thornhaugh Beck. Based on the elevation level of Thornhaugh Beck and the direction of the groundwater flow

at and in the vicinity of the site it is considered likely that groundwater from beneath the site discharges to Thornhaugh Beck to the south east and east of the site. A component of the groundwater flow beneath the north of the site may flow towards a spring and seepages which feed the Wittering Brook to the north of the site.

Off-site landfill gas monitoring

- 4.7** The principles of off-site landfill gas monitoring remain as described in the 2014 ESID.

Receptors and compliance points

Groundwater and surface water

- 4.8** Potential receptors for contaminants migrating from the landfill remain as described in the 2014 ESID and HRAs.

Landfill gas

- 4.9** As described in the LFGRA the permanent deposit of the proposed waste types is unlikely to generate significant quantities of landfill gas. The approximate locations of the receptors remain as described in the 2014 ESID and LFGRA.

Amenity

- 4.10** Potential receptors for nuisance from the landfill are described in the 2014 ESID and are reviewed in the Environmental Risk Assessment (ERA) presented at Appendix D to the Application report for this variation application.

Nature conservation

- 4.11** Potential nature conservation receptors for impacts from the landfill remain as described in the 2014 ESID.

Heritage conservation

- 4.12** Potential heritage conservation receptors for impacts from the landfill remain as described in the 2014 ESID.

Receptor summary

- 4.13** The receptors relevant to this variation Application are described in the 2014 ESID and in the ERA presented at Appendix D to the Application report for this variation application.

Site Report

- 4.14** No changes to the boundary of the landfill site or Permit are proposed as part of this variation application. The site conditions are described in Section 4 of the 2014 ESID. It is concluded that the conditions as described in the 2014 ESID represent the baseline conditions for the non-landfill areas of the site for the purpose of the 2016 EPR.

TABLES

Table ESID 1

Summary of the proposed design compared with the existing design for future landfill cells at Thornhaugh Landfill

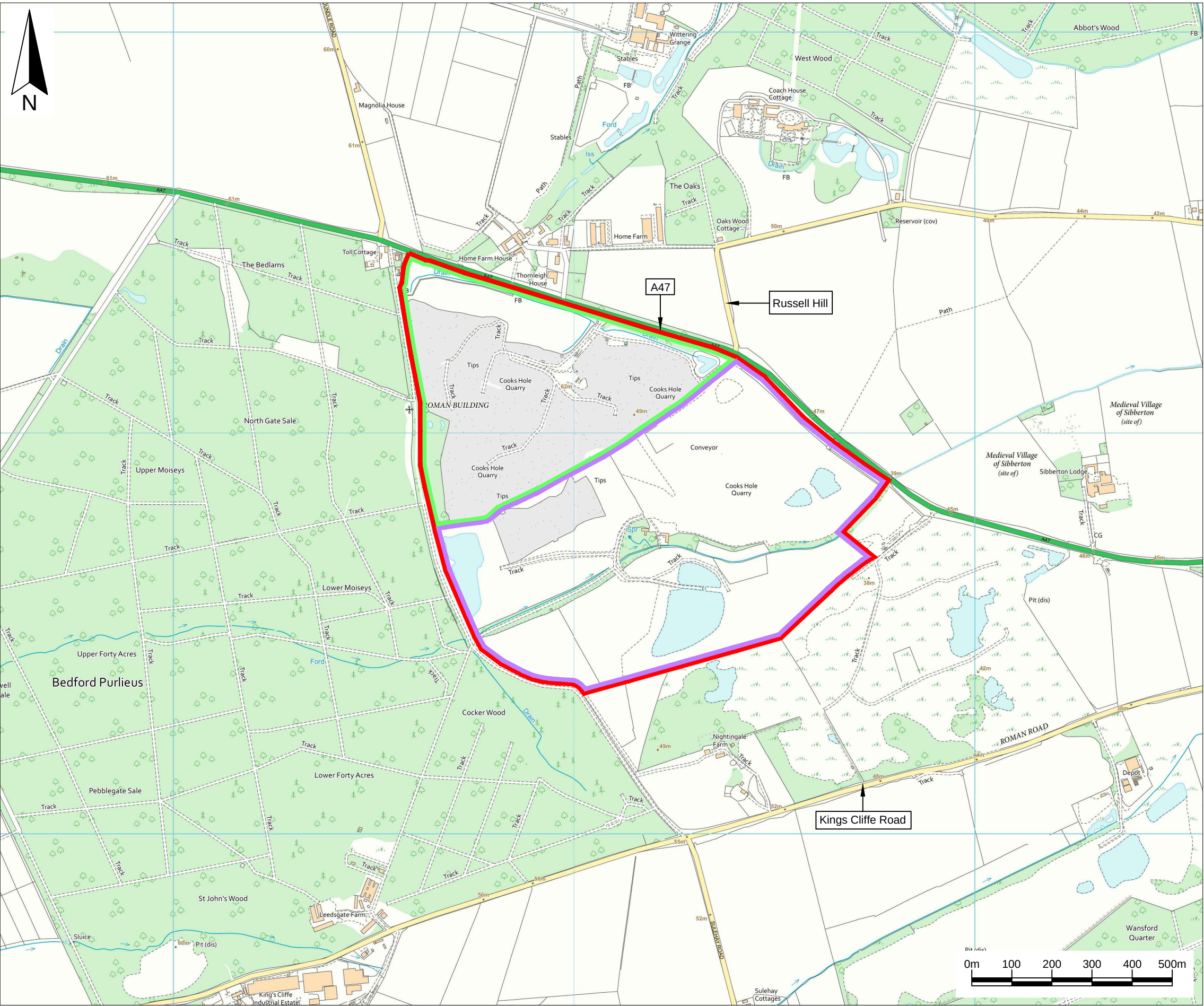
Element	Current design ¹	Proposed design for the future cells at the site
Basal sub-grade		
Strata	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation together with in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation together with in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.
Gradient	A minimum gradient of 1v:100h towards a sump in each landfill phase.	A minimum gradient of 1v:100h towards a sump in each landfill phase.
Formation level	Levels range from approximately 46.5mAOD to 51mAOD and are based on a 1m vertical standoff from groundwater.	Levels range from approximately 48mAOD to 51mAOD as shown on Figure SRA3 and are based on a 1m vertical standoff from groundwater.
Sideslope sub-grade		
Strata	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation together with in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation together with in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.
Gradient	Sideslope sub-grade to be excavated to a maximum gradient of 1v:2.5h.	Sideslope sub-grade to be excavated to a maximum gradient of 1v:2.5h.
Heights	Approximately 8m to 10m high slopes.	Approximately 8m to 11m high slopes.
Temporary slopes		
Strata	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation, waste materials up to 10m thick and in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.	Quarry backfill materials comprising mixed granular and cohesive materials derived from the Lincolnshire Limestone Formation and Grantham Formation, waste materials up to 10m thick and in situ ground comprising rocks from the Lincolnshire Limestone Formation and Grantham Formation.
Gradients	Temporary slopes to be excavated to a maximum gradient of 1v:1.5h.	Temporary slopes to be excavated to a maximum gradient of 1v:1.5h.
Heights/base	Up to approximately 14m high slopes.	Up to approximately 14m high slopes.
Basal lining system		
Mineral barrier	The basal mineral barrier agreed in the previous Permit Variation consisted of: - a minimum 0.5m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. - Overlain by a Geosynthetic Clay Liner (GCL) After the construction of Phase 7A and 4B South it was agreed through the CQA approval process to revert to the previous basal mineral barrier site design consisting of: - a minimum 1m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. The clay source will be Boulder or Rutland Formation clays sourced from ENRMF. If more than one type of clay is used the different clay sources will be used separately to form distinct areas of the clay liner and will not be mixed.	A minimum 1m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. The clay source will be Boulder or Rutland Formation clays sourced from ENRMF. If more than one type of clay is used the different clay sources will be used separately to form distinct areas of the clay liner and will not be mixed.
Geomembrane	2mm thick smooth HDPE geomembrane.	2mm thick smooth HDPE geomembrane.
Geomembrane protector	Geotextile protection layer	A geotextile protection layer, with an option for a 300mm sand protection layer on the basal area with a geotextile protection layer on the bunds.
Leachate drainage blanket	The leachate drainage blanket agreed in the previous Permit Variation consisted of: - a 300mm of granular drainage stone with leachate collection pipework installed in the drainage blanket. The granular drainage blanket will be underlain by a protection geotextile. Each phase will have an extraction sump, two monitoring wells and target pads. It was agreed through the CQA approval process that alternative leachate drainage blanket component designs could be used at the site consisting of: - a 150mm of 10mm stone overlain by a 250mm layer of 20/40mm stone as this specification allowed a reduction in the protection geotextile specification. - a layer of tyre bale underlain by either protection geotextile or a sand protection layer. - an option to use a sand protection layer under the gravel drainage layers provided a separation geotextile was installed above the sand protection layer.	300mm of 20/40mm granular drainage stone with leachate collection pipework installed in the drainage blanket. The granular drainage blanket will be underlain by a protection geotextile layer, with an option for a 300mm sand protection layer on the basal area with the geotextile protection layer on the bunds. Each phase will have an extraction sump, two monitoring wells and target pads. Alternative leachate drainage blanket component designs, not assessed as part of this SRA, may also be employed through the CQA approvals process, such as those listed below which have previously been agreed at the site: - a 150mm layer of 10mm stone overlain by a 250mm layer of 20/40mm stone with associated change in the protection geotextile specification. - a layer of tyre bale underlain by either protection geotextile or a sand protection layer. - an option to use a sand protection layer under the gravel drainage layers provided a separation geotextile was installed above the sand protection layer.
Leachate levels	Maximum 1.5m.	Maximum 1.5m.

Element	Current design ¹	Proposed design for the future cells at the site
Sideslope lining system		
Mineral barrier	The basal mineral barrier agreed in the previous Permit Variation consisted of: - a minimum 0.5m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. - Overlain by a Geosynthetic Clay Liner (GCL) After the construction of Phase 7A and 4B South it was agreed through CQA to revert to the previous basal mineral barrier site design consisting of: - a minimum 1m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. The clay source will be in situ Boulder or Rutland Formation clays sourced from ENRMF. If more than one type of clay is used the different clay sources will be used separately to form distinct areas of the clay liner and will not be mixed.	A minimum 1m thickness of clay compacted to achieve a maximum permeability of 1×10^{-9} m/s and a minimum shear strength of 50kPa. The clay source will be Boulder or Rutland Formation clays sourced from ENRMF. If more than one type of clay is used the different clay sources will be used separately to form distinct areas of the clay liner and will not be mixed.
Geomembrane	2mm thick double textured HDPE geomembrane.	2mm thick double textured HDPE geomembrane.
Leachate drainage blanket	The basal granular drainage blanket will be extended 2m vertically up the sideslopes and will be underlain by a protection geotextile. Over the remainder of the sideslopes a geocomposite drainage layer will be installed to drain perched leachate to the basal leachate drainage blanket and to act as a geomembrane protection geotextile. Selected fine grained wastes containing clay, silt and sand and gravel no greater than 20mm particle size will be used as a first protection layer placed against the drainage geocomposite.	The basal granular drainage blanket will be extended 2m vertically up the sideslopes and will be underlain by a protection geotextile. Over the remainder of the sideslopes a geocomposite drainage layer will be installed to drain perched leachate to the basal leachate drainage blanket and to act as a geomembrane protection geotextile. Selected fine grained wastes containing clay, silt and sand and gravel no greater than 20mm particle size will be used as a first protection layer placed against the drainage geocomposite.
Inter-cell bunds		
Gradient	Sideslopes of bunds to have a maximum gradient of 1v:2h.	Sideslopes of bunds to have a maximum gradient of 1v:2h.
Height	Minimum of 2m up to a maximum of 3m.	Minimum of 2m up to a maximum of 3m.
Crest width	Minimum 3m.	Minimum 3m.
Waste mass and temporary waste slopes		
Waste	Waste materials consistent with those placed previously at the site comprising non-hazardous and stable non-reactive hazardous waste.	Waste materials consistent with those placed previously at the site comprising non-hazardous and stable non-reactive hazardous waste.
Settlement/ Surcharge	15%	None, as evidence from waste inputs, survey monitoring and gas data has concluded that settlement is not taking place within the waste mass other than initial self-weight settlement occurring during waste placement.
Waste slope gradient	Temporary waste slopes to be constructed to a maximum gradient of 1v:2h.	Temporary waste slopes to be constructed to a maximum gradient of 1v:1.5h. If temporary waste slopes are to be left open beyond the short term then they should be constructed to a gradient of no greater than 1v:2h.
Waste slope height	Maximum waste slope height of approximately 17m.	Maximum waste slope height of approximately 19m.
Capping and restoration system²		
Components	The capping system assessed in the previous SRA in support of the Permit Variation consists of: - A 0.3m thick sub-grade overlain by a 1mm thick HDPE or LLDPE geomembrane cap which is protected by a drainage geocomposite. However this was changed during the permit determination period to consist of: - A 0.3m thick sub-grade overlain by a Geosynthetic Clay Liner (GCL) which is overlain and protected by a 300mm thick sand drainage layer formed from the site derived sand of the Northampton Sand Formation. 1m of soils or 1.5m of soils in areas where trees are to be planted.	A 0.3m thick sub-grade overlain by a 1m thick low permeability clay cap which is overlain and protected by a 300mm thick granular drainage layer. Minimum of 1m of soils or 1.5m of soils in areas where trees are to be planted.
Height and gradient	Pre-settlement capping and restoration slopes are typically approximately 10m high with slope gradients of approximately 1v:20h. The steepest slopes will be at a maximum gradient of 1v:3h and the maximum height over which this gradient is present is approximately 6m.	Capping and restoration slopes are typically approximately 10m to 20m high with slope gradients of approximately 1v:10 to 1v:20h. The steepest restored slopes will be at a maximum gradient of 1v:3h and the maximum height over which this gradient is present is approximately 6m. The steepest unrestored or partially restored slopes along the southern boundary between Thornhaugh and Cooks Hole will be at a maximum gradient of 1v:3h and 14m high and once restored will be at a maximum gradient of 1v:12h.

¹ In accordance with the current site permit requirements or as agreed through the CQA Plans in accordance with the current site permit requirements.

² A number of the current design elements differ from those assessed in SRA prepared for the previous permit variation as they either changed through correspondence during the permit determination stage, as referenced in Table S1.2 Operating techniques of the permit, or have been changed through agreement with local EA technical officers of engineering designs and CQA Plans.

FIGURES



Key / Notes

- Boundary of Thornhaugh Landfill Site
- Planning permission boundary
- Boundary of Cocks Hole Quarry

Note:
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cocks Hole Quarry is out of date and does not reflect the current ground conditions.

	Final	KR	LRM	LH	09/07/25
Rev	Status	Drn	App	Chk	Date

Site
THORNTAUGH LANDFILL SITE

Client

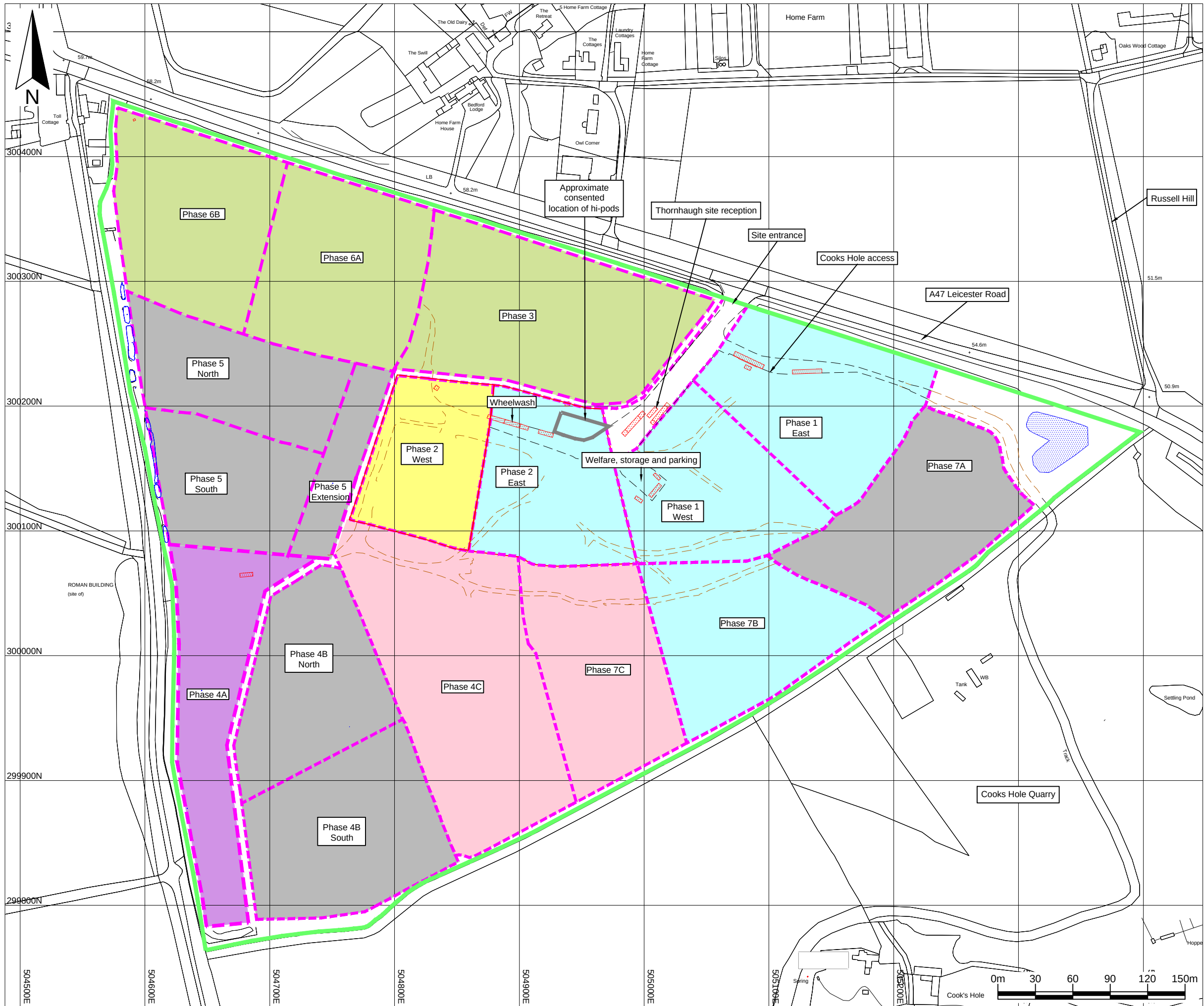
Title
The site location and boundary

Figure ESID 1
Scale
1:10,000@A3

Drawing Ref
AU/TH/06-25/25026

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Key / Notes

- Boundary of Thornhaugh Landfill Site
- Approximate phase boundaries
- Phase 2 East Original name of phase area
- Surfaced section of internal haul road
- Approximate route of haul roads
- Existing building
- Current surface water collection areas
- Unprepared area
- Excavation and preparation for landfilling
- Active landfill area
- Current landfill complete
- Restored
- Nature conservation habitat for great crested newts

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions.

	Final	KR	LRM	LH	09/07/25
Rev	Status	Drn	App	Chk	Date

Site
THORNHAUGH LANDFILL SITE

Client

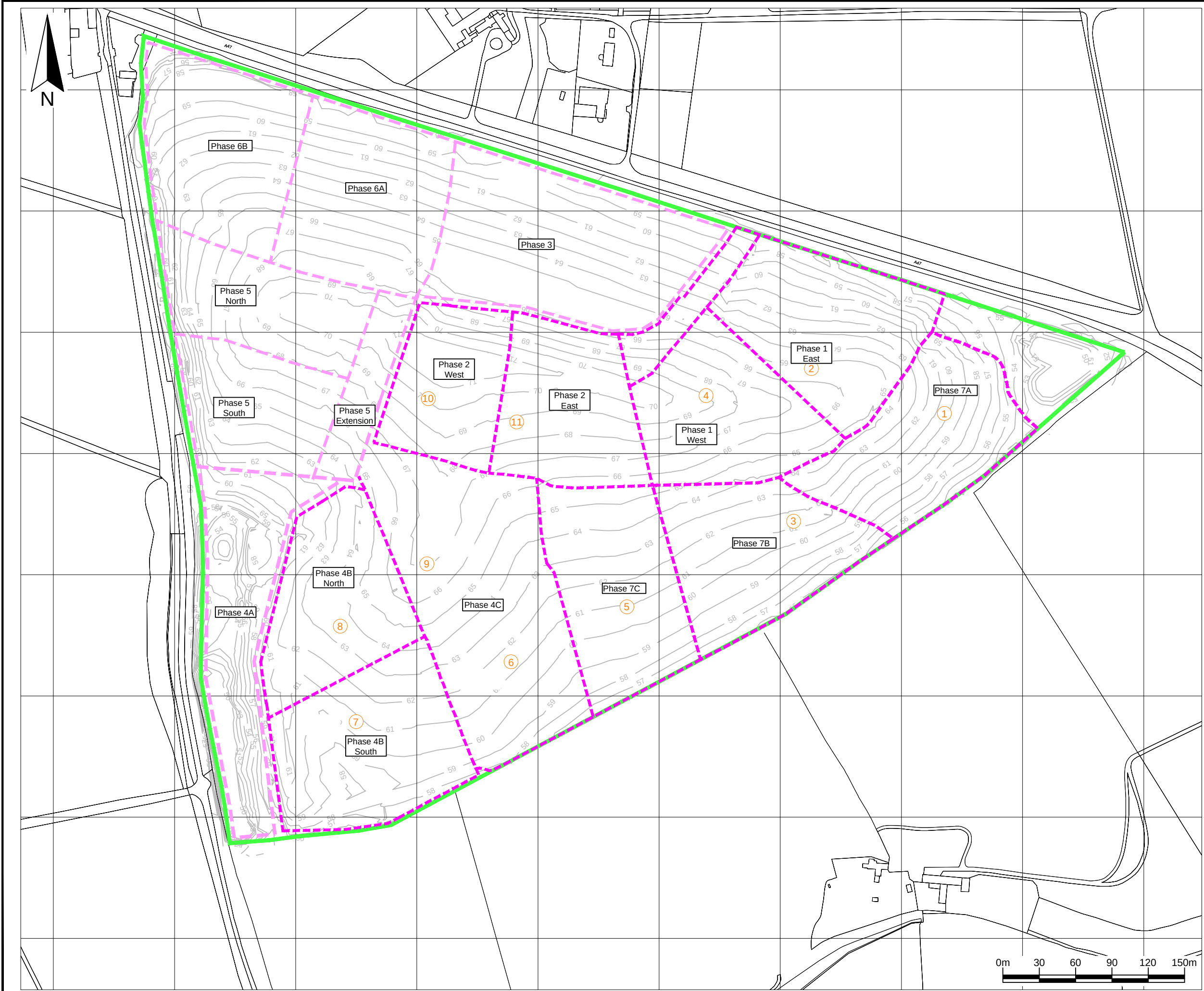
Title
The previously consented phases of Thornhaugh Landfill Site

Figure ESID 2 Scale
1:3,000@A3

Drawing Ref
AU/CH/06-25/25027

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Key / Notes

Environmental Permit boundary

Approximate phase boundaries

①

Order of working

—64—

Previously consented restoration contours(mAOD)

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on model reference
AU-TH-12379.LSS

	Final	KR	LRM	LH	09/07/25
Rev	Status	Drn	App	Chk	Date

Site

THORNHAUGH LANDFILL SITE

Client

Title

Plan showing the previously consented restoration levels

Figure ESID 3

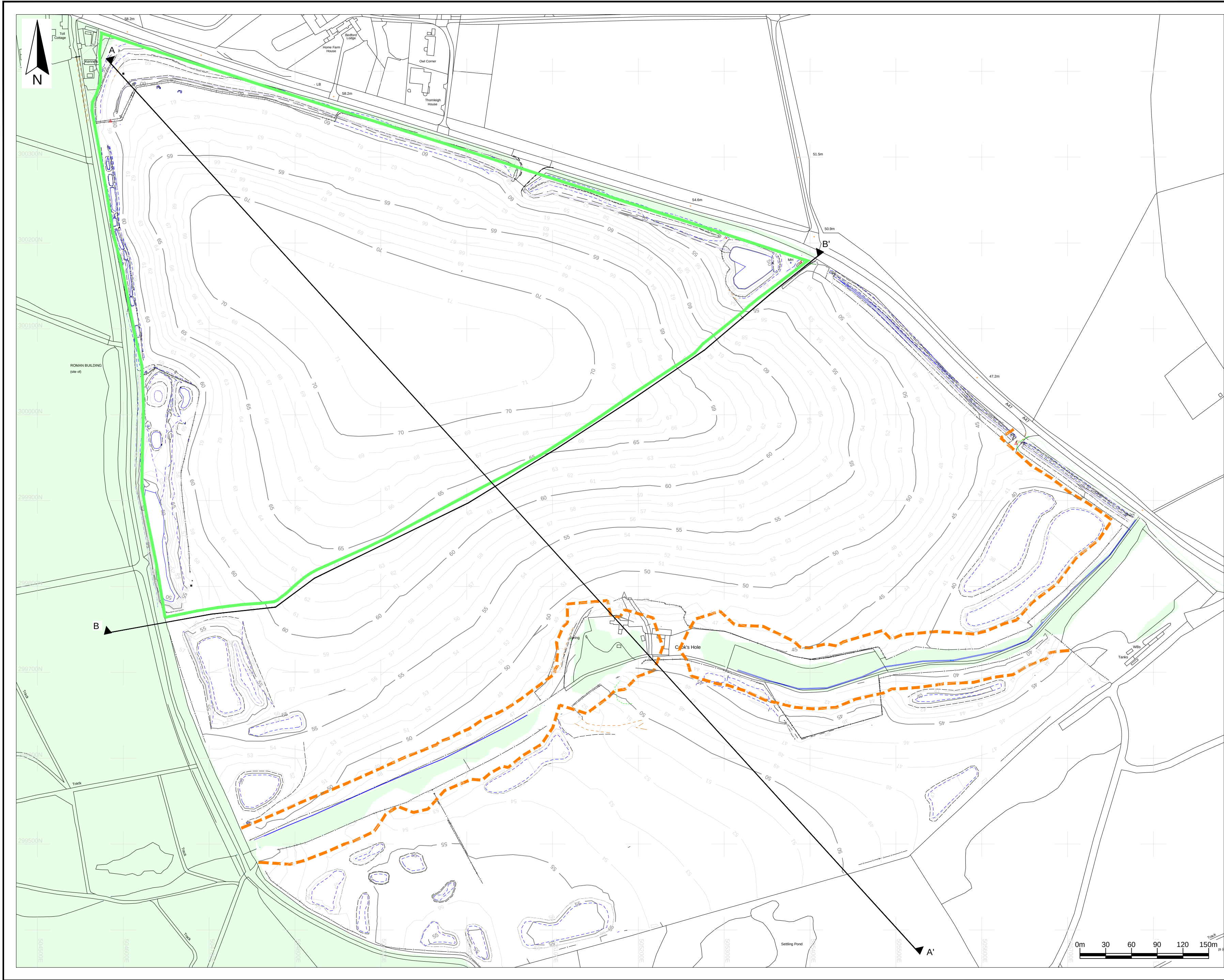
Scale
1:3,000@A3

Drawing Ref

AU/TH/06-25/25028

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Key / Notes

- Boundary of Thornhaugh Landfill Site
- Contours (mAOD)
- Change of surface
- Top of bank
- Bottom of bank
- Ditch invert
- Verge
- Fenceline
- Building/Road
- Track
- Overhead power line
- Survey station
- 20m standoff from existing vegetation
- Existing vegetation
- Cross section locations (shown on Figure ESID 5 drawing reference AU/CH/06-25/25030)

This drawing may not include all of the features listed in the above key

	Final	KR	LRM	LH	09/07/25
Rev	Status	Drm	App	Chk	Date

Site
THORNTAUGH LANDFILL SITE
Client



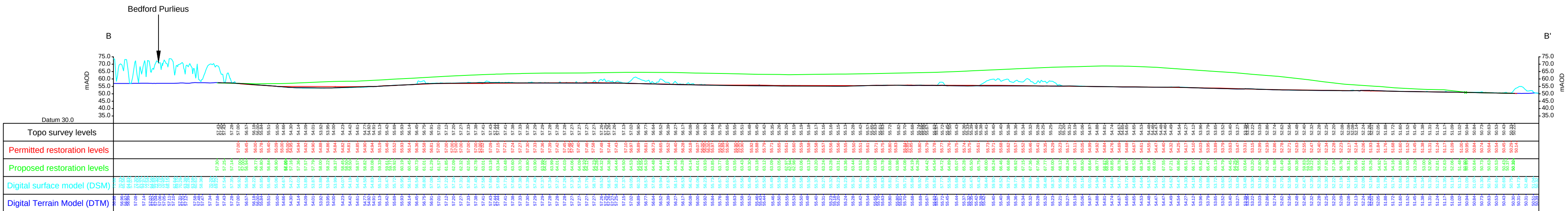
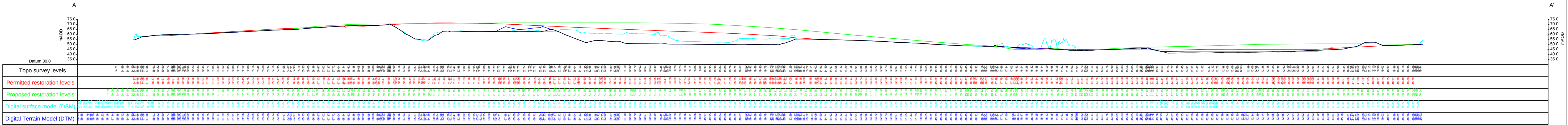
Title
The recently consented restoration profile

Figure ESID 4	Scale 1:3,000@A2
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Drawing Ref
AU/TH/06-25/25029
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Key / Notes

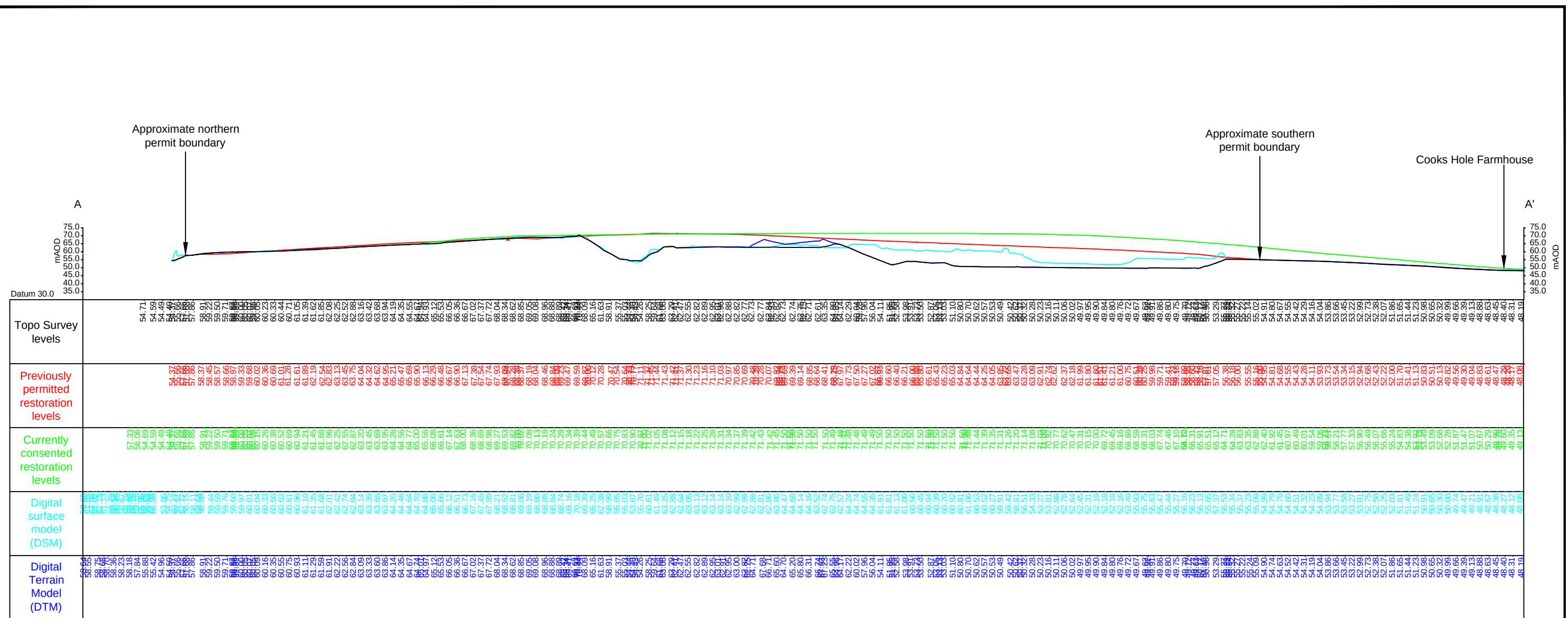
Note:
Cross section locations shown on drawing reference
A/CH/006-25/25029

Rev	Status	Drn	App	Chk	Date
	Final	KR	LRM	LH	09/07/25

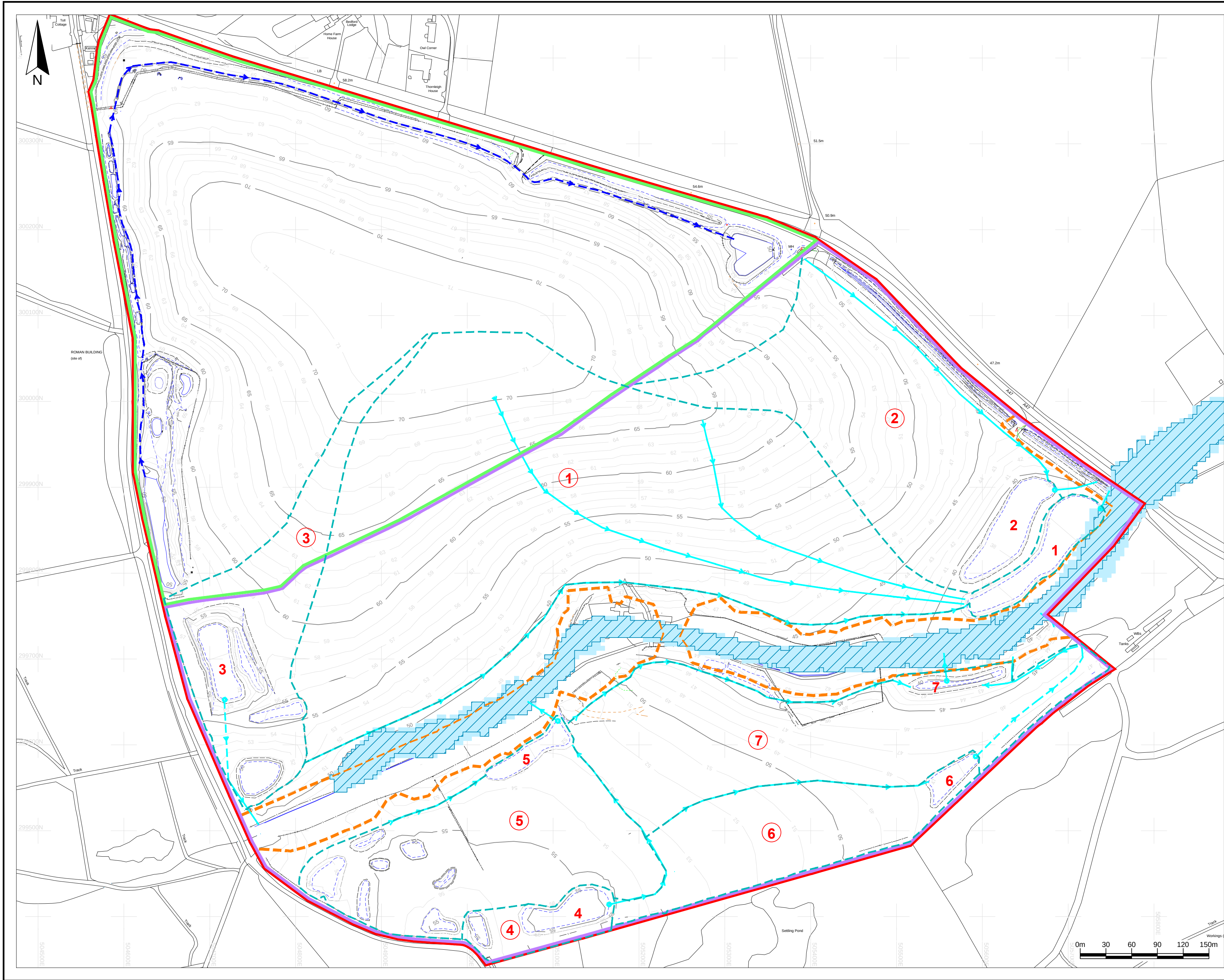
Site
THORNHAUGH LANDFILL SITE

Client
Augean

Title
Cross sections through the existing ground levels and
the previously permitted and recently consented
restoration contours



Key / Notes Note: Cross section locations shown on drawing reference AU/TH/06-25/25029						
		Final	TL	LRM	LH	09/07/25
	Rev	Status	Drm	App	Chk	Date
	Site THORNHAUGH LANDFILL SITE					
	Client 					
	Title Cross section through the existing ground levels and the previously permitted and recently consented restoration contours at Thornhaugh Landfill Site					
	Figure ESID 6		Scale 1:2,500@A3			
	Drawing Ref AU/CH/06-25/25018					
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Key / Notes

- Planning Permission boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Contours (mAOD)
- Change of surface
- Top of bank
- Bottom of bank
- Ditch invert
- Verge
- Fenceline
- Building/Road
- Track
- Overhead power line
- △ Survey station
- 20m standoff from existing tree groups
- Drain
- Basin out flow via flow restriction device
- 1 Detention basin
- 2 Detention basin catchment area
- - - Underground drainage pipe
- Area draining to consented surface water management system at Thornhaugh Landfill Site
- Flood zone 2
- Flood zone 3

This drawing may not include all of the features listed in the above key

	Final	KR	LRM	LH	09/07/25
Rev	Status	Drn	App	Chk	Date

Site	THORNTAUGH LANDFILL SITE				
Client					
Title	Current and proposed surface water management infrastructure				

Figure ESID 8	Scale
Drawing Ref AU/TH/06-25/25032	1:3,000@A2
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APPENDICES

APPENDIX ESID A
A COPY OF THE 2014 ESID



**AN APPLICATION TO VARY ENVIRONMENTAL
PERMIT NO. RP3133PP FOR THE THORNHAUGH
LANDFILL SITE OPERATED BY AUGEAN SOUTH
LIMITED TO EXTEND THE AREA OF THE EXISTING
PERMITTED SITE**

**ENVIRONMENTAL SETTING AND INSTALLATION
DESIGN (ESID) REPORT**

Report reference: AU/TH/MAS/5477/01/ESID
September 2014



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TABLES

Table ESID1	Risk assessment reports prepared to support the application to vary Environmental Permit number RP3133PP
Table ESID2	Summary of the proposed design for the new landfill area at Thornhaugh Landfill Site
Table ESID3	Summary of the receptors relevant to the environmental risk assessment reports prepared to support the application to vary Environmental Permit number RP3133PP

APPENDICES

Appendix A	A copy of VHE Construction letter report entitled "Thornhaugh Landfill Site Phase 1 and Phase 2 - Factual Letter Report" dated 31 January 2014 [on CD only]
Appendix B	A copy of MJCA report reference AU/TH/DFR/3164/01 entitled "Report of the Intrusive Investigation of Phase 1 and 2 at Thornhaugh Landfill Site" dated May 2014 [on CD only]
Appendix C	A copy of MJCA letter report reference AU/TH/DFR/78267/P entitled "Thornhaugh Landfill Site – Trial pit investigation along access road" dated 21 May 2014 [on CD only]
Appendix D	Copies of Figures 1 to 15 showing the proposed 15 stage sequential development of Thornhaugh Landfill Site
Appendix E	A copy of URS drawing number 47047967_LD_001 Rev C dated 12 March 2014 entitled "Planning Application Condition 5 Landscape Masterplan"
Appendix F	Wind data for Wittering Airfield for 2009 to 2013
Appendix G	Licensed and unlicensed groundwater and surface water abstractions within 4km of the application boundary
Appendix H	An electronic copy of the results of surface water quality and groundwater quality [on CD only]
Appendix I	Hydrographs showing groundwater levels recorded at Thornhaugh Landfill Site between December 2000 and April 2014
Appendix J	A copy of a letter from the Environment Agency dated 27 June 2008

This report has been prepared by MJCA with all reasonable skill, care and diligence, and taking account of the Services and the Terms agreed between MJCA and the Client. This report is confidential to the client and MJCA accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by MJCA beforehand. Any such party relies upon the report at their own risk.

FIGURES

Fig No	ESID 1	Scale	50,000	Title	The site location
Drawing Ref AU/TH/08-14/18025					
Detail		Site location in relation to surrounding features			
Fig No	ESID 2	Scale	5000	Title	Environmental site setting
Drawing Ref AU/TH/08-14/18026					
Detail		Installation boundary; residential areas; recreational areas; nature conservation sites and priority habitat areas; waterways; water bodies; agricultural areas; commercial and industrial areas; roads; public rights of way			
Fig No	ESID 3	Scale	50000	Title	Designated cultural and natural heritage features
Drawing Ref AU/TH/08-14/18027					
Detail		Natural heritage • SSSIs, NNRs, LNRs, CWSs, RIGS • SACs, cSACs, SPAs, pSPAs, Ramsar sites Cultural heritage • Listed buildings, scheduled monuments			
Fig No	ESID 4	Scale	3000	Title	Existing and proposed site layout and phasing and restoration contours
Fig No ESID 4A – Drawing Ref AU/TH/09-14/18074					
Fig No ESID 4B – Drawing Ref AU/TH/09-14/18073					
Detail		Existing and proposed site layout and phasing (Figure ESID 4A) Proposed pre-settlement and post-settlement contours (Figure ESID 4B) [The proposed progression of landfilling at the site is shown on Figures 1 to 15 provided at ESID Appendix D]			
Fig No	ESID 5	Scale	2500	Title	Restoration
Detail		Approved restoration scheme [Provided at ESID Appendix E as URS Drawing No. 47047967_LD_001 Rev. C dated March 2014 entitled “Planning Application Condition 5 Landscape Masterplan”]			
Fig No	ESID 6	Scale	As shown	Title	Installation / leachate management
Drawing Ref AU/TH/09-14/18075					
Detail		Summary of engineering details on a schematic cross section			
Fig No	ESID 7	Scale	As shown	Title	Leachate management
Drawing Ref AU/TH/09-14/18076					
Detail		Leachate sumps, abstraction wells, leachate storage, monitoring point location/ construction detail.			

Fig No	ESID 8	Scale	3000	Title	Leachate and landfill gas management
Drawing Ref AU/TH/09-14/18072					
Detail	Internal wells and collection points Internal and external / perimeter monitoring points				
Fig No	ESID 9	Scale	50000	Title	Geological Map
Detail	Regional geology [Provided as esi Drawing ESID 9 dated September 2004]				
Fig No	ESID 10	Scale	50000	Title	Regional Hydrogeology and Hydrology
Drawing Ref AU/TH/09-14/18060					
Detail	Licensed and private abstractions from groundwater and surface water groundwater source protection zones (SPZs) and surface water features				
Fig No	ESID 11	Scale	3000	Title	Maximum groundwater levels recorded in the Northampton Sand Formation
Drawing Ref AU/TH/09-14/18055					
Detail	Maximum groundwater levels recorded in the Northampton Sand Formation [Hydrographs showing groundwater levels recorded in boreholes at Thornhaugh Landfill Site are presented at Appendix ESID I]				
Fig No	ESID 12	Scale	As shown	Title	Hydrogeological cross sections
	Hydrogeological cross section A to A' (Drawing ESID 12A) Hydrogeological cross section B to B' (Drawing ESID 12B) [Provided as esi Drawings ESID 12A and ESID 12B dated May 2004]				
Fig No	ESID13	Scale	5000	Title	Source, pathways and receptors
Drawing Ref AU/TH/08-14/18028					
Detail	Receptors • Residential dwellings and commercial property • Cultural and natural heritage sites • Ground and surface water • Public open space, rights of way, roads Pathways • Surface water • Groundwater • Migration through surrounding strata • Air • Vehicles Sources • Leachate • Landfill gas • Mud and debris • Noise • Odour • Particulate matter				

1. Introduction

Report context

- 1.1** MJCA is commissioned by Augean South Limited (Augean) to prepare an Environmental Setting and Installation Design (ESID) report to support an application (the Application) to vary Environmental Permit (EP) Number RP3133PP (the Permit) to extend the current boundary of the Permit for the Thornhaugh Landfill Site (the site). The site is operated by Augean for the deposition of non-hazardous commercial and industrial waste, stable non-reactive hazardous waste (SNRHW), asbestos and gypsum together with other high sulphate bearing wastes. The application includes the treatment of waste as a new waste operation comprising the sorting, screening and crushing of suitable waste types to recover materials prior to removal from the site for use elsewhere or use at the site.
- 1.2** The proposed variation will extend the boundary of the landfill area authorised by the Permit to include an adjacent area of land known as the Bradshaw Land located between the current Phases 4 and 7 and to incorporate the closed landfill area comprising Phases 1 and 2 into the Permit. Phases 1 and 2 are the subject of Environmental Permit number EPR/FP3790NJ, which is also referred to as EAWML 70119 (Permit FP3790NJ). The Application boundary is shown on Figure ESID 1 and the proposed phase boundaries are shown on Figure ESID 4A together with the boundaries of the current EPs. Figure ESID 4A shows that the southern additional area of land (the Bradshaw Land) will be developed and operated as parts of Phases 4B North and South, 4C North, 7B and 7C and the whole of Phase 4C South. The proposed phasing shown on Figure ESID 4A is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.
- 1.3** In addition the proposed variation will add a waste operation to authorise limited forms of treatment of waste, comprising sorting, screening and crushing, at the site to allow wastes to be treated to recover materials imported to the site and recovered at the site before their exportation and use off site or their use on site. The screening and crushing activities are relevant particularly to suitable inert construction, demolition and excavation waste together with overburden or other mineral waste that has been deposited in Phases 1 2, 4 and 7 and which will be

removed before the phases are engineered to allow wastes to be deposited within these phases under the Permit. The principles of how the removal of the wastes will be progressed are set out in the document presented at Appendix O to the Application report reference AU/TH/MAS/5415/01 dated September 2014 (the Application report). Detailed schemes of working will be agreed with the Environment Agency prior to the commencement of excavation works in each phase as part of the Construction Quality Assurance (CQA) Plan preparation.

- 1.4** The structure of this ESID report is based on a template produced by the Environment Agency entitled “Conceptual Model, Environmental Setting and Installation Design Report” Version 1 dated March 2010.
- 1.5** In addition to this ESID report the variation application includes a hydrogeological risk assessment (HRA), a stability risk assessment (SRA), a landfill gas risk assessment (LFGRA) and a nuisance risk assessment (NRA) together with a completed variation application form and attachments as necessary. A list of the risk assessment reports is presented in Table ESID 1. To avoid repetition, the ESID report includes cross references where appropriate to information contained in the risk assessment reports or other reports provided as part of the Application rather than repeating the information in the ESID report. The risk assessments are provided as appendices to the Application report.
- 1.6** Planning permission reference 12/00463/MMFUL was granted on 9 November 2012 for the continued operation of the site until 31 December 2029 including the use of the Bradshaw Land, referred to as Phases 4B and 4C in the permission, and the recycling of materials at the site for use in the site and for export off site. A copy of the planning permission and a copy of the Committee Report are presented at Appendix K to the Application report. The existing approved development was the subject of an environmental impact assessment (EIA) the results of which are reported in an Environmental Statement (ES) prepared in March 2012 which supported the planning application. A copy of the ES is presented at Appendix L to the Application report and cross-references are made to information contained in these documents as appropriate to support the ESID. A Supplementary Environmental Statement (SES) was prepared in August 2012 to assess specifically the treatment through crushing and screening of surplus materials removed from some areas of the site during landfill cell preparation prior to their removal from the

site or use at the site. A copy of the SES is presented at Appendix M to the Application report and cross-references are made to information contained in these documents as appropriate to support the ESID.

- 1.7** A planning application is being prepared to obtain planning permission for the removal of the deposited wastes from Phases 1 and 2, amendments to the phasing and minor amendments to the restoration contours for the site. The proposed development is the subject of EIA and the ES which reports the findings of the EIA is in preparation and will be submitted to support the planning application.
- 1.8** In accordance with the relevant parts of the variation application form it is necessary to give consideration to the design and operation of the landfill with reference to the relevant technical standards. The European Commission has not produced a best available techniques reference document (BREF) for landfill. Instead the Landfill Directive (1999/31/EC)¹ and the associated Council Decision (2003/33/EC)² provide certain technical standards for landfill sites which are implemented in England and Wales through Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2010 (as amended) '2010 EPR'. Where Schedule 10 to the 2010 EPR does not provide the relevant technical standards the general principles of the Industrial Emissions Directive (2010/75/EC)³ must be applied for landfill sites falling within Part 2, Chapter 5, Section 5.2 of Schedule 1 to the 2010 EPR as an 'installation'. In the absence of a Sector Guidance Note for the landfill sector the Environment Agency (EA) published "How to comply with your environmental permit. Additional guidance for: Landfill (EPR 5.02)" in March 2009 together with "Waste acceptance at landfills – Guidance on waste acceptance procedures and criteria" Version 1.0 in November 2010 and "Waste sampling and testing for disposal to landfill" in March 2013.
- 1.9** The ESID together with the other reports and documents provided with the Application describe how the installation will be operated and managed in accordance with the applicable legislation and relevant guidance. It is important to recognise that the proposed changes to the current permitted landfill activities

¹ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

² Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II of Council Directive 1999/31/EC

³ Directive 2010/75/EC of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast)

include the operation of an additional landfill area to continue the existing landfill activities that have been on-going at the installation since December 2003. Based on information presented in the ESID report dated November 2004 (the 2004 ESID) prepared for the original permit application, the first deposits of non-hazardous waste in Phase 3 commenced in December 2003.

1.10 The proposed changes to the landfill area will include the removal of waste from Phases 1 and 2. The proposed methods of excavating waste and in particular working Phases 1 and 2 are set out in the 'Principles of material excavation and management at the Thornhaugh Landfill Site' presented at Appendix O to the Application report. The principles of the methods of extracting the wastes from the existing Phases 1 and 2 are summarised in the following paragraph.

1.11 Work on Phases 1 and 2 will not commence until a cell has been engineered and, subject to confirmation through Construction Quality Assurance (CQA) procedures, is ready to receive waste and becomes operational. In agreement with the Environment Agency measures will be taken during the excavation of all phases to control nuisance associated with odour and with dust emissions. The principles of the control methods are set out in the document provided at Appendix O. Detailed control measures and procedures will be provided as part of the CQA Plan for discussion and agreement with the Environment Agency prior to works commencing. Three material types are anticipated to be encountered as described below.

- **Waste** for disposal which is excavated from Phases 1 and 2 will be deposited directly into an engineered landfill area to avoid double handling and to minimise the time during which the excavated waste is exposed.
- **Non-waste material** excavated from future phases including Phases 1 and 2 such as backfilled overburden and backfilled mineral from previous quarrying operations and in-situ mineral will be reused on site or removed from the site for sale and/or reuse elsewhere. Non-waste materials which will be used are not considered wastes and will be stockpiled in the stockpile area located to the south of the permit boundary.

- **Potentially contaminated or potentially recoverable material** excavated from Phases 1, 2 and parts of 7 that may be suitable for reuse as fill, cover and or restoration materials or inert materials taken off site for re-use will be stockpiled on site to allow sampling for analysis to confirm their suitability for reuse. Potentially contaminated or potentially recoverable materials that are stockpiled awaiting the results of testing and confirmation of their status will be managed as wastes and will be stockpiled within the boundary of the Environmental Permit. Potentially contaminated/recoverable materials which are subsequently classified as unsuitable for reuse will be deposited in the engineered landfill. Potentially contaminated or potentially recoverable materials which are classified as suitable for reuse will be used on site and/or exported from site for use elsewhere following, as necessary, treatment comprising sorting, screening and crushing at the site.

Site history

- 1.12** Historically the site was quarried for ironstone of the Northampton Sand Formation by the removal of the overlying Lincolnshire Limestone and Grantham Formation. It is understood that the overlying materials removed during quarrying were used to backfill parts of the quarry. At a later date the overburden backfill was quarried and the remaining void was developed as a landfill. Phases 1 and 2 which are the subject of Permit FP3790NJ were developed on the principle of disperse and attenuate and are complete but uncapped and un-restored landfill areas. No engineered capping has been provided for Phases 1 and 2 although the site investigations that have been undertaken to determine the nature and extent of the materials used to fill the former Phase 1 and Phase 2 quarry voids, which are discussed further in Section 2, have identified that cover materials of variable types and thicknesses have been placed over the waste in Phases 1 and 2. Permit FP3790NJ is a former Waste Management Licence (WML) that was issued originally in November 1977 as Waste Disposal Licence reference LS14. Based on information provided in the 2004 ESID landfilling at the site commenced in Phase 1 in 1984. Phases 3 to 7 which are the subject of the Permit comprise engineered containment landfill areas being developed and restored progressively by landfilling. From a review of information presented in the 2004 ESID, landfilling in Phase 3 commenced in December 2003 and ceased in July 2004 and commenced in Phase

6 in July 2004. Based on a review of topographical surveys undertaken at the site landfilling in Phase 6 was complete by the end of 2005.

- 1.13** Phase 5 of the site is sub-divided into 5 separate monocells, comprising Phase 5A1 which accepted non hazardous waste generally between 2009 and 2014, Phase 5A2 which accepted non hazardous waste generally between 2006 and 2014, Phase 5B1 which accepted gypsum and high sulphate waste, non hazardous waste and contaminated soils (SNRHW) generally between 2006 and 2014, Phase 5B2 which accepted asbestos waste generally between 2006 and 2014 and Phase 5 Extension which accepted non hazardous waste between 2012 and 2014. The approximate locations of the monocells comprising Phase 5 are shown on Figure ESID 4A. Phases 5A1 and 5B1 are also referred to in combination as Phase 5 North and Phases 5A2 and 5B2 are referred to in combination as Phase 5 South. The approximate locations of the monocells comprising Phase 5 are shown on Figure ESID 4A. Phases 5A1 and 5B1 are also referred to in combination as Phase 5 North and Phases 5A2 and 5B2 are referred to in combination as Phase 5 South.
- 1.14** The most recent version of Permit FP3790NJ (formerly a WML) is Variation notice number EA/EPR/FP3790NJ that was issued on 31 December 2010. Permit FP3790NJ is relevant to Phases 1 and 2 only.
- 1.15** Permit RP3133PP is a former Pollution Prevention Control (PPC) permit that was issued on 9 November 2005 and authorised the landfilling of non-hazardous waste in the installation comprising Phases 3, 4, 5, 6 and 7 together with SNRHW in monocells within these phases. High sulphate wastes have been accepted into the installation further to the issue of permit variation reference UP3539LR on 22 May 2006. The most recent variation to the Permit was the addition of burning of waste as a fuel as a directly associated activity (DAA) to the existing primary activity of disposal of waste in a landfill under variation number EPR/RP3133PP/V004 that was issued on 24 March 2010.
- 1.16** Phases 1 and 2 are excluded from the current installation boundary because they were not engineered and operated as contained landfill phases and therefore did not meet the requirements of the PPC permit when it was issued. Further to the submission of the Closure Report to the Environment Agency in May 2008 and the variation of Permit FP3790NJ in December 2010 Phases 1 and 2 are closed but

have not been definitively closed. It is proposed that the area comprising Phases 1 and 2 will be included within the boundary of the variation to Permit RP3133PP as a result of this application to facilitate the removal of the waste from Phases 1 and 2 so that these phases can be re-engineered consistent with current requirements and infilled with waste to achieve the restoration of the site.

Installation details

- 1.17** The existing site is centred approximately on National Grid Reference (NGR) TF 04876 00139 approximately 1.2km to the west south west of the village of Thornhaugh, approximately 2km to the west north west of the village of Wansford and approximately 2.3km west north west of the River Nene at its closest point. The site is accessed via the A47 which runs adjacent to the northern boundary of the site. The location of the site is shown on Figure ESID 1. The boundary of the landfill is shown on Figure ESID 4A. The current permitted installation comprises an operational non-hazardous landfill (Phases 3, 4, 5, 6 and 7) and associated infrastructure including a weighbridge, welfare facilities, waste reception, site offices, wheel wash (and associated water tank), a car park, drum handling area, road sweeper bay, diesel and oil storage areas, a landfill gas flare, engineering materials, restoration materials and aggregates. The area of the site comprising Phases 1 and 2 is separated physically from Phase 3 by quarry backfill material forming a steep escarpment to the southern boundary of Phase 3. Leachate management and flaring of landfill gas are included as DAAs to the primary landfill activity at the installation. Ponds are located in the south west corner of the site in Phase 4A, north west of Phase 5 and a surface water collection pond is located east of Phase 7A. The landfill gas flare is located in the centre of the site approximately at X and Y co-ordinates 504938, 300202 (Easting and Northing) as shown on Figure ESID 4A. Infrastructure at the landfill site will be relocated progressively with the landfill gas flare moved to the eastern corner of the site as the landfilling proceeds in a generally western direction in the proposed phase boundaries.
- 1.18** The installation currently covers a total area of approximately 20 hectares and currently comprises Phase 3, Phase 4A, Phase 4B, Phase 5 North, Phase 5 South, Phase 5 Extension, Phase 6A, Phase 6B and Phase 7. Phase 4A which is located in the south west of the site is managed as Thornhaugh Quarry County Wildlife Site

(CWS), which provides a nature conservation habitat for great crested newts under an existing licence issued by Natural England. Because of its nature conservation status, Phase 4A will not be progressed as a landfill phase although it is included in the Permit boundary.

- 1.19** Access to the site is from Leicester Road (A47) which runs in a generally east south east to west north west direction adjacent to the northern boundary of the site. This is a single carriageway road part of the primary road network connecting Peterborough to the east with Leicester to the west. The A1 trunk road is located to the east of the site approximately 2km from the site at its closest point. The access road enters the site reception area between Phases 1 and 3. The southern site boundary adjoins Cook's Hole Quarry. The site access is shown on Figure ESID 4A. The current highway access will continue to be used during the works on Phases 1 and 2. The site access is shared with vehicles travelling to and from Cook's Hole Quarry. The current route to Cook's Hole Quarry runs along the northern boundary of the site. Temporary access routes will be provided to Cook's Hole Quarry during the development of Phase 7 and the Phase 1 and 2 works.
- 1.20** The entire site is fenced and secured from unauthorised vehicular access when closed. The northern boundary of the site is demarcated by sections of hedgerow and tree planting. The southern boundary adjoins the land forming part of Cook's Hole Quarry and comprises hawthorn hedge and sections of remnant dry stone wall. The Bedford Purlieus Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR) ancient woodland lies adjacent to the western boundary of the site. There is substantial bunding round the southern and western boundaries of the site. The western half of the northern site boundary has more limited bunding.
- 1.21** To the south of the site the landscape is dominated by quarry workings from the activities at Thornhaugh II Quarry and Cook's Hole Quarry. The remainder of the land surrounding the site is predominately woodland and agricultural. The site is remote from the main settlements in the area. A small number of residential and commercial properties is located to the north and to the south of the A47 in the vicinity of the site as shown on Figure ESID 13 and summarised in Table ESID 3. The properties include a small group of domestic dwellings at Home Farm to the north of the A47 between approximately 40m and approximately 130m north of the

site boundary. Magnolia House is approximately 320m north west of the site boundary adjacent to Old Oundle Road. To the south of the A47 the residential property closest to the site is Toll Bar Cottage which is approximately 40m to the west north west of the north western corner of the site. To the south of the site the residential property closest to the site is Cook's Hole Farmhouse which is approximately 210m to the south of the site boundary. Cook's Hole Farmhouse currently is unoccupied and in a poor state of repair. Two commercial properties are located within approximately 500m of the boundary of the site, a kennel business adjacent to the north western corner of the site and a group of poultry houses approximately 165m to the north of the site at the closest point. The boundary of the operational training airfield at RAF Wittering is approximately 1.9km to the north west of the site. The location of RAF Wittering is shown on Figure ESID 1.

- 1.22** Two watercourses, Thornhaugh Beck and Wittering Brook, are located in the vicinity of the site. Thornhaugh Beck flows generally easterly to the south of the southern site boundary approximately 260m from the site at its closest point. Based on the geological map the Thornhaugh Beck is underlain by the Grantham Formation and it is considered likely that the watercourse is fed by groundwater from the Grantham Formation and Northampton Sand Formation. A spring located approximately at X, Y co-ordinates 505131, 299742 near to Cook's Hole Farmhouse to the south of the site discharges to the beck. Thornhaugh Beck flows in a general easterly direction to its confluence with Wittering Brook approximately at X, Y co-ordinates 508700, 300150 before continuing easterly as Thornhaugh Beck to its confluence with White Water Brook approximately at X, Y co-ordinates 508706 300159. White Water Brook flows generally south easterly to its confluence with the River Nene approximately at X, Y co-ordinates 508869 299464 to the south of Sutton Heath and Bog SSSI. Wittering Brook is located north of the A47 and flows in a north easterly direction past Wittering Grange and into various small surface water bodies close to Wittering Grange before flowing eastwards and south eastwards to its confluence with Thornhaugh Beck. The location of these features is presented on Figure ESID 2 or Figure ESID 3. In addition to these surface water features there are a number of ponds within the installation boundary including four permanent ponds in Phase 4A which form part of the Thornhaugh Quarry CWS and provide habitat for great crested newts.

- 1.23** In total there are eighteen sites with a statutory designation for nature conservation within 5km of the site boundary. The internationally designated site for nature conservation closest to the site is the Barnack Hills and Holes Special Area of Conservation (SAC), which is located approximately 4.6km north east of the site boundary and covers an area of approximately 22.96ha. The Barnack Hills and Holes SAC is also designated as a SSSI and NNR. Six SSSIs are located within 2km of the site boundary. The SSSI closest to the site is Bedford Purlieus SSSI and NNR which lies adjacent to the western boundary of the site and covers an area of approximately 208ha. The Bedford Purlieus SSSI and NNR incorporates UK biodiversity action plan (BAP) priority habitat comprising Lowland Meadows, Lowland Beech and Yew Woodland and Wood-pasture and Parkland. The next closest SSSI to the site is West Abbot's and Lound Woods SSSI which is approximately 650m north north east of the site boundary and comprises a range of ancient woodland communities. Bonemills Hollow SSSI lies approximately 1.5km to the north east of the site and is designated for its important calcareous and marsh grassland habitats. Wansford Pasture SSSI is located approximately 1.6km east south east of the site and is designated for species-rich flush and limestone grassland communities. Old Sulehay Forest SSSI is located approximately 1.6km south east of the site and is designated for its ancient woodland and associated flora and fauna. Collyweston Great Wood and Eastern Hornstocks SSSI and NNR is located approximately 1.8km to the west of the site boundary and is designated for its ancient woodland habitat and associated flora and fauna. The locations of the statutorily designated nature conservation sites are shown on Figure ESID 3 and on the maps provided with the Environment Agency Pre-application Nature Conservation Screen presented at Appendix B to the Application report.
- 1.24** Two non-statutory designated sites of nature conservation interest are located within 500m of the site. Thornhaugh Quarry CWS covers an area of approximately 1.45ha and is located in Phase 4A of the site and within the current permitted boundary of the installation. The second CWS is Bedford Purlieus – Wittering Road Verge which is approximately 270m to the north west of the northern boundary of the site and covers an area of approximately 2.33ha. The locations of the non-statutorily designated nature conservation sites are shown on Figure ESID 3 and on the maps provided with the Environment Agency Pre-application Nature Conservation Screen presented at Appendix B to the Application report.

- 1.25** The Habitat Inventory data available through the Defra MAGIC website⁴ and the Environment Agency Pre-application Nature Conservation Screen identifies that three sites located within 500m of the site boundary contain UK BAP priority habitat. In addition to the BAP habitats within the Bedford Purlieu SSSI and NNR adjacent to the site, which is discussed above, an area of Lowland Mixed Deciduous Woodland UK BAP priority habitat located adjacent to Cook's Hole Farmhouse is situated approximately 190m to the south of the southern site boundary and covers an area of approximately 0.5ha and an area of Lowland Mixed Deciduous Woodland UK BAP priority habitat is located in Oaks Woodland approximately 210m to the north of the northern site boundary and covers an area of approximately 10.4ha. The location of the UK BAP priority habitats within the vicinity of the site is shown on Figure ESID 2 and on the maps provided with the Environment Agency Pre-application Nature Conservation Screen presented at Appendix B to the Application report.
- 1.26** The ES prepared in March 2012, a copy of which is presented at Appendix J/K to the Application report, concludes in respect of potential effects on ecology and nature conservation:

"The design process has ensured the protection and retention of existing features of highest ecology and nature conservation value. As such, the development would not impact the adjacent Thornhaugh Quarry County Wildlife Site.

With mitigation, no significant residual adverse effects are predicted for ecology and nature conservation."

The potential impacts of the proposed variation on nature conservation receptors are considered in the NRA which is presented at Appendix I to the Application report. The site is operated under an approved Ecological Management Plan dated April 2013 which minimises the potential for the site operations to have an adverse impact on local wildlife and habitats. A copy of the Ecological Management Plan is presented at Appendix N to the Application report.

⁴ <http://magic.defra.gov.uk/> - last checked on 1 August 2014

- 1.27** Four listed buildings are located within 500m of the site all of which are listed as Grade II. The listed buildings closest to the site are Home Farm House and its associated outbuildings (Stable Range & Granary and Barn & Dairy Ranges (Dairy Lodge)) that are approximately 65m to the north of the northern site boundary. The fourth listed building is Cook's Hole Farmhouse approximately 210m to the south of the southern site boundary. There are seven scheduled monuments located within 5km of the boundary of the site. The scheduled monument closest to the site is Wansford Bridge, which is approximately 2.2km to the south east of the site. The location of these statutorily designated heritage conservation sites is shown on Figure ESID 3. In addition to these designated heritage sites, the site of a Roman building is located approximately 30m to the west of the site boundary and within the boundary of Bedford Purlieu SSSI and NNR.
- 1.28** Three public rights of way are located adjacent to the site boundary. Footpath No. 2 originally ran across the centre of the site through Cook's Hole Quarry to the south and passed Home Farm House to the north, but this footpath was diverted in 1995 to a route which runs along the southern boundary of the site for approximately 400m before diverting west along the site boundary adjacent to the A47. Footpath No. 3 runs parallel to the southern boundary of the site and runs from east to west passing through Bedford Purlieu SSSI and NNR which adjoins the site to the west. Footpath No.4 is located approximately 230m to the south of the southern site boundary and runs north east to south west passing Cook's Hole Farmhouse. Orders have been granted for the temporary closure of a further section of Thornhaugh Footpath No. 2 and the temporary diversion of a section of Footpath No. 4 where they pass through Cook's Hole Quarry to enable resumption of mineral extraction operations. The permanent routes of the public rights of way through Cook's Hole Quarry are shown on Figure ESID 2.

2. Source term characterisation

The development of the installation

Historical development

- 2.1** The historical uses of the land in and round the site boundary prior to November 2004 are described in Section 2.1.1 of the 2004 ESID. Based on this information the main land uses at the site are summarised as comprising agriculture up to 1957 followed by progressive quarrying and landfilling with imported waste to restore the void created by the quarrying operations. From the information in the 2004 ESID landfilling in Phase 1 commenced in 1984 following the issue of Waste Disposal Licence number LS14 in November 1977.
- 2.2** Based on information presented in the 2004 ESID Phase 1 accepted a mixture of inert, putrescible and liquid/sludge wastes between 1984 and 1997 and Phase 2 accepted a mixture of putrescible, domestic, commercial and industrial wastes between 1992 and 2003. Landfilling in Phase 3 commenced in December 2003 and ceased in July 2004 and commenced in Phase 6 in July 2004. Landfill operations are complete in Phase 3, Phase 6A and Phase 6B and these phases have been capped and are awaiting final restoration.

Site planning, licensing and permitting history

- 2.3** The planning history of the site dates from 27 June 1957 when planning permission reference T2466 was granted by the Minister of Housing and Local Government for the winning and working of minerals and ancillary operations in the southern part of the site and at land to the south of the Cook's Hole site. Since 1957 various permissions have been granted for the site or parcels of land within the site in respect of mineral workings, processing of secondary aggregates, landfilling with waste together with the provision of associated infrastructure.
- 2.4** Most recently in respect of the landfilling operations the subject of this application planning permission reference 12/00463/MMFUL was granted on 9 November 2012 by Peterborough City Council for the:

'Continued operation and restoration (by landfill) of Thornhaugh Landfill Site until 31 December 2029, including restoration by landfill of Phase 4B and 4C,...[the Bradshaw Land]...temporary storage of materials on part of Cook's Hole Quarry, revised restoration (nature conservation) and landscaping schemes, and recycling of soils for site restoration and for export off site'.

- 2.5** Further to the grant of planning permission reference 12/00463/MMFUL various conditions of the planning permission have been discharged through the submission and approval of phasing plans, working schemes and management plans to the planning authority. The approved working schemes include those for dust and odour, noise and ecology that are provided at Appendix N to the Application report.
- 2.6** A planning application is being prepared to obtain planning permission for the removal of the deposited wastes from Phases 1 and 2 and for the removal of surplus materials from Phases 4 and 7 together with treatment of these wastes and materials and amendments to the phasing and restoration contours for the site.
- 2.7** A detailed summary of the site licensing and site operations up to November 2004 is provided in Table ESID 3 and Table ESID 2 of the 2004 ESID. The recent permitting history of the site is described in paragraphs 1.12 to 1.16 of this report.

Potential pollutant sources and pollution incidents

- 2.8** Phases 1 and 2 are located in the central to mid-north eastern area of the site and were developed on the principle of disperse and attenuate. It is understood that no engineered lining or drainage systems were constructed in Phases 1 and 2. The acceptance of waste into Phases 1 and 2 together with Phase 7 is discussed in Section 2.1.1.2 of the 2004 ESID together with the findings of site investigations conducted in and round these phases. The information provided in the reports on the waste deposited in Phases 1 and 2 has been supplemented by further site investigations completed in December 2013, March 2014 and May 2014. The results of the December 2013 trial pit investigation are provided in the VHE Construction letter report entitled "Thornhaugh Landfill Site Phase 1 and Phase 2 - Factual Letter Report" dated 31 January 2014. A copy of the letter report is

presented on CD at Appendix ESID A. The results of the March 2014 investigation are provided in MJCA report reference AU/TH/DFR/3164/01 entitled “Report of the Intrusive Investigation of Phase 1 and 2 at Thornhaugh Landfill Site” dated May 2014. A copy of the report is presented on CD at Appendix ESID B. The results of the May 2014 investigation are provided in MJCA letter report reference AU/TH/DFR/78267/P entitled “Thornhaugh Landfill Site – Trial pit investigation along access road” dated 21 May 2014. A copy of the letter report is presented at Appendix ESID C.

- 2.9** A summary of the results of the site investigations undertaken at and in the vicinity of the site prior to November 2004 is presented at section 3.2.1 and 3.2.3 of the 2004 ESID. In general the investigations were undertaken to delineate the edge of the filled areas (Phases 1 and 2), to characterise the fill materials present, to obtain information on the engineering properties of the fill materials and to install monitoring wells round the perimeter of the infilled areas. The March 2014 site investigation was undertaken in the area of Phases 1 and 2 to determine the nature and extent of the materials used to fill the former Phase 1 and Phase 2 quarry voids. Based on the results of the March 2014 site investigation the thickness of the waste varied between approximately 2.5m and 9m and no evidence was seen of an engineered basal liner.
- 2.10** Based on the site investigation information presented in the 2004 ESID and the information from the site investigations presented at Appendix ESID A, Appendix ESID B and Appendix ESID C it is anticipated that the majority of materials that will be excavated from the site will comprise non-waste materials consisting of clean in-situ mineral materials and quarry backfill. It is anticipated that the materials excavated from Phases 4B North, 4B South, 4C North, 4C South, 7C and 7B will consist only of non-waste materials. Based on the site investigation information from Phase 7A it is anticipated that the majority of the materials excavated from this area will comprise non-waste materials but that there may be small amounts of potentially contaminated or potentially recoverable material consisting of construction and demolition waste. In Phases 1 and 2 it is anticipated that waste, non-waste and potentially contaminated or potentially recoverable material may be encountered and based on an interpretation of the site investigation information approximately half of the material will be waste materials consisting of household

type waste or mixed household type waste and backfill. The records from the intrusive investigations of Phase 1 and 2 do not record the household type waste as being significantly odorous. No basal body of leachate has been identified as present in Phases 1 and 2. It is anticipated that perched pockets of leachate may be encountered in Phases 1 and 2 but based on the site investigation information these will be localised.

- 2.11** It has been reported^{5,6} that groundwater quality down hydraulic gradient of Phases 1 and 2 is affected by leachate migrating from Phases 1 and 2. Based on a review of groundwater quality data completed in 2012⁷ the determinands ammoniacal nitrogen, chloride, electrical conductivity, mecoprop, naphthalene and sodium were selected to establish the benchmark water quality as the determinands were identified to be elevated down hydraulic gradient compared with up hydraulic gradient of Phases 1 and 2.
- 2.12** The current and potential future impacts on groundwater quality are the main reason for the proposed removal of the deposited wastes in Phases 1 and 2 to engineered phases at the installation and the re-engineering of the area of Phases 1 and 2 to allow imported wastes to be deposited to achieve the restoration of the site. Removal of the wastes from the disperse and attenuate areas of the landfill site and their replacement in engineered cells will provide confidence in the long term that there will be no unacceptable impact on groundwater quality.
- 2.13** A number of monitoring boreholes are located within areas of the site that will be excavated for redevelopment. An appropriate scheme for the decommissioning of these boreholes will be agreed with the Environment Agency prior to the commencement of excavation works.
- 2.14** Details of pollution incidents at and in the vicinity of the site available on the Environment Agency website⁸ have been reviewed. The Environment Agency

⁵ Bullen Consultants and Environmental Simulations International Limited. 2004. Atlantic Waste (Thornhaugh) Limited. Thornhaugh Landfill. Environmental Setting and Installation Design (ESID) Report. Client reference RP3133PP project reference 104B028 report number 01 version A.

⁶ Bullen Consultants. 2005. Augean South Ltd. Thornhaugh Landfill Site. Site Investigation. Project reference 104B028 report number 01 version A.

⁷ MJCA. 2012. A review of benchmark groundwater quality and proposed groundwater trigger levels down hydraulic gradient of Phases 1 and 2 of Thornhaugh Landfill. Report reference AU/TH/CN/2756/01. April 2012.

⁸ http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

pollution incidents database identifies 12 significant pollution incidents between December 2003 and November 2005 within the vicinity of the site. Pollution incident reference 317459 dated 3 June 2005 is located close to northern site boundary according to the point located on the geographical information system (GIS) system which supports the reporting of the data on the Environment Agency website. The associated pollutant is reported as "Atmospheric Pollutants and Effects" on the website. Eleven of the pollution incidents are reported for locations in the vicinity of the East Northants Resource Management Facility (ENRMF) which is located approximately 3.3km to the west of the site boundary. The pollution incidents all relate to impacts of air and the pollutant for each incident was identified as odour (chemical, landfill or sulphide). No subsequent air pollution incidents have been recorded within 500m of the site.

- 2.15** It is stated in paragraph 2.3.1 of a document entitled "Response to PPC Schedule 4 Notice Thornhaugh Landfill Site" prepared by Faber Maunsell in October 2005 that

"...in April 2005 a small spillage did occur in the drum unloading/quarantine area, although this was contained and cleared in accordance with the Operator's procedures for the clearance of accidental spills [referenced CBP 20 in Appendix D]. It must be noted that this incident was not considered to be significant."

Measures were implemented to minimise the potential for similar incidents to occur in the future. Augean is not aware of any incidents at the site that would have had a significant impact on water or ground quality.

- 2.16** Based on the information available through the Public Register maintained by the Environment Agency there are no Environmental Permits for discharges to water within 1km of the site.⁹ The discharge of site drainage from the site to controlled waters is included as a DAA in the Permit.

Proposed development

- 2.17** The proposed variation of the EP to extend the permit boundary for the site will facilitate the implementation of revised phasing and working arrangements at the

⁹ Based on a search of the Public Register conducted on 16 August 2014 using the post code PE8 6NL as the search location.

site. The proposed phase layout of the site is shown on Figure ESID 4A. The currently anticipated progression of landfilling at the site further to the variation of the Permit is shown on Figures 1 to 15 provided at ESID Appendix D. Landfilling will continue in Phase 5 before commencing in the newly engineered Phase 7A. The proposed phasing shown in Figures 1 to 15 at ESID Appendix D and in the other figures provided in this report is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions. Phase 4A will not be used for the deposition of waste owing to its nature conservation status.

- 2.18** Based on the proposed phasing and progression of working shown in Figures 1 to 15 at ESID Appendix D, the waste in Phase 1 will be excavated and deposited in other engineered phases at the site during approximately the first third of the remaining 19 year operational landfill period of the site. The waste in Phase 2 will be excavated and deposited in engineered phases at the site over approximately the last third of this period.
- 2.19** Consistent with the current landfill installation, the additional landfill areas that will be included within the permit boundary will be designed and operated based on the principle of engineered containment with low permeability basal, perimeter and capping seals. Excavated materials or suitable imported materials will be used as daily cover material and as protective cover material below the clay cap. Suitable excavated materials will be stockpiled on site prior to treatment as necessary and use or removal from the site as described further in the 'Principles of material excavation and management at the Thornhaugh Landfill Site' presented at Appendix O to the Application report. The size and locations of the stockpiles will vary depending on the stage of site development. Up to 200,000m³ of non-waste materials will be stockpiled temporarily in the area of Cook's Hole Quarry to the south of the site shown on Figure ESID 2. Clay materials excavated at the nearby Augean East Northants Resource Management Facility (ENRMF) will be imported and used to construct the low permeability clay liners at the site.
- 2.20** The types of waste which may be accepted at the site are specified in Schedule 3 to the Permit. There are no changes proposed to the list of wastes that may be accepted at the installation. The waste types that may be accepted for treatment at the facility are set out in the table at Appendix P to the Application report.

- 2.21** Details of the existing and proposed engineered containment system including information with respect to leachate, landfill gas and surface water management are provided in the relevant sections of this ESID or the associated risk assessments.
- 2.22** Currently landfill gas and leachate generated in the site are managed. Landfill gas is extracted from Phases 3 and 6 and flared. The flare will continue to operate as necessary to manage the landfill gas from the landfill area. It is proposed that gas will also be extracted from Phases 5A1, 5A2, 5B1 and 5E and combusted at the landfill gas flare. An increase in the proportion of soil wastes accepted at the site and a decrease in the proportion of mixed municipal waste accepted at the site between 2009 and 2013 reflects a significant decrease in the proportion of waste deposited at the site that has a significant potential to generate landfill gas. Augean considers that future waste inputs to the site will continue to comprise waste types with generally low gas generating potential. Based on the low organic content hence low potential for the generation of landfill gas of wastes accepted currently and proposed to be accepted at the site in the future and based on the low predicted landfill gas generation rates derived in the LFGRA provided at Appendix H to the Application report there are no proposals to collect landfill gas from future phases of the site.
- 2.23** Leachate is pumped directly from the waste to an enclosed holding tank located approximately on the boundary of Phase 4A and Phase 5 South near to the western boundary of the site and then taken offsite for treatment and disposal at a suitable permitted facility. Leachate may be recirculated at the site depending on operational requirements. If Augean determines that it is appropriate to recirculate leachate at the site an operational scheme will be prepared for discussion with the Environment Agency.
- 2.24** The consented restoration landform for the site comprises a dome with the highest post settlement restoration contour at approximately 69mAOD. The current consented restoration scheme is for the planting of deciduous woodland, shrub and scrub and hedgerow together with the creation of Calcareous Grassland, Open Calcareous Grassland and wetland habitats. The consented restoration contours and the consented restoration scheme are presented on URS drawing number 47047967_LD_001 Rev C dated 12 March 2014 which was approved by Peterborough City Council (PCC) on 28 March 2014. A copy of the consented

restoration drawing is provided at Appendix ESID E. The planning application that is in preparation includes amendments to the consented phasing and minor amendments to the restoration contours for the site. The proposed post settlement restoration contours are shown on Figure ESID 4B.

- 2.25** As a result of consolidation of waste in the landfill the completed surface of the landfill will be subject to settlement. To accommodate the effects of settlement landfills are surcharged to pre-settlement levels to achieve the planned restoration profile. The proposed pre-settlement restoration contours are shown on Figure ESID 4B.
- 2.26** It will be necessary to import materials for use in restoration to supplement the materials that have been, and will be, retained on site for this purpose. A document setting out the principles for the use of waste materials which might be used to form soils for use in the restoration of the site is provided at Appendix J to the Application report which includes a table of the waste types which may provide a suitable source of restoration materials.
- 2.27** A key element of the development of the principles for the restoration of the site is to establish criteria for the acceptance of soil forming materials that confirm the materials are fit for purpose and will not result in harm to human health or the environment. In determining suitable criteria for the acceptance of materials for use in restoration Augean will carry out a site specific risk assessment. The risk assessment will be provided to the Environment Agency for agreement prior to finalisation. Based on the results of the risk assessment acceptance criteria will be derived and applied to the identification of materials which can be accepted at the site for use in restoration

Installation engineering

- 2.28** The installation engineering will be agreed with the Environment Agency prior to the commencement of works in each phase as part of the CQA Plan preparation.

Groundwater management

- 2.29** The base of the clay liner to the landfill will be at least 1m above the maximum recorded groundwater level. Accordingly it is not necessary to install a groundwater management system.

Basal lining system

- 2.30** Details of the basal lining system are summarised in Table ESID 2.

Side slope lining system

- 2.31** Details of the side slope lining system are summarised in Table ESID 2.

Capping system

- 2.32** Details of the capping system are summarised in Table ESID 2.

Restoration and aftercare

- 2.33** The current consented restoration scheme for the site comprises deciduous woodland, shrub and scrub and hedgerow together with the creation of Calcareous Grassland, Open Calcareous Grassland and wetland habitats. The restoration and after-use proposals are shown on URS drawing number 47047967_LD_001 Rev C dated 12 March 2014 a copy of which is provided at Appendix ESID E. These proposals may be subject to minor amendments as part of the planning application being submitted shortly.

Leachate management and monitoring infrastructureLeachate generation

- 2.34** Leachate is generated as a result of infiltrating rainfall. After completion of the placement of the waste in each phase the landfill phase will be capped. This will reduce infiltration and will minimise the generation of leachate.
- 2.35** A leachate management system is included in the design of the landfill. A summary of the leachate management infrastructure is presented in Table ESID 2. The objective of the leachate management system is to maintain leachate at a level not

exceeding 1.5m above the top of the basal liner. The leachate management system includes provision for the extraction of excess volumes of leachate.

Leachate management and monitoring

- 2.36** To facilitate control of the level of leachate accumulating in the landfill hence to minimise the potential for leachate migration and the resultant risk of a deterioration in groundwater and surface water quality a leachate management system is included in the design of the landfill. The system facilitates the collection and extraction of leachate.
- 2.37** Leachate generated in the existing landfill Phases 3, 5 and 6 and that which will be generated in future phases of the landfill will drain to a drainage blanket at the base of the waste and to a leachate collection sump or collection point in the lowest point of each phase. The base of each landfill phase generally is constructed at a minimum gradient of 1v in 100h to facilitate the drainage of leachate. Leachate levels are controlled by pumping leachate from leachate collection sumps or other extraction wells drilled as necessary. The proposed construction design of the leachate management system is shown on Figure ESID 7. Internal inter-cell bunds comprising low permeability material placed on the base of the landfill delineate the boundary of the phase and prevent the movement of water from non-operational parts of the landfill to the waste and prevent the movement of leachate from the waste to non-operational areas. Leachate is collected and stored on site temporarily before being tankered off site for treatment and disposal at a suitable permitted facility. Leachate may be recirculated at the site depending on operational requirements. Detailed schemes for leachate recirculation will be agreed with the Environment Agency prior to the commencement of recirculation in each phase as part of the CQA Plan preparation.
- 2.38** The leachate level in the landfill is monitored to facilitate early identification of trends in the leachate level and to identify the need to implement and adjust leachate control measures. Leachate levels will be controlled by pumping leachate from leachate collection sumps using extraction wells constructed progressively in each phase. At least two monitoring facilities will be installed progressively in each phase or sub-phase. If necessary leachate extraction or leachate monitoring wells will be replaced by drilling. To facilitate the drilling of replacement wells and to

protect the basal liner reinforced concrete target pads will be constructed on the basal liner in proximity to the progressively constructed leachate extraction sumps and monitoring wells. The proposed leachate extraction sump and target pad locations are shown on Figure ESID 7. The monitoring wells facilitate the monitoring of leachate levels and the extraction sumps will be used for the collection of leachate samples for laboratory analysis. Risk based monitoring schemes for leachate level and for leachate quality are presented in Tables HRA 7 and HRA 8 respectively of the HRA which is provided at Appendix F to the Application report. The existing leachate monitoring locations together with the proposed leachate monitoring locations are shown on Figure ESID 8. The post closure monitoring will be agreed with the Environment Agency prior to closure of the landfill.

- 2.39** The efficiency of the leachate drainage system in controlling leachate levels will be evaluated by reviewing the leachate levels recorded in the leachate monitoring wells. If necessary additional leachate extraction wells will be installed.
- 2.40** The compliance limits and control levels for leachate level and for leachate quality are presented in Tables HRA 7 and HRA 8 respectively. Any change to the control levels and compliance limits for the leachate during the managed phase of the site will be agreed with the Environment Agency. Following the completion of the managed phase leachate pumping will cease. The time at which the leachate level is allowed to rise will be agreed with the Environment Agency.

Landfill gas management and monitoring infrastructure

Landfill gas generation

- 2.41** The potential for landfill gas generation in existing phases and the proposed additional landfill areas is discussed in detail in Section 1.2 of the LFGRA which is provided at Appendix H to the Application report. In summary, there is limited landfill gas generation from the waste in the existing Phases 3 and 6 and Phases 5A1, 5A2, 5B1 and 5E. Based on the low organic content hence low potential for the generation of landfill gas of wastes accepted currently and proposed to be accepted at the site the landfill gas generation rates in future phases are predicted to be low.

Landfill gas management

- 2.42** Landfill gas from Phases 3 and 6 is extracted currently and combusted at the landfill gas flare which is located adjacent to the southern boundary of Phase 3 as shown on Figure ESID 4A. As described in the LFGRA a landfill gas flare with a combustion capacity between approximately 50m³/hr and approximately 500m³/hr was replaced in 2013 with a landfill gas flare with a combustion capacity between approximately 50m³/hr and approximately 8m³/hr. As landfilling proceeds at the site and the waste in Phase 2 is excavated the flare will be relocated to a proposed location in the north eastern corner of the site as shown on Figure ESID 4A.
- 2.43** The proposed control measures in respect of landfill gas include the extraction and combustion in the flare of landfill gas generated in Phases 5A1, 5A2, 5B1 and 5E which are nearing completion. It is proposed that gas collection will commence following capping of Phase 5. There are no proposals for landfill gas collection from Phase 5B2 which accepted only asbestos wastes which have no gas generating potential as confirmed by the results of in-waste landfill gas monitoring in Phase 5B2. Based on the low organic content hence low potential for the generation of landfill gas of wastes accepted currently and proposed to be accepted at the site in the future and based on the low predicted landfill gas generation rates discussed in section 2.5 of the LFGRA there are no proposals to collect landfill gas from future phases of the site.

Landfill gas monitoring infrastructure

- 2.44** The existing landfill gas monitoring provision is described in Section 3.2 of the LFGRA and selected landfill gas monitoring data are provided at Appendix LFGRA 2 to the LFGRA. The existing landfill gas monitoring locations are shown on Figure ESID 8.
- 2.45** In order to confirm that the waste deposited in future phases has a negligible potential to generate landfill gas the leachate wells in each of the phases will be constructed so that they are suitable for monitoring landfill gas. The use of the leachate wells which are installed progressively will minimise the need to install in the waste additional gas monitoring facilities. The leachate wells in future phases will be fitted with headworks incorporating monitoring ports for gas monitoring,

leachate level monitoring and leachate extraction. The wellheads will be designed to facilitate connection if necessary to the gas flare at the site. The necessity for the connection of the vertical wells to the active gas extraction system will be determined based on the results of the gas monitoring in the wells. The proposed locations of the leachate monitoring wells are shown on Figure ESID 8. The proposed programme of in waste monitoring is shown in Table LFGRA6. The post closure monitoring will be agreed with the Environment Agency prior to closure of the landfill.

- 2.46** Monitoring of landfill gas surface emissions from Phases 3, 6, 5A1, 5A2, 5B1 and 5E will continue as specified currently in Table S4.6 of the Permit. It is not considered necessary to carry out landfill gas surface monitoring in the landfill phases that contain wastes with a low potential for the generation of landfill gas with no gas management systems including the proposed future landfill phases. The necessity for landfill gas surface monitoring in the future phases will be determined based on the results of the gas monitoring in the leachate monitoring wells.
- 2.47** Assessment limits and compliance limits have been set for air quality in the existing landfill gas monitoring boreholes at the site. The current compliance limits in external monitoring boreholes are set out in Table S4.5 of the Permit and compliance limits for temporarily and permanently capped areas are set out in Table S4.6 of the Permit.
- 2.48** Based on the Industry Code of Practice on perimeter soil gas¹⁰ which recommends that no compliance limits should be set for carbon dioxide in landfill Environmental Permits unless there is a sensitive receptor where there is a risk to human health, it is proposed in the LFGRA that the emission limits for carbon dioxide in external monitoring boreholes specified in Table S4.5 of the Permit are removed. In a position statement¹¹ the Environment Agency has accepted that this is a reasonable approach. Based on the guidance presented in the Environment Agency position statement it is proposed that Augean will continue to monitor carbon dioxide in the perimeter boreholes round the site based on the Landfill Gas

¹⁰ Perimeter soil gas emissions criteria and associated management: Industry Guidance. Version 1.01. January 2011.

¹¹ Environment Agency. 2011. Position statement: Industry code of practice on perimeter soil gas. Version 1. August 2011.

Monitoring Action Plan dated September 2008 and assess carbon dioxide concentrations against the action levels specified in the action plan.

Groundwater management and monitoring infrastructure

Groundwater management

- 2.49** There is no groundwater management system in place at the site currently as the landfilling operations are all above the water table. In the 2004 ESID it is reported that where the excavation in Phases 3 to 7 has reached the groundwater table the base of the excavation has been or will be raised above the groundwater table prior to construction of the basal engineered liner to the landfill site. The base of the clay liner in all future phases of the site will be at least 1m above the maximum recorded groundwater level.

Groundwater monitoring infrastructure

- 2.50** To monitor the effectiveness of the containment and leachate control systems groundwater quality will be monitored in boreholes external to the waste. A risk based monitoring scheme and proposed interim compliance limits and interim control levels for groundwater quality during the operational phase and post closure managed phase of the landfill are presented in Table HRA 9. The approximate locations of the groundwater monitoring points are shown on Figure ESID 11. The post closure monitoring will be agreed with the Environment Agency prior to completion of landfilling.
- 2.51** Control levels and trigger levels have been set for groundwater quality in the existing groundwater monitoring boreholes at the site. The current trigger levels, now referred to as compliance limits, that are relevant to the installation are set out in Table S4.4 of the Permit.
- 2.52** Revised groundwater compliance limits were agreed with the Environment Agency in May 2014 in respect of Permit FP3790NJ for the boreholes down hydraulic gradient of Phases 1 and 2. The revised compliance limits for the boreholes down hydraulic gradient of Phases 1 and 2 are presented in Table1 to an addendum to a closure report for Phases 1 and 2. The addendum to the closure report is presented at Appendix HRA 5 to the HRA. In the addendum to the closure report it

is stated that in preparing the HRA for the excavation and development of Phases 1 and 2 the compliance limits set for the unlined Phases 1 and 2 will be reviewed based on more recent site data. The revised compliance limits for the unlined Phases 1 and 2 are presented in Table HRA 10 which are relevant to the time prior to the completion of excavation of the waste materials in Phases 1 and 2 and development of the engineered liner in the location of Phases 1 and 2. It is proposed that once the revised interim compliance limits are agreed with the Environment Agency they will be reviewed every three years until such time as groundwater quality has stabilised sufficiently to allow compliance limits to be set for a longer period in these boreholes.

Surface water management and monitoring system

Surface water management

- 2.53** A Surface Water Management Plan (SWMP) was prepared for the site in 2006. A copy of the SWMP is provided at Annex G1 to the surface water assessment (SW assessment) that forms Appendix G to the ES that is presented at Appendix L to the Application report.
- 2.54** As part of the SWMP a Surface Water Management System (SWMS) was designed to be installed progressively as the landfill cells were restored. The SWMS was for the proposed landfilling of Phases 1, 2, 3, 5, 6 and 7 and comprised a series of cut off grips, drainage ditches, an attenuation lagoon in the eastern corner of the site and an outfall. The layout of the SWMS is shown on Drawing number 1622.SWM.02 included with the SWMP. The lagoon was designed to discharge into Thornhaugh Beck to the south-east of the site via a lined surface water drainage channel which runs parallel to the A47 through Cook's Hole Quarry.
- 2.55** The design of the SWMS was amended as part of the SW assessment to accommodate the revised restoration scheme for the site which includes Phase 4. In the revised SWMS a drainage ditch will be constructed along the southern and northern site perimeter which will drain surface water run-off from the southern catchment to the existing attenuation lagoon in the eastern corner of the site. The ditch will be sized for a 1 in 10-year design storm. The SW assessment concludes that no change is necessary to the design of the attenuation lagoon as provision for

the storage of runoff from the southern site catchment, including the Bradshaw Land, was included in the original drainage design. The principles of the SWMP will remain the same and the SWMS system will continue to be installed progressively as landfilling continues into the additional landfill areas.

- 2.56** The revised SWMS does not alter or affect the surface water features that are present in Phase 4A comprising Thornhaugh Quarry CWS and which are inhabited by great crested newts. The SW assessment states that no surface water run-off will enter the ponds in Phase 4A for events up to the 1 in 50 year event which was agreed in 2006 with the Environment Agency in respect of the drainage system.

Surface water monitoring

- 2.57** To monitor the effectiveness of the containment and leachate control systems together with the surface water management system, surface water quality is monitored in the surface water collection system at the landfill. The surface water monitoring for the installation is the subject of Table S4.3 of the Permit. The approximate locations of the surface water monitoring points are shown on Figure HRA 2.
- 2.58** Compliance limits have been set for water quality for the existing surface water discharge point at the site. The current compliance limits are set out in Table S4.3 of the Permit.
- 2.59** A risk based monitoring scheme for surface water quality is presented in Table HRA 6 and compliance limits for surface water quality are presented in Table HRA 10. The post closure monitoring will be agreed with the Environment Agency prior to closure of the landfill.

Particulate matter monitoring

- 2.60** To monitor the effectiveness of the measures in place at the landfill to minimise the risk of the emission of significant quantities of particulate matter including asbestos fibres monitoring of particulate matter and asbestos fibres is carried out at the landfill as specified in the Particulate Monitoring Action Plan dated September

2008¹² and the Asbestos Monitoring Action Plan dated September 2008¹³. Particulate matter and asbestos monitoring during the operational period is the subject of Table S4.10 of the Permit. The approximate locations of the particulate matter monitoring points in respect of the approved Dust and Odour Control Scheme for the purposes of planning control are shown on Figure 3 (Drawing number AU/US/01-12/16529) which is included with the approved Dust and Odour Control Scheme which is presented at Appendix N of the Application report. Compliance limits in respect of particulate matter including asbestos have been set for the installation. The current compliance limits for the installation are presented in Table S4.10 of the Permit.

- 2.61** Particulates will continue to be monitored round the boundary of the site in accordance with Table S4.10 of the Permit in the short-term. As the development of Phases 1 and 2 proceeds the current particulate monitoring locations will be augmented with additional locations to be agreed with the Environment Agency as part of the detailed schemes of working which will be prepared to support the removal of wastes from Phases 1 and 2. The post closure monitoring will be agreed with the Environment Agency prior to the completion of landfilling.

Post closure controls

- 2.62** The proposed management of leachate, landfill gas, groundwater and surface water during the life of the landfill is described in Paragraphs 2.36 to 2.40, 2.42 and 2.43, 2.49 and 2.53 to 2.56 of this ESID respectively. The results of the HRA demonstrate that the landfill design for all phases at the site will comply with Annex I of the Landfill Directive. Where the design deviates from the defaults set out in Annex I of the Landfill Directive the HRA demonstrates that the design complies with the regulations regarding the protection of groundwater in Schedule 22 of the 2010 EPR and the Groundwater Daughter Directive¹⁴ hence complies with the Landfill Directive. It is concluded that the site will comply with the

¹² Augean. 2008. Particulate Monitoring Action Plan Thornhaugh Landfill Site. In Accordance with Permit RP3133PP Dated 9th November 2005. Final Report – 14th September 2008.

¹³ Augean. 2008. Asbestos Monitoring Action Plan Thornhaugh Landfill Site. In Accordance with Permit RP3133PP Dated 9th November 2005. Final Report – 14th September 2008.

¹⁴ Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration

regulations regarding the protection of groundwater in Schedule 22 of the 2010 EPR.

- 2.63** To determine the effectiveness of the landfill design and operational procedures in controlling leachate and landfill gas during the post closure period environmental monitoring will continue at the landfill. The monitoring scheme will be designed in accordance with guidance available at the time, the results of monitoring during the operational period and the associated risk assessments. The scheme will include the monitoring of surface water quality, groundwater levels, leachate levels, groundwater quality and leachate quality together with the monitoring of landfill gas. The programme of monitoring will be agreed with the Environment Agency prior to closure of the landfill.
- 2.64** The principal purpose of the monitoring scheme will be to identify at an early stage the migration of landfill gas or the migration of contaminants from leachate which could result in pollution of the environment in terms of groundwater or surface water or harm to human health. The potential for future degradation or failure of management systems, drains and sealing liners is assessed in Section 2.5.5 of the HRA.
- 2.65** A topographic survey of the landfill will be undertaken annually during the post closure period to monitor settlement. Monitoring of the settlement will continue until the results of the monitoring show that there is no longer any significant residual settlement of the waste.
- 2.66** Permit surrender will be acceptable when the concentrations of contaminants in the leachate are such that without active management there is no significant risk to groundwater quality from the migration of leachate and when without active management the generation of landfill gas presents no significant risk to the environment or to human health. Leachate and landfill gas will be monitored until the completion criteria are reached. Hydrogeological completion criteria are discussed in Section 2.7 of the HRA and landfill gas completion criteria are discussed in Section 2.6 of the LFGRA.

3. Pathway and receptor term characterisation

Climate

- 3.1** A wind rose prepared by ADM Limited for the Wittering Airfield meteorological monitoring station located approximately 2.5km to the north west of the site for the period from January 2009 to December 2013 is presented at Appendix ESID F. The location of Wittering Airfield is shown on Figure ESID1. It is considered that the weather station at this location is the nearest to the site and most appropriate location for the landfill. Based on the windrose the prevailing wind direction in the vicinity of the site generally is from the south west and wind speeds commonly are between 3m/s and 8m/s.
- 3.2** A summary of the average monthly and annual rainfall is presented in Section 3.1 of the 2004 ESID. It is stated in the 2004 ESID that the annual average rainfall recorded at the meteorological station at RAF Wittering to the north of the site is 587.7mm based on meteorological data collected between 1973 and 2004 and the sum of the average monthly effective rainfall values derived from the MORECS database is 74.3mm.

Geology

- 3.3** A detailed description of the local and regional geology at and in the vicinity of the site including information from site investigation reports which have been undertaken at or in the vicinity of the site is presented in sections 3.2.2 and 3.2.3 of the 2004 ESID. In summary the geology in the vicinity of the site comprises Lincolnshire Limestone which in turn is underlain by the Grantham Formation and Northampton Sand Formation. In parts of the site the sequence has been replaced partly with backfilled material comprising reworked natural strata. The Northampton Sand Formation is underlain by the Whitby Mudstone Formation (formerly referred to as the Upper Lias). The regional geology is presented on Figure ESID 9. Based on the hydrogeological cross sections presented on the Figures ESID 12A and ESID 12B the strata dip gently to the east at and in the vicinity of the site. To the north, east and south of the site the Lincolnshire Limestone, Grantham Formation and Northampton Sands are cut by several valleys.

Man-made subsurface migration pathways

- 3.4** Details of the potential man made subsurface migration pathways at and in the vicinity of the site are presented in section 3.3 of the 2004 ESID. In summary it is considered that the main potential migration pathways comprise the quarry backfill, a water main located along the northern edge of the A47 to the north of the site and the boreholes with monitoring installations located round the perimeter of the site.

Hydrology

- 3.5** The hydrology at and in the vicinity of the site is described in section 3.4 of the 2004 ESID and in paragraph 1.20 of this report. In summary the site is in the catchment of the River Nene located approximately 2.3km east south east of the site. Two watercourses are located within 250m of the site boundary. The watercourse closest to the site is the Thornhaugh Beck which flows generally from west to east approximately 260m to the south of the site at its closest point. The second watercourse, Wittering Brook originates in the vicinity of Home Farm House close to and north of the A47 and the site. A spring, referred to as Cook's Hole Spring, which discharges to the Thornhaugh Beck is located approximately 220m to the south of the site. The regional hydrology in the vicinity of the site is presented on Figure ESID 10 and the local hydrology is presented on Figure ESID 11. Surface water features in the vicinity of the site are shown on Figure ESID 2.
- 3.6** Figure ESID 10 shows the approximate locations of licensed and unlicensed surface water abstractions within a 3km radius of the site. Summary information in respect of licensed and unlicensed surface water abstractions within a 4km radius of the site is presented at ESID Appendix G.

Hydrogeology

- 3.7** Details of the hydrogeology comprising the aquifer characteristics, groundwater flow direction and groundwater quality at and in the vicinity of the site are presented in sections 3.5.1, 3.5.2 and 3.5.3, respectively of the 2004 ESID. Updated groundwater quality data are presented at Appendix ESID H. The regional hydrogeology in the vicinity of the site is presented on Figure ESID 10. The local hydrogeology in the vicinity of the site is presented on Figure ESID 11 showing the maximum groundwater levels recorded in the Northampton Sand Formation.

Hydrographs presented at Appendix ESID I show the groundwater elevation levels recorded at the site from December 2000 to April 2014.

- 3.8** In summary the groundwater in the vicinity of the site is supported by the basal aquitard (Whitby Mudstone Formation) and, based on the hydrogeological cross sections on Figures ESID 12A and ESID 12B, groundwater is present in the Northampton Sand Formation, Grantham Formation and in places in the base of the Lincolnshire Limestone. Generally the groundwater flow direction beneath the site is to the east towards and in the direction of flow of the Thornhaugh Beck (Figure ESID 11). Based on the geological map (Figure ESID 9) Thornhaugh Beck is underlain by the Grantham Formation and it is considered likely that the watercourse is fed by groundwater from the Grantham Formation and Northampton Sand Formation. Based on the elevation level of Thornhaugh Beck and the direction of the groundwater flow at and in the vicinity of the site it is considered likely that groundwater from beneath the site discharges to Thornhaugh Beck to the south east and east of the site. A component of the groundwater flow beneath the north of the site may flow towards a spring and seepages which feed the Wittering Brook to the north of the site.
- 3.9** For the purpose of providing a minimum 1m thick unsaturated zone beneath the base of the engineered liner, the elevation level on which the engineered barrier will be constructed has been designed based on maximum groundwater elevation levels recorded across the site in January 2011. The maximum groundwater elevation levels recorded in the Northampton Sand Formation in January 2011 are presented as interpolated groundwater contours in Figure ESID 11. For the purpose of conservatively interpolating the groundwater elevation levels across the site, groundwater levels recorded in a number of boreholes located in the north of the site have not been relied on as it is uncertain if the response zone in the monitoring wells is intersecting the groundwater levels in the Northampton Sand Formation.
- 3.10** The Lincolnshire Limestone is designated by the Environment Agency as a Principal Aquifer, the Grantham Formation is designated a Secondary Aquifer (undifferentiated), the Northampton Sand Formation is designated a Secondary A Aquifer and the Whitby formation is designated unproductive strata.

3.11 The Environment Agency policy on landfill location is set out in the document “Groundwater protection: Principles and practice (GP3)”¹⁵ dated August 2013. The Environment Agency position is that:

‘(i) We will object to any proposed landfill site in groundwater source protection zone 1.

(ii) For all other proposed landfill site locations, a risk assessment must be conducted based on the nature and quantity of the wastes and the natural setting and properties of the location.

(iii) Where this risk assessment demonstrates that active long-term site management is essential to prevent long-term groundwater pollution, we will object to sites:

- below the water table in any strata where the groundwater provides an important contribution to river flow or other sensitive surface waters;*
- within source protection zones 2 or 3;*
- on or in a principal aquifer.’*

The site is not located within a groundwater Source Protection Zone (SPZ) 1. The Lincolnshire Limestone, which is a Principal Aquifer, is largely unsaturated in the vicinity of the landfill with the underlying Grantham Formation and Northampton Sand comprising the primary water bearing strata. These strata are classified as a Secondary (undifferentiated) and a Secondary A aquifer respectively. The base of the clay liner in all future phases of the site will be at least 1m above the maximum recorded groundwater level, and will require active long-term site management to prevent long-term groundwater pollution until such times as the waste mass stabilises.

3.12 In a letter dated 27 June 2008 the Environment Agency confirmed that on this basis the extension of landfilling into the Bradshaw Land is acceptable in principle. A copy of the letter is provided at ESID Appendix J.

¹⁵ Environment Agency. 2013. Groundwater protection: Principles and practice (GP3). Version 1.1. August 2013.

- 3.13** Regional hydrogeological features in the vicinity of the site are presented on Figure ESID 10 including the approximate locations of licensed and unlicensed groundwater abstractions within a 3km radius of the site. Summary information in respect of licensed and unlicensed groundwater abstractions within a 4km radius of the site is presented at ESID Appendix H.

Off-site landfill gas monitoring

- 3.14** As stated in the LFGRA, Table S4.2 of Permit FP3790NJ specifies monitoring for landfill gas at boreholes BH11, BH12, BH18a, BH20, BH21, BH22, BH23 and BH24 which are located at the perimeter of the closed landfill site comprising Phases 1 and 2. As shown on Figure ESID 8, following incorporation of the Phases 1 and 2 into the Permit boreholes BH20, BH21, BH22, BH23 and BH24 will be internal to the installation boundary and will no longer comprise perimeter boreholes. It is proposed that these boreholes are removed from the monitoring requirements and landfill gas monitoring is continued at the site boundary at the consolidated list of perimeter monitoring boreholes presented in Table LFGRA6.

Receptors and compliance points

Groundwater and surface water

- 3.15** Potential receptors for contaminants migrating from the landfill are described in Section 1.2 of the HRA. The relevant locations of the compliance points are shown on Figure HRA 2.

Landfill gas

- 3.16** As described in Section 1.2 of the LFGRA the permanent deposit of the proposed waste types is unlikely to generate significant quantities of landfill gas. The approximate locations of the receptors are shown on Figure ESID 13. The relevant locations of the compliance points are shown on Figure LFGRA 1.

Amenity

- 3.17** Potential receptors for nuisance from the landfill are described in paragraphs 1.19 and 1.26 of this ESID and in the NRA presented at Appendix I to the Application

report. The approximate locations of the identified receptors are shown on Figures ESID 3 or ESID 13.

Nature conservation

- 3.18** Potential nature conservation receptors for impacts from the landfill are described in paragraphs 1.18 and 1.20 to 1.23 of this ESID and in the NRA. The approximate locations of the receptors are shown on Figures ESID 3 or ESID 13.

Heritage conservation

- 3.19** Potential heritage conservation receptors for impacts from the landfill are described in paragraph 1.25 of this ESID and in the NRA. The approximate locations of the receptors are shown on Figures ESID 3 or ESID 13.

Receptor summary

- 3.20** The receptors relevant to the Application are summarised in Table ESID 3 and shown on Figure ESID 13 or Figure ESID 3.

4. Site report

Introduction and background information

- 4.1** The variation application is necessary to extend the installation boundary to authorise the deposition of non-hazardous commercial and industrial waste, gypsum and other high sulphate bearing wastes, stable non-reactive hazardous waste (SNRHW) and asbestos waste in additional areas of land at the Thornhaugh Landfill Site (the site). The location of the site is shown on Figure ESID 1 and the site setting is described in paragraphs 1.17 to 1.28 of this ESID.
- 4.2** The proposed development is described in paragraphs 1.1 to 1.3 of this ESID. Background information on the site and a description of the history of the site is provided in paragraphs 1.12 to 1.16 and in paragraphs 2.1 to 2.7 of this ESID and information on the surrounding land use is presented in paragraphs 1.19 to 1.28. The layout of the site and the land use in its surrounds are shown on Figure ESID 4A and Figure ESID 2, respectively.
- 4.3** Detailed descriptions of the geology, hydrology and hydrogeology within the vicinity of the site are presented in paragraphs 3.3, 3.5 and 3.6 and 3.7 to 3.10 of this ESID respectively.

Objectives of this assessment

- 4.4** The objectives of this report are to satisfy the requirements of the Environmental Permitting (England and Wales) Regulations 2010 (as amended) '2010 EPR' at the time of permitting by:
- identifying the environmental setting and land pollution history of the site;
 - identifying activities that will be conducted at the site that may lead to land pollution;
 - identifying and assessing the preventative measures that are in place to protect the land and
 - assessing whether there is:

- (i) little likelihood that land pollution or leaks to land will occur during the future life of the site, or
- (ii) a reasonable possibility that there is potential for current or future land pollution of the land from the site.

4.5 The site report is designed to provide a factual “baseline” for information and data specific to the site prior to its operation in the context of the Environmental Permitting regime and support the eventual surrender of the Environment Permit. In this context the site report has been produced in order to provide a reference point prior to the acceptance of the wastes in specifically engineered cells in the additional landfill areas at the site under the proposed variation to the Permit.

4.6 The information used to define the conditions at the landfill are observations made during walkover surveys, information provided by commercial and regulatory organisations, a review of the results of site investigations, a review of the results of leachate, groundwater and surface water quality monitoring, a review of the results of landfill gas monitoring together with discussions with representatives of Augean.

4.7 The report has been prepared with reference to the Environment Agency template and relevant guidance including “Environmental Permitting Regulations: Site condition report – guidance and template” published in April 2013.

4.8 The range of potential contaminants considered has been determined based on the range of wastes which have been and will be accepted at the landfill. It is important to understand that the site report is not relevant to parts of a permitted landfill that have or will have permanent deposits of waste or to mobile plant.

Site investigation (data collection) details

4.9 Various site investigations have been carried out at the site including the most recent investigation that was conducted in May 2014 to support the assessment of the extent of waste deposits in Phases 1 and 2 which focused on the haul road access to the site. A summary of the site history is presented in paragraphs 1.12 to 1.16 and in paragraphs 2.1 and 2.7 of this ESID. The results of leachate quality monitoring in the current landfill area are discussed in Section 1.2 of the HRA and summarised in Table HRA1 of the HRA. The results of surface water quality

monitoring up to 2004 are presented in section 3.4.3 of the 2004 ESID. The results of groundwater quality monitoring up to 2004 are presented in section 3.5.3 of the 2004 ESID. Updated surface water and groundwater quality data are presented at Appendix ESID F. The results of landfill gas monitoring are discussed in Section 1.2 of the LFGRA and presented at Appendix LFGRA 2 to the LFGRA.

Summary of site investigation and analysis of findings

- 4.10** The results of site investigations completed at the site are summarised in paragraphs 2.8 and 2.10 of this ESID and factual reports prepared in respect of the site investigations completed in December 2013, March 2014 and May 2014 are presented at Appendices ESID A, ESID B and ESID C respectively. Based on the results of the site investigations and the review of the history of the site there is no evidence that significant contamination of the non-landfill areas of the site will remain following the removal of the wastes that were deposited historically in Phases 1 and 2 under Permit FP3790NJ.
- 4.11** The review of the results of groundwater quality monitoring completed at the site in respect of Phases 1 and 2 are summarised in paragraph 2.11 of this ESID. The groundwater quality data show that groundwater quality down hydraulic gradient of Phases 1 and 2 is affected by leachate migrating from Phases 1 and 2. Based on this assessment it is likely that groundwater quality directly beneath Phases 1 and 2 is also affected. All the waste deposited in Phases 1 and 2 under Permit FP3790NJ will be excavated prior to the deposition of non recoverable waste in other engineered phases at the site. This will remove the source of the un-contained contaminants and groundwater quality in the vicinity of the site is expected to improve as a result.

Data interpretation

- 4.12** The baseline groundwater and surface water monitoring data have been used to derive interim control levels and compliance limits in respect of groundwater in Tables HRA 9 and surface water in Table HRA10 presented in the HRA. The baseline landfill gas monitoring data have been reviewed in the LFGRA and have been used to propose a risk based monitoring scheme in Table LFGRA 6 in the LFGRA.

Conclusions

- 4.13** It is concluded that the existing conditions as defined by the monitoring data represent the baseline conditions for the non-landfill areas of the site for the purpose of the 2010 EPR.

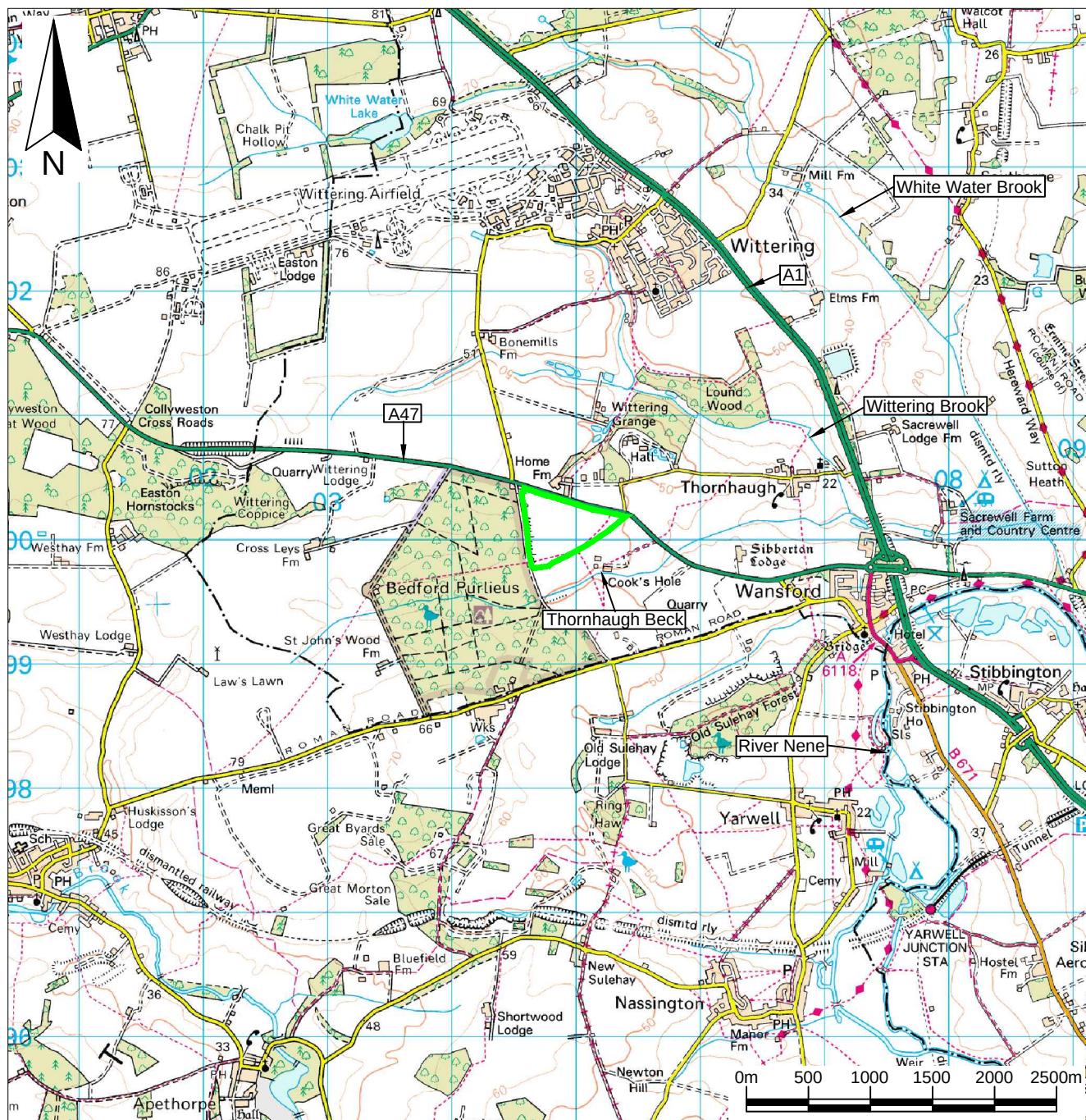
TABLES

Table ESID 1

**Risk assessment reports prepared to support the application to vary Environmental
Permit number RP3133PP**

Document title	Document reference
Hydrogeological risk assessment (HRA)	AU/TH/JRC/2826/01/HRA
Stability risk assessment (SRA)	AU/TH/DFR/3181/01
Landfill gas risk assessment (LFGRA)	AU/TH/AW/5482/01/LFGRA
Nuisance risk assessment (NRA)	AU/TH/MAS/5477/01/NRA

FIGURES

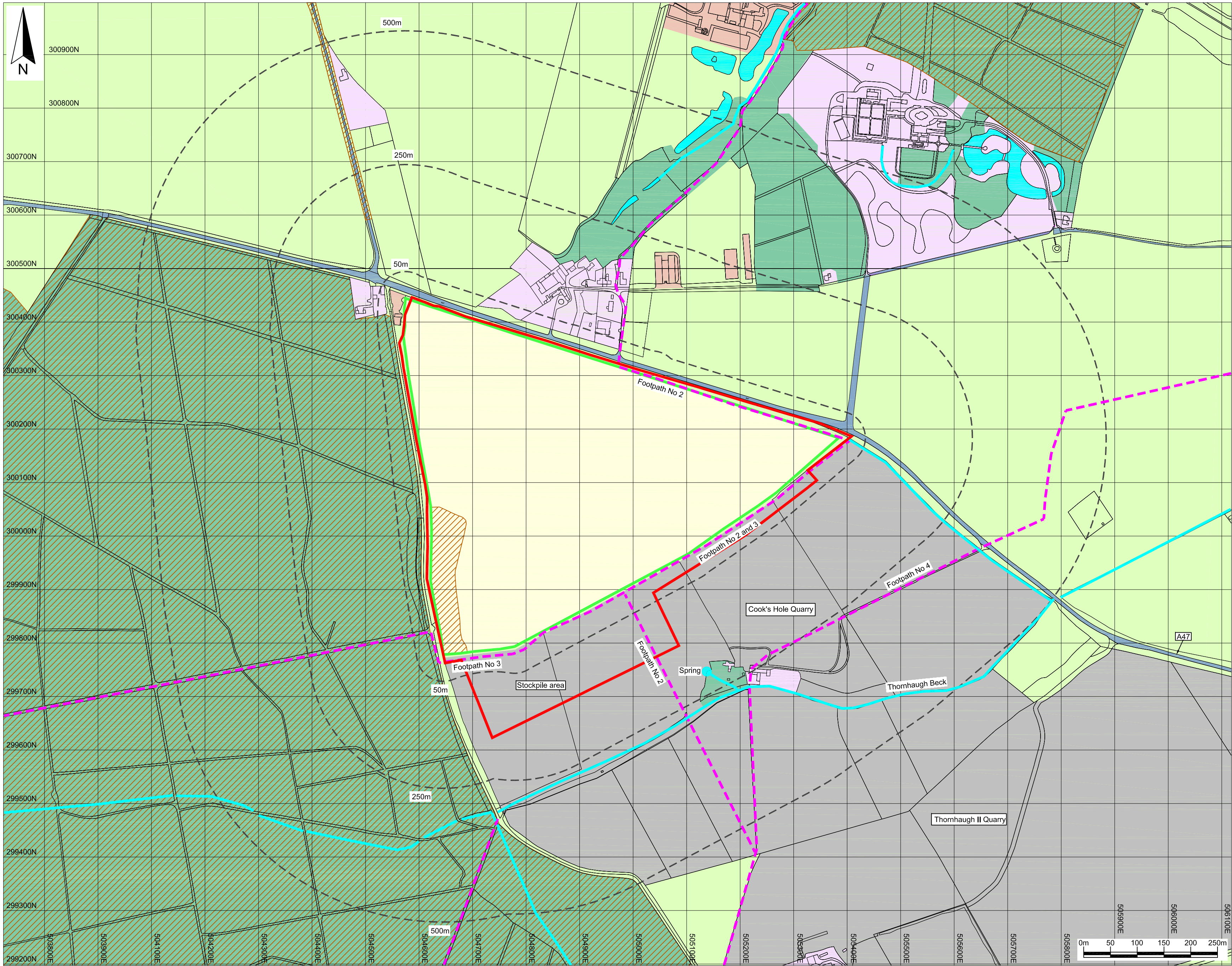


Key / Notes



Proposed boundary of the permitted installation

	Final	KR	CF	LH	24/09/14
Rev	Status	Drn	App	Chk	Date
Site THORNHAUGH LANDFILL SITE					
Client 					
Title The site location					
Figure ESID 1		Scale 1:50,000@A4			
Drawing Ref AU/TH/08-14/18025					



Key / Notes

- Proposed boundary of the permitted installation
- Planning boundary based on Figure ES 3.2 Application boundary approved 9 November 2012
- 500m Radius around the proposed installation boundary
- Public rights of way
- Existing and proposed landfill site area
- Mineral working
- Domestic dwelling
- Open spaces, parks and farmland
- Offices and commercial areas
- Major road
- Nature conservation sites
- Biodiversity Action Plan priority habitat
- Surface water feature

Note:
The extent of designated nature conservation sites and BAP priority habitats has been obtained from the MAGIC website. The nature conservation sites include county wildlife sites the extent of which has been obtained from URS Drawing Number D136707/EC/001 dated 06.02.12. The location and extent of public rights of way has been taken from URS Drawing Number Figure ES 3.6 undated.

	Final	KR	CF	LH
Rev	Status	Dm	App	Chk
				Date

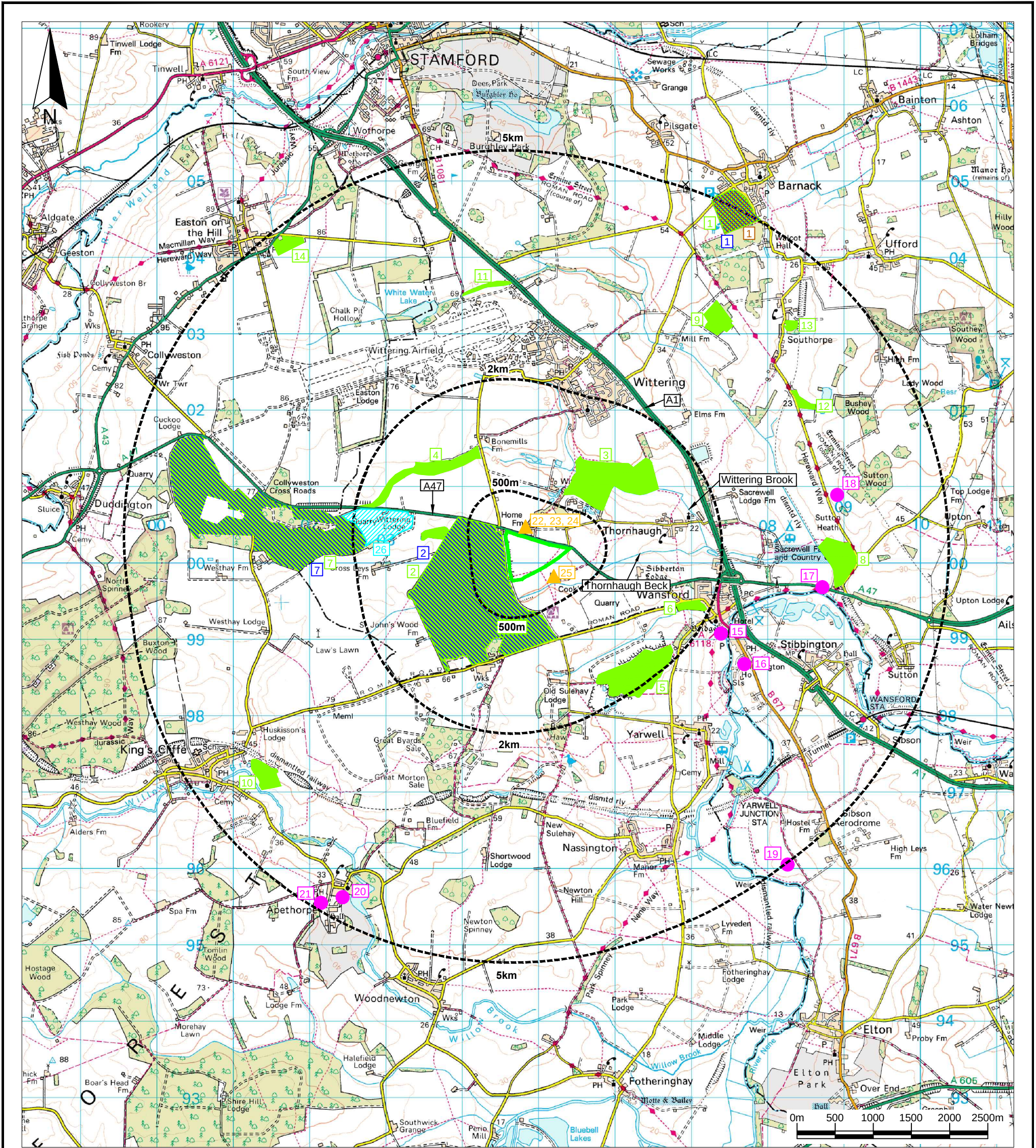
Site	Client
Thornhaugh Landfill Site	

Title
Environmental site setting

Figure ESID 2	Scale 1:5,000@A2
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Drawing Ref
AU/TH/08-14/18026
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Key / Notes

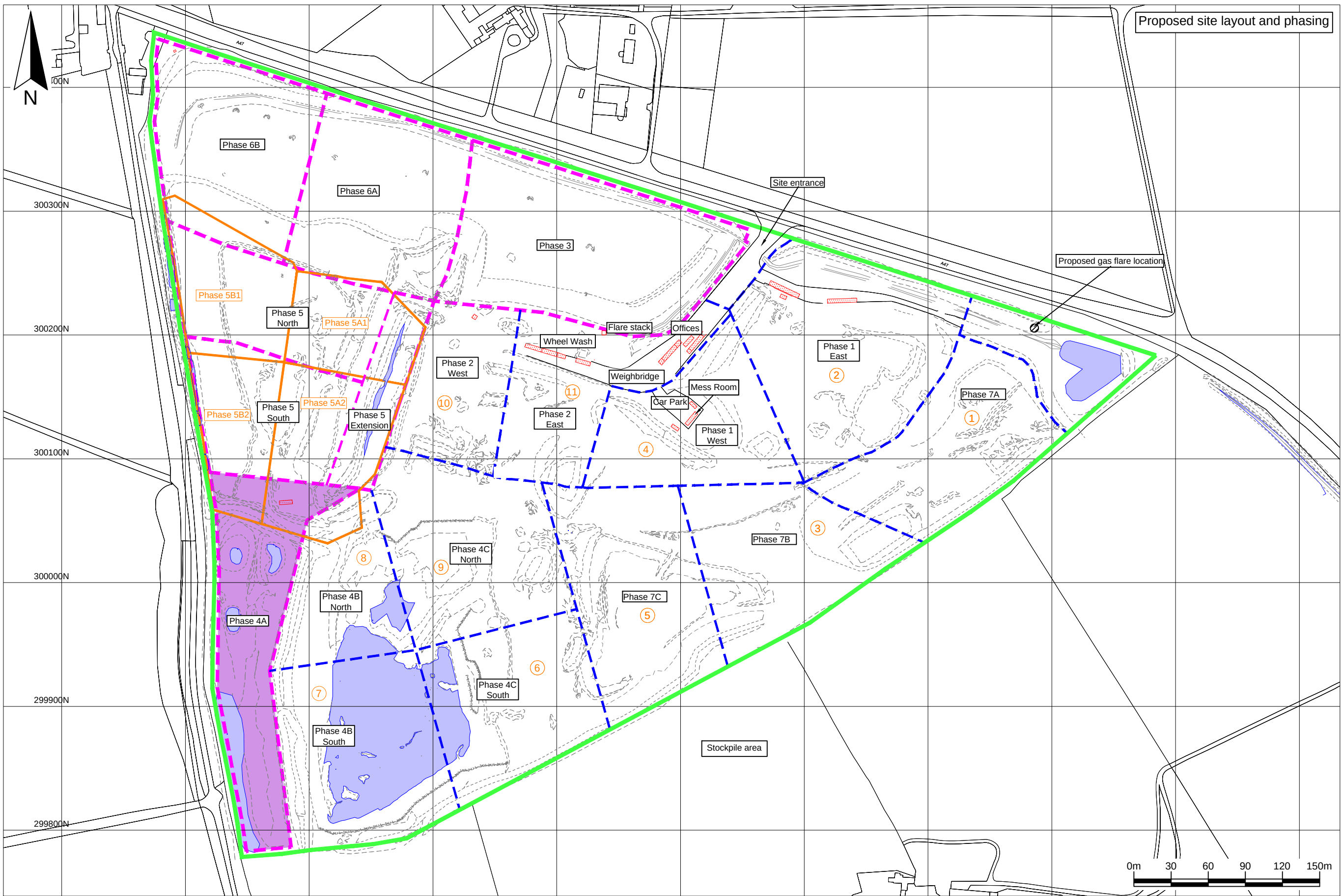
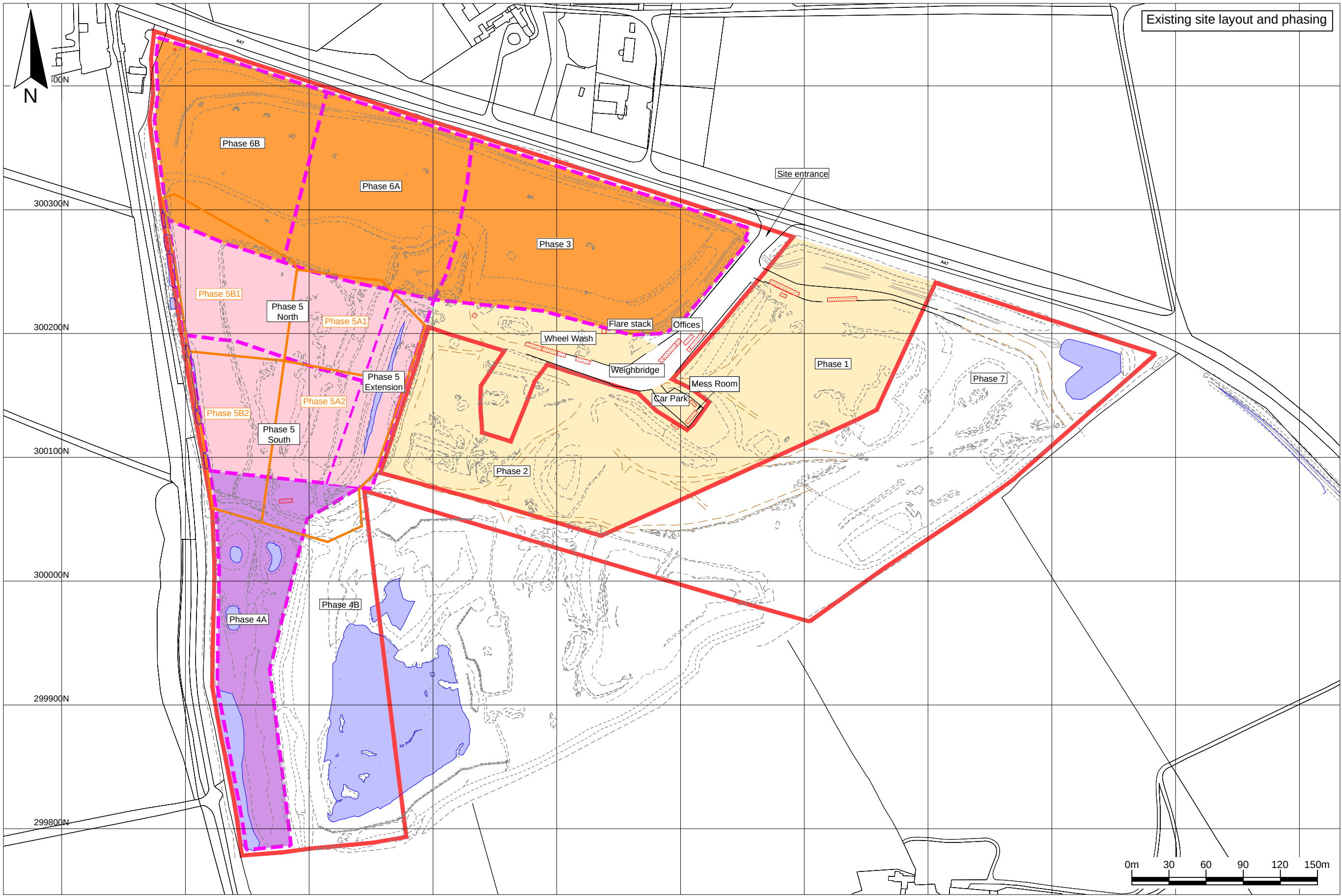
	Proposed boundary of the permitted installation		Old Sulehay Forest		National Nature Reserve		Churchyard Cross in St Leonard's Churchyard
	Radius from the permitted installation boundary		Wansford Pasture		Barnack Hill Holes		Dovecote NW of Apethorpe Hall
	Special Area of Conservation		Collyweston Great Wood and Easton Hornstocks		Bedford Purlieus		Listed buildings (within a 500m radius)
	Barnack Hills and Holes		Sutton Heath and Bog		Collyweston Great Wood and Easton Hornstocks		Home Farm House
	Site of Special Scientific Interest		Southorpe Roughs		Scheduled Monuments		Barn and Dairy Ranges (Dairy Lodge)
	Barnack Hill and Holes		King's Cliffe Banks		Wansford Bridge		Stable Range and Granary
	Bedford Purlieus		Whitewater Valley		Wansford Roman Site		Cooks Hole Farmhouse
	West Abbot's and Lound Woods		Southorpe Paddock		Unnamed		Regionally Important Geological Site
			Southorpe Meadow		Sutton Heath, Romano - British Site		Cross Leys Quarry
			Racecourse Farm Fields		Henge, ring ditch and prehistoric settlement remains		

Technical advisers on environmental issues

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	Final	KR	CF	LH	24/09/14
Rev	Status	Drn	App	Chk	Date
Site Thornhaugh Landfill Site		Client 			
Title Designated cultural and natural heritage					
Figure ESID 3		Scale 1:50,000@A3			
Drawing Ref AU/TH/08-14/18027					
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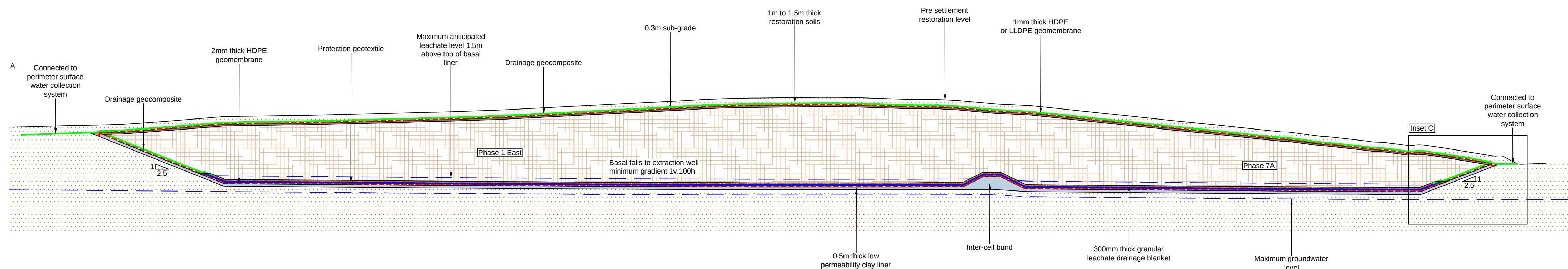
Key / Notes

- Environmental Permit variation application boundary
- Boundary of Variation notice number EA/EPR/PP3133PP/V004
- Area the subject of Variation Notice Number EA/EPR/PP3790NJ
- Approximate existing phase boundaries
- Approximate proposed phase boundaries
- Approximate location of monocells in Phase 5 based on Faber Maunsell drawing number DWG/44879/1 dated 29 November 2004
- Existing building
- Surfaced section of internal haul road
- Approximate route of haul roads
- Current water bodies and surface water collection areas
- Active landfill area
- Capped, awaiting final restoration
- Thornhaugh Quarry County Wildlife Site - Not included in the landfill area
- Proposed order of working

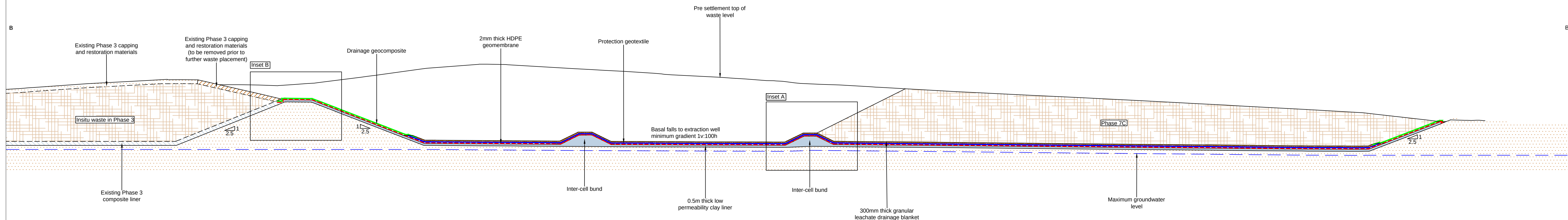
Note:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

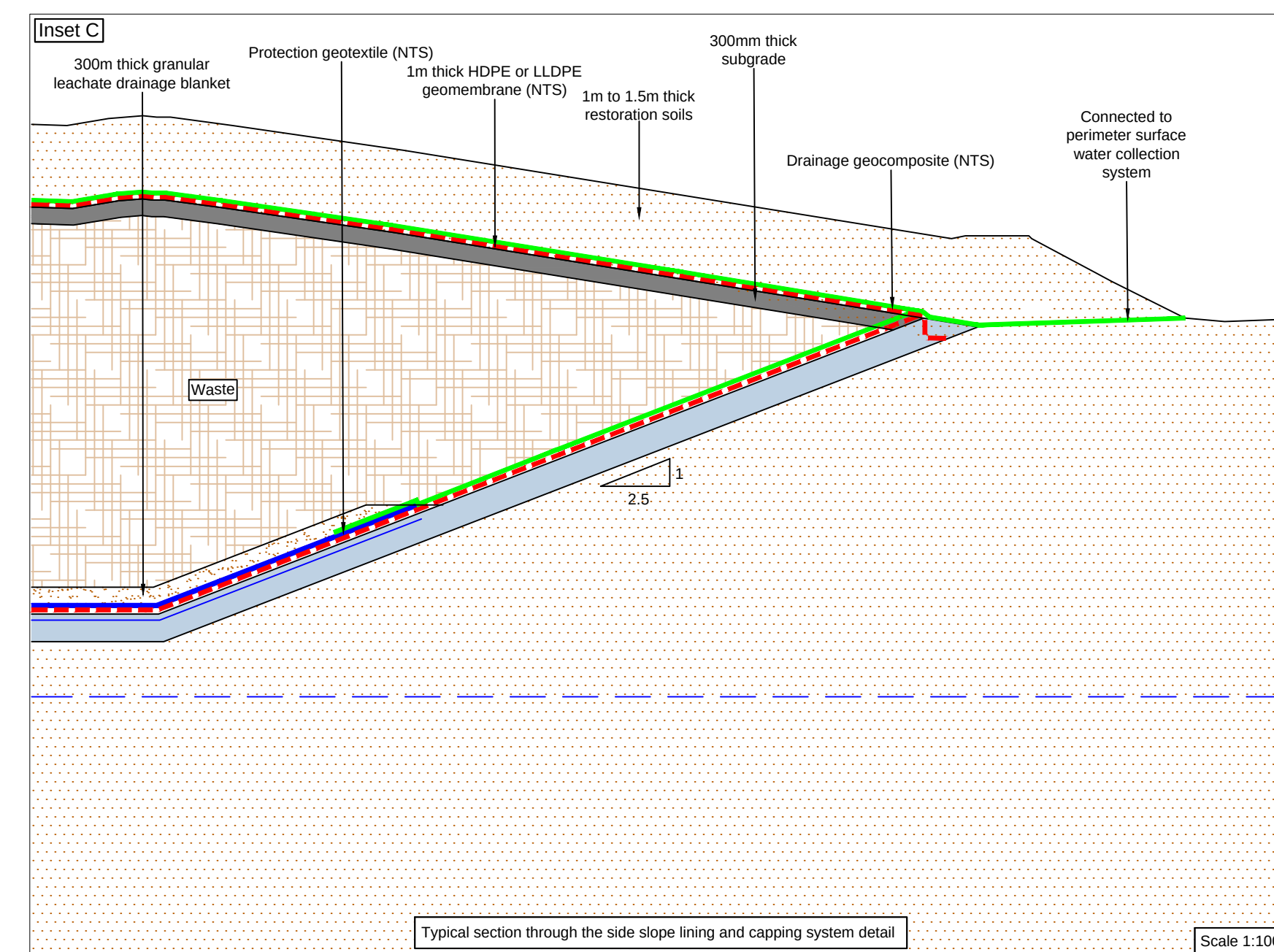
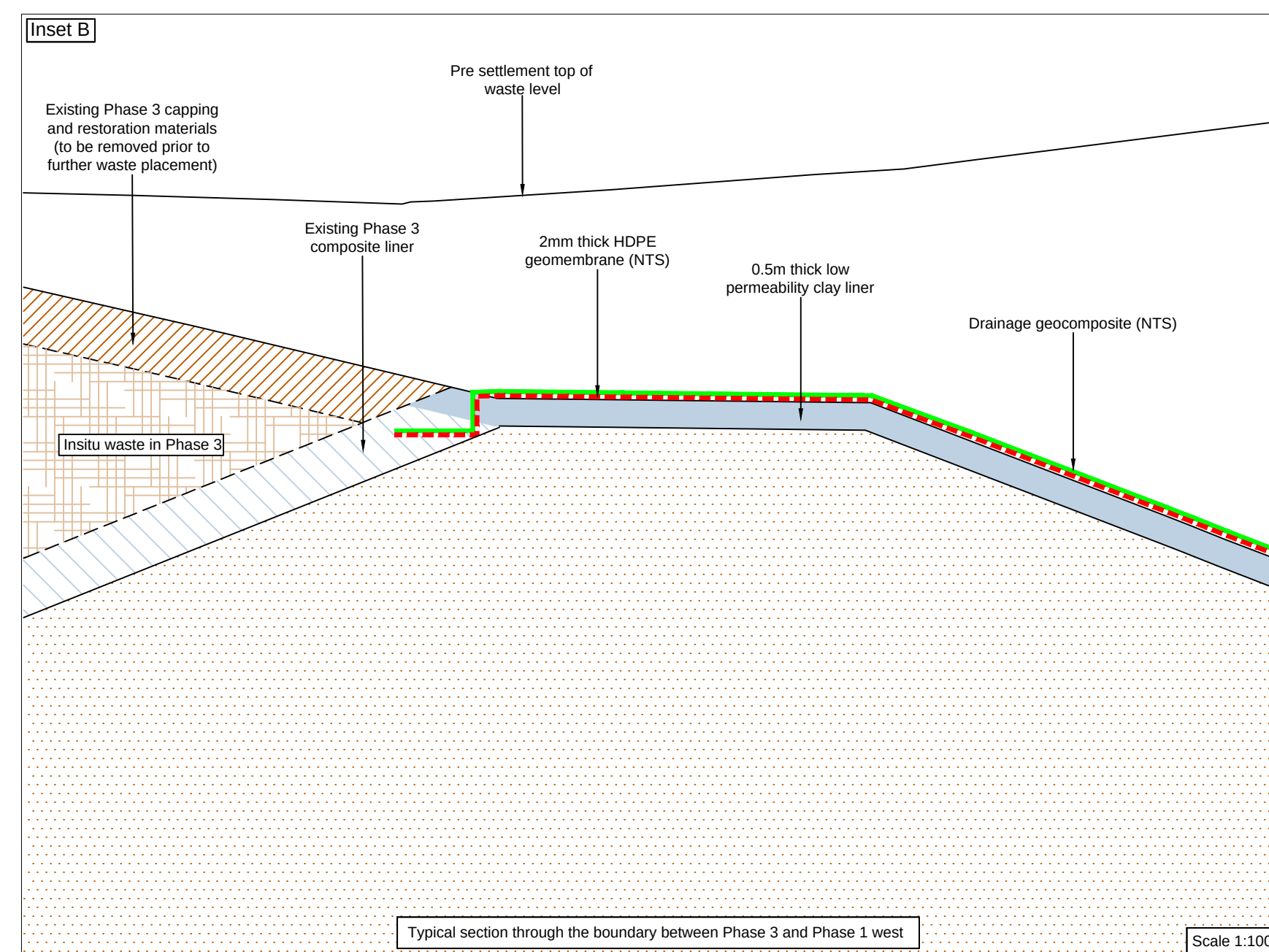
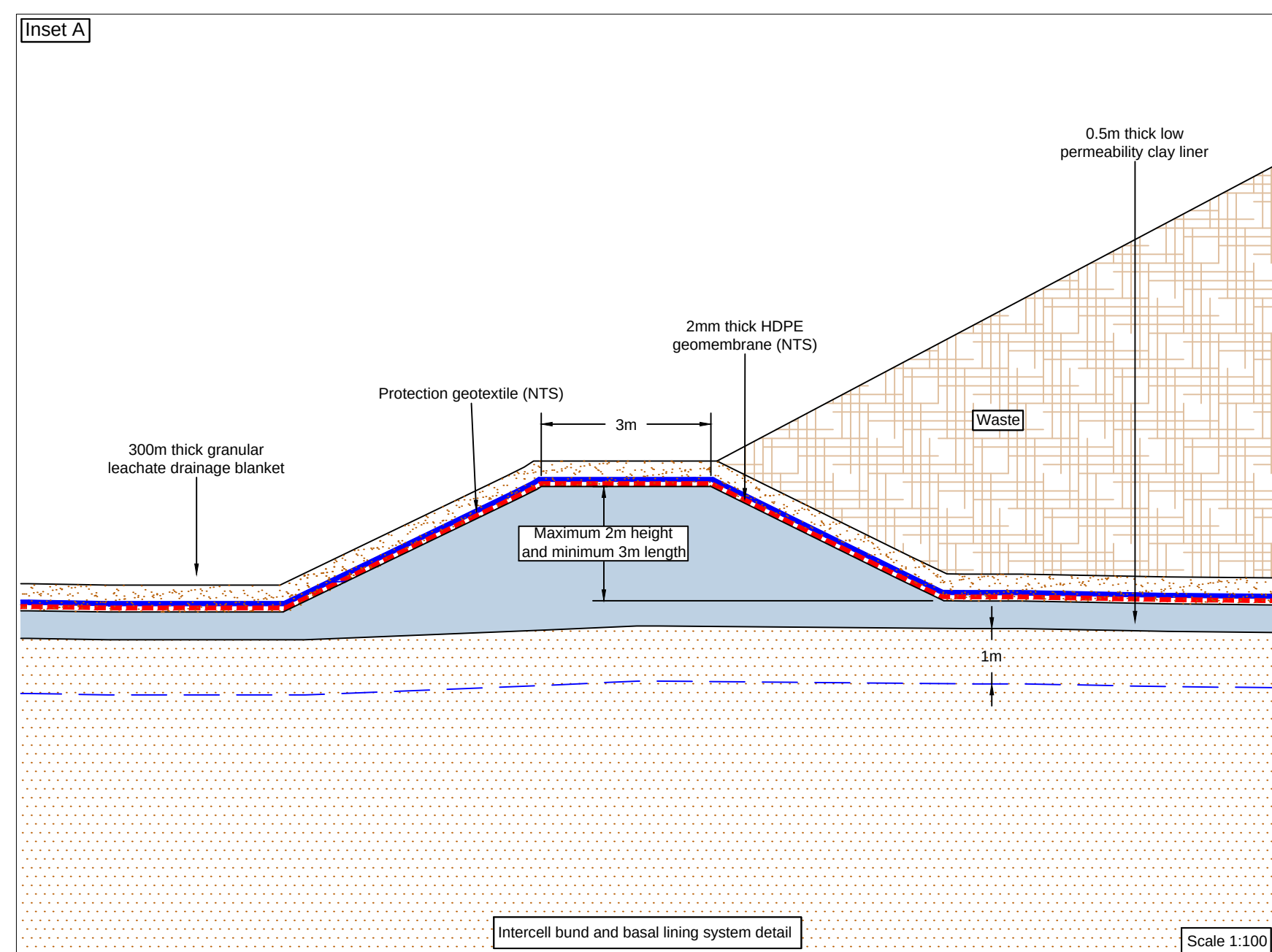
Rev	Final	KR	MAS	LH	24/09/14
	Status	Drn	App	Chk	Date
Site		Client			
THORNHAUGH LANDFILL SITE					
Title		Existing and proposed site layout and phasing			
Figure ESID 4A		Scale 1:3,000@A2			
Drawing Ref AU/TH/09-14/18074		Reproduced scale mapping by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright 2006. All rights reserved. Licence number 100017818.			



Scale 1:500



Scale 1:500



Key / Notes

NTS - Not to scale

Note
Section location lines shown on Figure ESID 7 drawing reference AUTH/08-14/18075

Rev	Status	Crn	App	Chk	Date
	Final	KR	MAS	LH	24/09/14

Site
THORNHAUGH LANDFILL SITE

Client
Augean
ENERGY & CONSTRUCTION

Title
Conceptual cross sections

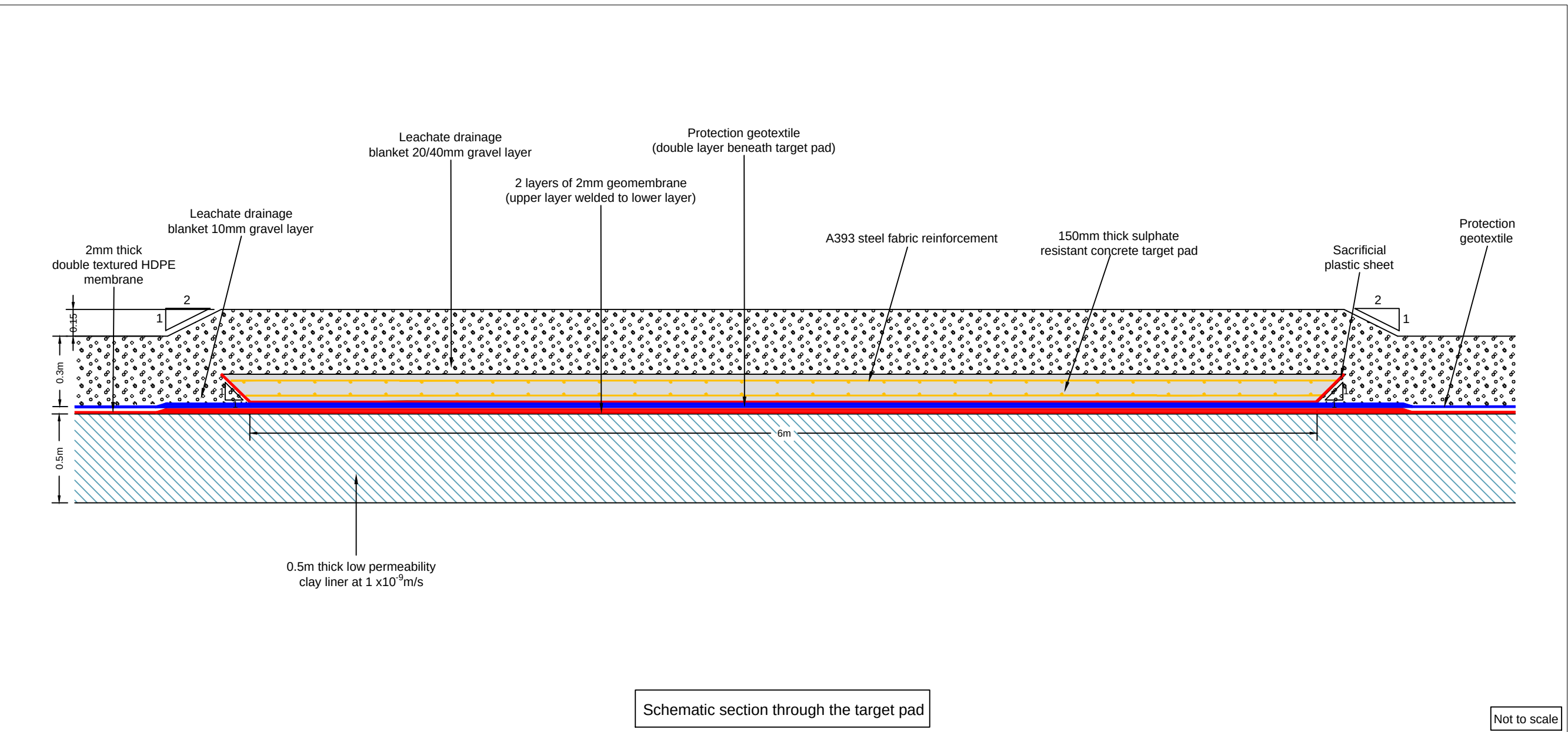
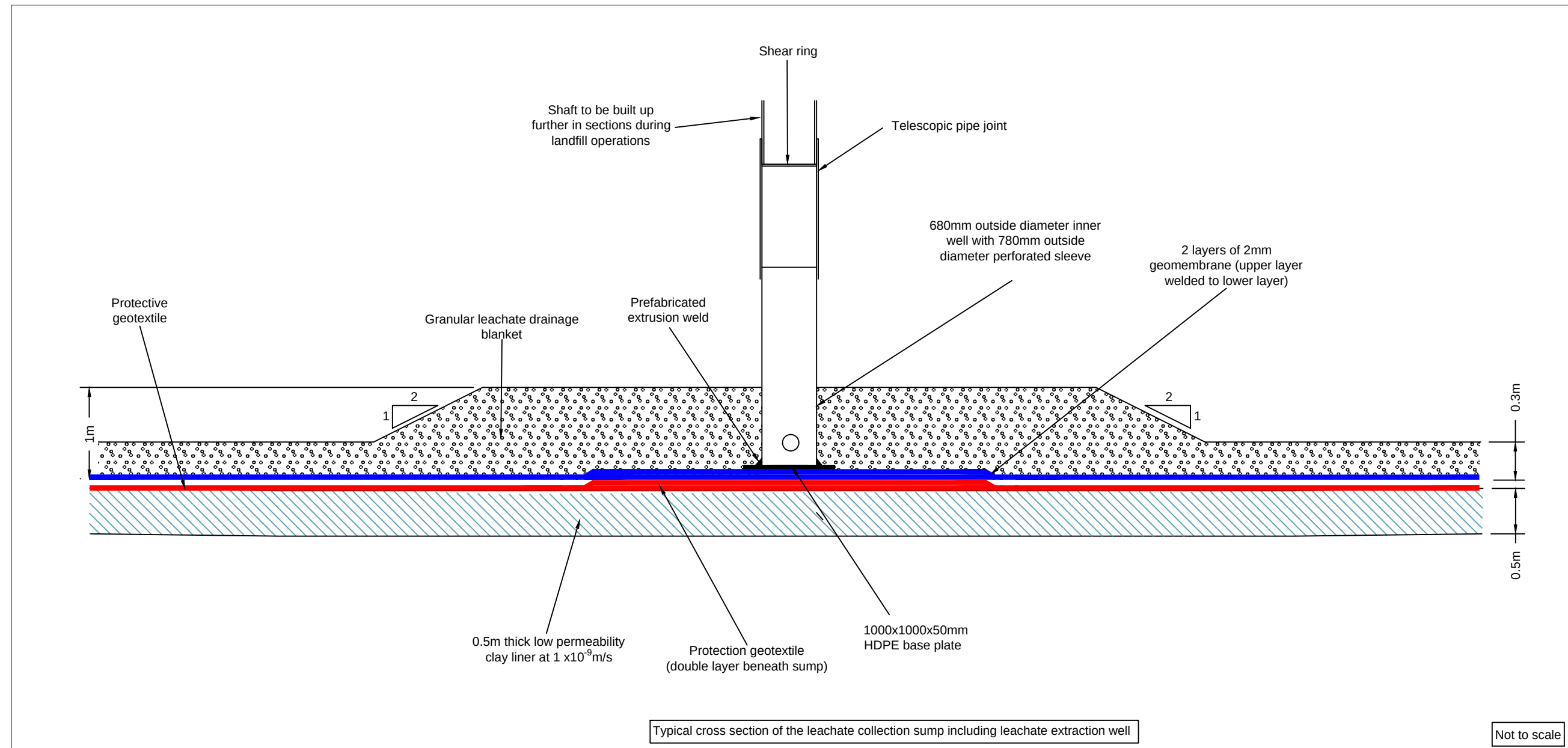
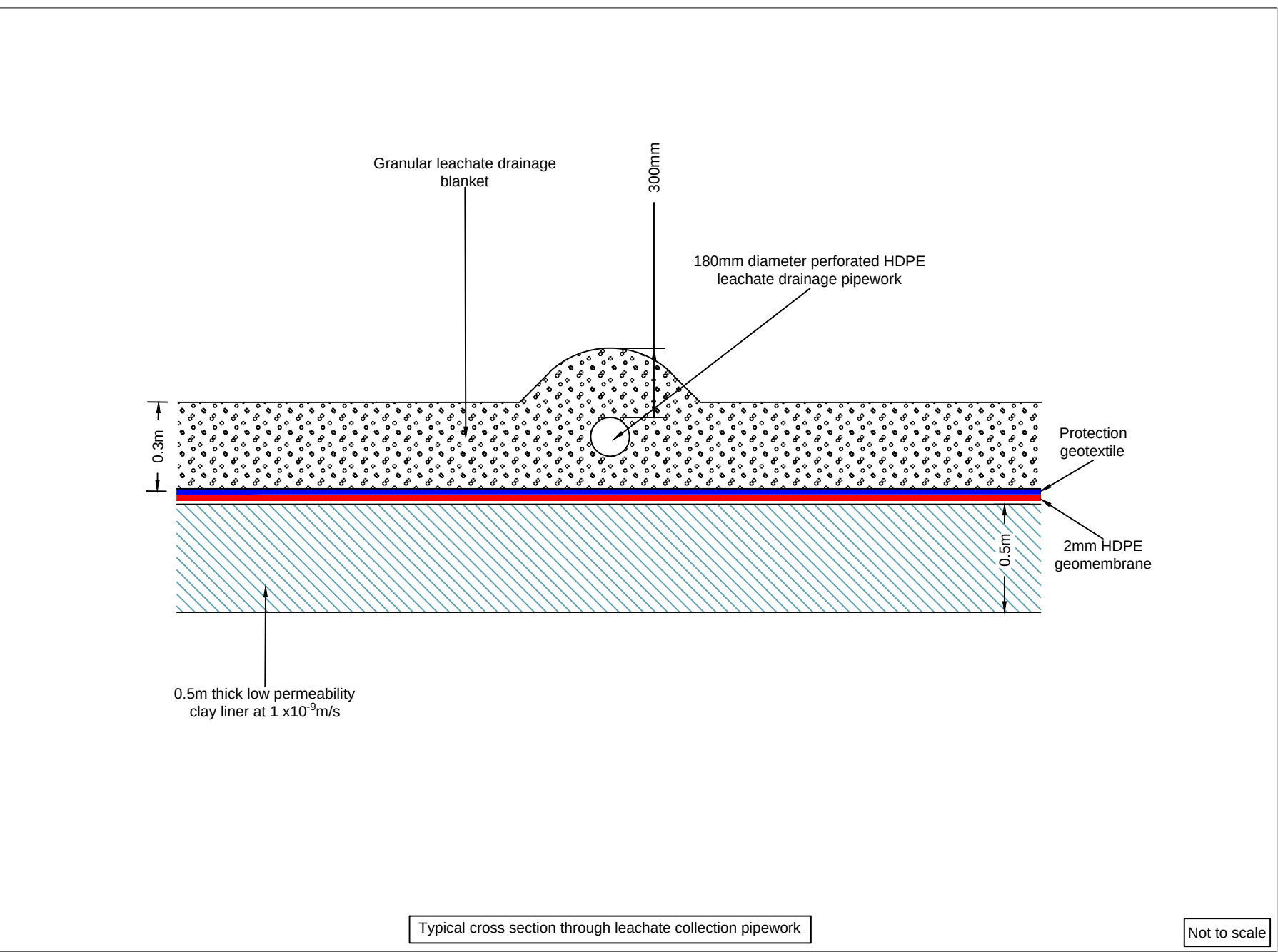
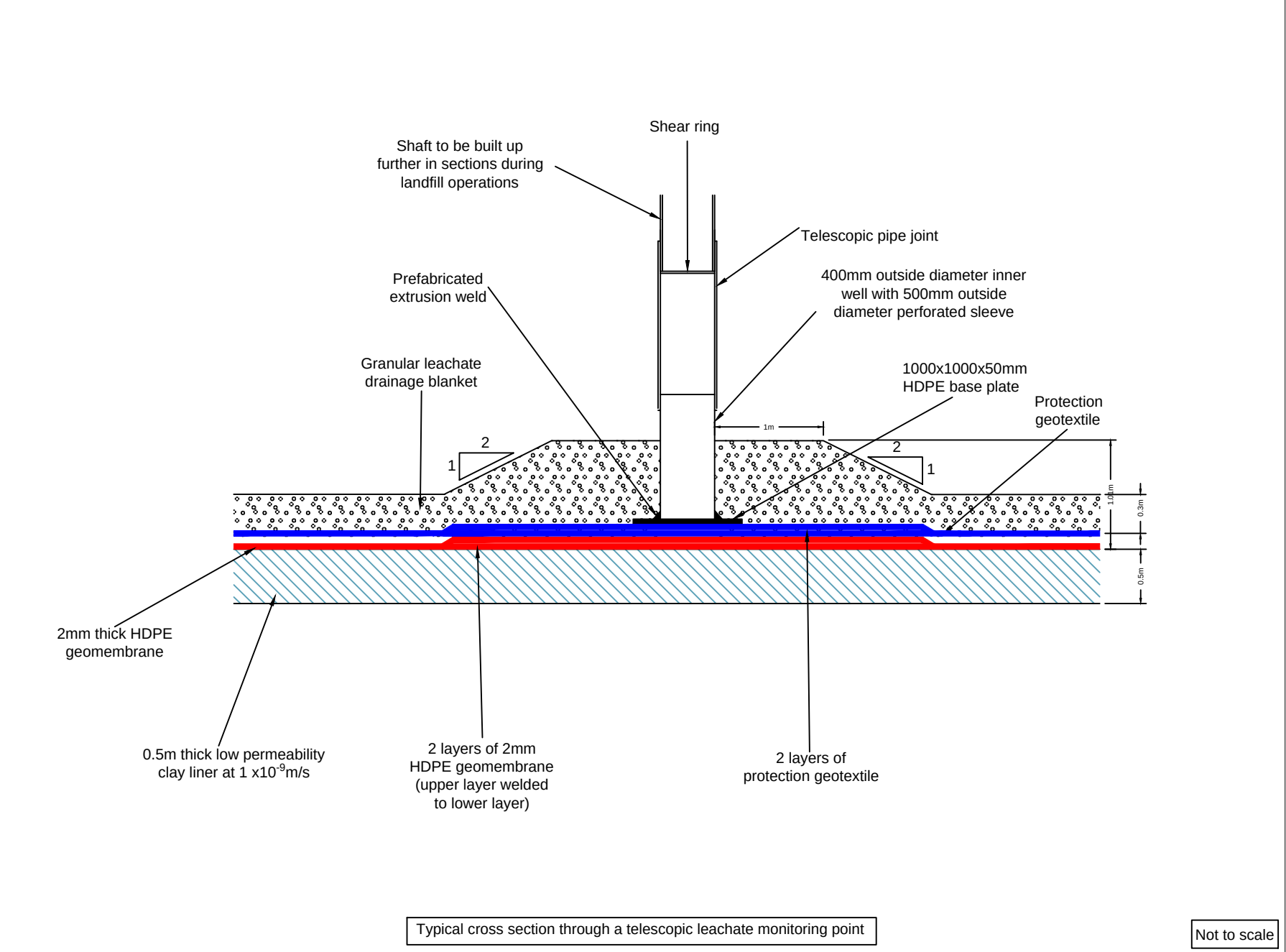
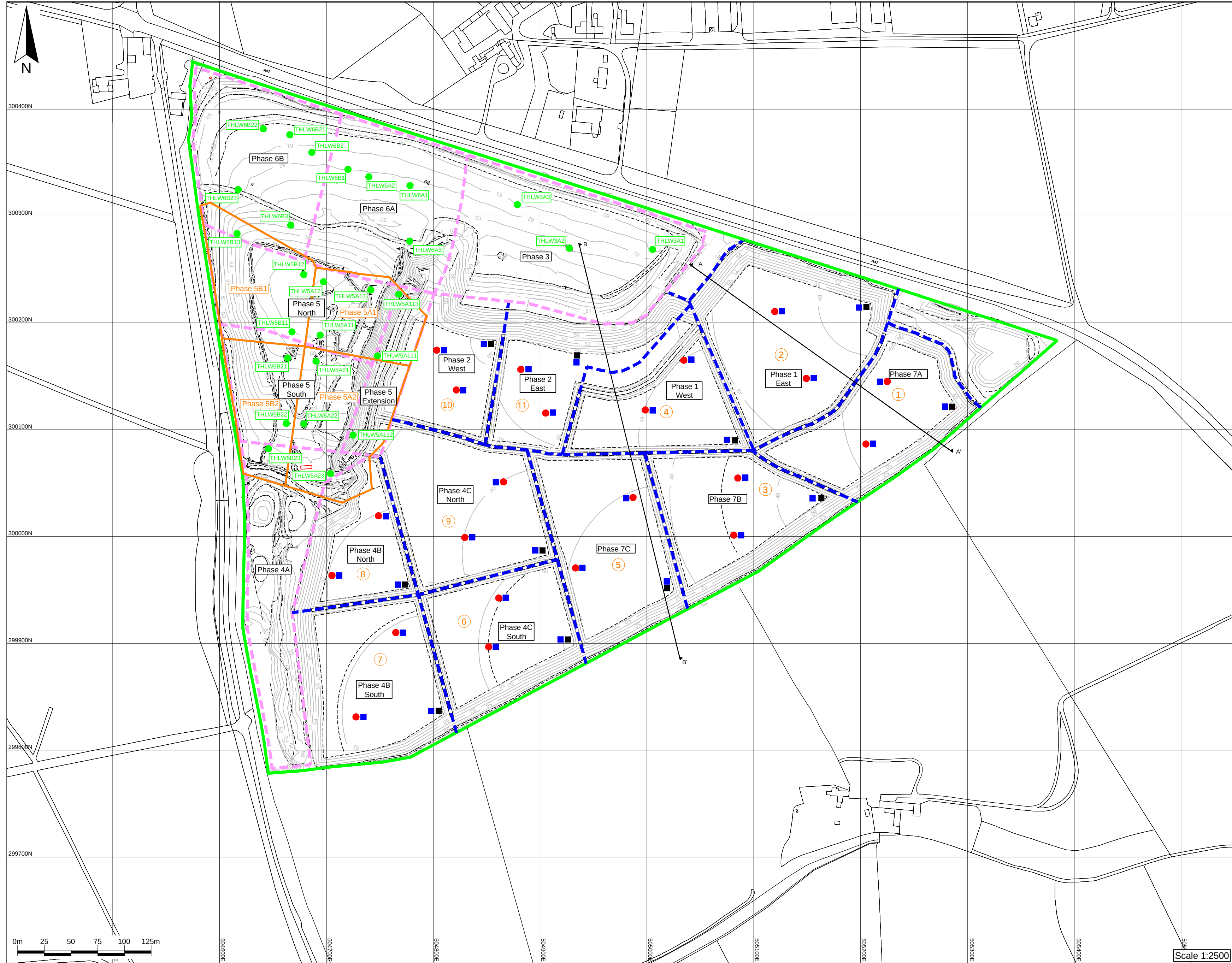
Figure ESID 6

Scale
As shown

Drawing Ref
AUTH/08-14/18075

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Key / Notes

- Environmental Permit Variation application boundary
- Approximate existing phase boundaries
- Proposed phase boundaries
- Approximate location of monocells in Phase 5 based on Faber Maunself drawing number DWG/44879/1 dated 29 November 2004
- Proposed order of working
- Location of cross sections (presented on ESID 6)
- Location of a leachate well
- Approximate location of a proposed leachate sump configured for gas monitoring
- Approximate location of a proposed leachate monitoring well configured for gas monitoring
- Approximate location of a proposed target pad

Note:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Final KR MAS LH 24/09/14
Rev Status Dm App Chk Date

Site THORNHAUGH LANDFILL SITE

Title Leachate management

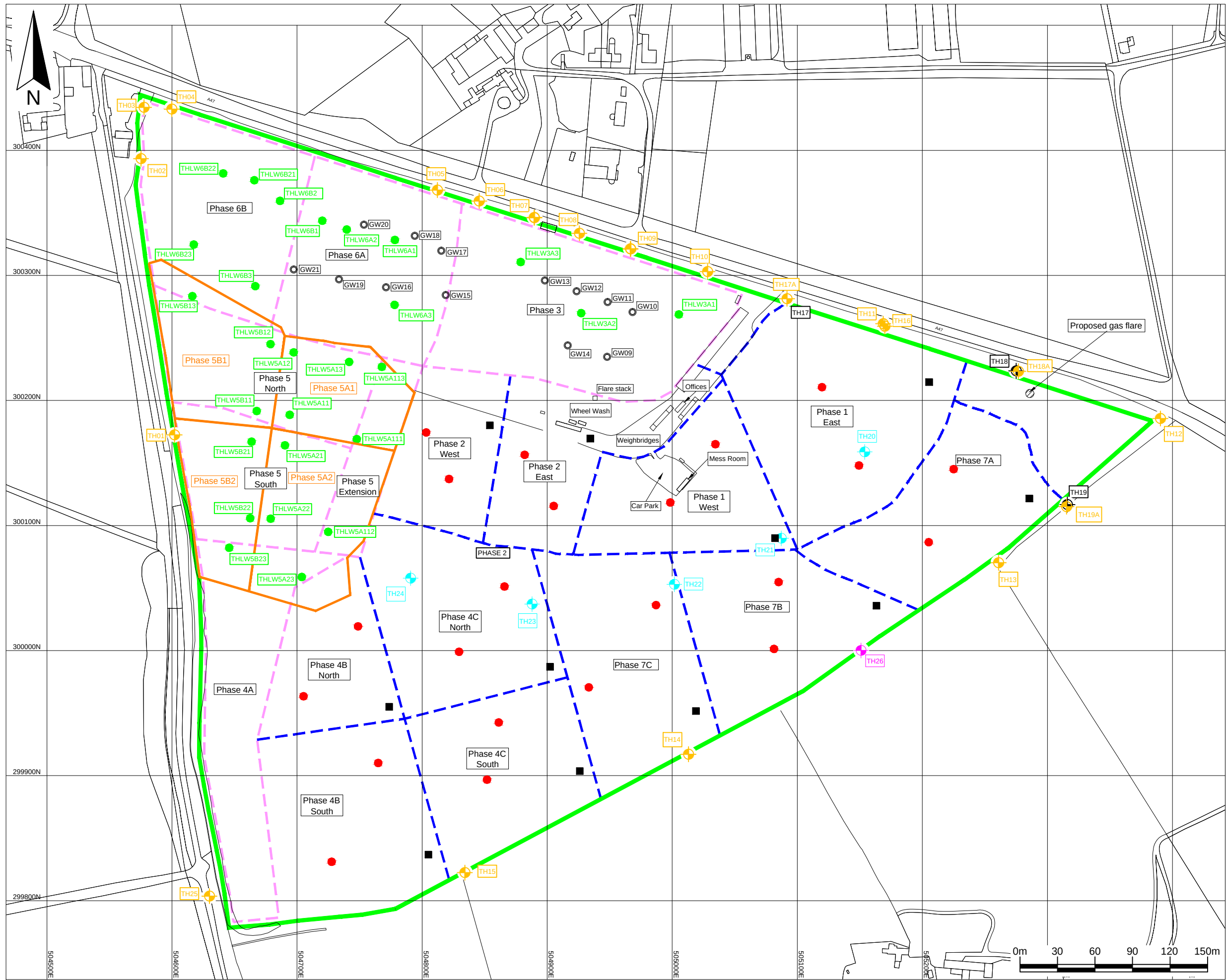
Figure ESID 7 Scale As shown

Drawing Ref AU/TH/09-14/18076

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Key / Notes

- Environmental Permit variation application boundary
- Approximate existing phase boundaries
- Proposed phase boundaries
- Approximate location of monocells in Phase 5 based on Faber Maunsell drawing number DWG/44879/1 dated 29 November 2004
- Location of a leachate well
- Location of a groundwater and landfill gas monitoring borehole
- Location of a groundwater and landfill gas monitoring borehole that will be decommissioned as part of the development
- Approximate location of a proposed groundwater and landfill gas monitoring borehole
- Location of a borehole which is no longer fit for purpose
- Approximate location of a proposed leachate sump configured for gas monitoring
- Approximate location of a proposed leachate monitoring well configured for gas monitoring
- Approximate location of a gas well

Note:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

	Final	KR	AW	LH	24/09/14
Rev	Status	Drn	App	Chk	Date

Site	Client
THORNHAUGH LANDFILL SITE	Augean ENERGY & CONSTRUCTION

Title	Leachate and landfill gas management
-------	--------------------------------------

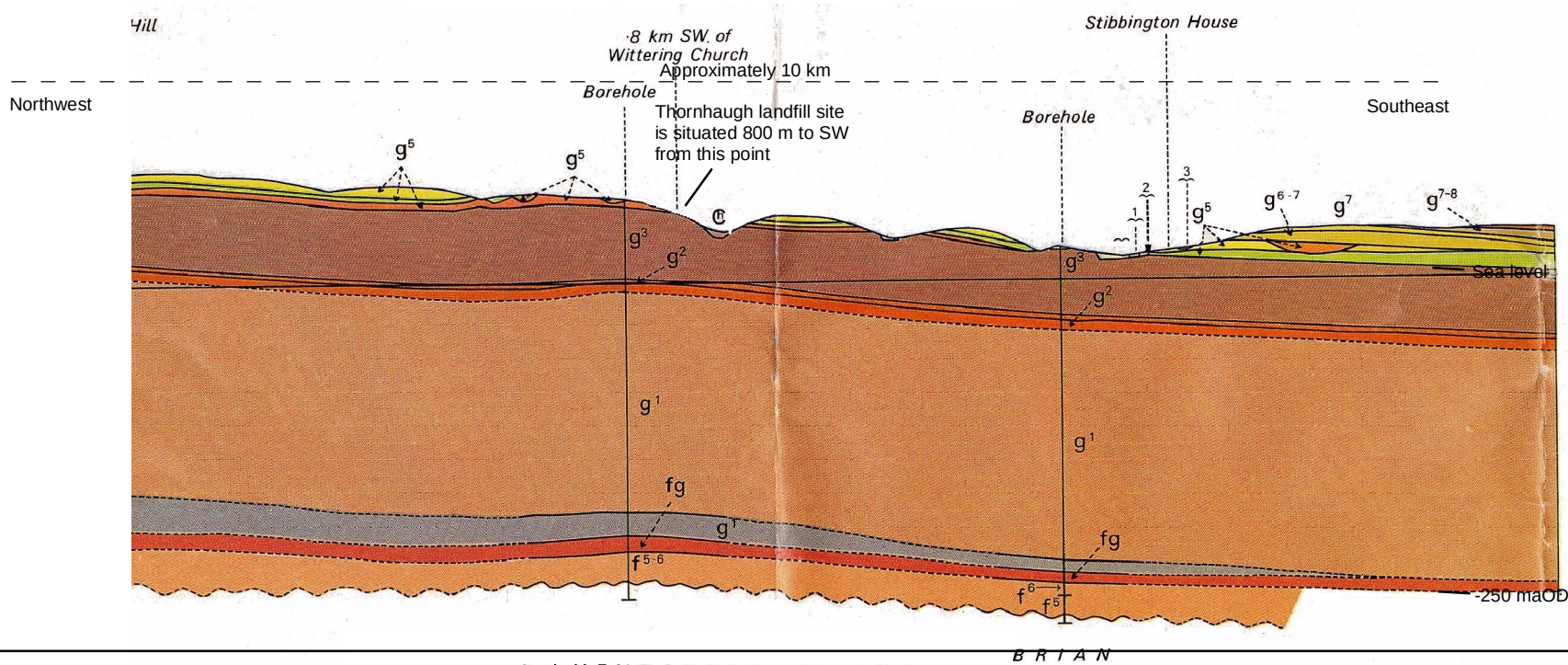
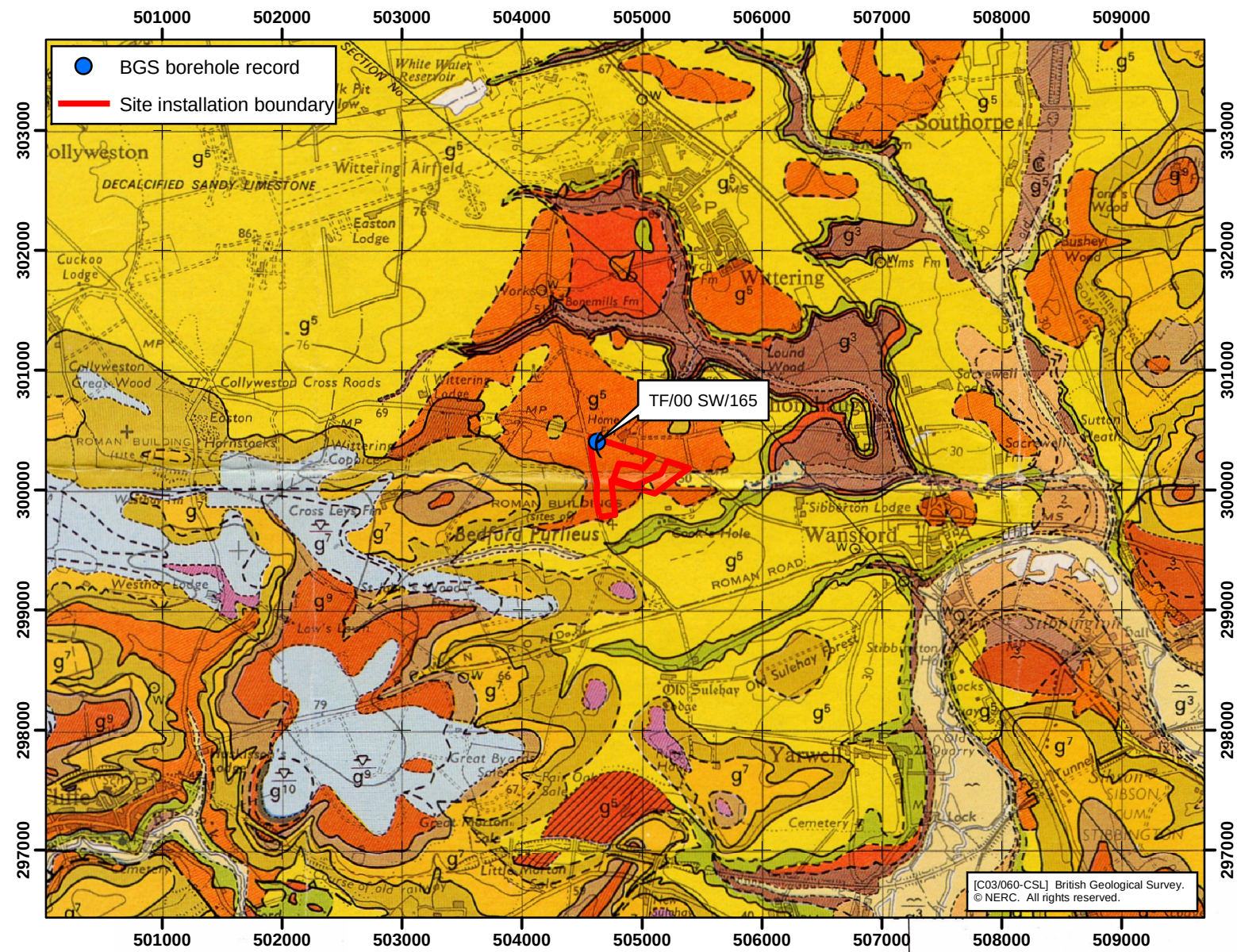
Figure ESID 8	Scale 1:3,000@A3
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Drawing Ref AU/TH/09-14/18072

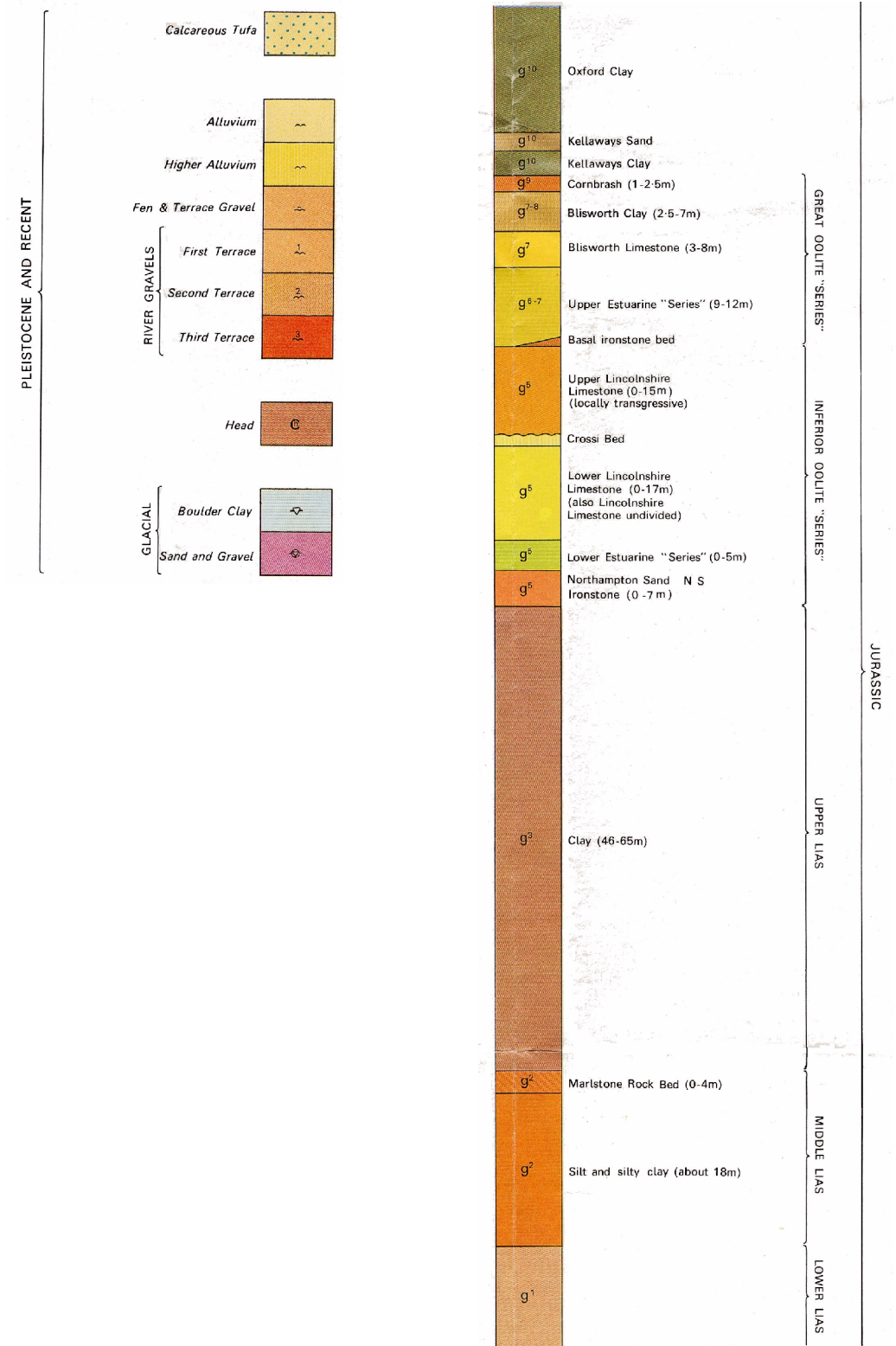
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Drift and solid geology stratigraphical columns

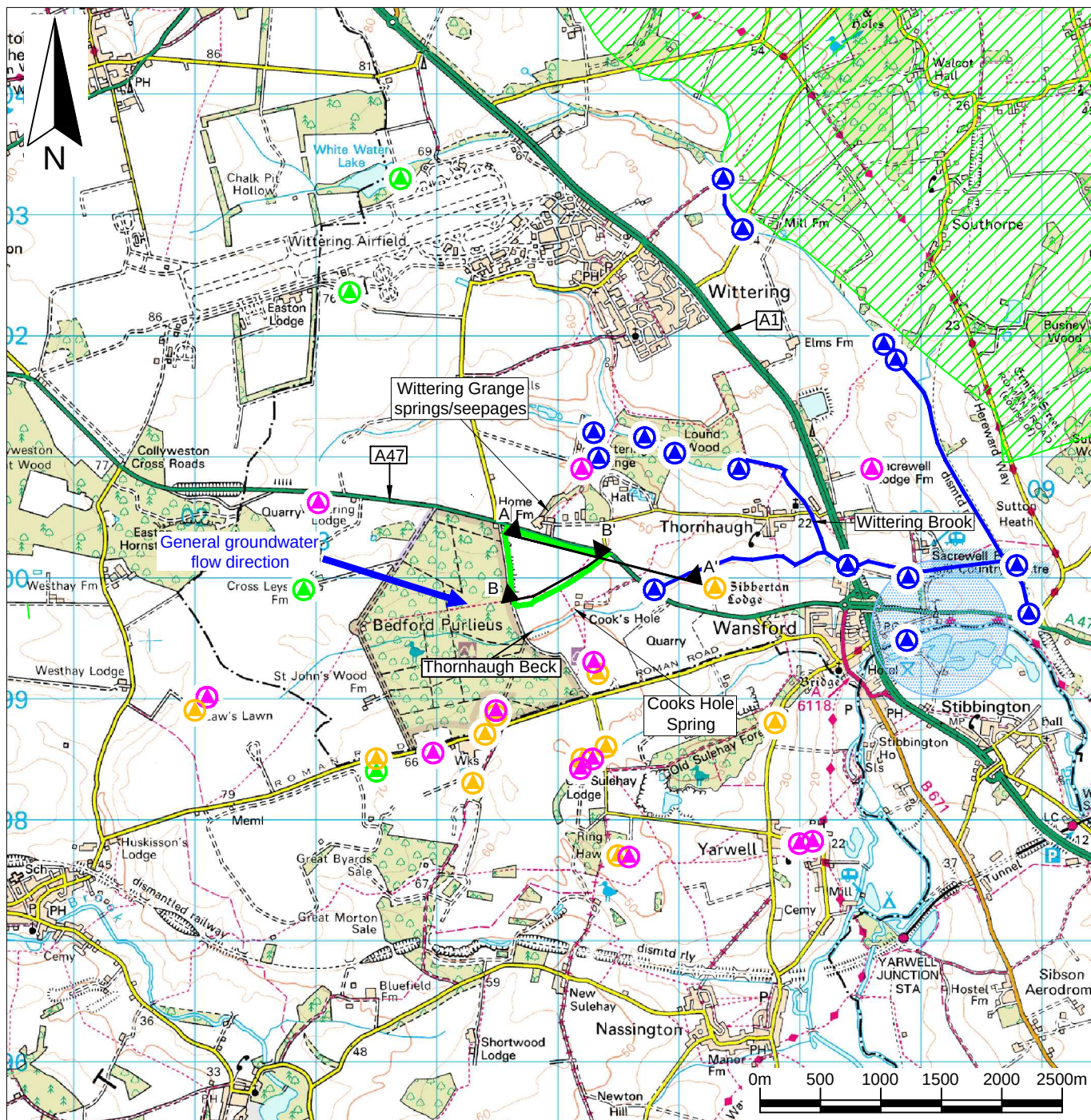


Drawing ESID 9
Regional geology

Date	STET	Drawn	JSB
Scale	1:50,000	Checked	RCS
Original	A3	Revision	STET
File Reference O:\6453\reports\ESID\6453R1D2\Figures\Updated Figure\Drawing ESID09.mxd			



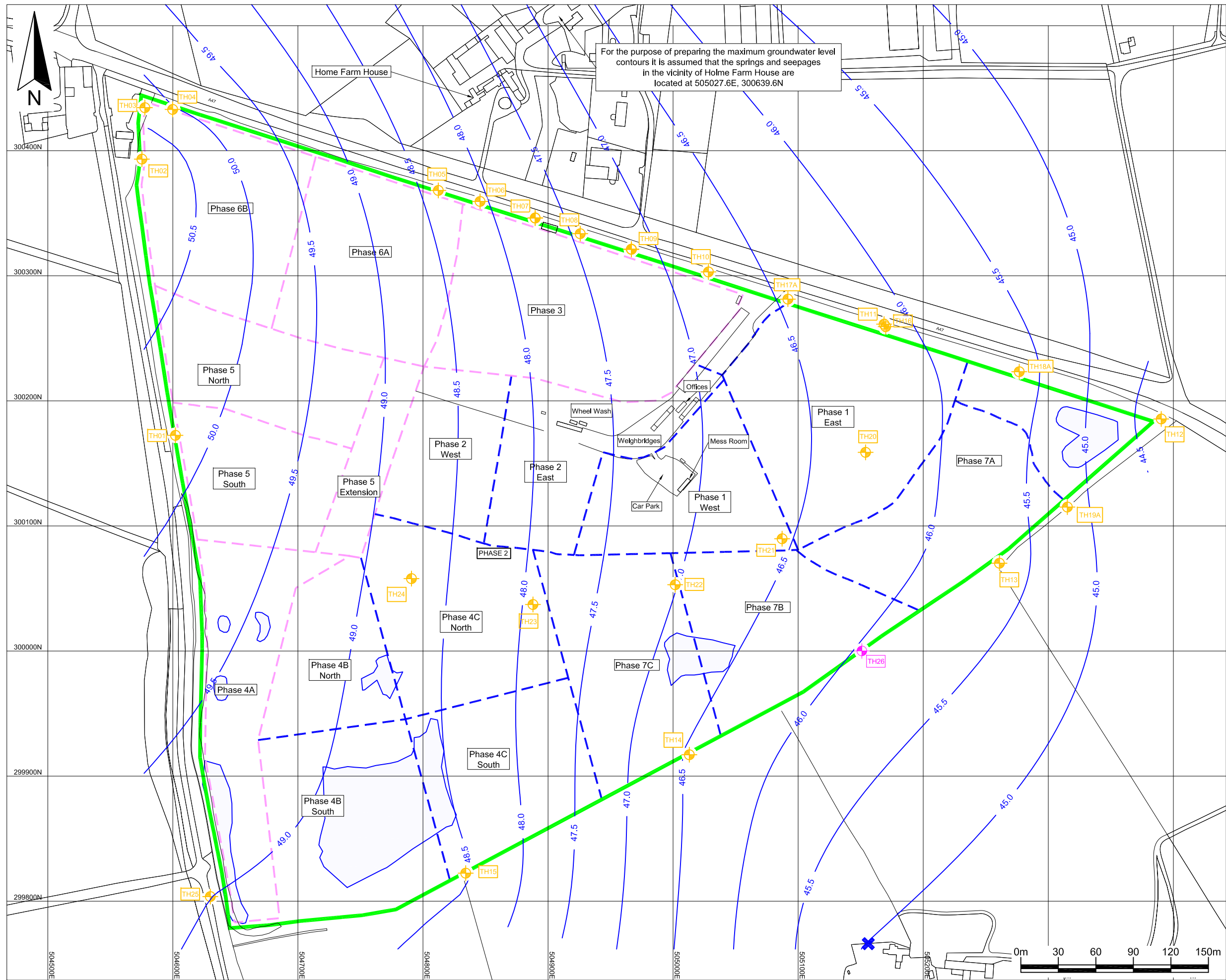
Environmental Simulations International Ltd



Key / Notes

-  Approximate boundary of the Environmental Permit Variation application area
 -  Approximate lines of hydrogeological sections (presented on drawings ESID 12A and ESID 12B)
 -  Location of a licensed groundwater abstraction
 -  Location of a licensed surface water abstraction
 -  Location of a deregulated groundwater abstraction
 -  Location of a private water supply abstraction
 -  1km² area showing the approximate location of an abstraction used for public water supply
 - Source Protection Zones**
 -  SPZ1
 -  SPZ3
 -  SPZ2
 -  SPZ4
- Note:**
Contains Environment Agency information © Environment Agency and database right

	Final	KR	MAS	LH	24/09/14
Rev	Status	Drn	App	Chk	Date
Site Thornhaugh Landfill Site		Client 			
Title Regional hydrogeology and hydrology					
Figure ESID 10		Scale 1:50,000@A4			
Drawing Ref AU/TH/08-14/18060					



Key / Notes

- Environmental Permit variation application boundary
- Approximate existing phase boundaries
- Proposed phase boundaries
- Location of a groundwater monitoring borehole
- Location of a proposed groundwater monitoring borehole
- Approximate location of Cook's Hole Spring
- Interpolated maximum groundwater levels mAO

Note:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

The interpolated maximum groundwater levels are based on groundwater levels recorded in boreholes TH01, TH02, TH03, TH04, TH12, TH13, TH14, TH15, TH18, TH19 and TH25 in March 2013 which comprises a date when groundwater levels at each borehole were closest to or at their respective highest levels (mAO) together with the levels of Cook's Hole Spring and the springs and seepages in the vicinity of Home Farm House presented on Figure 2.5 of the report entitled "Thornhaugh Landfill Groundwater Impact Assessment" dated March 2012 prepared by RUKhydro Limited.

	Final	KR	CN	LH	24/09/14
Rev	Status	Drn	App	Chk	Date

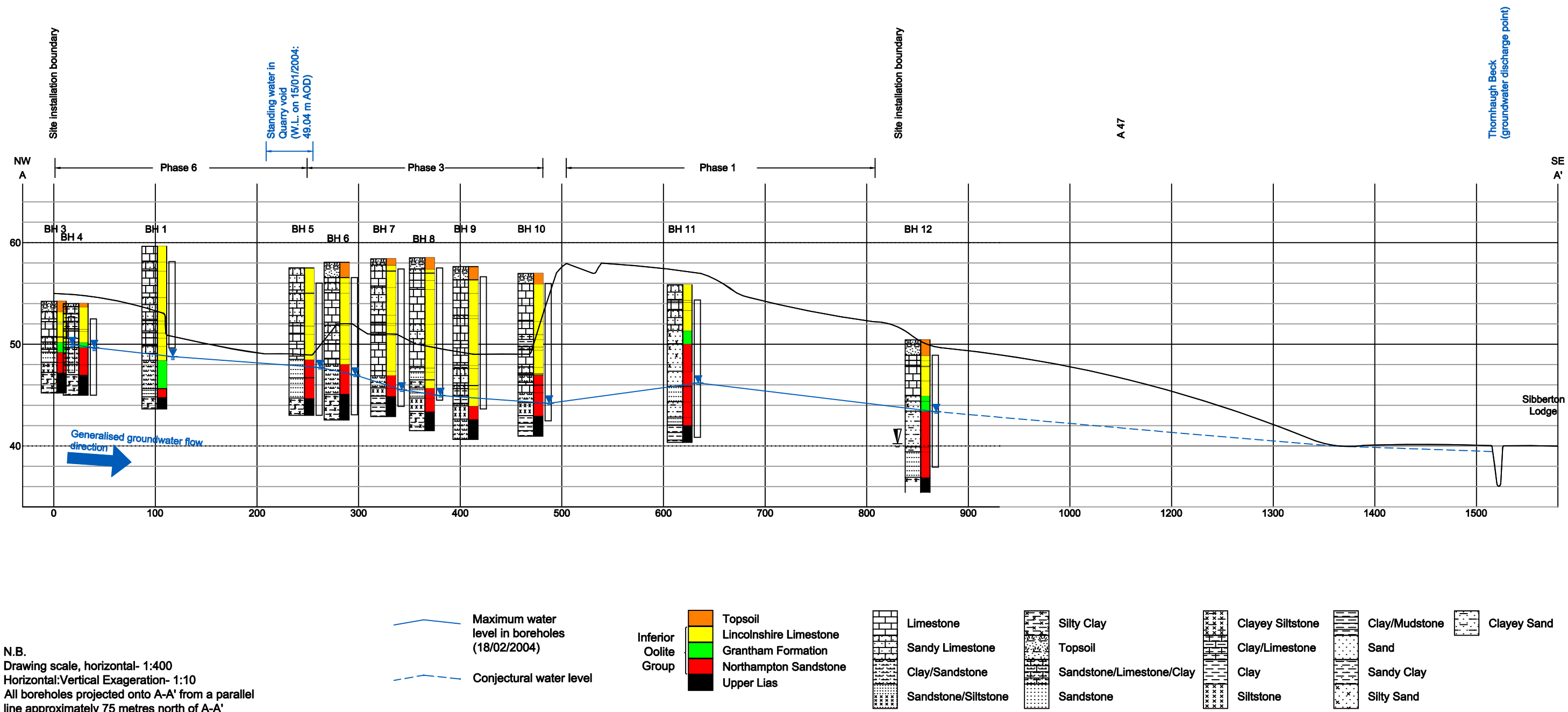
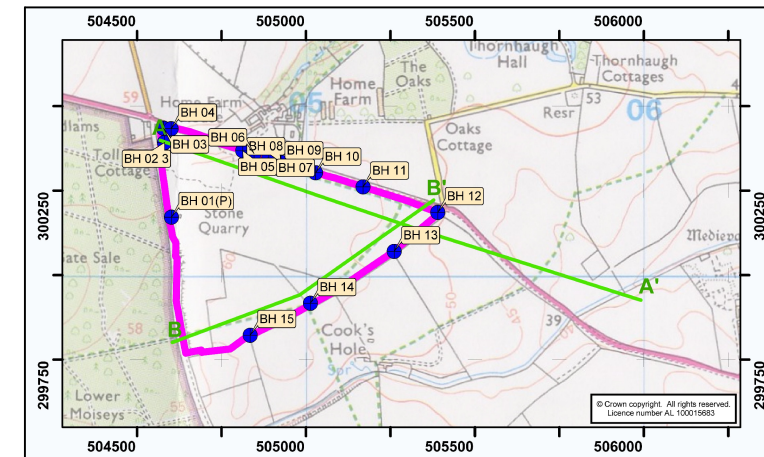
Site	Client
THORNHAUGH LANDFILL SITE	

Title
Maximum groundwater levels recorded in the Northampton Sand Formation

Figure ESID 11	Scale 1:3,000@A3
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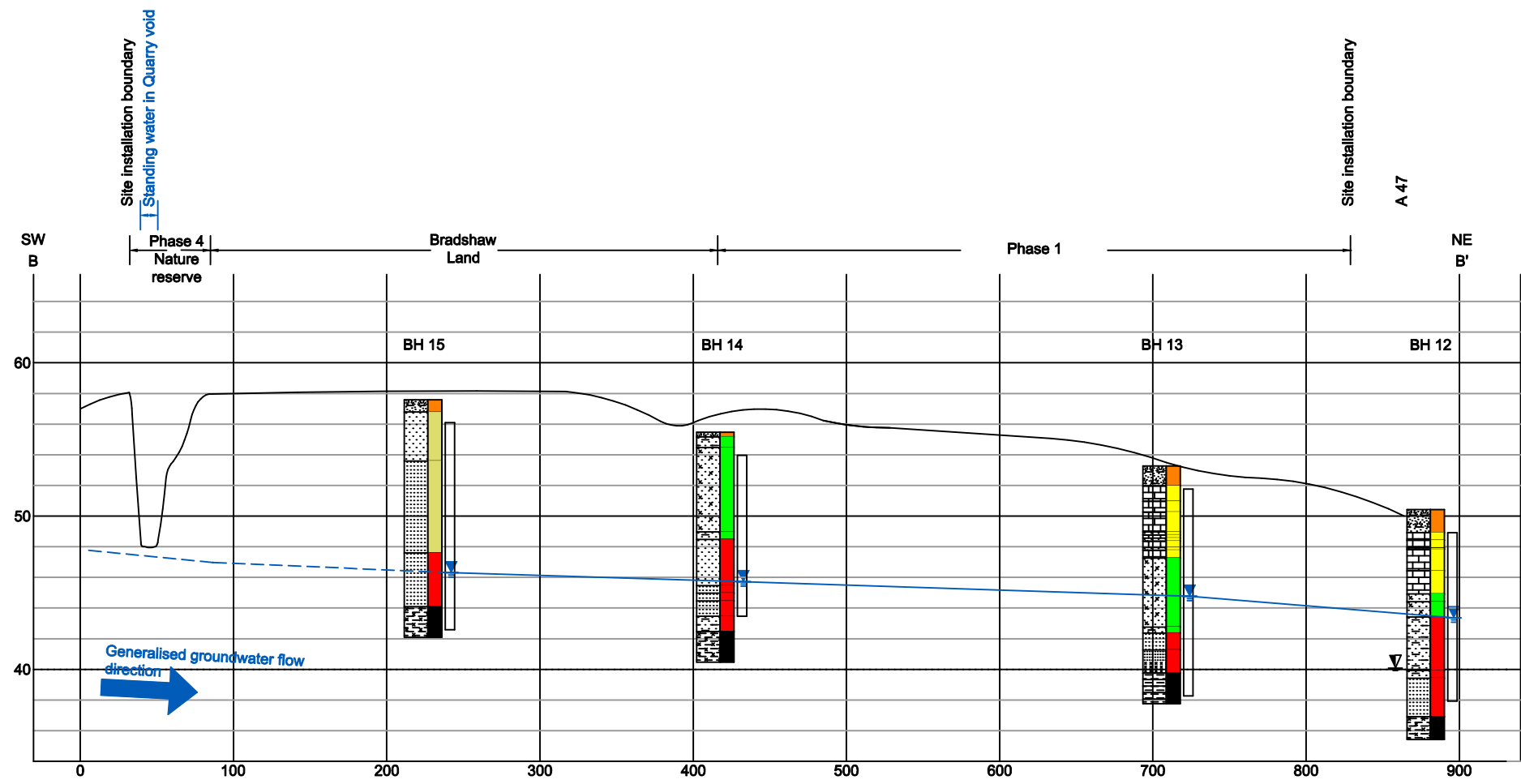
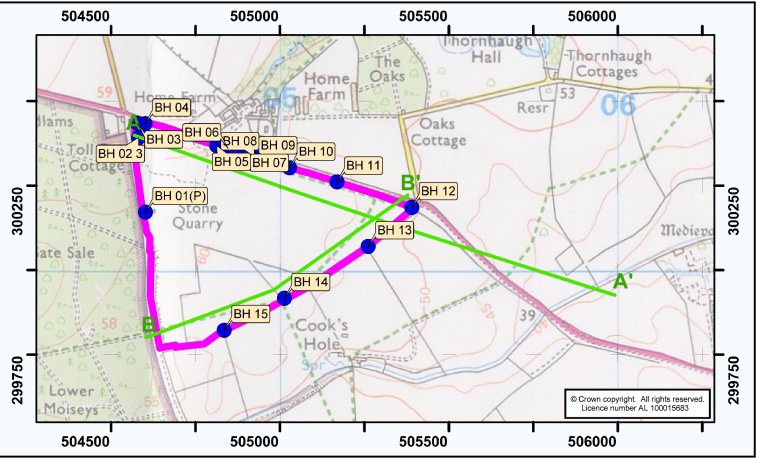
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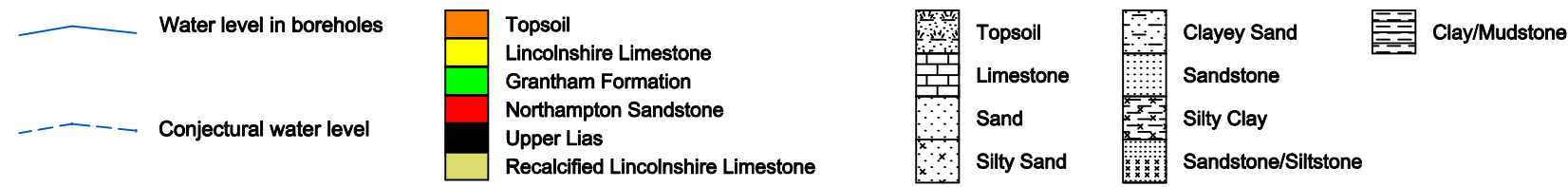


Drawing ESID12 A Hydrogeological Cross Section

Date	May 2004	Drawn	CDB
Scale	See Dwg.	Checked	JSB
Original	A3	Revision	1
File Reference	O:/6453/Reports/ESID/ESID12 A.dwg		

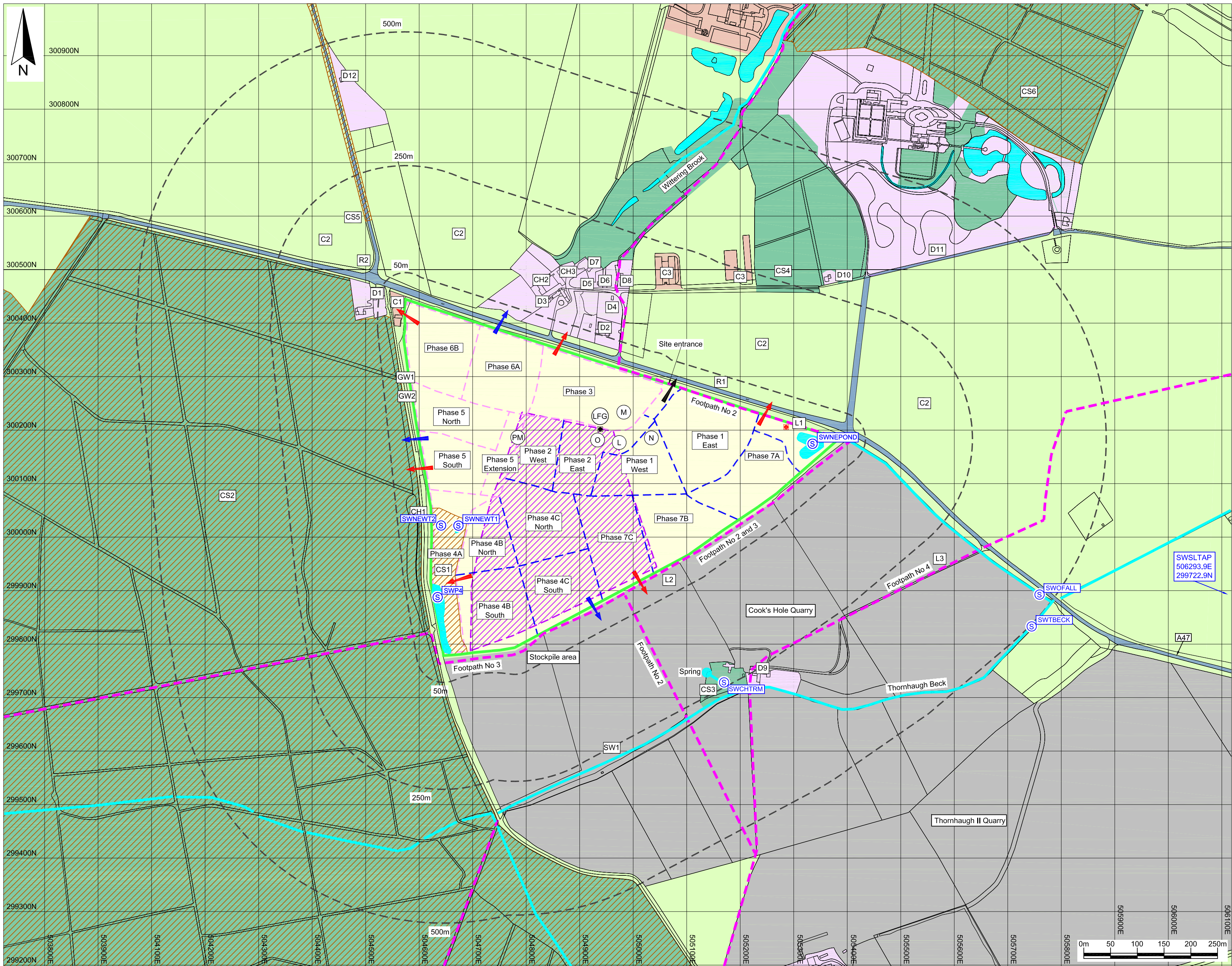


N.B.
Drawing scale, horizontal- 1:400
Horizontal:Vertical Exageration- 1:10
All boreholes projected onto B-B', from a roughly parallel line approximately 60 metres south of B-B'



Drawing ESID12 B
Hydrogeological Cross Section B-B'

Date	May 2004	Drawn	CDB
Scale	See Dwg.	Checked	JSB
Original	A3	Revision	1
File Reference			
O:/6453/Reports/ESID/ESID12.dwg			



Key / Notes

- Proposed boundary of the permitted installation
- Approximate existing phase boundaries
- Proposed phase boundaries
- Radius around the proposed installation boundary
- Public rights of way
- Existing and proposed landfill site area
- Mineral working
- Domestic dwelling
- Open spaces, parks and farmland
- Offices and commercial areas
- Major road
- Nature conservation sites
- Biodiversity Action Plan priority habitat
- Surface water feature
- Landfill gas flare (current location)
- Potential location of future relocated flare
- Approximate extent of the proposed waste processing area
- Location of a surface water monitoring point

Sources

- Odour
- Noise
- Particulate matter
- Leachate
- Mud and debris on road
- Landfill gas

Pathways

- Groundwater
- Air
- Vehicles

Receptors

- D1 etc See Table ESID 3

Note:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

The extent of designated nature conservation sites and BAP priority habitats has been obtained from the MAGIC website. The locations of nature conservation sites CS7 to CS11 are shown on Figure ESID 3. The nature conservation sites include county wildlife sites the extent of which has been obtained from URS Drawing Number D136707/EC/001 dated 06.02.12. The location and extent of public rights of way has been taken from URS Drawing Number Figure ES 3.6 undated.

	Final	KR	CF	LH	24/09/14
Rev	Status	Drm	App	Chk	Date

Site	Client
Thornhaugh Landfill Site	

Title	Source, pathways and receptors
-------	--------------------------------

Figure ESID 13	Scale
	1:5,000@A2

Drawing Ref
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APPENDICES

**TO MINIMISE THE FILE SIZE APPENDICES A, B, C AND H HAVE NOT BEEN INCLUDED
BUT ARE AVAILABLE UPON REQUEST**

APPENDIX A

**A COPY OF VHE CONSTRUCTION LETTER REPORT ENTITLED "THORNHAUGH
LANDFILL SITE PHASE 1 AND PHASE 2 - FACTUAL LETTER REPORT" DATED
31 JANUARY 2014 [ON CD ONLY]**

APPENDIX B

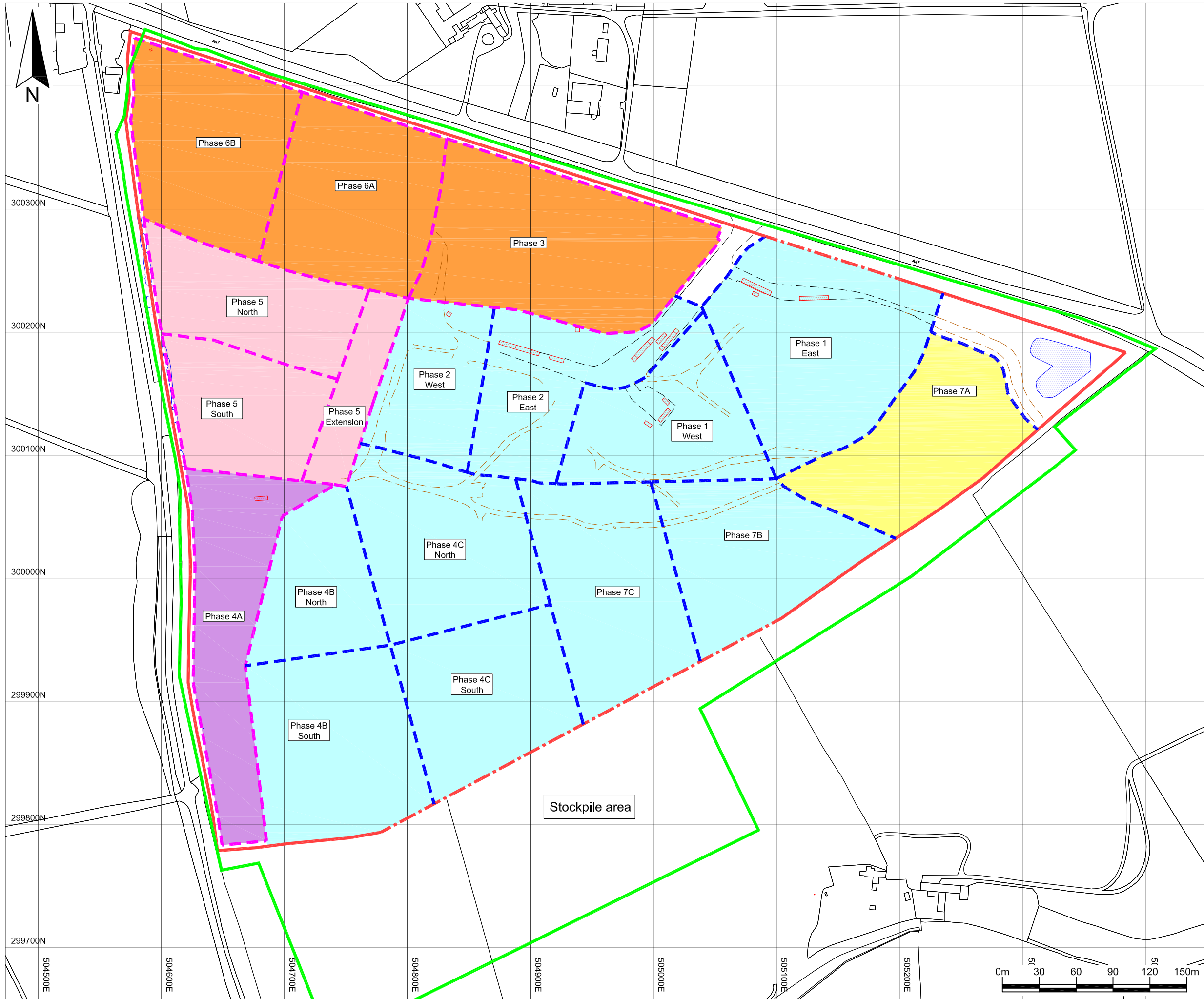
**A COPY OF MJCA REPORT REFERENCE AU/TH/DFR/3164/01 ENTITLED "REPORT OF
THE INTRUSIVE INVESTIGATION OF PHASE 1 AND 2 AT THORNHAUGH LANDFILL
SITE" DATED MAY 2014 [ON CD ONLY]**

APPENDIX C

**A COPY OF MJCA LETTER REPORT REFERENCE AU/TH/DFR/78267/P ENTITLED
“THORNHAUGH LANDFILL SITE – TRIAL PIT INVESTIGATION ALONG ACCESS
ROAD” DATED 21 MAY 2014 [ON CD ONLY]**

APPENDIX D

**COPIES OF FIGURES 1 TO 15 SHOWING THE PROPOSED 15 STAGE SEQUENTIAL
DEVELOPMENT OF THORNHAUGH LANDFILL SITE**



Key / Notes

- Planning boundary based on Figure ES3.2 Application Boundary approved 9 November 2012
- Boundary of Environmental Permit reference RP3133PP variation notice number EPR/RP3133PP/V004
- Proposed permit boundaries
- Approximate existing phase boundaries
- Proposed phase boundaries
- Existing building
- Surfaced section of internal haul road
- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. Being capped
- Capped, awaiting final restoration
- Restored
- Nature conservation habitat for great crested newts
- New buildings, structure or area

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 1

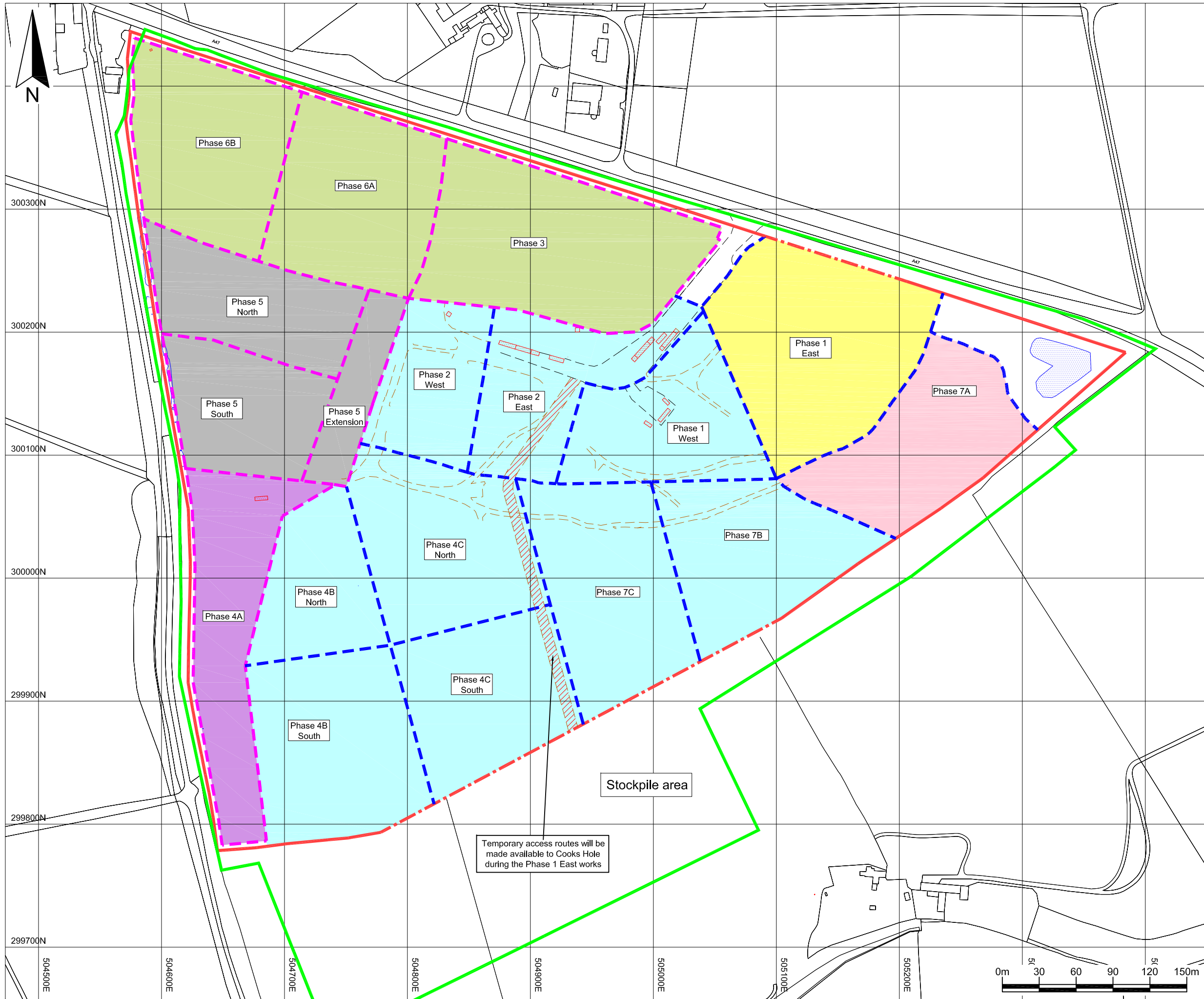
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Drawing Ref
AU/TH/09-14/18098

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Key / Notes

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- Proposed permit boundaries
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- Proposed phase boundaries
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- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
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- Capped, awaiting final restoration
- Restored
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- New buildings, structure or area

Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site	Thornhaugh Landfill Site	Client	
------	--------------------------	--------	--

Title	Stage 2
-------	---------

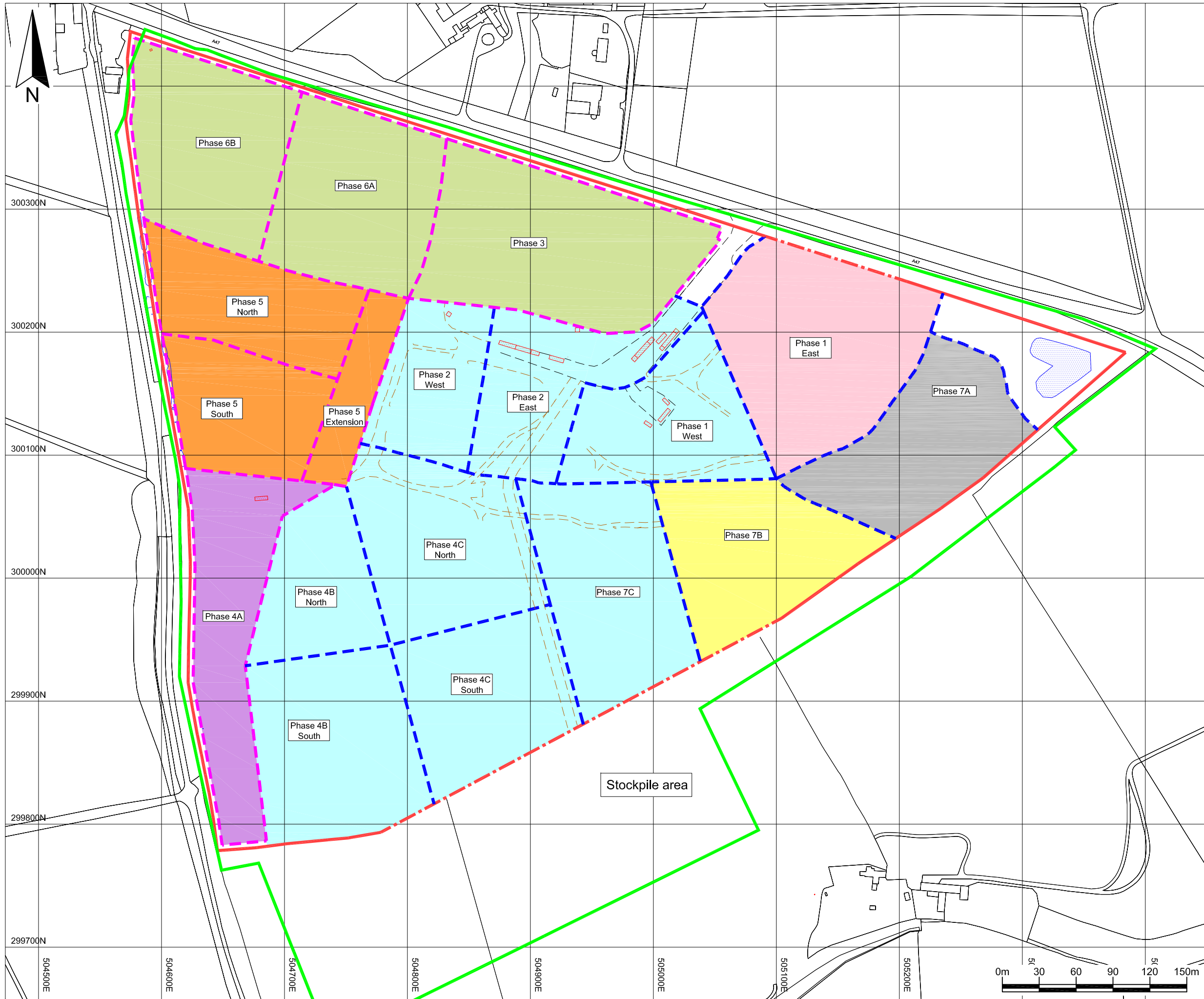
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Drawing Ref AU/TH/09-14/18099

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Key / Notes

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- Proposed phase boundaries
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- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. Being capped
- Capped, awaiting final restoration and available for stockpiling
- Restored
- Nature conservation habitat for great crested newts
- New buildings, structure or area

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 3

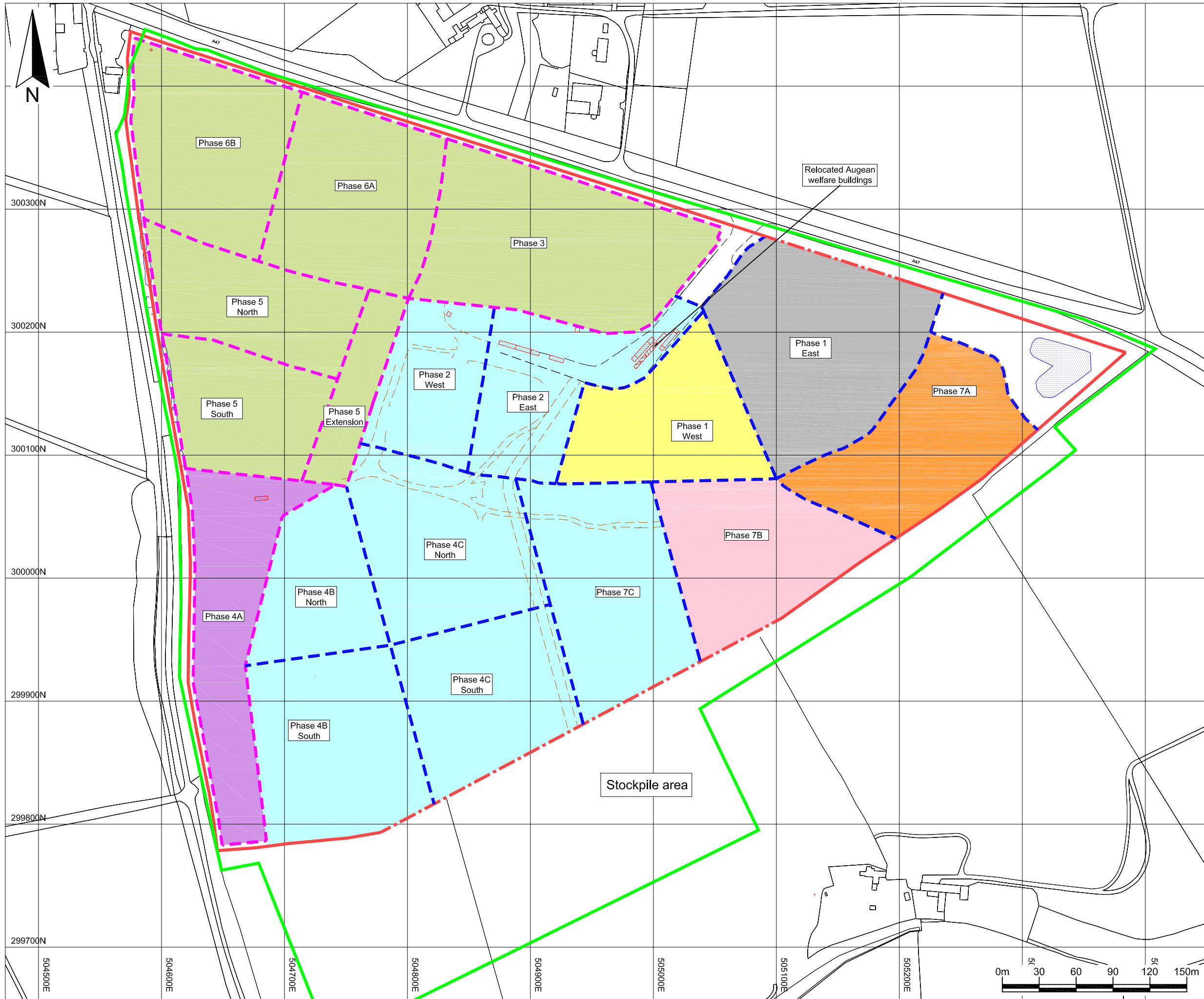
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Drawing Ref
AU/TH/09-14/18100

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Key / Notes

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- Proposed permit boundaries
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- Proposed phase boundaries
- Existing building
- Surfaced section of internal haul road
- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. Being capped
- Capped, awaiting final restoration
- Restored
- Nature conservation habitat for great crested newts
- New buildings, structure or area

Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 4

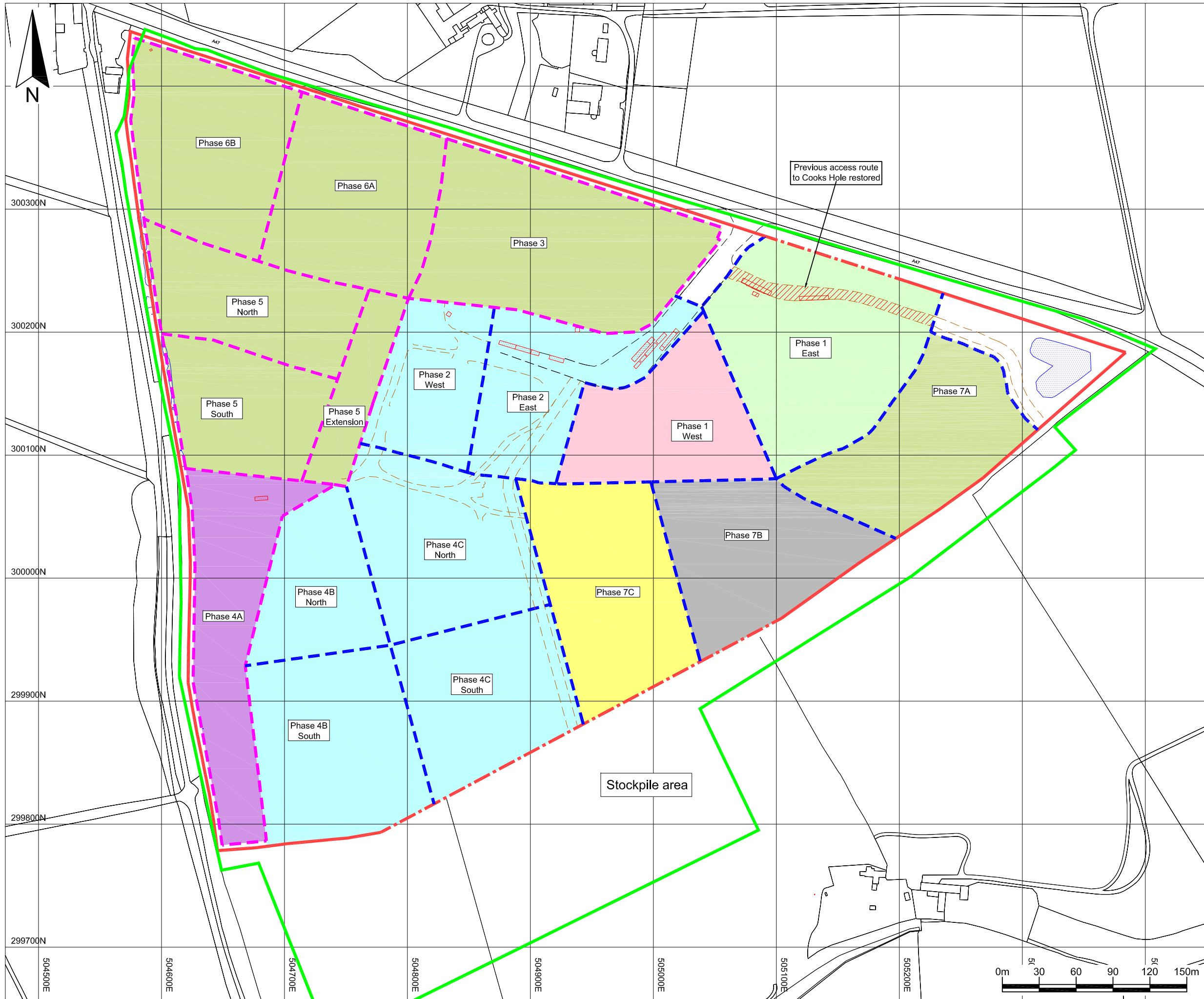
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Drawing Ref
AU/TH/0914/18101

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Key / Notes

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- Proposed phase boundaries
- Existing building
- Surfaced section of internal haul road
- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. Being capped
- Capped, to be restored at earliest opportunity, not available for stockpiling
- Restored
- Nature conservation habitat for great crested newts
- New buildings, structure or area

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client
Augean
ENERGY & CONSTRUCTION

Title
Stage 5

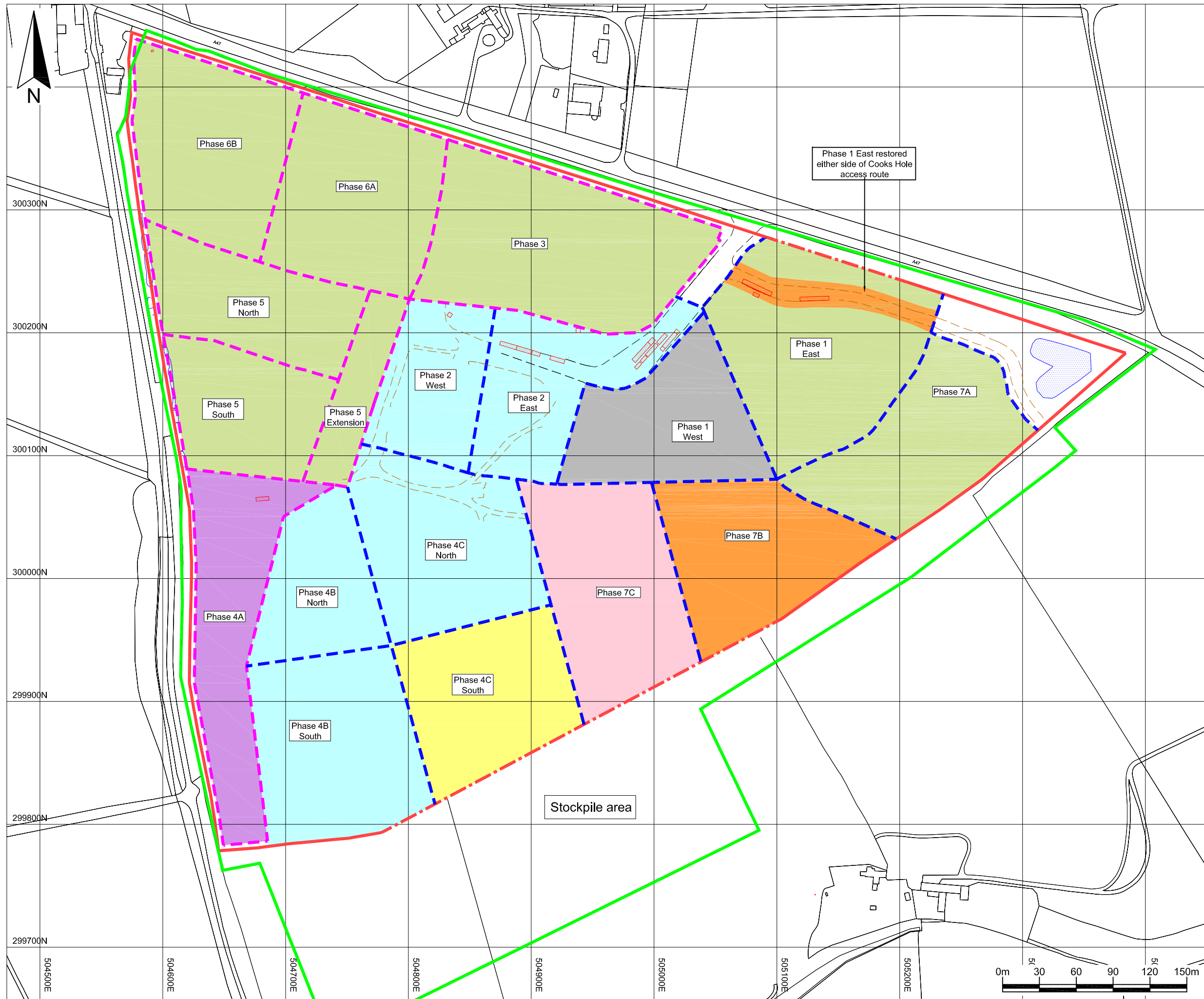
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Drawing Ref
AU/TH/09-14/18102

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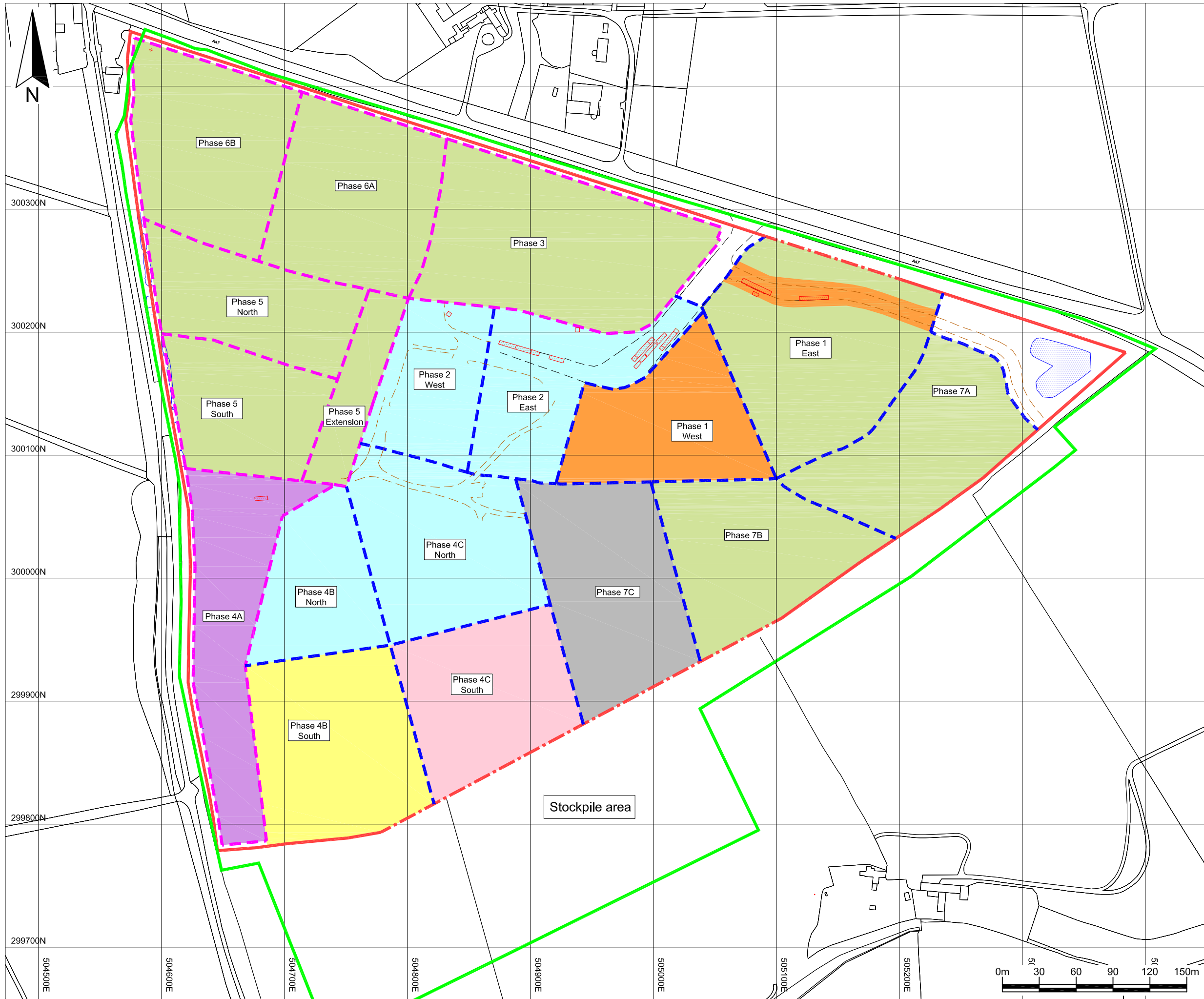
Key / Notes

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- Capped, awaiting final restoration and available for stockpiling
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- New buildings, structure or area

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899,LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date
Site Thornhaugh Landfill Site		Client 			
Title Stage 6					
Figure 6		Scale 1:3,000@A3			
Drawing Ref AU/TH/09-14/18103					
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Technical advisers on environmental issues					



Key / Notes

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- Boundary of Environmental Permit reference RP3133PP variation notice number EPR/RP3133PP/V004
- Proposed permit boundaries
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- Proposed phase boundaries
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- Surfaced section of internal haul road
- Approximate route of haul roads
- Current surface water collection areas
- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. Being capped
- Capped, awaiting final restoration and available for stockpiling
- Restored
- Nature conservation habitat for great crested newts
- New buildings, structure or area

Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

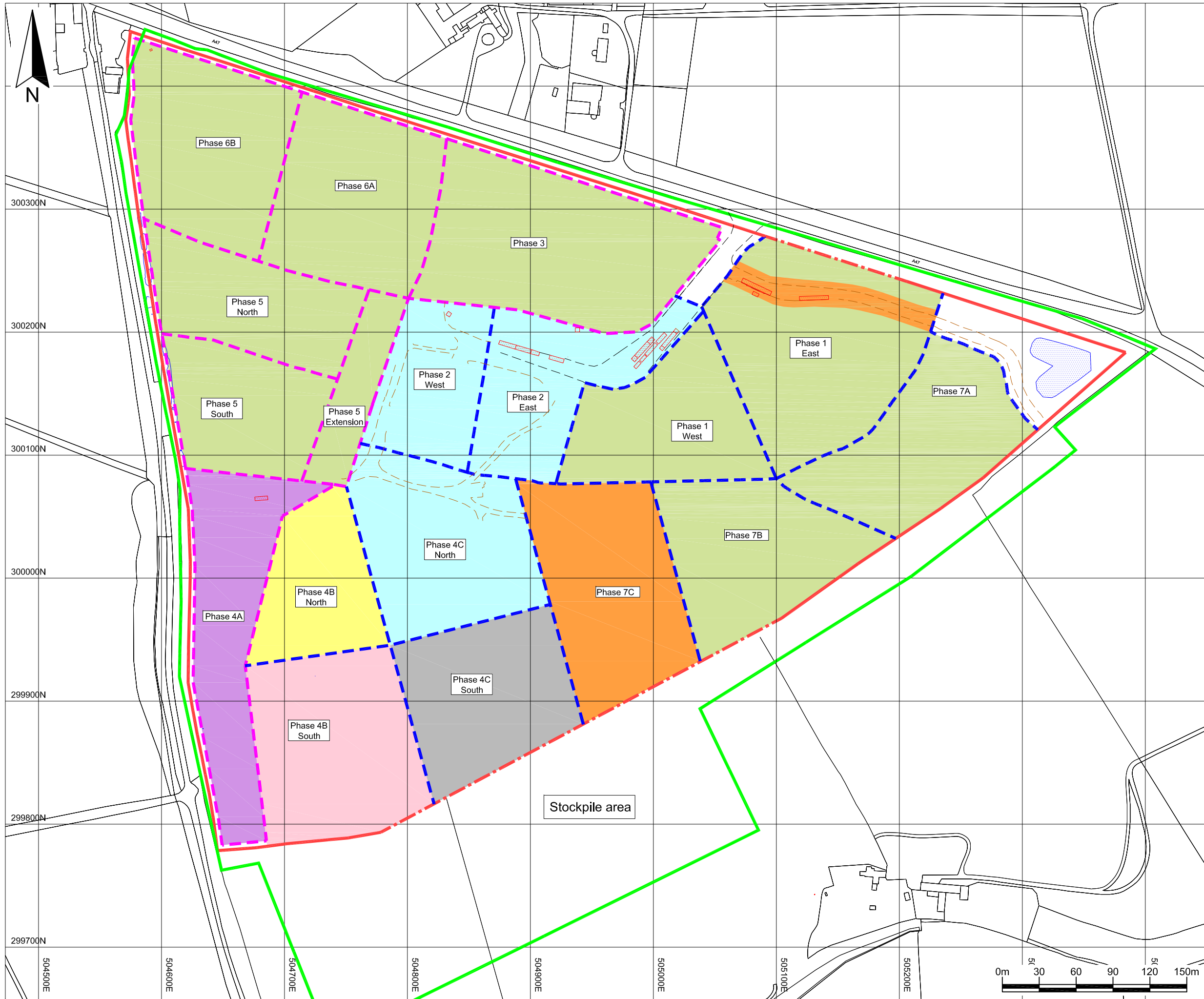
	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site	Thornhaugh Landfill Site	Client	
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Title	Stage 7
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Figure 7	Scale 1:3,000@A3
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Drawing Ref AU/TH/09-14/18104
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- Proposed phase boundaries
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- New buildings, structure or area

Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site	Thornhaugh Landfill Site	Client	
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Title	Stage 8
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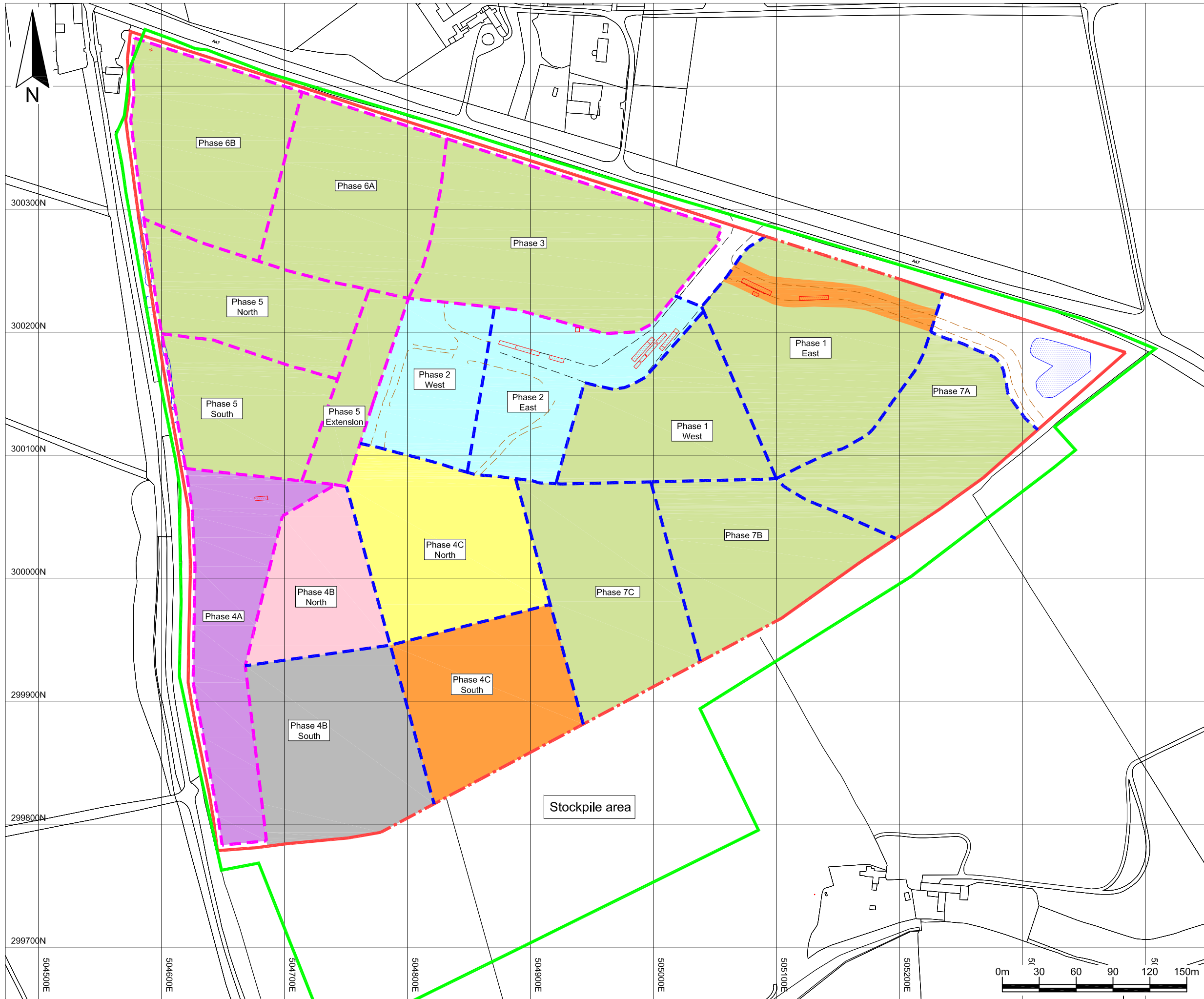
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Drawing Ref AU/TH/09-14/18105

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Key / Notes

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- Proposed phase boundaries
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- Approximate route of haul roads
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Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 9

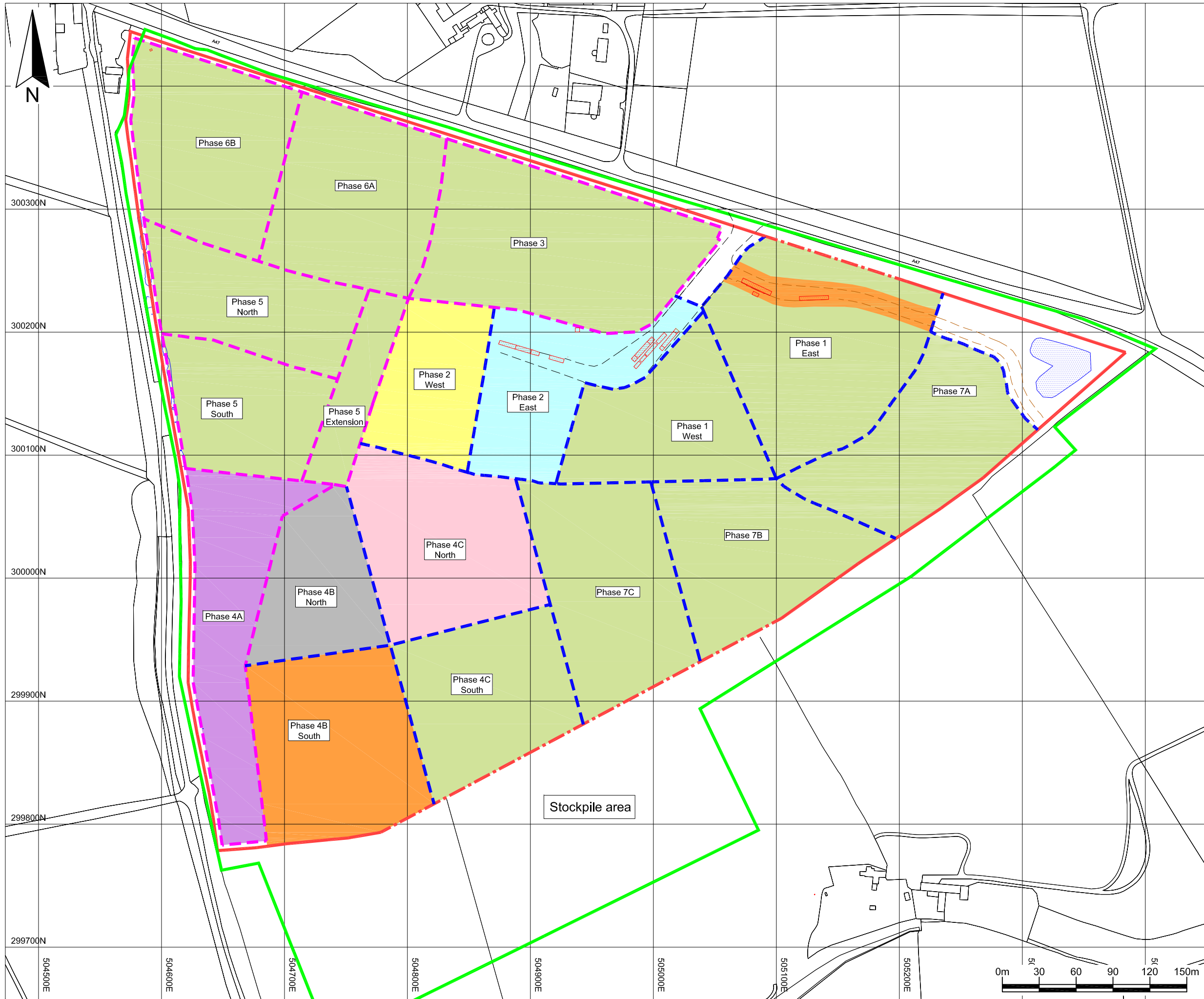
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Drawing Ref
AU/TH/09-14/18106

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Key / Notes

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- Proposed phase boundaries
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Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 10

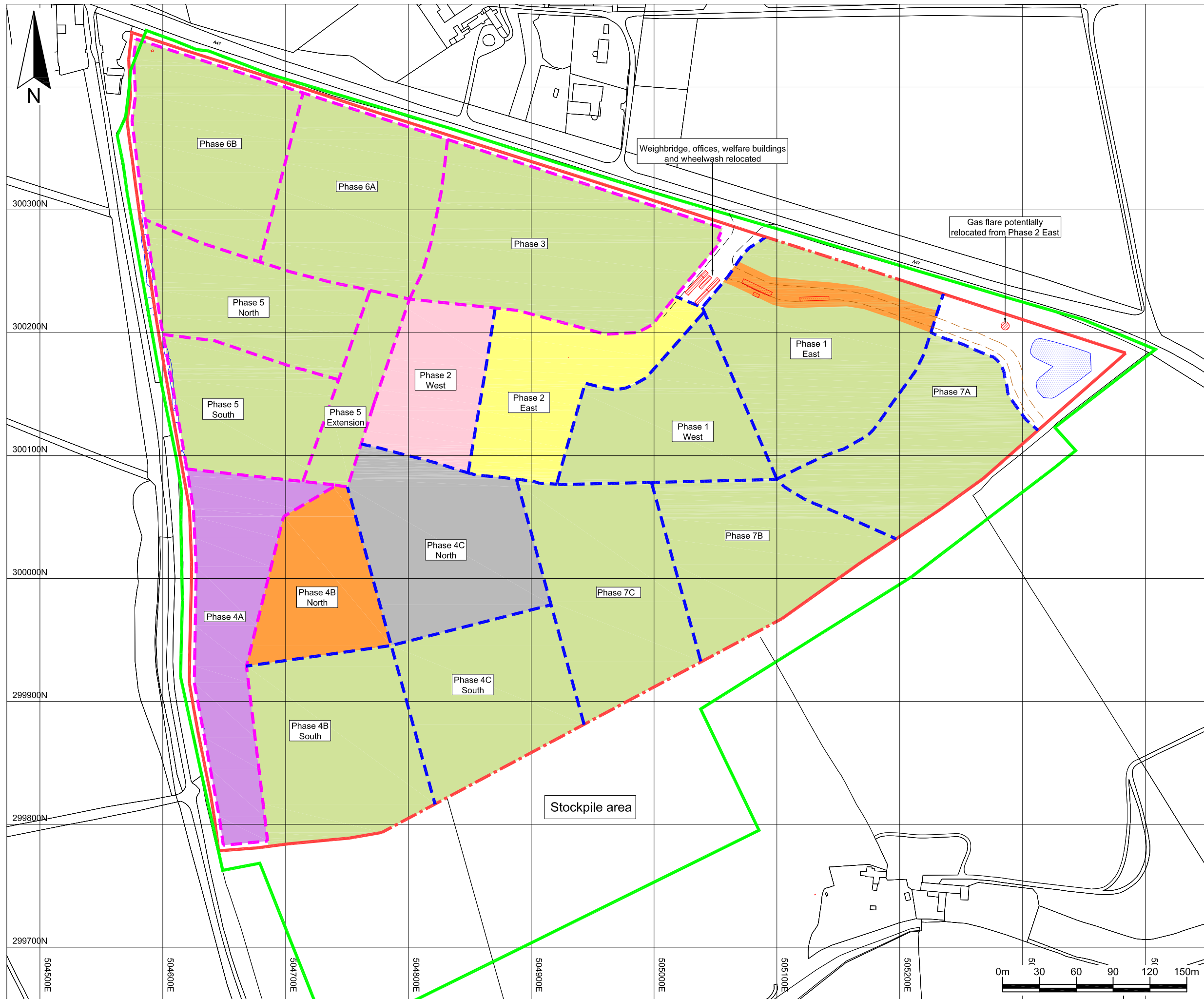
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Drawing Ref
AU/TH/09-14/18107

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Key / Notes

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- New buildings, structure or area

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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site	Thornhaugh Landfill Site	Client	
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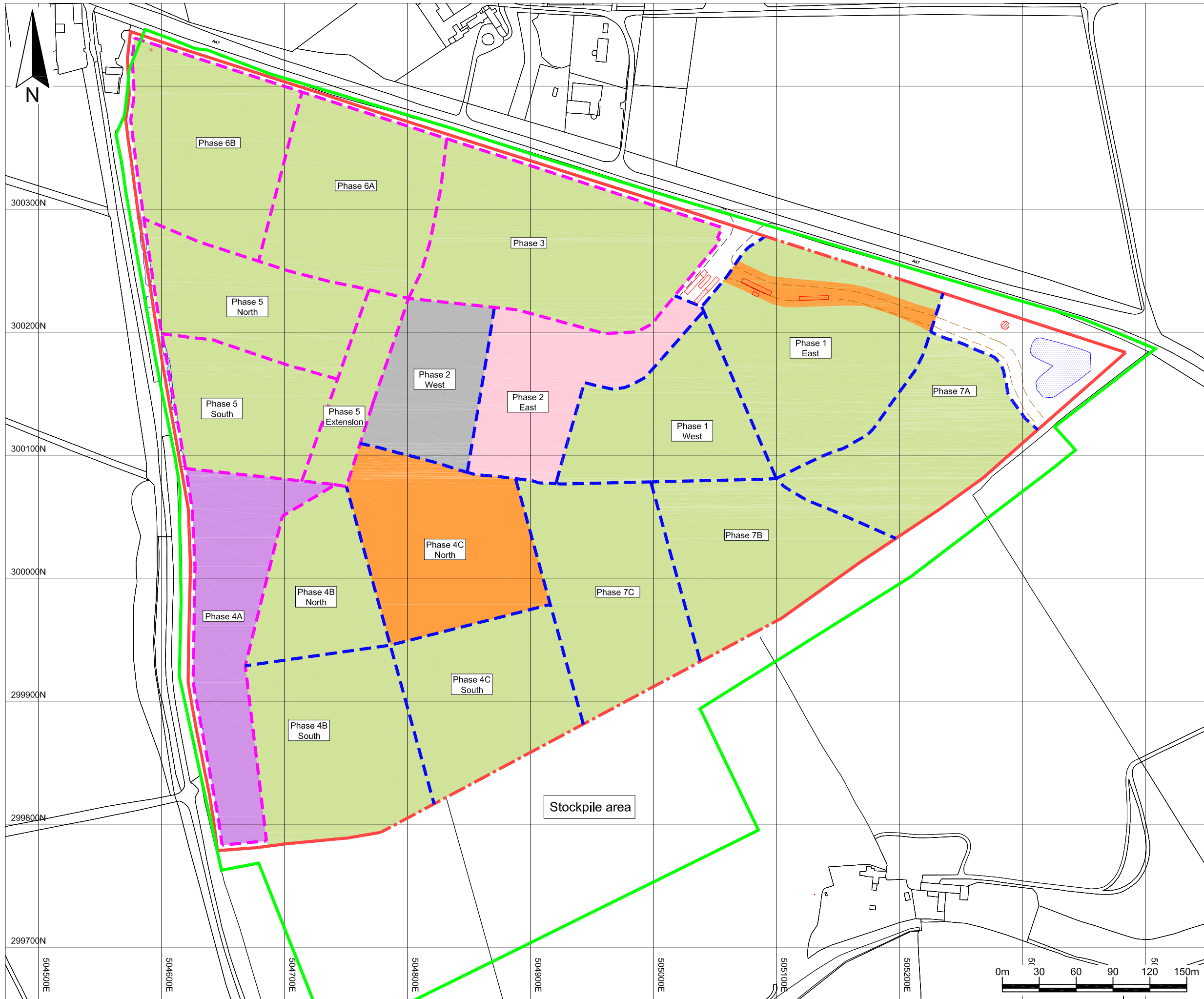
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Drawing Ref AU/TH/08-14/18108
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Key / Notes

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- Approximate route of haul roads
- Current surface water collection areas
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Notes:
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Drawing based on survey reference AU-US-11899,LSS

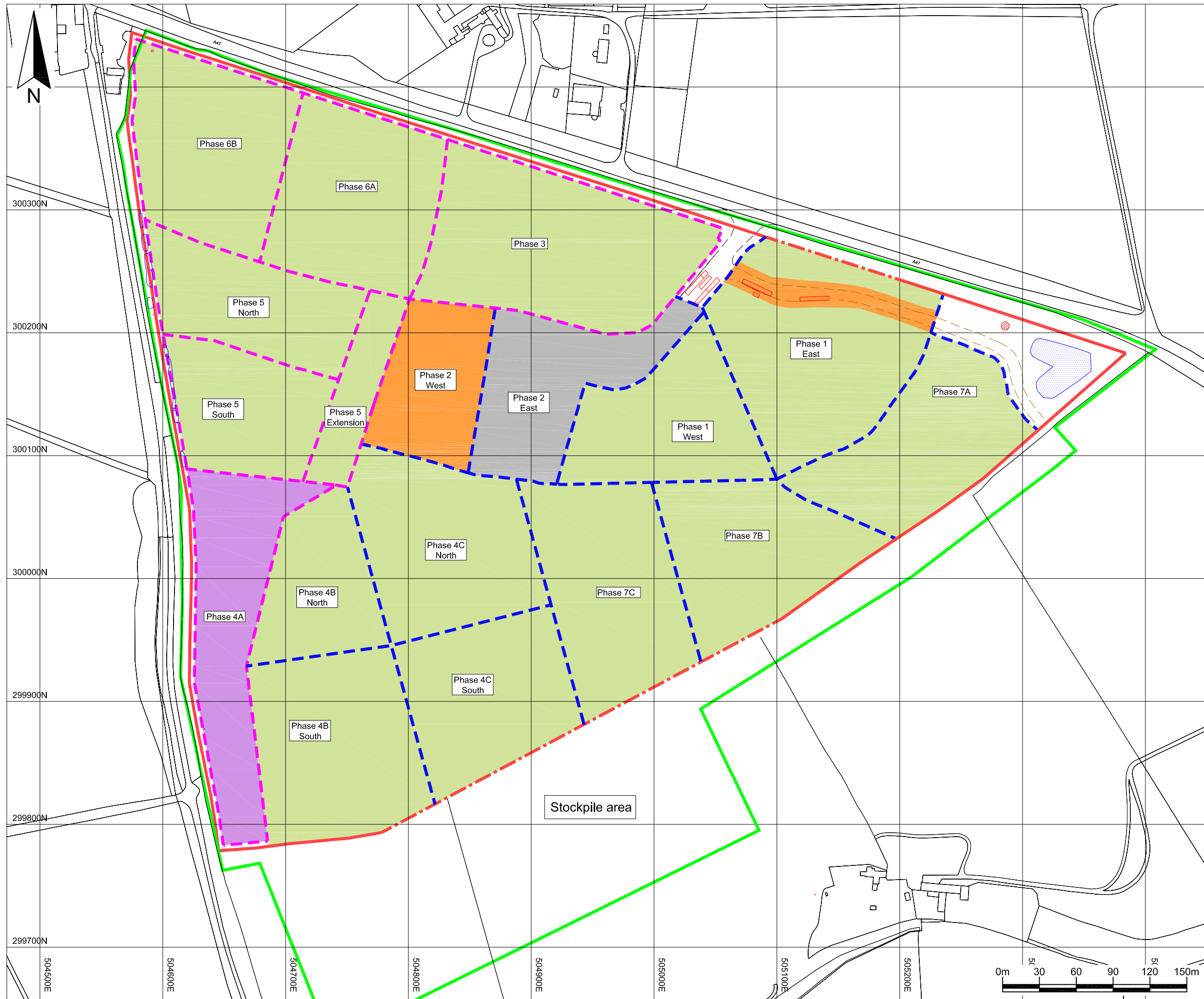
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Rev	Status	Drn	App	Chk	Date
Site	Thornhaugh Landfill Site				
Client					

Title
Stage 12

Figure 12
Scale
1:3,000@A3

Drawing Ref
AU/TH/09-14/18109

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- Restored
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- New buildings, structure or area

Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 13

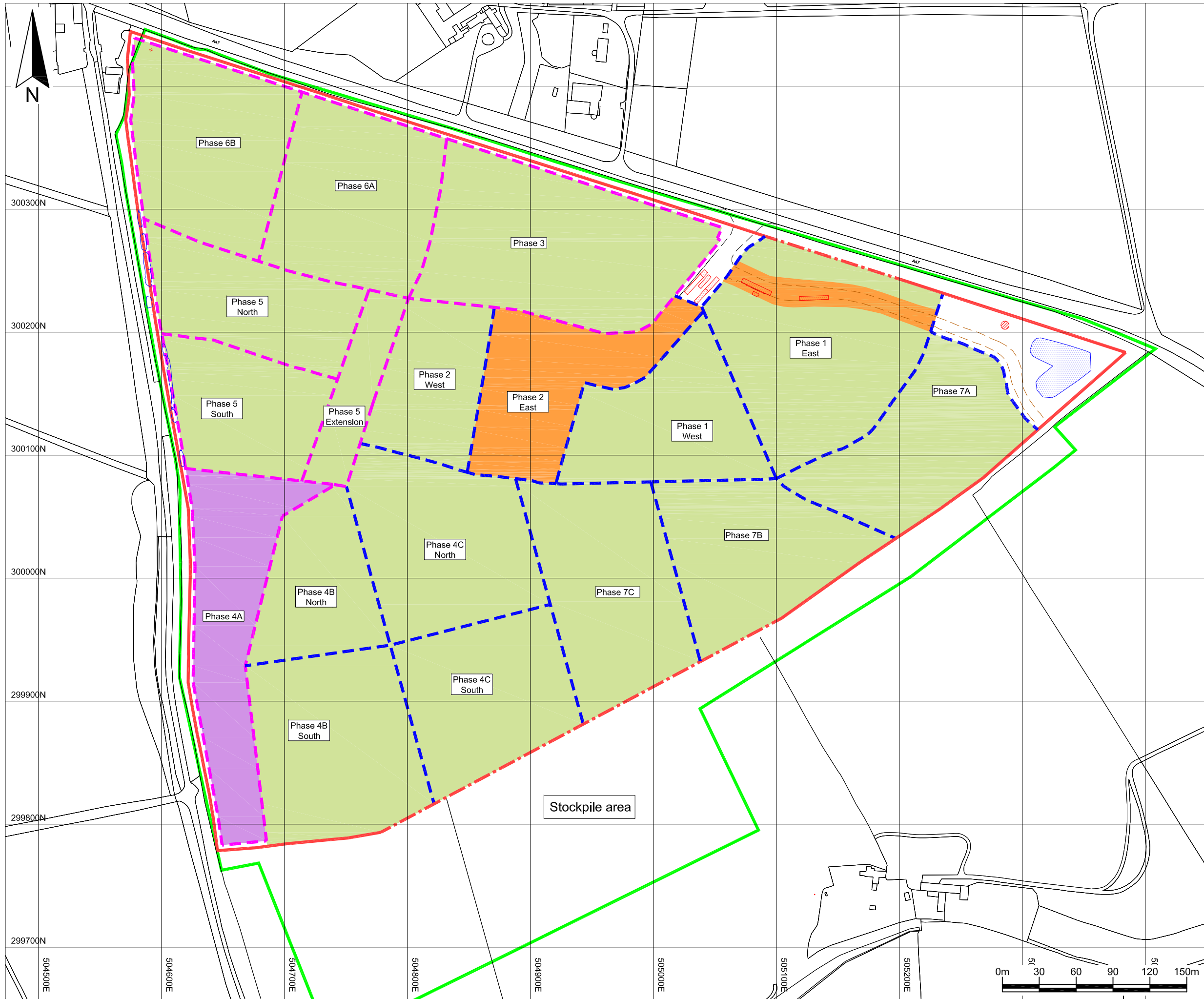
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Drawing Ref
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Key / Notes

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- Proposed phase boundaries
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- Approximate route of haul roads
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- Unprepared area available for stockpiling
- Excavation and preparation for landfilling
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- Restored
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Notes:
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Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date

Site
Thornhaugh Landfill Site

Client

Title
Stage 14

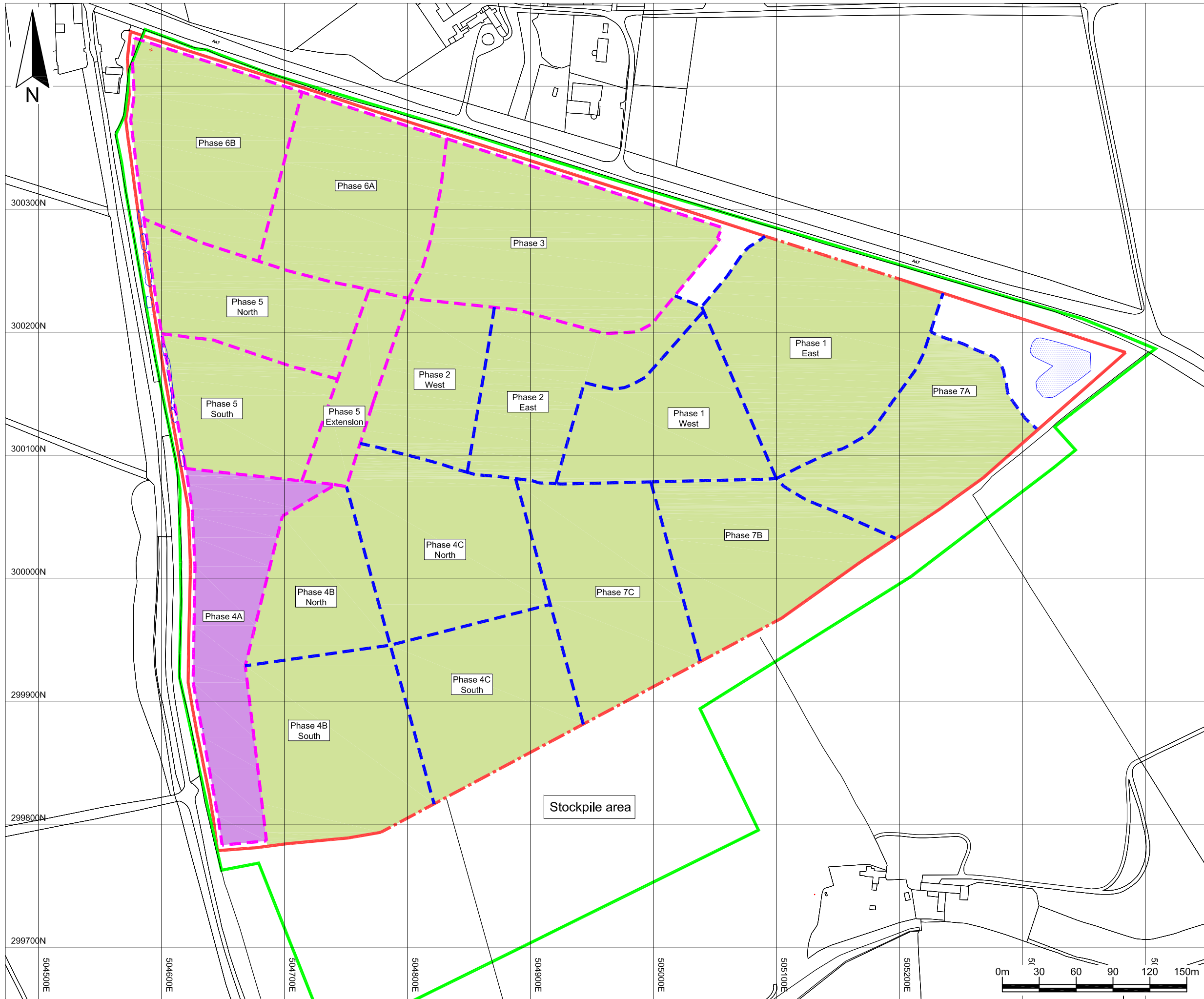
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Scale
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Drawing Ref
AU/TH/09-14/18111

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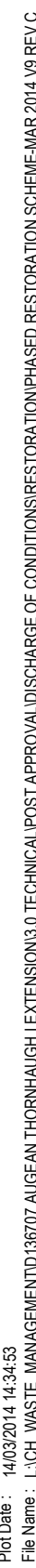
Notes:
The proposed phasing shown is approximate and, while the principles and order of phasing are unlikely to change, phase boundaries and haul routes may change in response to operational conditions.

Drawing based on survey reference AU-US-11899.LSS

	Final	KR	LCH	DFR	30/09/14
Rev	Status	Drn	App	Chk	Date
Site Thornhaugh Landfill Site		Client 			
Title Stage 15					
Figure 15		Scale 1:3,000@A3			
Drawing Ref AU/TH/09-14/18112					
Reproduced scale mapping by permission of Ordnance Survey® on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright 2006. All rights reserved. Licence number 100017818.					
		Baddesley Colliery Offices, Main Road, Baxterley, Atherstone, Warwickshire, CV9 2LE. Telephone : 01827 717891 Fax : 01827 718507			
Technical advisers on environmental issues					

APPENDIX E

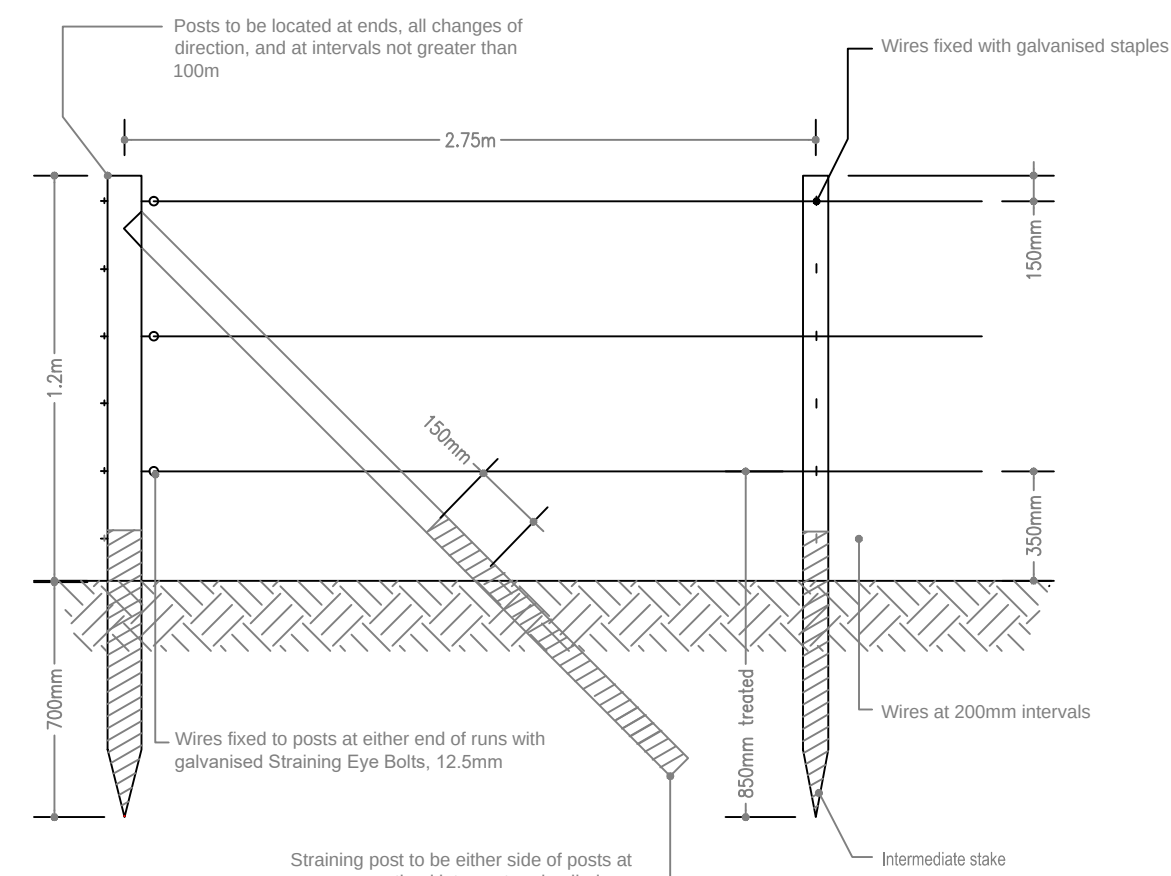
**A COPY OF URS DRAWING NUMBER 47047967_LD_001 REV C DATED 12 MARCH
2014 ENTITLED "PLANNING APPLICATION CONDITION 5 LANDSCAPE
MASTERPLAN"**



Phase	3, 5 & 6	A1	B1	A2	B2	A3	A4	B3	A5	B4	B5	Stockpile
Calcareous Grassland	30,600 m ²	8,600 m ²	16,400 m ²	3,000 m ²	9,700 m ²	6,800 m ²	600 m ²	28,700 m ²	7,700 m ²	11,500 m ²	4,000 m ²	36,900 m ²
Open Calcareous Grassland	100 m ²	0	0	0	0	1,200 m ²	900 m ²	200 m ²	900 m ²	0	700 m ²	0

Calcareous Grassland Seed Mix			
EM6: Meadow Mixture for Chalk and Limestone Soils			
Herbs			
%	Latin name	Common name	
0.5	<i>Achillea millefolium</i>	Yarrow	
1.5	<i>Anthrillix vulneraria</i>	Kidney vetch	
1	<i>Centaurea nigra</i>	Common knapweed	
1	<i>Centaurea scabiosa</i>	Greater knapweed	
0.5	<i>Clinopodium vulgare</i>	Wild basil	
1	<i>Daucus carota</i>	Wild carrot	
0.5	<i>Filipendula vulgaris</i>	Dropwort	
1	<i>Galium verum</i>	Lacy's bedstraw	
1.5	<i>Knaulia arvensis</i>	Field scabious	
0.5	<i>Leontodon hispidus</i>	Rough hawkbit	
1	<i>Leucanthemum vulgare</i>	Oxeye daisy	
2	<i>Lotus corniculatus</i>	Birdsfoot trefoil	
0.5	<i>Origanum vulgare</i>	Wild marjoram	
0.5	<i>Pimpinella saxifraga</i>	Burnet-saxifrage	
1	<i>Plantago media</i>	Hoary plantain	
1	<i>Primula veris</i>	Cowslip	
1	<i>Prunella vulgaris</i>	Selfheal	
1	<i>Ranunculus acris</i>	Meadow buttercup	
0.5	<i>Reseda lutea</i>	Wild mignonette	
2	<i>Sanguisorba minor</i> (<i>Poterium sanguisorba</i>)	Said burnet	
0.5	<i>Scabiosa columbaria</i>	Small scabious	
20			
Grasses			
%	Latin name	Common name	
1	<i>Briza media</i>	Quaking grass (w)	
32	<i>Cynosurus cristatus</i>	Crested dogtail	
22	<i>Festuca ovina</i>	Sheep's fescue	
16	<i>Festuca rubra</i>	Slender-creeping red-fescue	
1	<i>Koeleria macrantha</i>	Crested hair-grass (w)	
5	<i>Phleum bertolonii</i>	Smaller cat's-tail	
3	<i>Trisetum flavescens</i>	Yellow oat-grass (w)	

80



- NOTES**
1. All timber is to be sweet chestnut or larch, peeled.
 2. Straining posts are to be 75mm diameter, approx 1.5m long, and treated with an approved timber preservative to 150mm above ground level.
 3. Wires are to be fixed by means of galvanised Straining Eye Bolts through posts at beginnings and ends of runs, and by being fixed to intermediate stakes with galvanised staples.
 4. Tree protection fence to be located 2m from the limit of extraction boundary where space allows.

Designed RC	Drawn RC	Checked NW	Approved Approved by	Date Approved Date
URS Internal Project No. 47047967		Subsidiary PLANNING		
Scale @ A1 1:2500		Zone / Mileage Zone / Mileage		

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Rev C

Proposed Trees and Shrubs

Native shrub and tree mixes to be notched planted at 3m centres in some species groups of 5 - 9 with a random distribution of species in a random configuration avoiding straight lines and regular geometric patterns.

Open shrub mix to be notched planted at 4m centres, over 50% of the area, in some species groups of 5 - 9 with a random distribution of species in a random configuration avoiding straight lines and regular geometric patterns.

Shrub mix to be notched planted at 350mm centres in a double staggered row 350mm apart. All trees and shrubs to be fitted with 600 mm high Tubex standard tree protector supported by an appropriate wooden stake and fitted as per manufacturers recommendations.

Planting will be undertaken in the period November to March into areas previously seeded with a calcareous grassland seed mix.

A 50 cm diameter weed free area shall be maintained around each planted tree.

- BS 3936-1:1992. Nursery stock. Specification for trees and shrubs
- BS 3882: 2007 Specification for topsoil and requirements for use (incorporating Corrigendum No.1)
- BS 4428:1989. Code of practice for general landscape operations (excluding hard surfaces) (AMD 6784)
- BS 5837: 2012 Trees in relation to construction - Recommendations (AMD Corrigendum 15988)
- BS 7370-3:1991. Grounds maintenance. Recommendations for maintenance of amenity and functional turf (other than sports turf)

Losses of less than 10% of the total numbers of plants will introduce an element of randomness and habitat variation within the planting areas, particularly the scrub, which is desirable.

THORNHAUGH LANDFILL

PLANNING APPLICATION CONDITION 5 LANDSCAPE MASTERPLAN

Designed RC	Drawn RC	Checked NW	Approved Approved by	Date Approved Date
----------------	-------------	---------------	-------------------------	-----------------------

URS Internal Project No. 47047967	Suitability PLANNING
Scale @ A1 1:2500	Zone / Mileage Zone / Mileage

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Drawing Number
47047967_LD_001

Rev C

APPENDIX F

WIND DATA FOR WITTERING AIRFIELD FOR 2009 TO 2013

Wittering_2009_2013

Station ID: 034620
Start Date: 1/1/2009 - 00:00
End Date: 12/31/2013 - 23:00

Frequency Distribution
(Count)

Wind Direction Total	Speed m/s						
	0.5 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	>= 10.0
348.75 - 11.25 1958	165	352	455	744	193	40	9
11.25 - 33.75 2494	188	332	485	921	452	93	23
33.75 - 56.25 2724	189	356	419	923	571	194	72
56.25 - 78.75 1487	145	234	337	479	201	78	13
78.75 - 101.25 963	164	205	198	272	96	25	3
101.25 - 123.75 1312	269	347	241	329	103	22	1
123.75 - 146.25 1514	407	416	321	303	59	8	0
146.25 - 168.75 1975	306	383	375	541	275	80	15
168.75 - 191.25 2937	287	402	502	875	524	237	110
191.25 - 213.75 4463	257	462	598	1248	1003	544	351
213.75 - 236.25 4732	258	404	554	1257	1160	694	405
236.25 - 258.75 5135	199	381	667	1723	1273	617	275
258.75 - 281.25 4169	202	400	792	1480	710	393	192
281.25 - 303.75 3160	176	408	563	1043	623	249	98
303.75 - 326.25 2431	209	370	533	948	298	61	12
326.25 - 348.75 1898	144	300	499	699	200	49	7
Sub-Total:	3565	5752	7539	13785	7741	3384	1586

Wittering_2009_2013

43352 Calms: 190
Missing/Incomplete: 137
Total: 43679

Frequency of Calm Winds: 0.44%
Average Wind Speed: 4.86 m/s

Station ID: 034620
Start Date: 1/1/2009 - 00:00
End Date: 12/31/2013 - 23:00

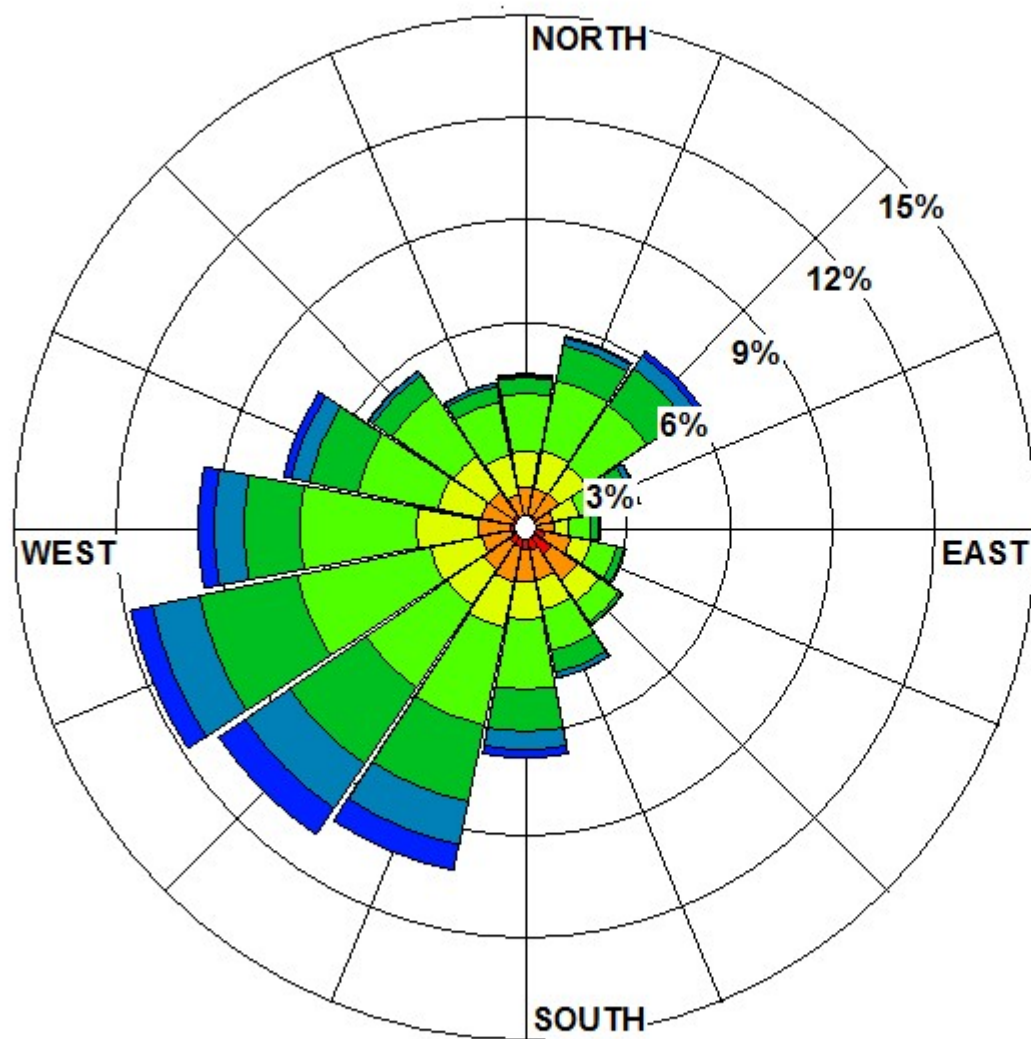
Frequency Distribution (Normalized)

Wind Direction Total	Speed m/s						
	0.5 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	>= 10.0
348.75 - 11.25 0.044968	0.003789	0.008084	0.010450	0.017087	0.004433	0.000919	0.000207
11.25 - 33.75 0.057278	0.004318	0.007625	0.011139	0.021152	0.010381	0.002136	0.000528
33.75 - 56.25 0.062560	0.004341	0.008176	0.009623	0.021198	0.013114	0.004455	0.001654
56.25 - 78.75 0.034151	0.003330	0.005374	0.007740	0.011001	0.004616	0.001791	0.000299
78.75 - 101.25 0.022117	0.003766	0.004708	0.004547	0.006247	0.002205	0.000574	0.000069
101.25 - 123.75 0.030132	0.006178	0.007969	0.005535	0.007556	0.002366	0.000505	0.000023
123.75 - 146.25 0.034771	0.009347	0.009554	0.007372	0.006959	0.001355	0.000184	0.000000
146.25 - 168.75 0.045359	0.007028	0.008796	0.008612	0.012425	0.006316	0.001837	0.000344
168.75 - 191.25 0.067452	0.006591	0.009232	0.011529	0.020096	0.012034	0.005443	0.002526
191.25 - 213.75 0.102499	0.005902	0.010610	0.013734	0.028662	0.023035	0.012494	0.008061
213.75 - 236.25 0.108677	0.005925	0.009278	0.012723	0.028869	0.026641	0.015939	0.009301

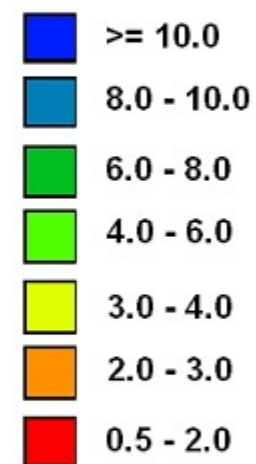
				Wittering_2009_2013				
236.25 - 258.75	0.004570	0.008750	0.015319	0.039571	0.029236	0.014170	0.006316	
0.117932								
258.75 - 281.25	0.004639	0.009187	0.018189	0.033990	0.016306	0.009026	0.004410	
0.095747								
281.25 - 303.75	0.004042	0.009370	0.012930	0.023954	0.014308	0.005719	0.002251	
0.072574								
303.75 - 326.25	0.004800	0.008498	0.012241	0.021772	0.006844	0.001401	0.000276	
0.055831								
326.25 - 348.75	0.003307	0.006890	0.011460	0.016053	0.004593	0.001125	0.000161	
0.043590								
Sub-Total:	0.081875	0.132102	0.173143	0.316591	0.177782	0.077718	0.036425	
0.992514								
Calms:							0.004350	
Missing/Incomplete:							0.003137	
Total:							1.000000	

Frequency of Calm Winds: 0.44%
Average Wind Speed: 4.86 m/s

Wittering, UK 2009-2013



Wind Speed
(m/s)



Calms: 0.44%

APPENDIX G

**LICENSED AND UNLICENSED GROUNDWATER AND SURFACE WATER
ABSTRACTIONS WITHIN 4KM OF THE APPLICATION BOUNDARY**

Deregulated licences in 4km rectangle around TF 049 001.

Licence No.	Revoked Date	Use Description	Point Name	NGR 1	NGR 1 Cartesian	Max Daily Quantity (m3)	Max Annual Quantity (m3)
5/32/08/*G/0003	31/03/2005	General Farming & Domestic	BOREHOLE AT LAW'S LAWN	TL02109901	502100 299010	7.96	2659
5/32/08/*G/0003	31/03/2005	General Farming & Domestic	BOREHOLE AT LAW'S LAWN	TL02109901	502100 299010	7.96	2659
5/32/09/*G/0023	31/03/2005	Process Water	BOREHOLE "A", YARWELL	TL03979855	503970 298550	15	4255
5/32/09/*G/0023	31/03/2005	Process Water	BOREHOLE "A", YARWELL	TL03979855	503970 298550	15	4255
5/32/09/*G/0093	31/03/2005	General Washing/Process Washing	WELL AT NASSINGTON	TL06159660	506150 296600	13.6	1909.4
5/32/09/*G/0093	31/03/2005	General Washing/Process Washing	WELL AT NASSINGTON	TL06159660	506150 296600	13.6	1909.4
5/32/09/*G/0093	31/03/2005	Spray Irrigation - Direct	WELL AT NASSINGTON	TL06159660	506150 296600	13.6	1909.4
5/32/09/*G/0093	31/03/2005	Spray Irrigation - Direct	WELL AT NASSINGTON	TL06159660	506150 296600	13.6	1909.4
5/32/09/*G/0095	31/03/2005	General Farming & Domestic	WELL "A" AT MANOR FARM	TL07119782	507110 297820	4.66	1627
5/32/09/*G/0095	31/03/2005	General Farming & Domestic	WELL "B" AT MANOR FARM	TL07219765	507210 297650	4.66	1627
5/32/09/*G/0095	31/03/2005	General Farming & Domestic	WELL "A" AT MANOR FARM	TL07119782	507110 297820	4.66	1627
5/32/09/*G/0095	31/03/2005	General Farming & Domestic	WELL "B" AT MANOR FARM	TL07219765	507210 297650	4.66	1627
5/32/09/*G/0106	31/03/2005	General Farming & Domestic	WELL AT THORNHAUGH	TL053993	505300 299300	0.68	114
5/32/09/*G/0106	31/03/2005	General Farming & Domestic	WELL AT THORNHAUGH	TL053993	505300 299300	0.68	114
5/32/09/*G/0124	31/03/2005	General Farming & Domestic	2 WELLS AT NASSINGTON	TL063962	506300 296200	3.41	1000
5/32/09/*G/0124	31/03/2005	General Farming & Domestic	2 WELLS AT NASSINGTON	TL063962	506300 296200	3.41	1000
5/32/09/*G/0128	31/03/2005	General Farming & Domestic	WELL IN STOCK YARD, YARWELL	TL070978	507000 297800	0.34	91
5/32/09/*G/0128	31/03/2005	General Farming & Domestic	WELL IN STOCK YARD, YARWELL	TL070978	507000 297800	0.34	91
5/32/09/*G/0194	31/03/2005	General Farming & Domestic	SPRING & CATCHPIT - YARWELL	TL05299850	505290 298500	12.96	4341
5/32/09/*G/0194	31/03/2005	General Farming & Domestic	WELL - OLD SULEHAY	TL05199842	505190 298420	12.96	4341
5/32/09/*G/0194	31/03/2005	General Farming & Domestic	SPRING & CATCHPIT - YARWELL	TL05299850	505290 298500	12.96	4341
5/32/09/*G/0194	31/03/2005	General Farming & Domestic	WELL - OLD SULEHAY	TL05199842	505190 298420	12.96	4341
5/32/09/*G/0220	31/03/2005	General Farming & Domestic	WELL - YARWELL	TL05599769	505590 297690	0.23	83
5/32/09/*G/0220	31/03/2005	General Farming & Domestic	WELL - YARWELL	TL05599769	505590 297690	0.23	83
5/32/09/*G/0224	31/03/2005	General Farming & Domestic	BOREHOLE IN ST JOHNS WOOD, THORNHAUGH	TL04499890	504490 298900	13.6	4978
5/32/09/*G/0224	31/03/2005	General Farming & Domestic	BOREHOLE IN ST JOHNS WOOD, THORNHAUGH	TL04499890	504490 298900	13.6	4978
5/32/10/*G/0014A	31/03/2005	General Farming & Domestic	WELL AT SACREWELL LODGE	TF076009	507600 300900	18.18	6819
5/32/10/*G/0014A	31/03/2005	General Farming & Domestic	WELL AT SACREWELL LODGE	TF076009	507600 300900	18.18	6819
5/32/10/*G/0026	31/03/2005	General Farming & Domestic	WELL AT CASTLE FARM	TL084982	508400 298200	2.73	996
5/32/10/*G/0026	31/03/2005	General Farming & Domestic	WELL AT CASTLE FARM	TL084982	508400 298200	2.73	996
5/32/10/*G/0036	31/03/2005	General Farming & Domestic	WELL, WITTERING GRANGE	TF052009	505200 300900	2.27	682
5/32/10/*G/0036	31/03/2005	General Farming & Domestic	WELL, WITTERING GRANGE	TF052009	505200 300900	2.27	682
5/32/10/*G/0068	31/03/2005	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services	BOREHOLE - WITTERING	TF03020062	503020 300620	5	700
5/32/10/*G/0068	31/03/2005	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services	BOREHOLE - WITTERING	TF03020062	503020 300620	5	700
5/32/10/*G/0068	31/03/2005	General Washing/Process Washing	BOREHOLE - WITTERING	TF03020062	503020 300620	5	700
5/32/10/*G/0068	31/03/2005	General Washing/Process Washing	BOREHOLE - WITTERING	TF03020062	503020 300620	5	700

Current licensed abstractions in 4km rectangle around TF 049 001 - 14/02/2013

Licence No.	Use Description	Point Name	NGR 1	NGR 2	NGR 1 Cartesian	NGR 2 Cartesian	Max Daily Quantity (m3)	Max Annual Quantity (m3)
5/31/09/*G/0043	General Farming & Domestic	SPRING FED RES., WOTHORPE FARM	TF025032		502500 303200		170	39600
5/31/09/*G/0043	General Farming & Domestic	WELL 18, WOTHORPE FARMS	TF035040		503500 304000		170	39600
5/31/09/*G/0043	General Farming & Domestic	WELL 19, WOTHORPE FARMS	TF037033		503700 303300		170	39600
5/31/09/*G/0043	General Farming & Domestic	SPRING FED RES., WOTHORPE FARM	TF025032		502500 303200		170	39600
5/31/09/*G/0043	General Farming & Domestic	WELL 18, WOTHORPE FARMS	TF035040		503500 304000		170	39600
5/31/09/*G/0043	General Farming & Domestic	WELL 19, WOTHORPE FARMS	TF037033		503700 303300		170	39600
5/32/09/*G/0016	General Farming & Domestic	WELL "B" AT THORNHAUGH	TL029999		502900 299900		20.4	3886
5/32/09/*G/0016	General Farming & Domestic	WELL "C" AT THORNHAUGH	TL035984		503500 298400		20.4	3886
5/32/09/*G/0016	General Farming & Domestic	WELL "B" AT THORNHAUGH	TL029999		502900 299900		20.4	3886
5/32/09/*G/0016	General Farming & Domestic	WELL "C" AT THORNHAUGH	TL035984		503500 298400		20.4	3886
5/32/09/*S/0202	Transfer Between Sources (Post Water Act 2003)	RIVER NENE - WANSFORD	TL08169958		508160 299580		763000	180000000
5/32/09/*S/0225	Spray Irrigation - Direct	RIVER NENE "C - D" AT SIBSON	TL08059747	TL07899778	508050 297470	507890 297780	2448	65900
5/32/09/*S/0225	Spray Irrigation - Storage	RIVER NENE "A" AT SIBSON	TL07899948		507890 299480		2448	65900
5/32/09/*S/0225	Spray Irrigation - Storage	RIVER NENE "B" AT SIBSON	TL08039731		508030 297310		2448	65900
5/32/10/*G/0041	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household	BOREHOLE, EASTON LODGE	TF03280236		503280 302360		22.85	8340
5/32/10/*G/0041	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household	BOREHOLE, EASTON LODGE	TF03280236		503280 302360		22.85	8340
5/32/10/*G/0041	General Farming & Domestic	BOREHOLE, EASTON LODGE	TF03280236		503280 302360		22.85	8340
5/32/10/*G/0041	General Farming & Domestic	BOREHOLE, EASTON LODGE	TF03280236		503280 302360		22.85	8340
5/32/10/*G/0053	General Farming & Domestic	WELL "20" WOTHORPE FARM	TF026031		502600 303100		37	1000
5/32/10/*G/0053	General Farming & Domestic	WELL "20" WOTHORPE FARM	TF026031		502600 303100		37	1000
5/32/10/*S/0007	Spray Irrigation - Storage	WITTERING BROOK	TF053012		505300 301200		818.3	45460
5/32/10/*S/0008	Spray Irrigation - Direct	TRIB OF NENE "A - B"	TF065009	TF074001	506500 300900	507400 300100	818.3	27277
5/32/10/*S/0008	Spray Irrigation - Direct	TRIB OF RIVER NENE "B - C"	TF074001	TL058999	507400 300100	505800 299900	818.3	27277
5/32/10/*S/0014B	Milling & Water Power Other Than Electricity Generation	WATERCOURSE AT SACREWELL	TF078018	TL089997	507800 301800	508900 299700	1363.83	45460
5/32/10/*S/0014B	Spray Irrigation - Direct	STREAM AT SACREWELL	TF074001	TF088001	507400 300100	508800 300100	1363.83	45460
5/32/10/*S/0025A	Spray Irrigation - Direct	SOUTHORPE BROOK AT WITTERING	TF06530288	TF06370330	506530 302880	506370 303300	820	14000
5/32/10/*S/0031	Spray Irrigation - Direct	SPRING AT WEST WOOD, THORNHAUGH	TF05340099		505340 300990		32.8	12728
5/32/10/*S/0031	Spray Irrigation - Direct	STREAM AT WESTWOOD THORNHAUGH	TF05720116		505720 301160		32.8	12728
5/32/10/*S/0047	Spray Irrigation - Direct	CATCHPIT 1 ADJ WITTERING BROOK	TF026031		502600 303100		1500	91000
5/32/10/*S/0047	Spray Irrigation - Direct	CATCHPIT 3 ADJ WITTERING BROOK	TF042036		504200 303600		1500	91000
5/32/10/*S/0047	Spray Irrigation - Direct	CATCHPIT 4 ADJ WITTERING BROOK	TF051039		505100 303900		1500	91000
5/32/10/*S/0047	Spray Irrigation - Direct	CATCHPIT 5 ADJ WITTERING BROOK	TF056038		505600 303800		1500	91000
5/32/10/*S/0047	Spray Irrigation - Direct	WHITE WATER RESERVOIR	TF035034		503500 303400		1500	91000
5/32/10/*S/0060	Make-Up Or Top Up Water	WITTERING BROOK, THORNHAUGH	TF05970103		505970 301030		103	9289
5/32/10/*S/0061	Spray Irrigation - Storage	THORNHAUGH BECK AT THORNHAUGH	TF079000		507900 300000		2400	145475
5/32/10/*S/0067	Spray Irrigation - Storage	SOUTHORPE BROOK - SOUTHORPE	TF07700193		507700 301930		3000	115000

Private abstractions within 4km radius of NGR TF 049 001 and located in the administrative boundary of East Northamptonshire Council

ID	VILLAGE	GRID_REF	SOURCE	AQUIFER
54	Yarwell	506799 298800	Well	Lincolnshire Limestone
49	Nassington	505400 298601	Borehole	Lincolnshire Limestone
51	Nassington	505201 298501	Borehole	Lincolnshire Limestone
53	Yarwell	505499 297701	Well	Blisworth Limestone
48	Kings Cliffe	504400 298703	Borehole	Lincolnshire Limestone
52	Yarwell	504299 298300	Borehole	Lincolnshire Limestone
50	Nassington	505400 298601	Borehole	Lincolnshire Limestone
45	Kings Cliffe	503500 298502	Borehole	Blisworth Limestone
44	Kings Cliffe	501999 298902	Borehole	Blisworth Limestone

Information supplied by East Northamptonshire Council on 15 February 2013

Private abstractions within 4km radius of NGR TF 049 001 and located in the administrative boundary of Peterborough City Council

SUPPLY NAME	ESTIMATED ABSTRACTION (M3/DAY)	EASTING	NORTHING	SOURCE	USE
THE OLD MILL	0.7	512795	296833	SPRING	COMMERCIAL
NEW COVENT GARDEN	110	516795	299586	BOREHOLE	COMMERCIAL
SIBERTON LODGE	1	506303	299915	SPRING	DOMESTIC
PILSGATE GRANGE	1.8	506543	306283	BOREHOLE	DOMESTIC
LEEDSGATE FARM	0.8	504491	298862	BOREHOLE	DOMESTIC
BURGHLEY HOUSE	<10	504804	306095	SPRING	DOMESTIC
NIGHTINGALE FARM	<10	505334	299205	BOREHOLE	DOMESTIC
CHASE FARM	<10	519584	304179	BOREHOLE	DOMESTIC
WOTHORPE TOWERS	<10	502433	305252	WELL	DOMESTIC

Information supplied by Peterborough City Council on 14 February 2013

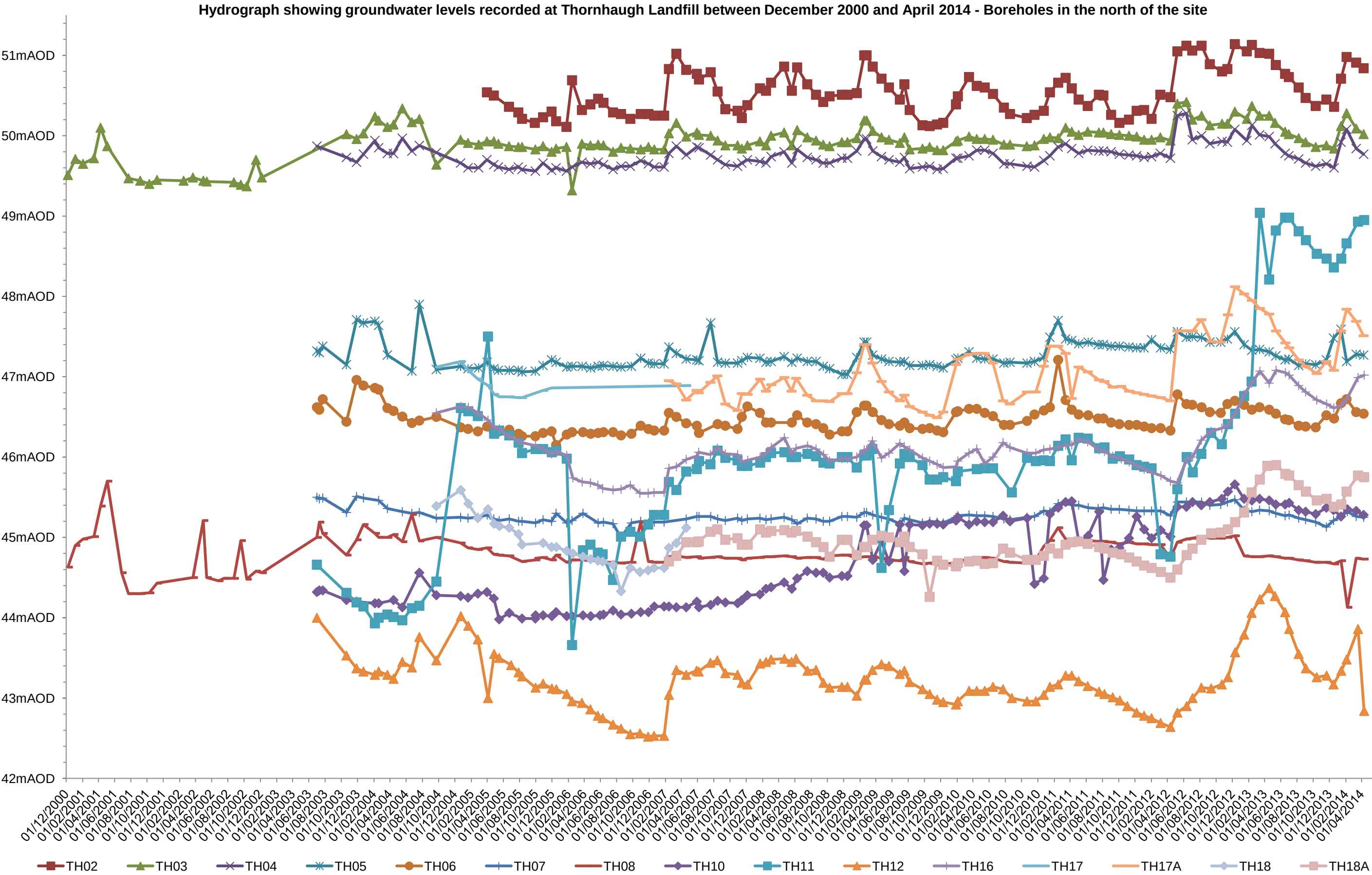
APPENDIX H

**AN ELECTRONIC COPY OF THE RESULTS OF SURFACE WATER QUALITY AND
GROUNDWATER QUALITY [ON CD ONLY]**

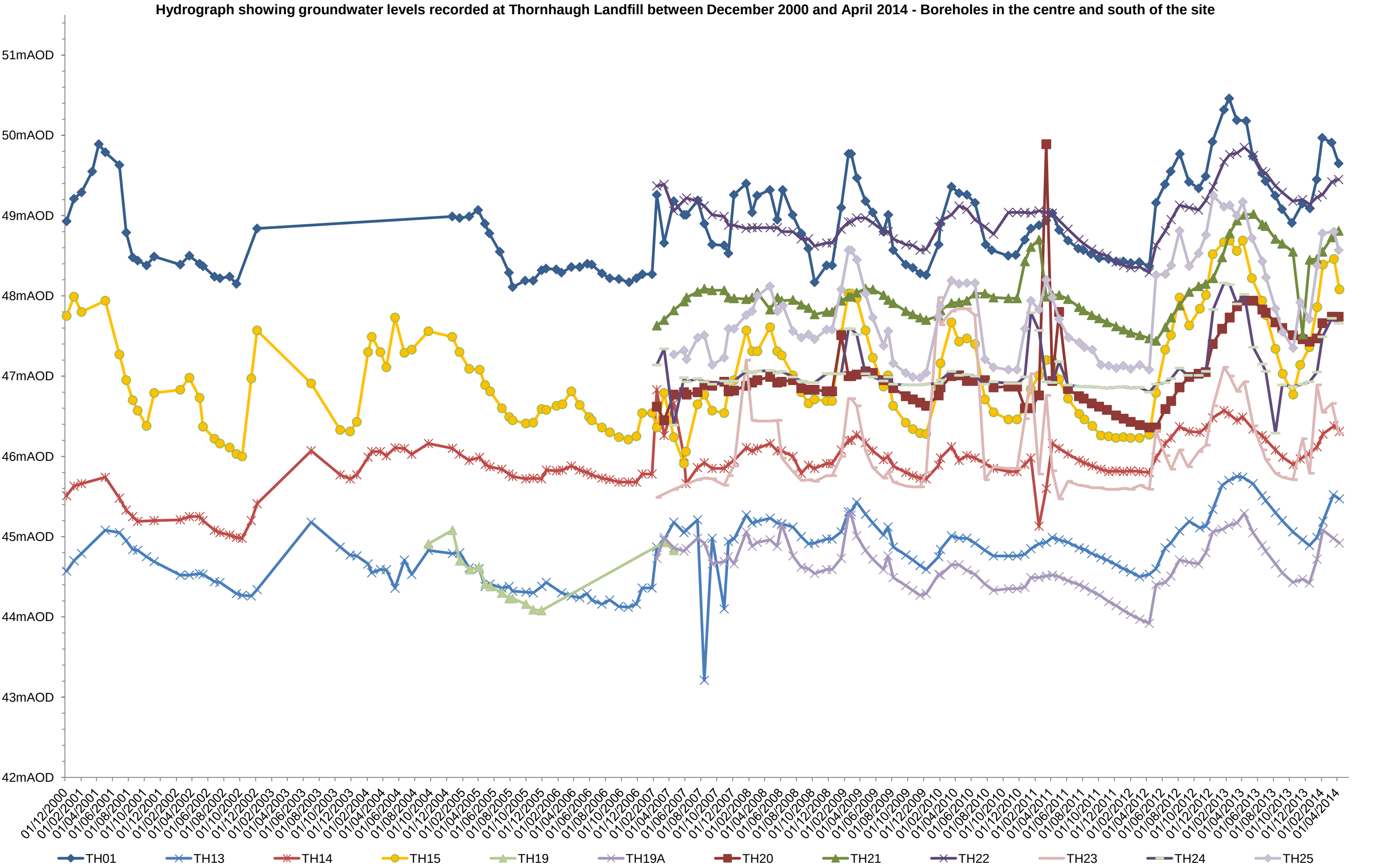
APPENDIX I

**HYDROGRAPHS SHOWING GROUNDWATER LEVELS RECORDED AT THORNHAUGH
LANDFILL SITE BETWEEN DECEMBER 2000 AND APRIL 2014**

ESID Appendix I Figure 1



ESID Appendix I Figure 2



APPENDIX J

A COPY OF A LETTER FROM THE ENVIRONMENT AGENCY DATED 27 JUNE 2008

Rob Sears
ESI Ltd
New Zealand House
160 Abbey Foregate
Shrewsbury
SY2 6FD

Our ref: UP3539LR (RP3133PP)

Date: 27th June 2008

Dear Mr Sears,

Thornhaugh Landfill Site – Groundwater Assessment

I have reviewed the ESI report entitled 'Thornhaugh Landfill: Assessment of the regional significance of groundwater' and after internal consultation I have the following comments.

The report was commissioned to assess the significance of groundwater in the Lincolnshire Limestone Major Aquifer on which the site is located. This was done to allow the Environment Agency to consider whether the requirements of RGN3 (Landfill Location Policy) could be relaxed for the purposes of the extension to Thornhaugh landfill.

The report demonstrates that the Lincolnshire Limestone is largely unsaturated in the vicinity of the landfill with the underlying Grantham Formation and Northampton Sand being the primary water bearing strata. Both of these strata are classed as Minor Aquifers.

The landfill is located on a groundwater divide between the Wittering Brook and Thornhaugh Beck. Both of these watercourses are supplied with water by the Grantham Formation and Northampton Sand, such hydrogeology should prevent groundwater levels rising into the Lincolnshire Limestone.

It is also understood that the extension areas known as the Bradshaw Land and Phase 7 have been previously exploited for the extraction of Northampton Sand. As a result, there is no in-situ Lincolnshire Limestone in these areas. Additionally it is proposed that all engineered cells be constructed above local piezometric heads.

On this basis it is considered that the requirements of RGN3 could be relaxed for the proposed extension to the site to allow landfill in an area classed as a Major Aquifer. This decision strictly applies to the proposed extension areas where the Limestone has already been removed. Therefore it should not be taken that any further extension proposals will be treated in the same way. Such proposals will be subject to assessment on their own merits.

Should you have any questions please do not hesitate to contact me on 01522 785989 or the email address below.

Yours sincerely

Nick Simmons
PPC Officer – PPC South, Anglian Region
01522 785989
Nick.simmons@environment-agency.gov.uk

CC (by email). Simon Moyle (Augean), Gene Wilson (Augean), James Wathen (Augean), Elliot Newman (Augean), Howard Goulbourne (Environment Agency), Roland Evans (Environment Agency), Jim Branson (Environment Agency)

APPENDIX ESID B
A COPY OF THE 2024 ENVIRONMENTAL STATEMENT



ENVIRONMENTAL STATEMENT

**FOR THE PLANNING APPLICATION FOR THE
CONTINUATION OF THE LANDFILLING OPERATIONS
AT THORNHAUGH LANDFILL SITE AND THE
IMPORTATION OF CLEAN NATURALLY OCCURRING
MATERIALS TO CREATE AN INTEGRATED
RESTORATION LANDFORM WITH NATURE
CONSERVATION HABITATS AT COOKS HOLE
QUARRY AND THORNHAUGH LANDFILL SITE,
LEICESTER ROAD, THORNHAUGH, PETERBOROUGH**

Report reference: AU/CH/SPS/1774/01/ES/FV
February 2024



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Appendix ES8.1 Ecological Impact Assessment

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Appendix ES14.1 Dust Assessment Methodology

Appendix ES14.2 Wind rose for Wittering Airfield 2000-2019

Appendix ES14.3 Beaufort Wind Scale

This report has been prepared by MJCA with all reasonable skill, care and diligence, and taking account of the Services and the Terms agreed between MJCA and the Client. This report is confidential to the client and MJCA accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by MJCA beforehand. Any such party relies upon the report at their own risk.

AU/CH/SPS/1774/01/ES/FV

February 2024

1. Introduction

- 1.1** Augean South Ltd (Augean) operates the existing Cooks Hole Quarry and Thornhaugh Landfill Site. Cooks Hole Quarry (Cooks Hole) is a mineral extraction site which has been active since the 1950s. Thornhaugh Landfill Site (Thornhaugh) has been operational since the 1990s. Thornhaugh accepts a range of non-hazardous waste and stable non-reactive hazardous waste including asbestos which is used to restore the previous mineral workings. Throughout this report, when referred to collectively, Cooks Hole Quarry and Thornhaugh Landfill Site will be called 'the sites'. The sites are located approximately 1km south west of the village of Thornhaugh and 10km west of Peterborough. Cooks Hole is to the south west of the A47 Leicester Road and Thornhaugh is adjacent to and south of the A47 Leicester Road. The sites boundaries and locations are shown on Figure ES1.1.
- 1.2** The sites have a complex planning history and have been worked by various operators however the overarching principle of both sites is to restore them to a beneficial after use. The approved restoration scheme for Cooks Hole is to a low level and comprises agricultural grassland with some tree and shrub planting. The approved restoration profile for the north eastern corner of Cooks Hole is to return the land to original ground levels. The approved restoration scheme for Thornhaugh comprises a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland. The currently approved restoration schemes for the sites are presented at Appendix ES1.1 and ES1.2 respectively. The restoration landform profile for Cooks Hole which is shown on the restoration scheme presented at Appendix ES1.1 has been superseded and the current profile which has been approved is presented at Appendix ES1.3.
- 1.3** Augean is proposing to revise the restoration schemes for Cooks Hole and Thornhaugh to provide an integrated, coherent landform for both sites. The proposed restoration scheme would extend the habitats from Thornhaugh to Cooks Hole so that a wider mix of habitats is available across both sites. In addition there is the potential for the restoration to tie in with wider aspirations for the enhancement of Rockingham Forest, to create green infrastructure links with Bedford Purlieus and for the proposals to contribute to landscape scale recovery.
- 1.4** The material that will be used to create the proposed landform at Cooks Hole will comprise clean, naturally occurring materials. Only clean naturally occurring

materials which have been extracted as part of the existing landfill construction operations and will be extracted as part of the future construction operations for the landfill at the East Northants Resource Management Facility (ENRMF) in Kings Cliffe and as part of the landfill construction operations at Thornhaugh will be used. It is proposed that only material arising from the construction operations at Thornhaugh and ENRMF will be deposited in Cooks Hole. Some of the additional landfill void created at Thornhaugh will be filled with waste types already consented for disposal there. The creation of the proposed landform at Cooks Hole and its integration with the restoration scheme for Thornhaugh will facilitate the continued operation of ENRMF which is a Nationally Significant Infrastructure Project by utilising the material that arises during the construction operations of the landfill cells.

- 1.5** This Environmental Statement accompanies a single planning application for the revised restoration profile for Cooks Hole and Thornhaugh. The planning application includes the continuation of the mineral processing operations at Cooks Hole and the continuation of the existing operations at Thornhaugh (construction of phases, landfilling and processing of waste) as described in Section 4 and 5 of this report. It is proposed that the existing planning permissions will be superseded on granting of a new planning permission. The planning application boundary is shown on Figure ES1.2.
- 1.6** MJCA is commissioned by Augean to prepare the planning application and undertake an Environmental Impact Assessment and to prepare this Environmental Statement for the proposed development at Cooks Hole and Thornhaugh. Further details on the approach to the application are presented in Section 2 of this report.

2. Pre-application advice, scoping and approach to the Environmental Impact Assessment

Pre-application advice

- 2.1** Pre application advice was sought from Peterborough City Council (PCC) through their formal pre-application advice procedure in May 2023. Two meetings were held with PCC including a site visit with the Council Ecologist and Conservation Officer. Pre-application consultation responses were provided by the statutory consultees to the Planning Department. The formal written pre application advice was received in September 2023 and is presented at Appendix ES2.1.
- 2.2** The pre-application advice states that it is necessary for the application to be supported by an Environmental Statement, Flood Risk Assessment, sustainable drainage strategy, tree survey, biodiversity checklist and survey, heritage statement, transport assessment, noise and vibration assessment and air quality assessment. The scope of these assessments were considered further in the scoping report.

Scoping and approach to the Environmental Impact Assessment

- 2.3** The Environmental Impact Assessment (EIA) of the proposed development has been undertaken in accordance with EU Directive 2011/92/EU¹ on the assessment of the effects of certain public and private projects on the environment (as amended by EU Directive 2014/52/EU²) and in accordance with The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)³ (the 2017 EIA Regulations). Guidance produced by the Department for Communities and Local Government regarding EIA has also been considered.
- 2.4** The fundamental principles of EIA are embodied in EU Directive 2011/92/EU (as amended by EU Directive 2014/52/EU) in which it is stated that:

*‘...policy on the environment is based on the precautionary principle
and on the principles that preventative action should be taken, that*

¹ Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

² Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

³ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

environmental damage should, as a priority, be rectified at source and that the polluter should pay.'

2.5 In EU Directive 2011/92/EU (as amended by EU Directive 2014/52/EU) it is stated that effects on the environment should be taken into account at the earliest possible stage in all technical planning and the decision-making process.

2.6 The 2017 EIA Regulations specify the projects that will and the projects that may be the subject of an EIA. Schedule 2 of the 2017 EIA Regulations lists the projects for which it may be necessary to undertake an EIA. The proposed development falls under development description 13a and 13b of Schedule 2 of the 2017 EIA Regulations which states:

'(a) Any change to or extension of development of a description listed in Schedule 1 (other than a change or extension falling within paragraph 24 of that Schedule) where that development is already authorised, executed or in the process of being executed.

(b) Any change to or extension of development of a description listed in paragraphs 1 to 12 of column 1 of this table, where that development is already authorised, executed or in the process of being executed.'

2.7 The existing developments have previously been subject to Environmental Impact Assessments under the EIA Regulations. As there is the potential for the proposed development to have significant effects on the environment an EIA is necessary.

2.8 In accordance with good practice the scope and level of detail of the information provided in the Environmental Statement (ES) was determined in consultation with statutory consultees and Peterborough City Council (PCC) planning department. A Scoping Report was prepared including a plan sufficient to identify the land, a brief description of the nature and purpose of the proposed development and the proposed scope of the EIA including an explanation of the likely significant effects of the proposed development. A request for a Scoping Opinion together with the Scoping Report was submitted to PCC on 13 October 2023. A copy of the request for a scoping opinion and the Scoping Report are provided at Appendix ES2.2. A Scoping Opinion was provided by PCC on 23 November 2023 and is presented at Appendix ES2.3 together with the responses from the consultees.

2.9 As a result of the scoping process it has been determined that an assessment of the potential effects of the proposed development associated with ecology and biodiversity, landscape and visibility, cultural heritage, water resources, flood risk, traffic and transport, noise, amenity and dust and climate change are assessed as part of the EIA. It was agreed that assessment of the potential effects of the proposed development associated with population and human health, soils and agricultural land quality, buried archaeology, vibration, traffic noise, traffic air quality, groundwater and major accidents could be excluded from the scope of the ES. A summary of the issues raised in the scoping opinion and a description of how they have been addressed in the EIA and presented in the ES is presented at Table ES2.1.

2.10 It is necessary as part of the EIA to consider the potential for cumulative impacts. The construction and operation of major developments within 5km of the site have been considered where necessary in the technical assessments. The approximate boundaries of the sites are shown on Figure ES2.1. The developments which have been considered are summarised below.

No	Site name	Planning permission reference and date that planning permission was granted	Comments
1	Thornhaugh II	M25/1/3 – M25/1/6 (97P0071) 8 February 1999	Conditions 1-10 and 22 and 23 apply to all 3 ownerships. The operations of winning and working of minerals and the deposit of mineral waste have to cease no later than 21 February 2025. It is understood that operations in the main part of Thornhaugh II ceased a number of years ago.
		APP/J0540/A/12/2179541/NWF 8 May 2013	Recycling of residual waste and infilling up to ground levels (approximately 6 hectares of Thornhaugh II). The development had to commence by May 2016.
2	Thornhaugh IIB	14/01716/MMFUL 10 April 2015	5 year operation to extract 700,000 tonnes of limestone and restore the site to ground levels with imported inert materials. The operations had to commence by 2021 and be completed by 2026.

No	Site name	Planning permission reference and date that planning permission was granted	Comments
3	Cross Leys Quarry Leicester Road	19/01530/WCMM, 10 December 2020 19/01370/WCMM 10 December 2020 19/01365/MMFUL 10 December 2020	Restoration of quarry workings to agriculture and woodland through the importation and deposit of inert restoration materials and quarry waste. Operations had to commence by December 2023 and it is stated that the operations are anticipated to be completed in 7 years.
4	A47 Wansford to Sutton	Development Consent Order 2023 (S.I. 2023 No. 218) 17 February 2023	Various highway works including dualling the A47 from the Wansford eastern roundabout for 2.6km and improvement of the on/off ramps for the A1. The works have to commence within 5 years of the date of the grant of the order (ie by February 2028).
5	East Northants Resource Management Facility (ENRMF)	Development Consent Order (SI 2023 No.110) 23 January 2023	Hazardous waste and LLW waste landfill and waste treatment and recovery facility with restoration to nature conservation habitats. The operations are ongoing. The operations have to cease at the site by 31 December 2046.

2.11 This document comprises the ES which has been prepared in accordance with the 2017 EIA Regulations. In this ES the information which has been collated, the results of the investigations, the proposed development and the results of the EIA are presented. The positive and negative effects of the proposed development are explained. In accordance with Regulation 18(5)(a) of the 2017 EIA Regulations a statement is provided at Appendix ES2.4 outlining the relevant expertise and qualifications of those who have carried out the EIA and prepared the Environmental Statement in order to confirm their competence to carry out the work. In accordance with Regulation 18(5)(b) of the 2017 EIA Regulations a statement by the applicant confirming that the Environmental Statement has been prepared by competent experts is also provided at Appendix ES2.5.

- 2.12** The EIA has been based on discussions with Augean, statutory consultees and the experience of MJCA together with specialist technical advice. In summary this ES includes a description of the main development, an outline of the main alternatives studied, a description of the aspects of the environment which have the potential to be significantly affected by the development, a description of the likely significant effects of the development on the environment and a description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
- 2.13** The baseline studies include desk studies and site surveys and provide the basis against which the assessments of environmental impacts are made. The impacts are assessed against the baseline conditions described as a result of the baseline studies taking into consideration the design and operational procedures for the proposed development together with the restoration proposals. For each impact subject area, a description and justification of the assessment procedure is presented together with an evaluation of the significance and scale of impact. The assessments have been undertaken by competent experts as set out in Appendix ES2.4. A non-technical summary of the ES is provided as a separate document.
- 2.14** Consultation has been undertaken with the local community in respect of the proposals and a summary of the consultation undertaken prior to the submission of the application is presented in a Statement of Local Engagement which is presented as an appendix to the Planning Statement.

3. The site location and description

- 3.1** The sites are located approximately 10km west of Peterborough and 1.7km west of the A1. The nearest villages to the sites are Thornhaugh which is located approximately 1km to the north east of the sites beyond the A47, Wittering located approximately 2km to the north of the sites and Yarwell located more than 2km to the south east of the sites. Cooks Hole is centred on National Grid Reference (NGR) 505207 299747 and is bordered by Thornhaugh to the north and by the A47 Leicester Road to the north east. Beyond the site boundary there are agricultural fields and scattered residential buildings. Immediately to the south of Cooks Hole lies an unrestored former quarry known as Thornhaugh II Quarry beyond which is Kings Cliffe Road which runs between the villages of Wansford and Kings Cliffe. To the south of Kings Cliffe Road are agricultural fields and woodland blocks. Immediately west of Cooks Hole Quarry is Old Oundle Road and Bedford Purlieus woodland (Figure ES1.2). Old Oundle Road is a Public Highway with no cars permitted. Thornhaugh is centred on NGR 504902 300111 and is bordered to the north by the A47 Leicester Road, to the south by Cooks Hole and to the west by Old Oundle Road and Bedford Purlieus woodland. Beyond the site boundary to the north are scattered residential properties and agricultural fields. Bedford Purlieus is an ancient woodland designated as a Site of Special Scientific Interest (SSSI) and a National Nature Reserve (NNR) (Figure ES3.1).
- 3.2** Cooks Hole comprises an active mineral extraction site which is approximately 53 hectares. Ironstone, sandy limestones, silty sands and clays have been extracted from the site since the 1950s. The mineral extraction operations are now complete at Cooks Hole and no further mineral will be extracted. There are a number of stockpiles of mineral materials at Cooks Hole and there is mobile plant active at the site which is currently processing the material from the stockpiles and those materials arising from the construction operations at Thornhaugh (Figure ES3.1). There are also a number of soil stockpiles. An area in the north of Cooks Hole adjacent to the boundary with Thornhaugh is used to stockpile materials arising from the construction operations at Thornhaugh.
- 3.3** Thornhaugh comprises an active landfill site which is being filled in phases (Figure ES3.2). Thornhaugh is approximately 30.5 hectares. The northern and north eastern phases of Thornhaugh have already been landfilled and are restored albeit that the

planting is not yet well established. Phase 7C has recently been constructed, construction of Phase 2 West will commence imminently and Phases 4B South, 5 and 7A are filled and awaiting capping. Thornhaugh Landfill Site is the subject of an Environmental Permit which is issued and regulated by the Environment Agency. Access to Thornhaugh is from the A47 Leicester Road. The site access is shared by Cooks Hole. A surfaced access road, site reception and welfare facilities, a weighbridge and wheel wash, landfill gas flare, hi pod storage area and car parking areas are located generally centrally within Thornhaugh. The access to Cooks Hole is to the east of the site entrance (Figure ES3.2).

- 3.4** The topography of the sites is varied due to the historical and ongoing operations with the ground level falling generally to the Thornhaugh Brook which runs through Cooks Hole generally from west to east. The Thornhaugh Brook rises to the west of Bedford Purlieus woodland and flows to the east to join the White Water Brook which is a tributary of the River Nene.
- 3.5** The geology at and in the vicinity of Cooks Hole comprises the Lincolnshire Limestone Formation which is underlain by the Grantham Formation and the Northampton Sand Formation. The central part of the site comprising the Thornhaugh Brook Valley is underlain by the Grantham Formation. The Northampton Sand Formation is underlain in turn by the Whitby Mudstone Formation (formerly referred to as the Upper Lias). Groundwater is present generally in the Grantham Formation and Northampton Sand Formation and in the base of the Lincolnshire Limestone underlying the site. Groundwater in the vicinity of the site is abstracted for domestic water supply and agricultural use and provides base flow to local rivers and streams. The Thornhaugh Brook is fed by groundwater including from Cooks Hole Spring located adjacent to Cooks Hole Farmhouse. Settlement ponds for mineral wash water are located in the south eastern corner of Cooks Hole.
- 3.6** The geology in the vicinity of Thornhaugh comprises the Lincolnshire Limestone Formation which in turn is underlain by the Grantham Formation and Northampton Sand Formation. In parts of the site the sequence has been replaced partly with backfilled material comprising reworked material from the Lincolnshire Limestone Formation and Grantham Formation. The Northampton Sand Formation is underlain by the Whitby Mudstone Formation (formerly referred to as the Upper Lias). The strata dip gently to the east at and in the vicinity of Thornhaugh. To the north, east

and south of the site the Lincolnshire Limestone Formation, Grantham Formation and Northampton Sand Formation are cut by several valleys.

- 3.7** Cooks Hole Farmhouse and outbuildings are located in the centre of Cooks Hole adjacent to the Thornhaugh Brook. The buildings are surrounded by dense vegetation and are owned by Augean. The property has been uninhabited for some time and is uninhabitable in its current state. Cooks Hole Farmhouse is a Grade II Listed Building. Beyond the sites there are 3 Grade II listed buildings to the north of the sites, the closest being Home Farm House approximately 80m from Thornhaugh and 540m from Cooks Hole. The Home Farm House group of buildings includes a barn and stable. There are also four listed buildings located to the east of the sites. Sibberton Lodge is a Grade II* listed building which is approximately 495m from Cooks Hole and 940m from Thornhaugh. Sibberton Lodge is surrounded by four Grade II buildings which include a barn, a cottage and stables (Figure ES1.2).
- 3.8** The nearest residential properties to the sites which are not listed are located to the north of the A47 Leicester Road and include Thornleigh House (45m) and Bedford Lodge (70m). Toll Cottage is located approximately 40m north west of Thornhaugh (Figure ES1.2). Oaks Wood Cottage is located approximately 290m to the north of the sites and beyond the A47 Leicester Road. Nightingale Farm is located approximately 335m to the south of Cooks Hole. Leedsgate Farm is located approximately 630m south west of Cooks Hole Quarry.
- 3.9** There is a network of Public Rights of Way (PRoW) in the vicinity of the sites as shown on Figure ES3.3. Footpath Thornhaugh No. 3 Section 3 and Section 4 runs between Thornhaugh and Cooks Hole in an east to west direction before turning north on Old Oundle Road and then turning west to run through Bedford Purlieus. Thornhaugh Footpath No. 4 Section 1 currently runs along the southern boundary of Cooks Hole before turning north west along the A47 Leicester Road and then turning north east and running towards Thornhaugh village. Thornhaugh Footpath No 4 Section 1 originally ran through the centre of Cooks Hole through the area of the buildings associated with Cooks Hole Farmhouse before turning east north east towards the A47 before being diverted to its current route. Thornhaugh Footpath No 2 Section 2 which ran generally from south to north through the centre of Cooks Hole is currently stopped up. The diversion of Thornhaugh Footpath No 4 Section 1 and the stopping up of Thornhaugh Footpath No 2 Section 2 remain in force until 2042.

Thornhaugh Footpath 2 which ran through Thornhaugh is currently diverted to follow Thornhaugh Footpath No 3 Section 4. The PRoW in the vicinity of the site including the original routes, diversions and the potential new permissive footpaths are shown on Figure ES3.3.

- 3.10** Barnack Hill and Holes Special Area of Conservation (SAC) is located approximately 4.5km to the north east of the sites (Figure ES1.1). Bedford Purlieus located adjacent to the western boundary of the sites is designated as an ancient woodland, a Site of Special Scientific Interest (SSSI) and a National Nature Reserve (NNR). Several other SSSIs (West, Abbot's and Lound Woods SSSI, Wansford Pasture SSSI and Old Sulehay Forest SSSI) are located in the vicinity of the sites but are located more than 500m from the sites and are shown on Figure ES1.1. Phase 4A of Thornhaugh is a designated County Wildlife Site as it supports amphibians including Great Crested Newts. Thornhaugh, Bedford Purlieus and Thornhaugh II are designated as brownfield biodiversity sites (Figure ES1.1). Cross Leys Quarry to the west of Thornhaugh is also designated as a brownfield biodiversity site.
- 3.11** Based on the Environment Agency Flood Map for Planning Thornhaugh is located in Flood Zone 1. Flood Zone 1 is defined as land having a less than 1 in 1,000 annual probability of river or sea flooding. The majority of Cooks Hole is located in Flood Zone 1 except a small area in the vicinity of Thornhaugh Brook that passes through Cooks Hole which is in Flood Zones 2 and 3. Flood Zone 2 is defined as land having between a 1 in 100 and a 1 in 1,000 annual probability of river flooding. Flood Zone 3 is defined as land having a greater than a 1 in 100 annual probability of river flooding.
- 3.12** The RAF base at Wittering Airfield is located approximately 3km to the north west of the northern boundary of Thornhaugh at its closest point. The sites are located in the Aircraft Safeguarding Zone for Wittering Airfield.
- 3.13** The only mains service to the sites is water. Power is provided by site generators and foul sewage is collected in a cess pit at Thornhaugh.

4. Summary of the proposed development

4.1 As stated previously there is a complex planning history associated with the sites. A description of the currently consented activities at the sites is presented at Table ES4.1 together with a description of the intended changes as a result of the proposed development. The application boundary shown on Figure ES1.2 covers an area of 83.5 hectares. A summary of the main elements of the proposed development at the sites is presented below based on the detailed descriptions in Table ES4.1:

- The continuation of landfilling at Thornhaugh with non hazardous waste and stable non-reactive hazardous waste. No new landfill cells additional to those that are already permitted will be consented as a result of the proposed development. Up to 120,000 tonnes per annum of non hazardous waste and stable non-reactive hazardous waste will continue to be imported. The currently consented void remaining at Thornhaugh Landfill Site is approximately 1,310,000m³ and the maximum additional waste void created at Thornhaugh as a result of the proposed development is approximately 920,000m³.
- Continuation of the extraction of mineral to facilitate the construction of the permitted landfill cells at Thornhaugh. The cells which are consented but which have not yet been constructed are shown on Figure ES3.2.
- The continuation of stockpiling of materials imported to Thornhaugh for use in landfill engineering operations.
- Amendment of the restoration profiles for Thornhaugh and Cooks Hole to form one integrated, coherent landform. The proposed restoration profile is presented on Figure ES4.1. The elevation of the highest point of the restoration landform at Thornhaugh (71.5m Above Ordnance Datum (AOD)) will not change as a result of the proposed changes to the restoration profile.
- Continuation of the use of the existing Thornhaugh access from the A47 for the importation of waste for deposition at Thornhaugh, material for use in landfill engineering at Thornhaugh and material for use in the restoration of Cooks Hole.
- The importation of in the order of 1.2 million m³ of clean, naturally occurring excavated material from ENRMF to create the landform of Cooks Hole and to tie in with the landform at Thornhaugh. This volume of material to be imported from

ENRMF includes clay for use in landfill engineering at Thornhaugh. On average approximately 80,000m³ of material will be imported per annum from ENRMF. The maximum amount of material that it is anticipated will be imported per annum from ENRMF will be 150,000m³.

- The placement of restoration material and restoration of completed areas will be carried out in a phased manner. The proposed phasing of the operations at Cooks Hole and Thornhaugh is presented on Figure ES4.2. The restored landform to the south of Thornhaugh Brook will be created first.
- The continuation of processing of materials from mineral stockpiles at Cooks Hole and processing of minerals arising from the construction of the landfill cells at Thornhaugh.
- The continuation of crushing and screening of imported soil forming materials and minerals arising from the construction operations at Thornhaugh. It is anticipated that up to 28,000 tonnes of material will be imported per annum.
- The continued extraction and redeposition or processing of historically deposited waste from Phases 1 and 2 at Thornhaugh as consented by the Environmental Permit for the landfill site.
- The continuation of the export of up to 10,000 tonnes per annum of material from the recycling, recovery and waste processing operations for reuse or disposal at an appropriate facility.
- There are no proposals to increase the numbers of HGV movements compared with historical traffic movements associated with the operations of the site.
- As is the case currently, during the operation of the sites haul roads will be constructed as necessary.
- As is the case currently, during the operation of the sites the site reception facilities including the welfare facilities which comprise portable cabins will be relocated as necessary to accommodate the phased activities.

- As is the case currently, the retention of the site management infrastructure at Thornhaugh for the continuation of monitoring and the management of landfill gas and leachate.
- The retention of Cooks Hole Farmhouse and the associated outbuildings for the duration of the operations at the sites. Proposals for the future use of the listed building and associated outbuildings will be the subject of a separate planning application.
- Continuation of the operations at the sites until the completion of restoration by 21 February 2042.
- During the operation of the sites surface water will be managed consistent with the current operations at Cooks Hole and continue to be managed in accordance with the Environmental Permit at Thornhaugh.
- The establishment of a post restoration surface water runoff management system at the sites as an integrated part of the design of the site restoration profile and restoration scheme. The principles of the surface water management system for the restored Thornhaugh site including the surface water attenuation ponds will remain generally as currently consented. Detention basins will be created in Cooks Hole to manage the rate of discharge from the sites of surface water. The calculations for the attenuation capacities of the detention basins are presented at Appendix ES4.1
- The restoration of the sites will be to nature conservation interest and the habitats currently included in the approved restoration scheme at Thornhaugh will be extended to the south to include and be integrated with Cooks Hole. The revised restoration scheme for Cooks Hole will deliver significant biodiversity net gain compared with the previously consented restoration scheme. The restoration plan is presented at Figure ES4.3. Further details on the restoration are presented in Section 6 of this report.
- The sites will be subject to an aftercare and maintenance period following the completion of restoration. The length of the aftercare period will be 30 years consistent with the requirements for Biodiversity Net Gain under the Environment Act 2021.

- The use of the access from the A47 at Cooks Hole for amenity access following restoration and the provision of a small car park for approximately 12 cars (Figure ES4.3).
- 4.2** There will be no changes to the principles of the landfilling operations at Thornhaugh as a result of the proposed development. The landfilling operations at Thornhaugh will continue to be the subject of an Environmental Permit. The Environmental Permit specifies the types of non hazardous wastes and stable non reactive hazardous waste which are permitted for deposition at the site as well as the detailed measures necessary for the containment, management and monitoring of the wastes and the surrounding environment.
- 4.3** The mitigation measures that will be implemented at the site to ameliorate any potential impacts are presented in Table ES4.2.

5. Phasing of the operations

- 5.1** The proposed development will be undertaken in a series of phases which are presented on Figure ES4.2. The operations will be undertaken concurrently in Cooks Hole and Thornhaugh. The habitats that are currently in place at Cooks Hole which will be removed as part of the proposed development will remain in place as long as possible during the operations and will be removed when operations move into that phase. The current status of the footpaths within the site is summarised in Table ES5.1 and the footpaths are shown on Figure ES3.3.
- 5.2** Prior to or at the commencement of the operations, taking into account seasonal constraints, further vegetation will be established and fenced as appropriate on the restored north and north eastern phases in Thornhaugh adjacent to the A47 (Phases 3, 6A and 6B).

Cooks Hole

- 5.3** The restoration operations will commence in the area to the south of Thornhaugh Brook. As part of the works in Phase A the new ponds and hibernacula will be established to form an ecological area. Groups of scrub and shrubs will be planted on the western boundary of Cooks Hole and in groups between the ponds as shown on the restoration scheme provided at Figure ES4.3. On completion of the establishment of the ecological area a hedgerow will be established on the eastern boundary of the area to minimise access by people in order to protect the sensitive habitats that will be encouraged to develop here. Operations will then be undertaken from east to west in Phases B and C and the surface water detention basins will be established as the operations progress (Figure ES4.3). As the operations progress in the area to the south of Thornhaugh Brook the new permissive right of way will be installed. The initial section of the permissive footpath route will run eastwards from Old Oundle Road on the southern boundary of Cooks Hole before turning northwards between the southern boundary of Cooks Hole and Thornhaugh Brook (Figure ES3.3). On this section the permissive route will follow the same route as the reinstated Footpath Thornhaugh No 2 Section 2 before turning eastwards to follow the route of Thornhaugh Brook. It is anticipated that the material placement and restoration operations in the area to the south of Thornhaugh Brook (Phases A to C) will be completed in 3 to 5 years. On completion of the restoration operations the permissive right of way will be opened.

- 5.4** The material placement and restoration operations will continue to Phase D on the western boundary of Cooks Hole to the north of Thornhaugh Brook. The new ecological habitats shown on Figure ES4.3 will be established in this area. Groups of scrub and shrubs will be planted on the western boundary of Cooks Hole and in groups between the ponds. On completion of the establishment of the ecological area a hedgerow will be established on the eastern boundary of the ecological area to minimise access by people in order to protect the sensitive habitats that will be encouraged to develop here. The ecological area will be fenced as necessary. The material placement and restoration operations will generally be undertaken from south to north in each phase. It will be necessary to close Footpath Thornhaugh No 3 Section 3 and Footpath Thornhaugh No 3 Section 4 as the operations progress. The stone wall which currently runs adjacent to Footpath Thornhaugh No 3 Section 3 and 4 will be removed and the stones will be used to create a new wall adjacent to the reinstated footpath in the restored site. Footpath Thornhaugh No 3 Section 3 and 4 will be diverted temporarily to follow the new permissive route to the south of Thornhaugh Brook. The currently diverted Footpath Thornhaugh No 4 Section 1 route via Footpath Thornhaugh No 2 Section 1 will remain accessible throughout the operations and following restoration.
- 5.5** The operations in Cooks Hole will then progress to Phase F on the eastern boundary adjacent to the A47. Following the placement of material in Phase F the operations will then progress in a west to east direction from Phases G to J. The phases will be restored progressively as the placement of materials to final ground levels is completed. Once the planting is carried out it will be fenced as necessary to minimise the risk that the young vegetation is eaten by deer.

Thornhaugh

- 5.6** The landfilling operations will continue generally in the landfill phasing order shown on Figure ES4.2. The operations will be completed in Phase 4C and Phase 7C and then progress in turn into Phase 2 West, Phase 2 East, Phase 1 West, Phase 1 East and Phase 7B (Figure ES4.2). The phases will be constructed to form engineered landfill cells and then filled, all in accordance with the Conditions of the Environmental Permit. Consistent with the currently approved operations as part of the landfill construction operations in Phases 2 and 1 it will be necessary to remove waste which was deposited in historically authorised un-engineered landfill areas. This historically

deposited waste will be directly transferred to the newly engineered cells for deposit. Where the excavated wastes comprise natural materials or generally inert construction and demolition waste that is suitable for recovery, the waste will be tested, sorted and recovered for reuse where possible. Any waste treatment activities (comprising physical treatment including sorting and crushing) will be carried out in accordance with the Environmental Permit as is the case currently. Where appropriate the materials will be exported off site for use. The waste processing operations will be located within the Thornhaugh permit boundary and will be undertaken using appropriate mitigation and monitoring measures as specified in the Environmental Permit.

- 5.7** In order for the restoration landform at Thornhaugh to tie in with the landform at Cooks Hole it is necessary for further waste to be placed in the current landfill phases prior to the placement of the restoration materials. The placement of additional waste will be undertaken in all the landfill phases which currently remain uncapped. Restoration materials will then be placed over the progressively capped landfill cells in restoration phases E, H1, H2, K, L, M, N, O, P and Q (Figure ES4.2). As with all sequential phased filling and material placement operations such as proposed, the completion of adjacent phases will overlap. This overlapping will be particularly evident in the phases adjacent to each other in Cooks Hole and Thornhaugh.
- 5.8** Depending on operational circumstances at the time, it may be practicable to complete the restoration operations in Phase K earlier in the phasing order so that the restoration operations on the boundaries are completed sooner than scheduled. Such opportunities to restore areas sooner than scheduled will be implemented where possible.
- 5.9** As the landfilling operations progress in the central area of Thornhaugh it will be necessary to relocate the wheel wash and site reception facilities. The facilities will be relocated to a suitable alternative location within the Thornhaugh boundary. The access road from Thornhaugh to Cooks Hole will be relocated as necessary once the landfilling construction operations commence in Phase 1 East.
- 5.10** As the final restoration operations are completed, Footpath Thornhaugh No 3 Section 3 and Footpath Thornhaugh No 3 Section 4 will be reinstated as well as Footpath Thornhaugh No 4 Section 1, Footpath Thornhaugh No 2 Section 2 and Footpath

Thornhaugh No 2 together with the new permissive footpaths as shown on Figure ES3.3.

6. Restoration proposals and Biodiversity Net Gain

- 6.1 The currently approved restoration schemes for Cooks Hole and Thornhaugh are presented at Appendices ES1.1 and ES1.2. The restoration plan for the proposed development is shown on Figure ES4.3 and cross sections through the proposed restoration landform are shown on Figure ES6.1.

Landform

- 6.2 The currently consented landforms for Cooks Hole and Thornhaugh comprise two discrete landforms which are separated by Footpath Thornhaugh 3 Section 3 and Section 4. The currently approved restoration profile for Cooks Hole comprises a landform which slopes down towards Thornhaugh Brook from the south and then raises up from Thornhaugh Brook to the north up to Footpath Thornhaugh 3 Section 3 and Section 4 at a ground level of between 47mAoD to 57mAoD. The approved restoration profile for the north eastern corner of Cooks Hole is to return the land to original ground levels. Thornhaugh Brook is located in a valley feature. The currently approved restoration profile for Thornhaugh comprises generally a domed shape with a high point of 71.5mAOD. The existing Thornhaugh profile has been designed in accordance with the best practice for landfill restoration in order to maximise rainfall runoff and minimise rainfall infiltration.
- 6.3 The proposed integrated landform retains the valley feature through which Thornhaugh Brook flows with the ground to the north of the brook at a ground level of 47mAoD rising gently to the same high point level at Thornhaugh of 71.5mAOD. The slopes are retained on the flanks of Thornhaugh so that water is shed from the surface of the landform. The gradients from south to north for the restored landform in Cooks Hole are between 1v:8h and 1v:10h. The gradients on the flanks of the landform in Thornhaugh are between 1v:9h and 1v:15h from south to north, 1v:6h to 1v:16h on the eastern flanks and 1v:6h to 1v:10h on the western flank. The slopes of the restored landform are designed to vary to create local features which result in a more natural profile and which will provide further ecological benefits.

Afteruse

- 6.4 The approved restoration profile for most of Cooks Hole is to a level which is below the original ground level prior to mineral extraction and the restoration scheme comprises agricultural grassland with some tree and shrub planting. The approved

restoration scheme for Thornhaugh comprises a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland.

- 6.5** The habitats that will be established at Cooks Hole comprise waterbodies, woodland, shrub and scrub, open scrub, hedgerows, calcareous grassland and neutral grassland together with hibernacula and areas of bare ground. An area will also be established for nesting sand martins. The habitats at Thornhaugh will remain consistent with those that are currently consented so will comprise a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland.
- 6.6** As the areas of site operations and restoration are phased, existing habitats will be removed gradually and the creation of similar or improved habitats for sensitive and protected species will also be phased such that there will be a range of suitable habitats on site at any one time to accommodate the protected species that are known to use the sites as explained further in Section 8.
- 6.7** Development of the habitats will directly benefit wildlife such as amphibians, reptiles, invertebrates and mammals and provide connectivity for these fauna. The proposed restoration scheme principles follow the principles agreed for Thornhaugh. Discussions have been held regarding the restoration scheme with Peterborough City Council ecologists, Rockingham Forest Vision and Natural England.

Grassland areas

- 6.8** In Cooks Hole neutral grassland and calcareous grassland will be established. In Thornhaugh calcareous grassland will be established. The grassland/plant mixes will be selected to include plenty of pollen/nectar supplying flowers for the important invertebrates. The grassland areas will be managed primarily by seasonal mowing. In areas where there is a mix of scrub and grassland a band of taller grass will be left around the edges of the scrub patches which will provide over-wintering habitat for invertebrates, cover for reptiles and an area into which woody plants can spread, achieving the longer-term aim of developing a natural open woodland.

Woodland/scrub/hedge planting

- 6.9** Mixed scrub will be planted in blocks of varying size and density throughout the restored sites. The mixed scrub will comprise a minimum of three native species with no one species comprising more than 70% of the scrub. Species could include but is not limited to hawthorn, hazel, crab apple, field rose, purging buckthorn, dogwood and wild service tree.
- 6.10** As with mixed scrub, woodland planting will be undertaken throughout the restored areas and will comprise a minimum of five native tree species per woodland block. This includes species such as English oak to tie-in to adjacent woodlands, field maple, small leaved lime, wayfaring tree, wild service tree, silver birch, elder, hawthorn, hazel and purging buckthorn.
- 6.11** Hedgerows will be planted throughout the restored sites to link up areas of woodland and scrub planting. These will comprise a minimum of five native hedgerow species per 30m of hedgerow length.

Waterbodies

- 6.12** Twelve ponds will be created in the GCN conservation area of Cooks Hole Quarry. These ponds will be planted up with a diverse range of marginal, emergent and aquatic plants. The waterbodies have been sized so that they are unlikely to be attractive to flocking birds that could pose a hazard to aircraft using RAF Wittering. These waterbodies are planted for habitat creation purposes whereas the detention basins are designed to provide catchment areas in response to rainfall events. Detention basins are designed to remain dry or with limited water for most of the time in order that sufficient freeboard is maintained to accommodate runoff as and when it occurs.

Access

- 6.13** Public access to the restored sites is included in the restoration scheme. A number of rights of way which have been historically diverted will be reinstated across restored sites and a number of new permissive paths will also be established to provide circular walks around the site. A permissive path will be established adjacent to the A47 to allow walkers to walk inside the boundary of the sites rather than on the highway verge.

- 6.14** A small car park for up to 12 cars will be established at the former Cooks Hole entrance. It has been demonstrated that an access can be re-established at this location with appropriate visibility for cars. The surface of the car park will be formed of suitable aggregate material. The proposed access design is presented at Figure ES6.2. In the future a track may be established to Cooks Hole Farmhouse from the access point. A maintenance and monitoring access will be retained at the existing Thornhaugh entrance. This retained maintenance access will provide sufficient space for one vehicle to leave the A47 and obtain access to the sites via a 5 bar gate.

Restoration soils

- 6.15** Following the completion of the landform to the appropriate levels, between 1m (for areas of grassland) to 1.5m (for areas of woodland over the landfill site) of soil forming materials will be placed over the placed restoration materials prior to vegetation planting. All the soils that are currently stockpiled on Cooks Hole will be used in the restoration of Cooks Hole. Soil forming materials for Thornhaugh will be sourced from suitable material received through the gate which will also be processed as necessary in order to achieve the specification required for the placed growing medium.

Habitat Management and Monitoring Plan

- 6.16** A Habitat Management and Monitoring Plan will be submitted to the Local Planning Authority in response to an appropriately worded planning condition. Details of the species that will be planted are provided in the Biodiversity Net Gain Plan presented at Appendix ES6.1. The Habitat Management and Monitoring Plan will set out how the habitats will be managed over 30 years from the establishment of the habitats and describe the monitoring methods which will be used for each habitat type.

Biodiversity net gain

- 6.17** The restoration scheme for Cooks Hole has been designed to meet the objective of achieving Biodiversity Net Gain (BNG). The BNG for Thornhaugh is consistent with the current restoration scheme. BNG is defined as development that leaves biodiversity at the development site in a better state than it was before the development took place or in the case of an already approved development, a better state than the currently consented restoration scheme.

- 6.18** The habitat creation and biodiversity enhancement proposals are set out in detail in the Biodiversity Net Gain Plan presented at Appendix ES6.1. The BNG has been calculated using the statutory Biodiversity Metric. The completed calculations for the consented and proposed restoration schemes based on the approved metrics are presented at Appendix ES6.2 and Appendix ES6.3 respectively. The proposed measures will provide a BNG of over 104% for habitats and over 124% for hedgerows. The calculated net gain is substantially above the target of 10% which is specified in the Environment Act 2021. Mandatory BNG comes into force for planning applications submitted from 12 February 2024. The Biodiversity Net Gain Plan will be submitted to the Council for approval under an appropriately worded condition on grant of planning permission.

7. Alternatives

7.1 In this section of the ES the options and alternatives considered during the development of the final proposals are explained. In accordance with Schedule 4 of the 2017 EIA Regulations a description of the reasonable alternatives considered is provided in this section. The alternatives considered as relevant to the proposed development and its specific characteristics comprise:

- 'do nothing';
- alternative uses for the materials arising from construction works at East Northants Resource Management Facility (ENRMF) and Thornhaugh; and
- alternative site restoration designs.

7.2 The need for the proposed development and the exceptional circumstances which apply given the need for reliable, available accommodation of the excavation arisings from ENRMF in order to enable the continuation of that Nationally Significant Infrastructure Project (NSIP) are set out in the Planning Statement. ENRMF provides hazardous waste treatment and recovery facilities and a hazardous waste and low level radioactive waste (LLW) landfill. The site is nationally significant and serves the West Midlands, East Midlands, East of England, South East and Greater London. The current operations at ENRMF and the current operations at Thornhaugh are inextricably linked due to the inputs of treated wastes to Thornhaugh from the ENRMF waste treatment facility. Approximately 40% of the wastes deposited at Thornhaugh landfill arise from the ENRMF treatment facility. In addition, suitable engineering clay materials arising from the excavation works as part of the construction of landfill cells at ENRMF are transported to Thornhaugh and used in the construction of the engineered low permeability seals to the landfill cells at Thornhaugh.

7.3 As explained in the Planning Statement, in order to facilitate the continued nationally significant operations at ENRMF it is necessary to export 1.2 million m³ of naturally occurring clean material from ENRMF. The movement of materials arising from construction is not economical over anything other than short distances. Extensive enquiries over the last 5 to 10 years for developments which might need the material for construction or fill purposes have only identified an appropriate need within a cost effective distance for a small volume of the arisings. Excess material excavated to

date is stockpiled at ENRMF and there is a risk that if it is not used in the near future its continued presence will begin to affect the ability of the site to operate effectively. The ENRMF NSIP therefore requires a nearby, confirmed and available route for the entire volume of material which has been excavated and will be excavated in order for the development to be able to continue in accordance with the ENRMF Development Consent Order.

- 7.4** The export of material needs to be undertaken on a continual basis to facilitate the continued construction of the landfill cells in the western extension. As Augean have control of Cooks Hole the material can be imported to create the proposed landform as needed and there is only a short distance between the two locations. Without the material being used at an alternative site the operations at ENRMF could be delayed and the provision of a NSIP would be prevented due to the practical and planning restrictions on stockpiling on site while the construction, treatment, disposal and engineering operations are all taking place in parallel.

‘Do nothing’

- 7.5** It is considered good practice to consider the ‘do nothing’ option which relates to the evolution of the site environment without the implementation of the proposed development. If the proposed development did not occur the restoration of Cooks Hole to agriculture and woodland would be completed by February 2042. The landfilling operations and restoration of Thornhaugh to a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland would be completed by the end of 2034 and the end of 2035 respectively. The restoration of the sites would comprise two independent landforms. The opportunity to provide significant biodiversity net gain in Cooks Hole and the potential to extend the range of habitats with a view to providing a significant contribution to the wider aspirations for the enhancement of Rockingham Forest would not be realised. The landfilling operations at Thornhaugh would continue to support the operations at ENRMF but an alternative solution would have to be found for the majority of the material arising from the construction operations at ENRMF to allow it to continue to operate. Extensive enquiries by Augean over the last decade and more have not identified suitable, timely solutions for the reuse of the materials to date.

- 7.6** The cessation of the operations at the sites would result in the loss of up to 5 jobs in 2035 once the operations in Thornhaugh are complete. The jobs will be secured for

a further 7 years if the proposed development proceeds. Traffic movements and plant movements associated with the existing operations would cease in accordance with the currently consented timescales.

Alternative uses for the materials arising from construction at ENRMF

- 7.7** A Development Consent Order was granted for the western extension to ENRMF in January 2023 and the construction of the first landfill cell in the western extension has now been completed. Approximately 1.2 million m³ of material needs to be exported from ENRMF which has been extracted during the construction operations to create the hazardous waste and LLW landfill in the western extension at ENRMF.
- 7.8** Over the last 10 years of operations at ENRMF Augean have investigated alternative uses for the material arising from the landfill construction operations. During the construction of the current and previous landfill cells Augean have only identified an appropriate need within a cost effective distance for limited quantities of materials arising from the construction operations. Material is exported for use as necessary at Thornhaugh for use in the construction of the landfill cells but there are currently still large quantities of naturally occurring material stockpiled at ENRMF that will not be used at either the operations at ENRMF or Thornhaugh.
- 7.9** The alternative uses for material from ENRMF in other projects is sensitive to distance and timescales. The material needs to be relocated from ENRMF regularly to allow the construction operations in the western extension to continue without restrictions and in accordance with the timescales that have been set out in the Development Consent Order. The movement of materials arising from construction is not economical over anything other than short distances. Whilst alternatives have and will continue to be investigated there is no guarantee that projects will arise within a suitable distance or timescale during the construction operations of the western extension at ENRMF. Without the material being used at an alternative site the operations at ENRMF could be delayed and the provision of a Nationally Significant Infrastructure Project would be prevented due to the practical and planning restrictions on stockpiling on site while the construction, treatment, disposal and engineering operations are all taking place in parallel.
- 7.10** Whilst material arising from the landfill construction operations at ENRMF could be exported to an inert waste landfill for disposal it would be utilising the landfill void that

could be being using by inert wastes rather than naturally occurring materials. In addition, the disposal rather than the re-use of the material is contrary to the waste hierarchy and the associated policies for its implementation.

- 7.11** The sites are located approximately 3.4km from ENRMF and are under Augean's control. As all three sites are controlled by Augean the material can be moved within the timescales necessary and there is certainty of provision and use. The proposed development provides the opportunity to create an integrated, coherent landform across the sites and to enable the continuation of the nationally significant operations at ENRMF.

Alternative site design

- 7.12** The landform and restoration design of the site has progressed as the findings of the Environmental Impact Assessment and the outcomes of consultation have been obtained and considered. The design process is iterative and numerous components of the site design change to a greater or lesser extent as the design process progresses to address issues identified. At the pre-application stage the restoration landform profile proposed would have necessitated the importation of more material than the final landform profile that is proposed in this application. As consultation responses have been received and the details of the proposed development have evolved, the landform profile has been amended to accommodate only the volume of material that will arise from the construction operations at ENRMF and the construction operations at Thornhaugh in Cooks Hole. The additional void created at Thornhaugh has resulted from tying the two landforms together in order to provide an integrated, coherent landform.

8. Ecology and biodiversity

- 8.1** An assessment of ecology and biodiversity has been undertaken by Ecological Services Limited (ESL). The ecology and biodiversity of the sites and the surrounding area have been examined extensively to facilitate an assessment of the potential impacts on flora and fauna as a result of the proposed development. Surveys have been undertaken including a preliminary ecological appraisal and a wide range of field surveys covering habitats and plant communities, invertebrates, amphibians, reptiles, birds, bats and badgers. A desk study has been undertaken including requests for data to local record centres and societies. Discussions have been held with consultees including Peterborough City Council and Natural England. The results of the baseline surveys, desk studies and consultations together with an explanation of the assessment methodology and an assessment of the potential impacts of the proposed development are presented at Appendix ES8.1 and summarised in this section.
- 8.2** In June 2023 a tree survey to BS 5837 was carried out over the sites. A detailed arboricultural impact assessment is presented at Annex 2 of Appendix ES8.1.
- 8.3** A Biodiversity Net Gain (BNG) assessment for the proposed development has been carried out to determine the gain which will be achieved. The BNG which will be delivered compared with the currently approved restoration schemes has been calculated. The BNG assessment is provided at Annex 3 of Appendix ES8.1. A draft Biodiversity Net Gain Plan is provided at Appendix ES6.1. The Biodiversity Net Gain Plan will be formally submitted to discharge the statutory biodiversity net gain condition following grant of planning permission.

Methodology

- 8.4** A desk study has been undertaken to identify internationally and statutorily designated sites within 5km and non statutorily designated sites within 2km of the sites using MAGIC⁴ and Natural England's Nature on the Map. The Cambridgeshire and Peterborough Environmental Records Centre (CPERC) and Northamptonshire Biodiversity Records Centre (NBRC) were asked to provide a data report on local sites of conservation interest including County Wildlife Sites (CWS) and Local Wildlife

⁴ Natural England (2023) MAGIC website <https://magic.defra.gov.uk/>

Sites (LWS) together with records for protected or notable species within 2km of the sites.

8.5 A Preliminary Ecological Appraisal (PEA) was undertaken in June 2023 including a survey of all habitats and plant communities within the sites. The habitat maps are presented at Figure ES8.1 and Figure ES8.2. The zone of influence for the development is the area over which ecologically valuable sites, habitats or species may be significantly affected by environmental changes resulting from the proposed project. It is not a set distance and is dependent on the sensitivity of the ecological features under consideration. As a result of the PEA it was confirmed that it was necessary to undertake habitat surveys including tree surveys, invertebrate surveys, great crested newt surveys, reptile surveys, breeding bird surveys, bat surveys, badger surveys, brown hare surveys and hedgehog surveys.

8.6 The following surveys were undertaken in 2023. The detailed methodology for each of the surveys is provided at Annex 1 of Appendix ES8.1.

- The PEA was undertaken in June 2023. The PEA extended over the whole area covered by the sites together with the edges of adjacent land where access was permitted.
- Invertebrate surveys were undertaken in April, July, August and September 2023. The initial survey in April 2023 was a scoping assessment and then full surveys of Cooks Hole and Thornhaugh and surveys of the wet woodland were undertaken in July to September 2023.
- All waterbodies within the site were surveyed for Great Crested Newts (GCN) between April to May 2023. Each waterbody was surveyed 6 times to enable a population size assessment.
- Seven reptile surveys using artificial refugia were undertaken between April to September 2023. 80 artificial refugia were placed in suitable areas.
- Six breeding bird surveys were undertaken between March and June 2023 and all birds seen or heard at the site or immediately adjacent land were mapped. During all survey visits, birds seen or heard were recorded. Surveys were undertaken following sunrise and on one occasion at dusk.

- The buildings in Cooks Hole were inspected for use by bats and all trees on site were examined for potential roost features. Activity surveys were undertaken for bats on five nights in June and July 2023.
- Badger activity signs were recorded on each site visit. Badgers are subject to protection under the Protection of Badgers Act 1992. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. Accordingly the detailed information on sett locations and associated search records are not included in this report but will be provided in a separate confidential report where requested by statutory consultees as appropriate.
- Any sightings of brown hare and hedgehog were recorded on each site visit.
- In June 2023 a tree survey to BS 5837 was carried out over the sites.

8.7 Based on the information collected in the surveys and the desk based research the potential impacts of the proposed development were assessed and mitigation measures were prepared and incorporated into the design of the proposed development including for implementation prior to and during the site operations as well as integrated with the restoration proposals. The methodology for assessing the impacts on features of ecological and nature conservation interest are those set out in the relevant guidelines⁵. Further detail on the impact assessment methodology is presented at Appendix ES8.1.

8.8 Following the review of the data obtained during the desk study and surveys at the sites a number of species have been scoped out of the impact assessment. These are water vole and otter, hazel dormouse, brown hare, hedgehog and white clawed crayfish.

Baseline

Statutory and non-statutory sites and protected species records

8.9 The closest site in the National Sites Network as established in the Conservation of Habitats and Species Regulations 2017 (as amended) is Barnack Hills and Holes

⁵ Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM) 2018 (Version 2.1)

Special Area of Conservation (SAC) which is located approximately 4.5km north east of the sites as shown on Figure ES1.1. Within 5km of the site there are six statutory ecological sites with the closest being the Bedford Purlieus Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR) located adjacent to the west of the sites as shown on Figure ES1.1. There are 17 non-statutory sites within 2km of the application boundary including the Thornhaugh Quarry County Wildlife Site (CWS) which is located in the south west of Thornhaugh Landfill Site to the west of the landfilled areas.

8.10 A number of records for protected species within 2km of the sites were identified during the desk based study. The records comprise:

- 53 records for great crested newts between 2005 and 2022 with the closest being the GCN in the Thornhaugh CWS located within the site boundary.
- 15 records for other amphibians between 2004-2021 including common frog, common toad, smooth newt and palmate newt the closest of which was in Bedford Purlieus to the west of the sites.
- 53 records for reptiles from 2004 to 2021 including common lizard, slow worm and grass snake the closest of which is within Bedford Purlieus.
- 33 records for badger from 2003 to 2020 including within the Thornhaugh CWS.
- 51 records for hazel dormouse between 2003 and 2015 with the closest in Bedford Purlieus.
- One record for harvest mouse within 1.1km of the sites.
- One record for brown hare 1.3km south of the sites.
- Two records for otters in 2007 in the River Nene 1.8km east of the sites.
- There are numerous records for at least 11 species of bats between 2003 and 2019 the closest being within Bedford Purlieus.
- Hundreds of records for at least 47 species of protected and priority birds between 2003 and 2022 including within Bedford Purlieus.

- Thousands of records for protected and priority invertebrates between 2003 and 2022 the closest being within Bedford Purlieus.
- Hundreds of records for protected and priority plants between 2003 and 2022 including within the Thornhaugh CWS.

Habitats, plant communities and species

- 8.11** The application boundary includes both Thornhaugh and Cooks Hole. Thornhaugh comprises an active landfill with unvegetated surfaces, capped and unrestored cells, haul routes and material storage areas as well as site reception facilities. There are fragments of early colonising ruderal vegetation between these areas in Thornhaugh and an area to the north adjacent to the A47 has been restored to grassland. The Thornhaugh Quarry CWS is located in the western side of Thornhaugh and comprises a mosaic of grassland interspersed with ponds and patches of bare ground. A chain of ponds is present to the north of the CWS which were created as part of great crested newt mitigation works.
- 8.12** Cooks Hole consists of a mineral extraction site and is separated from Thornhaugh by a gappy hedgerow with a haul road at the eastern end. The north east of Cooks Hole comprises large areas of bare ground with stockpiles and two water storage lagoons. In the north west of Cooks Hole there is a large area of agricultural grassland with a stockpile and large waterbody. Cooks Hole is spilt by Thornhaugh Brook running west to east through an area of wet woodland either side of the uninhabited Grade II listed Cooks Hole Farmhouse. Land to the south east of the brook is mainly bare ground with former agricultural grassland in the south west.
- 8.13** The wet woodland, ponds, open mosaic habitats on previously disturbed land and hedgerows present at the site qualify as S41 Habitats of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (as amended). The site is considered to be of County importance for habitats. No nationally rare or nationally scarce plant species or S41 Species of Principal Importance were recorded at the site. Three species present on site (pyramidal orchid, wild liquorice and common valerian) are listed as Cambridge and Peterborough Additional Species of Interest (CPASI). Four near threatened species (carline thistle, common eyebright, common valerian and field scabious) were recorded at the site however all but field scabious were located within the CWS or

boundary features which will not be affected by the proposed development. The site is considered to be of Local importance for plant species. No non native invasive plant species were recorded within the site.

Trees and hedgerows

- 8.14** There are no Tree Preservation Orders for the trees on site. The survey identified 3 large groups in proximity to Thornhaugh Brook which will be protected during the operations. The four tree groups in Thornhaugh will be protected and retained. The gappy hedgerow (shown as 4 parts in the tree survey) and small central tree group which separates Thornhaugh from Cooks Hole together with the hedgerow which runs from south east to north west in Cooks Hole will be removed as part of the development. The protection measures for the trees are set out in the tree protection scheme presented at Appendix ES4.3. Details on the timing for the removal of the trees is presented in Section 5 of the Environmental Statement.

Invertebrates

- 8.15** The sites comprise a range of habitats which support a significant total number of invertebrate species. The most prominent invertebrate habitat on site is short sward and bare ground which supports 81 species including 17 species with a nationally significant status. Tall sward and scrub habitat is also prominent on site with a total of 67 species of association recorded including two with a nationally significant status. The butterfly resource at the site is considered to be significant with two Section 41 species widespread across the site (dingy skipper and grizzled skipper). 68 species of ground nesting bees and wasps were recorded at the site including 14 with nationally significant status resulting in a diverse and robust population. The wet woodland present in Cooks Hole supports a range of habitats and the survey recorded 105 species of invertebrates. The number of wetland species is low with only 26 species of invertebrates recorded.
- 8.16** The sites support a moderately high number of invertebrates including a low number of localised and specialised species 15 of which have nationally significant status. The invertebrate assemblage is considered to be of County importance. The value of the wet woodland present at Cooks Hole is considered to be high and of District importance for its invertebrate assemblage. The wet woodland will not be affected by the proposed development as explained further below.

Amphibians

- 8.17** Work has been undertaken historically at Thornhaugh to translocate GCNs to the CWS located in the west of the site and to a receptor area with eight receptor ponds located to the north of the CWS. These ponds are separated from the rest of the sites by amphibian fencing. Population monitoring of the CWS and adjacent receptor ponds was undertaken from 2005 to 2019 which indicates that the population has varied but overall it is considered that there was a medium sized population present. 16 ponds within the sites which were surveyed for the presence of GCN during 2023. It was determined that the site supported three distinct GCN populations. There is a medium population of GCN across the ponds located in the CWS, the ponds to the north of the CWS and the pond in the north west of Cooks Hole. Two further small populations are present in the surface water management lagoon in the east of Thornhaugh and the mineral washing lagoons in the south east of Cooks Hole. In addition to great crested newts, palmate and smooth newts were found in the CWS and ponds to the north of the CWS and in the surface water management lagoon in the east of Thornhaugh and the pond in the north west of Cooks Hole. No frogs or toads were recorded at the site. The sites are considered to be of County importance for amphibians.

Reptiles

- 8.18** Previous surveys undertaken in 2009 and 2012 recorded slow worms and common lizards along the western edge of Cooks Hole adjacent to Bedford Purlieus and a 2011 survey found grass snake and common lizards to the south of Thornhaugh Landfill. In 2023 one grass snake was recorded under a survey tin at the western end of the central hedgerow between the sites and a common lizard was recorded in the restored grassland in the north of Thornhaugh.
- 8.19** Bedford Purlieus is known to support populations of common lizard, slow worm and grass snake and it is likely the reptiles present at the sites are part of this wider metapopulation. Given the levels of disturbance at the sites over the past 20 years the only suitable habitats for reptiles are the hedgerow between the two sites, habitats along the brook corridor in Cooks Hole and the area of restored grassland in the north of Thornhaugh. As a result of the species present at the site being Section 41 species of Principal Importance the site is considered to be of Local importance for reptiles.

Birds

- 8.20** Numerous bird species have been recorded at the site during previous site surveys with a total of 58 recorded during the six 2023 site visits. This included three Schedule 1 species comprising little ringed plover, red kite and redwing. The little ringed plover was confirmed to be breeding on Cooks Hole. The survey also noted ten species of principal importance including cuckoo and skylark in addition to eight Red List and 17 Amber List species and suitable nesting habitat is available within the sites. Whilst not currently believed to be of conservation concern a colony of sand martin were present in a spoil heap in Cooks Hole in such numbers that the sites can be considered to be of importance to the species.
- 8.21** Little ringed plover favour nest sites on transient areas of bare and sparsely vegetated ground such as those found in quarries, gravel pits and industrial sites with the availability and loss of such habitat having a direct effect on the population size. Studies on population size of little ringed plover in Cambridgeshire suggest the numbers present on site could represent at least 20% of the known breeding pairs in the County which would make the site of at least District and possibly County importance for the species. Suitable habitat for Little ringed plover will be available for the duration of the site operations as the material placement and restoration operations will be undertaken in phases.
- 8.22** Red kites were recorded on every site visit and were often seen over Thornhaugh. It is likely that Bedford Purlieu supports multiple breeding pairs and that competition has led to a pair nesting in the eastern end of the wooded brook valley in Cooks Hole. The site is considered to be of local importance to red kite. Whilst the sites support several Red and Amber list species of breeding birds the numbers are relatively small and typical of the habitats present. The site is considered to be of local importance for breeding birds. It is considered that larger areas of their preferred habitat will become present during the progressive restoration of the sites and that these new habitats will be able to carry an even greater number and range of species.

Bats

- 8.23** Surveys undertaken at the sites in 2023 did not identify any roosts however roosting opportunities are available at Cooks Hole Farmhouse and associated buildings and some mature trees along the brook corridor all of which will be unaffected by the

proposed development. As Thornhaugh is an active landfill foraging opportunities for bats are limited to pockets of habitat with poor connectivity internally and with the wider landscape. The most active area for foraging bats in Thornhaugh was the interface between the site and Bedford Purlieus. Thornhaugh is assessed as having 'low' suitability for commuting and foraging habitats, elevated to 'high' suitability along the boundaries. The open bare ground at Cooks Hole is unsuitable for foraging bats with the most active areas recorded as the brook corridor through the centre of the site and the interface with Bedford Purlieus to the west and to a lesser degree the two internal hedgerows at Cooks Hole. Cooks Hole is assessed as generally having 'low' suitability for commuting and foraging habitats, elevated to 'medium' suitability along the internal hedgerows and 'high' suitability along the brook corridor.

- 8.24** A total of eight bat types were identified to species level during the 2023 surveys in addition to bats from the *Myotis* genus which could not be identified to species level but are likely to be either Daubenton's bat or whiskered/Brandts bat. Bat activity elsewhere was generally low. Noctule bats were recorded in high numbers in June in proximity to the internal hedgerows. Noctule bats are not reliant upon linear landscape features for commuting or foraging hence the recorded activity levels are likely from short intense bursts of foraging activity in proximity to the detectors. Common pipistrelle activity was relatively high around Cooks Hole Farmhouse spread through the night so the records do not indicate that a roost is present.
- 8.25** Regular use of hedgerows on the sites including the central hedgerow was recorded by soprano pipistrelle, common pipistrelle and barbastelle with little evidence of commuting use by other species. Low levels of soprano pipistrelle, Nathusius' pipistrelle, Liesler's bat, barbastelle bat and the myotis bats were recorded primarily along the western boundary adjacent to Bedford Purlieus. Whilst brown long-eared bats are often underrepresented in acoustic surveys it is considered that the foraging opportunities within the sites will be limited to the western boundary with Bedford Purlieus as the species tends to be associated with woodland and edge habitats.
- 8.26** All bat species are protected under the Habitats Regulations and the Wildlife and Countryside Act 1981 (as amended) and barbastelle, noctule, soprano pipistrelle and brown long-eared bat are also S41 species. Most of the species recorded using the site are at relatively low levels. The most important habitats for bats on site (the brook corridor and western interface with Bedford Purlieus) will be unaffected by the

proposed development. Furthermore habitats that are lost during the operation of the sites will be replaced in far higher proportions upon restoration. Bats are likely to be resilient to the proposed development but the site is considered to be of Local importance for bats.

Dormice and other mammals

- 8.27** Hazel dormice were reintroduced to Bedford Purlieus in 2001 and monitoring of the species up to 2014 demonstrated its long term success. In addition a dormouse survey was undertaken at the site in 2009 which focused on the suitable habitat on the sites comprising the central hedgerow between the two sites. No evidence of dormouse was recorded. Given that the central hedgerow is now thin and gappy with poor habitat connectivity it is considered that no further surveys are necessary and that dormice can be scoped out of the assessment.
- 8.28** Fallow, roe and muntjac deer have been recorded within Cooks Hole and there is no operational requirement to exclude them from the active site. It is considered that deer can be scoped out of the assessment.
- 8.29** There has only been one record of brown hare since 2000 and there are no records of them ever being present at the sites. Given the low historic numbers and given that no brown hares were seen during the 2023 surveys it is considered that they can be scoped out of the assessment.
- 8.30** No records for hedgehogs were returned during the desk study and there are no records of them ever being present within the sites. It is considered that hedgehogs can be scoped out of the assessment.

Ecologically important features of the site

- 8.31** The following aspects of the proposed development are considered ecologically important features:
- The wet woodland that will be retained in the brook corridor in Cooks Hole is a Section 41 NERC habitat and a functional habitat providing feeding areas and shelter for a range of priority invertebrate species.

- The assemblage of amphibians on site including great crested newts which are a Wildlife and Countryside Act Schedule 5 species is sufficient to meet the selection criteria for a CWS.
- Little ringed plover, red kite and the assemblage of breeding birds present at the sites comprise Wildlife and Countryside Act Schedule 1 and Schedule 5 species.
- The habitats present on site provide feeding areas and shelter for a range of priority invertebrate species including two Section 41 NERC species of butterfly.
- The hedgerow network present at the sites supports a range of priority species by providing feeding areas and shelter.
- Use of habitats on the sites by Wildlife and Countryside Act Schedule 5 and Section 41 NERC species including bats and reptiles.
- Use of habitats on the sites by badgers protected under the Badgers Act, 1992.

Baseline evolution

- 8.32** It is necessary to outline the likely evolution of the baseline environment at the sites without the implementation of the proposed development. If the proposed revised restoration scheme was not approved and implemented then the operations would continue at Cooks Hole until 2042 and the operations at Thornhaugh would continue to 2035. Cooks Hole would be restored to agricultural grassland with some tree and shrub planting. Thornhaugh would be restored to a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland. The opportunity to provide significant biodiversity net gain in Cooks Hole would not be realised. The potential to extend the range of habitats with a view to providing a significant contribution to the wider aspirations for the enhancement of Rockingham Forest as described in Section 6 would not be realised.

Assessment of environmental effects and mitigation measures

- 8.33** In terms of their potential for ecological impacts, the activities associated with landfilling, earthmoving and the placement of restoration material are similar during the construction and operational phases including the placement of restoration

materials and as they are likely to take place simultaneously in different parts of the sites during the development they are considered together.

Designated and locally important sites

8.34 Due to the distance from the site to the nearest National Network Site and the lack of potential pathways for significant effects, there will be no impacts on Barnack Hills and Holes SAC. There is the potential for the proposed development to affect four SSSIs namely Bedford Purlieus, West, Abbots & Lounds Woods, Bonemills Hollow and Wansford Pasture. Potential impacts could occur as a result of emissions to air and water, vehicle movements and impacts associated with the deposition of dust. The controls which will be implemented in order to minimise the potential impacts on water quality are described and assessed in Section 11 of this ES. The controls which will be implemented in order to control emissions of dust as a result of the placement of restoration soils are described and assessed in Section 14 of this ES. The assessment of impacts as a result of traffic are presented in Section 12 of this ES. Measures for the embedded protection of tree roots are an integral part of the design of the development. Only clean naturally occurring material will be placed in Cooks Hole and the landfilling operations in Thornhaugh will continue to be implemented and regulated by the Environment agency through the Environmental Permit. Accordingly it is concluded that there will be no adverse effect or a negligible adverse effect on any statutorily protected site.

8.35 No work will be undertaken within the Thornhaugh County Wildlife Site (CWS) in the south west of Thornhaugh. Currently there is amphibian fencing around the CWS which will be removed under an ecological watching brief when it is necessary to grade the adjacent land to the final restoration levels. There will be no effect or a negligible effect on the function or conservation status of the CWS. In the long-term, the restoration will provide new and enhanced links to existing habitats extending the capacity of Bedford Purlieus and Thornhaugh CWS to support notable species and contributing to conservation aims of Nature Recovery Networks within the wider Rockingham Forest area. This would be a major beneficial effect at a regional level.

Wet woodland

8.36 Wet woodland currently covers a length of approximately 390m of the approximately 1.5km long Thornhaugh Brook corridor through the sites. The whole length of the

corridor will be protected during the proposed development by the implementation of a Construction Exclusion Zone. Surface water will be managed in Thornhaugh and Cooks Hole during the operations and following restoration in accordance with the surface water management scheme which is presented at Appendix ES4.1. Measures to enhance the wet woodland will be included in the Habitat Management and Monitoring Plan which will be submitted to discharge an appropriately worded planning condition. In the short term, with the implementation of the protective measures, there will be a negligible effect on the function or conservation status of the wet woodland. In the long term, with appropriate management as proposed, the area of wet woodland can be increased which would benefit a range of species resulting in a moderate beneficial impact which would be significant at a District or County level.

Hedgerows

- 8.37** Two hedgerows with a total length of 835m will be lost in stages as a result of the proposed development. This will result in a temporary reversible loss of an important habitat that provides foraging opportunities for invertebrates and bats and provides nesting habitat for birds. Once the restoration of the sites is completed an overall total length of 3376m of species rich hedgerow will be planted. A total length of 500m of hedgerow will be planted in Phase A and 280m in Phase C as shown on the phasing plan at Figure ES4.2. The planting of the hedgerows in Phases A and C will take place in the first 3-5 years of the development and prior to the removal of the existing hedgerows from Phase D onwards. A 240m length of hedgerow will be planted in Phase D so no net loss will be exceeded within 7 years of commencement. The new hedgerows are likely to take 5 to 7 years to reach a functional state so the loss will vary from short to medium term for most species. Once the site is restored the overall length and quality of hedgerow will exceed that to be lost by 400%. The overall effect will be minor beneficial at the local level following restoration.

Grassland and scrub

- 8.38** With the exception of the area of the CWS, the currently restored areas on Thornhaugh, the Thornhaugh Brook corridor and around half the grassland in the proposed new newt conservation area in the south west of Cooks Hole, all other grassland and scrub within the sites will be disturbed during the development. This will result in a gradual, temporary but reversible loss of habitat that provided foraging

opportunities for all the species recorded using the site and breeding/nesting habitats for invertebrates and ground nesting birds. The progressive restoration will result in the creation of approximately 49 hectares of varied grassland including calcareous and neutral grassland. It is likely to take 2-3 years for the grassland to reach a functional state so the loss is likely to be short term for most species affected. The restoration of the sites will deliver approximately 11 hectares of mixed scrub. Once established, the overall area and quality of grassland and scrub will exceed that which will be lost. The grassland and scrub will provide terrestrial habitat connectivity for all of the groups/species recorded using the site with the greatest benefit for invertebrates and nesting birds. The predicted effect is assessed as being minor beneficial at the local level increasing to moderate beneficial at a District level once the habitats are established and under appropriate management.

Invertebrates

- 8.39** The phased operation of the sites will result in the gradual loss of grassland, scrub, hedgerows and areas of open mosaic habitats which in combination with the retained habitats are important to a broad range of invertebrates including two important butterfly species the dingy and the grizzled skipper. The phased operations at the sites will result in gradual, temporary but reversible loss of habitats that provide breeding, nesting and foraging opportunities for invertebrates with the greatest effects on more sedentary species and those with limited or specific food plants. The phased operation and restoration of the sites means that areas of key habitats will remain available throughout the development.
- 8.40** The retention of the CWS, brook corridor and boundary features will mitigate the effects of the temporary loss of areas of habitats during the operations. For the most notable species any effects are likely to be short-term; for example, key habitats for the dingy and the grizzled skipper lie within the CWS and restored area of grassland in the north of Thornhaugh neither of which will be disturbed. Further expansion of invertebrate populations will be temporarily limited until new habitats are established but viable populations will be maintained in readiness to colonise them. In the long term the mosaic of habitats which will be created as a result of the restoration will provide significant opportunities for the current assemblage of invertebrates to increase and for the sites to be colonised by new species. The new habitats will also extend the capacity of the adjacent Bedford Purlieu woodland to support notable

species. With appropriate long-term management (including that of the CWS and wet woodland), the effects on the invertebrate assemblage are predicted to be moderate beneficial at a District or County level.

Amphibians

- 8.41** Three ponds (Ponds 18, 19 and 20 shown on Figure ES8.1) will be destroyed during the development to enable the creation of the new landform. With the exception of the CWS, the wet woodland, the Thornhaugh Brook corridor and the currently restored areas on Thornhaugh, it is likely that all of the terrestrial habitat on the sites that is used by amphibians will be impacted at some point during the development. The mitigation strategy for amphibians including great crested newts (GCN) has been designed to enable Natural England to grant a licence on the grounds of Licencing Policy 1 – ‘Greater flexibility to dispense with exclusion and relocation activities where there is investment in habitat provision’, and Licencing Policy 3 – ‘Greater flexibility on exclusion measures where this will allow GCN to use temporary habitat’. Prior to the loss of any waterbody there will be a supervised drawdown of the water in the ponds and removal of any amphibians present. Prior to clearance of the ponds all high value nearby habitats will be assessed and hand searched where deemed necessary. In all cases amphibians will be recorded and released into place of safety.
- 8.42** With the exception of Ponds 18, 19 and 20 all other ponds will be retained and have been incorporated into the restoration plan. Twelve new purpose built ponds will be created; this provides a ratio of 4:1 for those lost which meets the compensation requirements of District Level Licensing. The ponds will be clay lined and will be planted with locally native species. The ponds will be located in a dedicated Conservation Area to be created in the south western corner of Cooks Hole, north and south of the brook, contiguous with the western edge of Bedford Purlieus and the Thornhaugh CWS in order to provide optimal habitat connectivity. The Conservation Area will be protected and separated from the rest of the sites by new species rich hedgerows. A gate will be installed to facilitate access for management purposes. The terrestrial habitats within the Conservation Area will comprise a mosaic of neutral/calcareous grassland with islands of scrub. A minimum of 12 hibernacula will be created comprising large piles of inert rubble and timber capped with membrane and turves. The grassland will be cut annually, late in the season to benefit invertebrates, and managed on rotation to ensure that there are always areas

of taller, undisturbed vegetation. Population size class assessments will be undertaken annually in order to monitor progress towards achieving favourable conservation status.

- 8.43** The south-western part of the Conservation Area will be created in Phase A, (the first 12-18 months of the development), with the north-western part following four to five years later during Phase D. There will be no barriers to movement so amphibians are free to colonise these areas at any point in time. Any adverse effects on amphibians are considered to be reversible and short-term. Once new habitats are established the overall long term effect is predicted to be moderate beneficial at the County level.

Reptiles

- 8.44** The sites are unlikely to be important to reptiles with suitable habitat currently limited to the hedgerow running east to west between Thornhaugh and Cooks Hole and the associated rough grassland either side. Habitats suitable for use by reptiles will undergo habitat manipulation in order that any reptiles present are able to disperse from these areas prior to vegetation clearance. Where necessary targeted searches will be undertaken in order to demonstrate that reasonable effort has been made to avoid killing and injury of reptiles and ensure legal compliance. The restoration will result in the creation of a habitat mosaic that will benefit reptiles, including ponds (for grass snakes), grassland for foraging and hedgerows for cover and connectivity with adjacent habitats, most notably Bedford Purlieus, encouraging the free movement of animals between these areas. In the short to medium term, the effects on reptiles are predicted to be neutral with no or negligible effect on function or conservation status. In the medium term reptiles will benefit as each phase of the restoration is completed. In the long term once new habitats are established the effect is predicted to be minor beneficial at a local level.

Birds

Little ringed plover

- 8.45** In 2023 two pairs of little ringed plover were confirmed as breeding within an area of bare ground in Cooks Hole. Little ringed plover are summer visitors to Britain and favour broken, sparsely vegetated ground which is the dominant habitat in the north and south eastern parts of Cooks Hole. Habitats suitable for use by little ringed plover

will be identified and studied for behaviour indicating active nest sites each spring annually commencing in the 2024 breeding season. This information will be relayed to site staff and an appropriate buffer zone will be set up to prevent damage to nests and avoid disturbance. Nest monitoring will continue at intervals until the young have fledged.

- 8.46** Prior to the loss of the 2023 breeding area six detention basins will be constructed to temporarily hold excess surface water during storm events and the basins will comprise bare ground left to colonise naturally. It is anticipated that some or all will be dry in the summer making the stoney, sparsely vegetated margins available for use by little ringed plover. There will be sufficient habitat at the site to support at least two breeding pairs at all times throughout the operations. In the short term the effects on little ringed plover are predicted to be neutral with no or negligible effect on function or conservation status. In the medium term (up to the completion of restoration of Cooks Hole), this species is likely to benefit annually as each phase of the restoration is completed. In the long term once new habitats are established the number of suitable nesting areas and the physical distance between them (which is important for a territorial species) may make it possible for the sites to support additional nesting pairs which would have a beneficial effect. The restoration has the potential to be moderate beneficial at a District level if the number of breeding pairs of little ringed plover resulted in a sustainable increase over time.

Sand martin

- 8.47** In 2023 a sand martin colony was present in a bank within Phase J2. Sand martins are summer visitors to Britain arriving in mid-March and nesting through to July. They nest in colonies excavating nest burrows in steep-faced banks of material often either the exposed face of an excavation or a stockpile. Such transient habitats are not infrequent on the sites and so future nesting attempts could be made anywhere where there is suitable habitat. Habitats suitable for use by sand martins will be identified and studied for behaviour indicating active nest sites each spring annually commencing in the 2024 breeding season and can be combined with that designed for little ring plover. This information will be relayed to site staff and an appropriate buffer zone will be set up. Nest monitoring will continue at intervals until the young have fledged.

- 8.48** The clearance of habitat suitable for use by sand martins will be undertaken outside the breeding season. New nesting provision for sand martins will be created in Phase D approximately five to seven years into the operations and before the nest site in Phase J2 that was used in 2023 will be lost. On the assumption that suitable habitats will be available for use by sand martins to return to the sites each year there will be no effect on their conservation status and the predicted effect is assessed as being neutral. In the long-term the restoration will increase the invertebrate biomass available for sand martins (and other insectivorous birds) potentially resulting in an increase in the survival rates and thus their populations. The effect is assessed as being minor beneficial at a local level.

Bats

- 8.49** Only the buildings at Cooks Hole Farmhouse and the mature trees along the brook corridor are assessed as currently suitable for use by roosting bats. None of these features will be affected by the proposed development and there is a sufficient buffer from the working areas that there will be no significant disturbance. There are other trees with potential for use by roosting bats but this can change over time due to use by other species such as woodpeckers. The majority of commuting and foraging activity currently takes place along the more productive and continuous wet woodland corridor and the site boundaries.
- 8.50** The planting of an overall total of 3,376m of species rich hedgerow will provide bats with acoustic markers to aid commuting routes and once established will attract more invertebrates and provide a valuable foraging resource. As features suitable for use by bats can be created quickly any trees subject to felling will be re-assessed in advance in accordance with best practice guidelines and appropriate mitigation measures will be implemented. In order to provide additional roosting opportunities for bats, bat boxes will be fixed to suitable trees. In addition, three pole mounted bat boxes will be installed close to ponds in the GCN Conservation Area.
- 8.51** A total of 12 new waterbodies will be created in Phases A and D before the surface water management lagoons are lost during Phases F and J3. This will ensure that there is a continual supply of drinking water for bats and other species. As the ponds mature, the invertebrate biomass will increase, providing a valuable foraging resource for all bat species. There will normally be no night-time working and the sites will not be floodlit outside working hours so bats will not be subject to disturbance

by light, noise or dust. If lighting is necessary for health and safety reasons, it will be directed downward to minimise light spill in accordance with best practice guidelines.

- 8.52** The restoration has been designed to maximise habitat connectivity both within the sites and between the sites and adjacent habitats in particular Bedford Purlieus. The significant increase in linear habitats such as hedgerows will result in a far more connected landscape than currently exists providing new flyways and commuting routes. The areas of new grassland, woodland and scrub planting will provide sheltered foraging opportunities. Once established the overall area and quality of these habitat will greatly exceed those to be lost. The phased approach will result in habitat loss and subsequent habitat creation taking place simultaneously over the years. As bats are highly mobile species they are likely to switch foraging areas quickly in response to food availability. In the short term bats are likely to be resilient to any effects. In the medium to long term the predicted effects are assessed as being minor beneficial at a local level potentially increasing to moderate beneficial at a District or County level if the bat boxes are occupied by a maternity colony of a scarcer species, such as barbastelle bat.

Biodiversity net gain

- 8.53** The habitat creation and biodiversity enhancement proposals are set out in detail in the Biodiversity Net Gain Plan which is presented at Appendix ES6.1. The BNG has been calculated using the statutory Biodiversity Metric. The proposed measures will provide a BNG of over 104% for habitats and over 124% for hedgerows. The calculated net gain is substantially above the target of 10% which is specified in the Environment Act 2021.

Residual and cumulative effects

- 8.54** The adverse effects of the proposed development can be mitigated in full by the implementation of the mitigation measures. There will be no residual adverse effects. There are no cumulative adverse ecological effects as a result of the proposed development. Following restoration the proposed development will have beneficial impacts on a range of species.

Conclusions

- 8.55** Replacement habitats for those that will be lost during the development are embedded within the design fully mitigating all adverse effects and providing additional enhancement with overall beneficial impacts. The proposed restoration will create a mosaic of woodland with shrubby edges, a large area of calcareous and neutral grassland, scattered trees, network of hedgerows, waterbodies and areas of open mosaic habitats. The proposed restoration will provide new and enhanced links to existing habitats and will extend the capacity of Bedford Purlieus to support notable species. This will contribute to the conservation aims of Nature Recovery Networks within the wider Rockingham Forest area. The proposed new and extended habitats will generate significant Biodiversity Net Gain in accordance with the Environment Act 2021 and is fully in accordance with both national and local nature conservation policy objectives.

9. Cultural heritage

9.1 An assessment of cultural heritage has been undertaken by Andrew Josephs Associates. As stated in Section 1 of this ES, the sites have been consented for and subject to mineral extraction operations since the 1950s. The soils and overburden at the sites have already been stripped so there is no potential for buried archaeology to be present. An assessment of buried archaeology therefore has been scoped out of the EIA and this assessment focuses on the potential impacts on the setting of designated heritage assets at and in the vicinity of the site as a result of the proposed development. This approach has been agreed in the Scoping Opinion provided by Peterborough City Council (Appendix ES2.3). The cultural heritage assessment is presented at Appendix ES9.1.

Methodology

9.2 A desk based study has been undertaken in accordance with The Chartered Institute for Archaeologists guidance⁶ and Historic England Guidance^{7,8,9} to provide an initial assessment of the potential impacts upon heritage assets within the site and the surrounding area that would result from the proposed development. The desk based study:

- Identifies and defines the extent of known heritage assets within the study area including the extent of the setting of the heritage assets;
- Makes a preliminary assessment of the potential for indirect effects on onsite and offsite designated heritage assets; and
- Assesses the potential impact of the proposed development on known heritage assets.

9.3 A search has been undertaken of the Historic England Archive and the DEFRA Magic database to obtain information on designated heritage assets such as World Heritage Sites, listed buildings and other buildings of architectural or historic importance,

⁶ *Standard and Guidance for Archaeological Desk-Based Assessment* (Chartered Institute for Archaeologists 2008, revised 2012).

⁷ *Historic England (2017) Good Practice Advice 3 – The Setting of Heritage Assets, 2nd edition*

⁸ *Historic England (2009) Planning Mitigation and Archaeological Conservation – Resource Assessment.*

⁹ *Historic England (2019) Statements of Heritage Significance (HEAN12)*

scheduled monuments, Conservation Areas, archaeological sites, battlefields, historic parks and gardens and historic landscapes.

- 9.4** The prediction of effects and the assessment of their significance is based on the guidance stated above and using the criteria set out in the relevant section of the Design Manual for Roads and Bridges¹⁰ and informed by professional experience. These are considered the most transparent methods available for heritage assessments. The details of the assessment methodology are presented at Appendix ES9.1.

Baseline

- 9.5** A study area of 500m from the application boundary was established as an appropriate distance to assess the potential effects upon the setting of designated heritage assets given the scale of the current operations and the screening effect of trees, topography and severance of the landscape caused by the A47. There are no scheduled monuments, World Heritage Sites, conservation areas, historic parks and gardens or historic battlefields within 500m of the sites. The nearest scheduled monument is Wansford Bridge which is 1.8km south east of the application boundary. There are three listed buildings within 500m of the sites comprising Cooks Hole Farmhouse located within Cooks Hole Quarry, the Home Farm group of buildings located approximately 90m north of Thornhaugh and the Sibberton Lodge group of buildings which are located approximately 500m east of Cooks Hole. Both the Home Farm and Sibberton Lodge groups of buildings are enclosed by mature planting which screens the properties from the sites. There is additional planting on the boundaries of the sites which obscures the operations at the sites. The Home Farm Group of Grade II buildings includes the farmhouse that was rebuilt by the Duke of Bedford on the site of the former hunting lodge (hence the name Bedford Lodge). Cooks Hole Farmhouse is situated in the Thornhaugh Brook valley and is set below the surrounding ground levels. The views of Cooks Hole Farmhouse are limited due to the surrounding planting and ground levels.
- 9.6** It is necessary to outline the likely evolution of the baseline environment at the sites without the implementation of the proposed development. If the revised restoration scheme was not approved then the operations would continue at Cooks Hole until

¹⁰ *National Highways (2020) Design Manual for Roads and Bridges: LA104 Environmental Assessment and Monitoring*

2042 and the operations at Thornhaugh would continue to 2035. Cooks Hole would be restored to low level agricultural grassland with some tree and shrub planting. Thornhaugh would be restored to a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland. The settings of the heritage assets would continue to be affected as they are by the current operations. The currently consented restoration profiles would result in a deviations from historic ground levels. There would be no biodiversity net gain.

Assessment of environmental effects

- 9.7** As set out above due to the nature of the proposed development this assessment focuses on the potential impacts on the setting of designated heritage assets in relation to the proposed development. There will be no direct impacts on designated heritage assets as a result of the proposed development. The proposed revised restoration profile has the potential to cause an indirect impact on the setting of designated heritage assets.
- 9.8** As stated above there are three designated heritage assets within 500m of the site. The Home Farm group of buildings located approximately 90m north of Thornhaugh and the A47 is enclosed by trees which reduces visibility to and from the sites. There is a belt of mature and dense trees on the Thornhaugh boundary which further limits views of the sites from the designated buildings. The land at Thornhaugh closest to the Home Farm group of buildings has already been restored and the profile will not change as a result of the proposed development. It is considered that there will be no effect on the setting as a result of the proposed development.
- 9.9** The Sibberton Lodge group of buildings are located approximately 495m east of Cooks Hole and are surrounded by mature trees and lie to the north of the A47. There is also a belt of trees on the boundary of Cooks Hole. Due to intervening vegetation the revised restoration profile will not be visible from the buildings and there will be no effect on the setting of the asset as a result of the proposed development. There will be no impact upon the setting of listed buildings outside of the application boundary.
- 9.10** Cooks Hole Farmhouse is located within Cooks Hole Quarry and the proposed development will result in no changes to the ground levels in the immediate vicinity of Cooks Hole Farmhouse. The revised landform profile will result in an increase in

topography from the currently approved restoration by up to a maximum of 14m at the boundary with Thornhaugh (Figure ES9.1). The highest restoration level on Thornhaugh of 71.5m AOD will not change. The increased height of the topography will improve the views from the reinstated Footpath Thornhaugh No 3 Section 3 and 4 looking south towards Cooks Hole Farmhouse. There are limited views and wider appreciation of the surrounding land from the farmhouse due to the surrounding trees and the farmhouse being set down in the brook valley. The farmhouse has been surrounded by mineral working since the 1950s which has had a significant impact on the historic setting of the site. Following completion of the restoration of the site there will be no adverse effects upon the setting of Cooks Hole Farmhouse due to the natural appearance of the restored landform and its integration into the landscape.

- 9.11** It is considered that during the operations at the sites including restoration operations there will be a minor adverse impact on views from Cooks Hole Farmhouse however there will be no effect upon the appreciation of the heritage asset as the house is unoccupied and not currently visible from PRoW. The farmhouse will remain unoccupied until completion of the site operations. Following the completion of restoration it is considered that there will be no residual adverse effects on the setting of the asset or the ability to appreciate it. It is considered highly unlikely that a visitor would be able to recognise that the original setting of the farmhouse has changed given that the whole landscape surrounding the farmhouse has been worked or restored over a period of 100 years.

Mitigation

- 9.12** Whilst there are considered to be only minor adverse impacts during the operation of the sites and no residual impacts post restoration it is considered that the setting of Cooks Hole Farmhouse can be enhanced by the removal of some of the self set trees and ground vegetation which have established in the vicinity of the farmhouse to open up the land immediately in vicinity of the building and reduce any associated potential for damp in the building structure. Cooks Hole Farmhouse will be made watertight and secure to help prevent vandalism.

Conclusions

- 9.13** Due to the nature of the historic operations at the sites there is no remaining buried archaeology present.
- 9.14** There will be no impact as a result of to the proposed development on the setting of designated assets outside the application boundary due to the intervening vegetation and road infrastructure.
- 9.15** There will be minor adverse impacts on views from Cooks Hole Farmhouse during restoration operations but the farmhouse will remain unoccupied until the restoration operations are complete. There will be no effect on the appreciation of the significance of the asset during the restoration operations.. Following completion of restoration there will be no adverse effects on the setting of Cooks Hole Farmhouse due to the natural appearance of the restored landform and its integration into the landscape. No residual impacts will remain once restoration is complete. Public access to footpaths would be reinstated, with links through the countryside restored, such as south from Home Farm (the site of Bedford Lodge) and west from Sibberton Lodge, to Cooks Hole Farmhouse and beyond to Bedford Purlieus. New permissive footpaths to the south of Thornhaugh Brook will allow additional appreciation of Cooks Hole farmstead. The appreciation of views of Cooks Hole Farmhouse will be increased from the elevated reinstated Footpath Thornhaugh No 3 Section 3 and Footpath Thornhaugh No 3 Section 4.

10. Landscape and visual effects

Introduction

- 10.1** In this section the assessment of the effects of the proposals on landscape and visual receptors is presented. An assessment of the baseline landscape features and character of the sites and their environment, together with the baseline visibility of the sites from a range of representative viewpoints within the surrounding area has been undertaken in accordance with current guidance. An assessment of the potential effects of the proposed development on landscape and visual receptors undertaken by DB Landscape Consultancy Ltd is presented in the report at Appendix ES10.1.

Methodology

- 10.2** The Landscape and Visual Impact Assessment (LVIA) has been undertaken in accordance with the latest version of the Guidelines for Landscape and Visual Impact Assessment and Technical Guidance for Assessing Landscape Value Outside National Designations^{11,12}. The viewpoint photographs to support the LVIA have been taken in accordance with the latest Landscape Institute and Institute of Environmental Management and Assessment guidance¹³. The detail on the methodology followed is provided at Annex B of the report presented at Appendix ES10.1. The LVIA was carried out using combined site and desk based survey and assessment. The assessment is focussed on a study area with a 1.5km radius centred on the sites.
- 10.3** In line with accepted practice ten representative viewpoints and two photomontage viewpoints have been identified and selected based on professional judgement to help to define the existing visual baseline. These include views from sensitive receptors such as residents, amenity / recreation users such as PRow users and road users. These viewpoints were agreed with Peterborough City Council in November 2023. A field survey was carried out in November 2023 and photographs were taken from each of the representative viewpoints. The study area and viewpoint locations are shown on Figure ES10.1.

¹¹ Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment (Third Edition, GLVIA3)

¹² Landscape Institute (2021) Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations

¹³ Landscape Institute (2019) Technical Guidance Note 06/19: Visual Representation of Development Proposals

Baseline

- 10.4** The baseline for the LVIA comprises a study of the existing landscape receptors (landscape features/fabric and landscape character) relevant to the sites and surrounding areas and also of visual amenity. The baseline for the LVIA comprises the currently permitted operations at the site including the currently approved restoration schemes.

Landscape features

- 10.5** Landscape features are elements of the environment which contribute to the local character and setting of a site. The proposed development is for the amendment of the currently consented landform profile to create a coherent single integrated landform at Cooks Hole and Thornhaugh.
- 10.6** A tree and scrub belt which is between 20 to 30m wide and crosses the central part of Cooks Hole and forms part of the setting for a Grade II listed farmhouse and associated farm buildings will be retained. This tree belt follows the course of Thornhaugh Brook. The restoration landform to the north and south of the belt will tie-in to the existing ground levels to avoid disturbance to and protect the existing mature vegetation.
- 10.7** All of the other landscape features within the footprint of the landform will be removed in the areas that will be worked or restored including the hedgerow which runs adjacent to Footpath Thornhaugh No 3 Section 3 and Section 4, the blocks of scrub and woodland to the north and south of Footpath Thornhaugh No 3 and the hedgerow which runs north north west to south south east from the footpath to the north of Cooks Hole Farmhouse. Other than the hedgerow which runs adjacent to Footpath Thornhaugh No 3 Section 3 and Section 4 it was anticipated that these landscape features would be removed under the current planning permission meaning that their sensitivity to the proposed development is considered limited.
- 10.8** The sites do not lie within an area designated at a statutory /national or non statutory /local level for thier landscape value or quality. At a national level the sites lie within National Character Area (NCA) 92: Rockingham Forest as defined by Natural England, which consists of an undulating landform rising to a prominent northern scarp with large woodlands forming a prominent feature on the skyline and remnants of unimproved grassland and medium-large arable and pastoral fields with low

hedges. The sites are both characterised by their generally industrial nature and there is a further site immediately to the south of Cooks Hole which has been subject to historical mineral extraction. The sites are bounded to the west by Bedford Purlieus.

- 10.9** These features are mainly considered to have generally low sensitivity to the proposed development due mainly to the existing operational context.

Landscape character

- 10.10** The sites lie within Landscape Character Area (LCA)2: Nassaburgh Limestone Plateau. The LCA broadly reflects the Rockingham Forest National Character Area comprising a gently undulating landscape with large blocks of woodland, large arable fields with low hedgerows or dry stone walls and well managed parklands. Other key characteristics are the many areas of high nature conservation interest, several active and disused quarries and the quiet rural ambience.
- 10.11** Within this LCA the sites extend across two landscape character sub areas: 1) Sub Area LCA 2b Burghley and Walcot Slopes; and 2) Sub Area LCA 2c Wittering Limestone Plateau. The south east and central part of Cooks Hole Quarry fall within Sub Area LCA 2b: Burghley and Walcot Slopes. The remainder of Cooks Hole Quarry and all of Thornhaugh Landfill falls within Sub Area LCA 2c Wittering Limestone Plateau.
- 10.12** The sensitivity of the landscape character of the area of the proposed development is considered to be low due to the existing operational context and the restoration baseline.

Visibility

- 10.13** The baseline visibility assessment addresses the extent and quality of views towards the sites available to a range of visual receptors including settlements/residents, amenity/recreation users (including PRoW users), road users and people at work.
- 10.14** The visibility of the sites from the surrounding area is primarily influenced by the vegetated boundaries and views into the sites are generally well screened. A well-established hedgerow runs alongside the A47 which extends all the way along the north eastern boundary of the sites which screens views from the north and north east. Bedford Purlieus woodland lies to the west and a hedgerow with trees runs to

the east of Old Oundle Road which filters views from the west. To the south the naturally revegetated vegetation on the boundary between Cooks Hole and Thornhaugh II Quarry screens the sites from views along Kings Cliffe Road further to the south together with the roadside vegetation.

- 10.15** The relatively level topography across the surrounding landscape means that intervening layers of vegetation and other features influence the quality and distance of views available from the surrounding area. Some features within the sites are higher than the surrounding vegetation such as the previously restored area within Thornhaugh and various temporary stockpiles and mounds which extend above the boundary and internal vegetation, so are partially visible from surrounding viewpoints.
- 10.16** The entrance to the sites from the A47 allows glimpsed views into the sites for people travelling along the A47. Footpaths passing through the sites allow good, relatively close-up views of parts of the Sites for walkers using the routes. The report presented at Appendix ES10.1 shows the representative viewpoints.

Baseline evolution

- 10.17** It is necessary to outline the likely evolution of the baseline environment at the sites without the implementation of the proposed development. If the proposed revised restoration scheme was not implemented then the operations would continue at Cooks Hole until 2042 and the operations at Thornhaugh would continue to 2035. Cooks Hole would be restored to agricultural grassland with some tree and shrub planting at a lower level than the proposed landform with the landform sloping up to Thornhaugh. The opportunity to provide significant biodiversity net gain in Cooks Hole would not be realised. Thornhaugh would be restored to a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland at a maximum elevation of 71.5mAOD to form a domed feature. The individual sites would provide two landforms in the landscape which would be separated by a right of way. The landscape character of the site and the surrounding environs would not change. It is considered that the views of the site would remain generally consistent with the current baseline until the restoration of the sites is completed. The potential to extend the range of habitats with a view to providing a significant contribution to the wider aspirations for the enhancement of Rockingham Forest as described in Section 6 would not be realised.

Assessment of environmental effects

- 10.18** The predicted effects of the proposed development have been assessed with respect to the existing landscape features on and around the sites and the character of the local landscape and visual receptors. The detailed report is presented at Appendix ES10.1. The baseline for the LVIA comprises the currently permitted operations at the sites including the currently approved restoration schemes. The LVIA assesses the effects on landscape character and on visual receptors during the creation of the new restoration landform across Cooks Hole and the remaining landfill construction, infilling and restoration at Thornhaugh. Consideration is also given to the effects 10 years following the completion of restoration.

Effects on landscape features

- 10.19** The sites are active mineral extraction and landfilling operations so much of the land within the boundary of the sites is currently being worked, is unrestored or is otherwise degraded. The approved restoration schemes for the sites would result in the removal of some of the vegetation. The approved restoration scheme for Cooks Hole is for agricultural land with trees, shrubs and hedgerows and for Thornhaugh includes grassland, tree and shrub planting, hedgerows and reinstated footpaths. As a result of the proposed development the habitats that are currently approved for Thornhaugh will be extended to Cooks Hole resulting in significantly more tree and shrub planting on Cooks Hole and the creation of a number of waterbodies.
- 10.20** Whilst the landform will be higher in Cooks Hole than currently consented the changes across Thornhaugh will be very limited and it is considered that when assessed as a whole the differences will not be significant in the context of the currently permitted development. Effects on landform are assessed as resulting in a minor-moderate adverse which is not considered significant. The vegetation will be replaced in a phased programme in greater overall quantities as part of the proposed restoration scheme.
- 10.21** There will be limited effects on the footpaths during the operations when compared with the baseline. The footpaths which are already diverted or stopped up will remain diverted or stopped up until the operations are completed in 2042. It will be necessary for Footpath Thornhaugh No 3 Section 3 and Section 4 to be diverted once operations for the placement of restoration materials begin north of Thornhaugh Brook. An

alternative footpath route will be provided prior to the closure of the existing footpath. New permissive paths will be constructed at the site as part of the proposed restoration scheme. Following restoration there will be a benefit to users of the rights of way as there will be elevated views and additional paths to use.

Effects on landscape character

10.22 The landscape character of the sites is not considered highly valued or highly sensitive and consists of largely disturbed areas with some partially restored land with approved restoration schemes. The sensitivity of the landscape character at the sites to the proposed development is assessed as low. Effects on the landscape character of the sites is limited due to the existing context and setting. It is determined that the effects of the proposed development on landscape character would be limited during the operational period and there would be minor benefits to landscape character following restoration due to improved planting and enhancements to the rights of way network.

10.23 There will be negligible effects on the Landscape Character Areas 2 'Nassaburgh Limestone Plateau' (specifically LCA sub areas 2b and 2c) due to the small size of the sites in comparison with the overall area covered by these landscape character areas and the existing operational context (i.e. the landscape character of the proposed development is consistent with the landscape character of the permitted development).

Effects on visual receptors

10.24 The visibility of the site is restricted by the boundary hedgerow vegetation, the scrubby land to the south and Beford Purlieus to the west and there are limited properties with direct clear views of the sites. Only one receptor, users of the footpath which crosses the sites from east to west, will experience significant effects on visual amenity as a result of the proposed development. Footpath Thornhaugh No 3 Sections 3 and 4 will be closed for a number of years during the operations and reinstated once the sites are restored. The effects are significant as, in effect, the view is removed entirely for several years. Following reinstatement there would be a beneficial effect as there would be elevated views of the surrounding landscape from the footpath.

- 10.25** There will not be significant visual effects as a result of the proposed development for any other receptors including those from residential properties, road users or users of other rights of way when considering the existing context of the permitted development and the proposed development. Visual disruption will be experienced from several locations during the operations but these effects would be no higher than moderate adverse (Viewpoints 5, 6, 8 and 9 on roads and footpaths to the east and south east of the sites as shown on Figure ES10.1) at most and for a temporary period after which the restored areas will mature and integrate into the surroundings. On completion of restoration there will be significant biodiversity net gain which will benefit landscape features and character.

Cumulative effects

- 10.26** The potential cumulative effects associated with the five developments set out in Section 2 and shown on Figure ES2.1 have been considered in combination with the proposed development. Due to the distance between the sites and Cross Leys Quarry, the A47 highways works and ENRMF, there is no intervisibility between the sites and the other developments. The sites are currently operational facilities and the broad similarities between the proposed revised restoration landform and the permitted approved landform (no increase in maximum height or the nature of the infilling and earthworks to create the restoration landform) it is considered there will be no significant cumulative effects on either landscape or visual receptors.
- 10.27** There would be some cumulative effects on visual receptors during the operations at the sites and at Thornhaugh II located immediately to the south of Cooks Hole but these would be minor. On restoration of the sites and the other developments the cumulative effects would be beneficial for users of the A47, public rights of ways and for biodiversity,

Mitigation

- 10.28** The mitigation measures proposed to minimise the effects on landscape and visual receptors include the following:
- All soil placement operations will be carried out in accordance with the Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings (2021).

- Removal of the sections of dry stone wall along Footpath Thornhaugh No 3 Sections 3 and 4 will be mitigated by the construction of a new wall adjacent to the reinstated footpath route, on the restored landform, as part of the restoration works
- The creation of additional permissive footpath routes when compared to the approved restoration scheme and an elevated route along Footpath Th No.3 Sections 3 and 4, which will offer more interesting views for users
- The proposed restoration scheme will result in significant overall biodiversity net gain when compared with the currently approved restoration schemes for Thornhaugh and Cooks Hole.

Conclusions

- 10.29** The proposed development will result in noticeable but limited adverse effects on landscape features, landscape character and visual receptors. There will be negligible impacts on landscape character as a result of the proposed development. The sites are well screened and there are limited receptors with clear views of the sites. The only significant effect as the result of the proposed development will be the loss of views from Footpath No 3 Sections 3 and 4 due to the temporary closure of the footpaths during the operational period. The footpaths will be reinstated following the completion of the operations. The proposed restoration scheme will result in significant biodiversity net gain which is beneficial for landscape features and character.

11. Flood risk assessment and surface water drainage**Introduction**

- 11.1** An assessment of the potential impacts of the proposed development on surface water flow and flood risk at and in the vicinity of the sites has been undertaken by MJCA.

Methodology

- 11.2** The potential impacts of the proposed development in respect of flood risk have been assessed in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF. Consistent with the NPPF and the PPG on flood risk it is necessary to undertake a site specific flood risk assessment for all developments over 1ha in Flood Zone 1 and on all sites in Flood Zones 2 and 3 to demonstrate that the proposed development will be safe from flooding and will not increase the risk of flooding elsewhere. The currently consented restored landforms at Cooks Hole Quarry (Cooks Hole) and Thornhaugh Landfill Site (Thornhaugh) (collectively known as the sites) comprise the baseline situation against which the impacts of the proposed development on flood risk and surface water flows have been assessed.
- 11.3** The Peterborough Strategic Flood Risk Assessment (Peterborough SFRA) Level 1¹⁴ and the Peterborough Local Flood Risk Management Strategy 2015 – 2027 (Peterborough LFRMS)¹⁵ have been reviewed. Reference has been made as necessary when specifying sustainable drainage systems to the SuDS Manual CIRIA C753¹⁶.
- 11.4** The scoping opinion 23/00001/SCOP in respect of the development proposals was provided by Peterborough City Council on 23 November 2023 (Appendix ES2.3). It is stated that:

The Environment Agency have confirmed that no further groundwater assessments would be required, and it is accepted

¹⁴ Royal Haskoning DHV. (January 2018) Peterborough Level 1 Strategic Flood Risk Assessment & Outline Water Cycle Study. Report Reference WATPB5056R001F04.

¹⁵ Peterborough City Council. Undated. Peterborough Flood Risk Management Strategy (FMS).

¹⁶ Woods Ballard, B, Wilson, S, Udale-Clarke, H, Illman, S, Scott, T, Ashley, R, Kellagher, R (2015). The SuDS Manual. CIRIA C753. CIRIA. London

that assessments previously undertaken in 2015 for Thornhaugh and 2011 for Cook's Hole concluded there would be no significant risk to groundwater or surface water quality as a result of previously approved operations. The proposed scope focusing on surface water run off generation at the sites is therefore considered to be acceptable and consideration should be given to the potential effect of future climate change on the intensity of storm events.

- 11.5** In accordance with the agreed scope of the environmental impact assessment, the impacts of the completed development on groundwater levels, groundwater quality and surface water quality are not considered further. The potential impacts on surface water levels and surface water runoff generation are set out and assessed in the following sections. Mitigation measures to minimise the potential for the discharge of surface water runoff and substances during the operational phase of the proposed development are described in Section and Appendix ES4.1 and summarised below.

Baseline

- 11.6** The currently approved restoration scheme for Cooks Hole is presented at Appendix ES1.1. The currently approved restoration profile for Cooks Hole is presented at Appendix ES1.3. The landform drains generally towards the east in the direction of flow of the Thornhaugh Brook. The currently approved landform and restoration scheme for Thornhaugh is presented at Appendix ES1.2. The landform drains to a surface water management system through which runoff generated on the restored landform is conveyed to the newt ponds on the western boundary of Thornhaugh or into the surface water management ditch which runs on the northern and north eastern boundary of Thornhaugh to an attenuation lagoon on the north eastern boundary of Thornhaugh. The attenuation lagoon discharges via a flow restriction device to a surface water ditch which runs adjacent to the eastern boundary of Cooks Hole which discharges to the Thornhaugh Brook in the eastern corner of Cooks Hole. The sites are the subject of consented surface water management schemes for the

operational phases and following the completion of restoration operations at the sites^{17,18}.

Geology, hydrogeology and hydrology

- 11.7** The sites are in the catchment of the River Nene which is located approximately 1.8km east south east of Cooks Hole at its closest point. The Thornhaugh Brook flows generally west to east and crosses the central part of Cooks Hole. The Thornhaugh Brook is culverted beneath a small yard adjacent to the farm outbuilding in the central part of Cooks Hole. The Thornhaugh Brook is a tributary of the White Water Brook. The Thornhaugh Brook discharges to the White Water Brook approximately 2.9km east of Cooks Hole and the White Water Brook discharges to the River Nene approximately 3.0km east south east of Cooks Hole. A surface water ditch runs from the north of Thornhaugh adjacent to the north eastern boundaries of the sites.
- 11.8** Superficial deposits are recorded as not present at the sites. As set out in Section 3 of this report the geology at and in the vicinity of Cooks Hole comprises the Jurassic age Lincolnshire Limestone Formation which is underlain in turn by the Grantham Formation and the Northampton Sand Formation. The Grantham Formation comprises interbedded mudstones, sandy mudstones and siltstone-sandstones. The central part of Cooks Hole comprising the Thornhaugh Brook valley is underlain by the Grantham Formation. The Northampton Sand Formation is underlain in turn by the Whitby Mudstone Formation (formerly referred to as the Upper Lias). Groundwater is present generally in the Grantham Formation and Northampton Sand Formation and in the base of the Lincolnshire Limestone underlying Cooks Hole. Groundwater in the vicinity of the sites is abstracted for domestic water supply and agricultural use and provides base flow to local rivers and streams. The Thornhaugh Brook is fed by groundwater including from Cooks Hole Spring located adjacent to Cooks Hole Farmhouse. Settlement ponds for mineral wash water are located in the south eastern corner of Cooks Hole.

¹⁷ Augean plc. (July 2011). Cook's Hole – Schemes for the management of surface water and groundwater required under conditions 9 and 10 of Permission reference 03/01171/RMP-ROMPP conditions 10 and 11 of Permission ref.10/01440/MMFUL-Extension

¹⁸ Augean plc. (March 2012). Thornhaugh Landfill Site: Deferment of End-date and Extension of Development. Environmental Statement: Appendix G Surface Water.

- 11.9** The geology at and in the vicinity of Thornhaugh comprises the Lincolnshire Limestone Formation which in turn is underlain by the Grantham Formation and Northampton Sand Formation. In parts of Thornhaugh the sequence has been replaced partly with backfilled material comprising reworked material from the Lincolnshire Limestone Formation and Grantham Formation. The Northampton Sand Formation is underlain by the Whitby Mudstone Formation (formerly referred to as the Upper Lias). The strata dip gently to the east at and in the vicinity of Thornhaugh. To the north, east and south of the sites the Lincolnshire Limestone Formation, Grantham Formation and Northampton Sand Formation are cut by several valleys.

Flood zone designation

- 11.10** As stated in Section 3 of this report, based on the Environment Agency Flood Map for Planning Thornhaugh is located in Flood Zone 1. Flood Zone 1 is defined as land having a less than 1 in 1,000 annual probability of river or sea flooding. The majority of Cooks Hole is located in Flood Zone 1 except a small area approximately 20m to the north and south of Thornhaugh Brook which runs through Cooks Hole which is in Flood Zones 2 and 3. Flood Zone 2 is defined as land having between a 1 in 100 and a 1 in 1,000 annual probability of river flooding. Flood Zone 3 is defined as land having a greater than a 1 in 100 annual probability of river flooding. The site is not in an area which is at risk of flooding from the sea. The flood map for planning is reproduced at Appendix ES11.1.
- 11.11** Based on the information presented on Map C of the Peterborough SFRA the area of Cooks Hole comprising Flood Zone 3 is designated as Flood Zone 3a hence no part of the sites comprises the functional floodplain (Flood Zone 3b).

History of flooding and flood defences

- 11.12** There is no record shown on Map B of the Peterborough SFRA of historic flooding at the sites. The closest recorded incidence of historical fluvial flooding to the sites is approximately 1.7km east south east of the Cooks Hole site. Seven incidences of historical sewer flooding in the PE8 6 postcode area in which the sites are located are recorded in the Peterborough SFRA. No surface water, foul, or combined sewers are shown at or in the vicinity of the sites on the Peterborough SFRA map F0. No flood defences are shown at or in the vicinity of the sites on the EA Flood Map for Planning.

Flooding from surface water, sewer, drains, canals and reservoirs

- 11.13** Based on the extent of flooding from surface water map presented on the Gov.uk website the majority of the area of the sites are at a very low risk of flooding from surface water. The area of Cooks Hole adjacent to the Thornhaugh Brook and generally small areas comprising topographic hollows within the landform at the time that the maps were prepared are shown as being at a low, medium and high risk of surface water flooding. The designation of areas as being at a low, medium or high risk of surface water flooding is based on the topography at the sites at the time that the assessments were carried out. As the sites comprise mineral extractions and a landfill, the site topography changes regularly during the operational period and the topography has changed since the time the flood maps were prepared. No hollows except those designed to comprise drainage channels, ponds or detention basins are included in the proposed restored landform.
- 11.14** As stated above there are no surface water, foul or combined sewers shown on the Peterborough SFRA map. The sites are not located in the vicinity of any canals. The sites are not located within the maximum extent of any area at risk of reservoir flooding shown on the extent of flooding from reservoirs map presented on the Gov.uk website.

Flooding from groundwater

- 11.15** There are no records of groundwater flooding within the area the subject of the Peterborough SFRA. As the sites are underlain generally by the Lincolnshire Limestone Formation and the only outcrop of the underlying and less permeable Grantham Formation is within the Thornhaugh Brook valley it is considered unlikely that the sites are at significant risk due to groundwater flooding.

The sequential and exceptions tests

- 11.16** The sequential test is set out in the NPPF with the aim to steer new development to areas with the lowest probability of flooding. The flood risk vulnerability of various land uses and the appropriate land uses for different flood zones are defined in Table 2 of the PPG on flood risk. Both Thornhaugh and Cooks Hole are the subject of consented restoration schemes as set out above. Thornhaugh is located within Flood Zone 1 comprising the lowest flood risk hence the proposed development at Thornhaugh meets the requirements of the sequential test on this basis. The majority

of Cooks Hole is in Flood Zone 1 with the exception of the land immediately to the north and south of the Thornhaugh Brook. No increases in comparison with the existing and consented ground levels are proposed for the land within the area of Cooks Hole which comprises Flood Zones 2 and 3 hence there will be no loss of floodplain storage as a result of the proposed development. Runoff attenuation storage will be provided as part of the restored landform. Based on Table 2 of the PPG on flood risk minerals working and processing is classed as a "Less vulnerable development" which is appropriate in Flood Zones 1, 2 and 3a. As defined in Table 2 of the PPG on flood risk, it is not necessary to apply the exceptions test to less vulnerable developments in Flood Zones 1 to 3a. On the basis of the above it is concluded that the proposed development meets the requirements of the sequential test.

Baseline environment without implementation of the proposed development

- 11.17** It is necessary to outline the likely evolution of the baseline environment at the sites without the implementation of the proposed development. If the proposed revised restoration scheme was not implemented then the operations would continue at Cooks Hole until 2042 and the operations at Thornhaugh would continue to 2035. Cooks Hole would be restored to agricultural grassland with some tree and shrub planting at a lower level than the proposed landform with the landform sloping up to Thornhaugh. The opportunity to provide significant biodiversity net gain in Cooks Hole would not be realised. Thornhaugh would be restored to a mixture of woodland, hedgerows, shrub and scrub and calcareous grassland at a maximum elevation of 71.5mAOD to form a domed feature. There would be no changes to the sites operational practices and the sites would continue to be subject to the approved surface water management schemes. It is considered that the baseline for flood risk at the sites would not alter significantly.

Assessment of environmental effects

General

- 11.18** The proposed restoration profile is presented at Figure ES4.1 and details on the restoration proposal are described in detail in Section 6 of this report. The baseline conditions comprise the currently consented landforms. The restoration scheme for

the sites is shown on Figure ES4.3. The proposed phasing of the operations at the sites is shown on Figure ES4.2.

- 11.19** The layout of the proposed surface water management scheme is shown on Figure ES11.1. The catchment areas, proposed storage capacities and proposed maximum discharge rates in respect of the individual detention basins are summarised in Table ES11.1. The greenfield run off rates in respect of each individual detention basin catchment area as well as of the entire catchment area the subject of the proposed surface water management system are presented at Appendix ES11.2. The surface water run-off attenuation calculations in respect of the individual detention basin catchment areas along with justification of the parameters used are presented at Appendix ES11.3.

Environmental impacts during the operational phase of the proposed development

- 11.20** The restoration of the Thornhaugh site including the progressive construction and maintenance of the surface water management system will continue in accordance with the consented surface water management plan for Thornhaugh during the operational phase and following the completion of the restoration works. The proposed development includes no changes to the general arrangement of the consented surface water management infrastructure at the Thornhaugh site. The surface water from Thornhaugh will continue to be managed in the existing surface water management system. Leachate and any potentially contaminated surface water will continue to be managed separately to surface water consistent with the Environmental Permit in respect of the Thornhaugh landfilling operations. The management of leachate, any potentially contaminated surface water and clean surface water from the restored areas of the Thornhaugh site will continue to be the subject of the site Environmental Permit.
- 11.21** The restoration of Cooks Hole and the construction of the detention basins as shown on Figure ES11.1 will take place progressively. The restoration operations will be completed to the south of Thornhaugh Brook first and then to the north of Thornhaugh Brook to tie in with the landform at Thornhaugh. Temporary settlement basins will be constructed as necessary down slope of any working areas to minimise the potential for the discharge of silt laden runoff to the Thornhaugh Brook. During the operational period any attenuation basins constructed as the operations progress will collect surface water at the site and as currently the volume of water discharging from the

basins into Thornhaugh Brook will be controlled. Stockpiles will be dampened as necessary and those stockpiles that will remain in place for longer than 6 months will be seeded in order to minimise the risk of silt laden runoff generation. Ditches will be excavated near the stockpiles as necessary to allow for the capture of runoff and settlement of suspended solids and to minimise the risk of the discharge of silt laden runoff to Thornhaugh Brook and the surface water drainage ditch to the east of Cooks Hole. Suspended solids in the surface water will be managed as necessary through the use of settlement lagoons consistent with the current operations. Routine observations will be made by the Augean operational and environmental monitoring team during the placement of materials in proximity to Thornhaugh Brook or the surface water drainage ditch to the east of Cooks Hole to monitor the potential for silt laden runoff reaching the surface water. If silt laden runoff or otherwise contaminated runoff is observed to be migrating towards Thornhaugh Brook or the surface water drainage ditch to the east of Cooks Hole any such water will be impounded immediately and will not be released until the operators are satisfied that any suspended sediment which may pose a risk to water quality in the Thornhaugh Brook has settled.

Environmental impacts following the completion of the proposed development

- 11.22** No permanent buildings or structures will be constructed at the sites as a result of the proposed development. Cooks Hole Farmhouse and the farm outbuildings are located in the centre of Cooks Hole and will be retained. The surface water management plan presented at Appendix ES4.1 sets out the principles of the surface water drainage system at the restored landform and demonstrates that surface water generated at the Cooks Hole site can be managed on site with discharge at the pre-development greenfield runoff rate and that surface water at the Thornhaugh site can be managed with the currently consented discharge rate from the existing surface water management system without increasing flood risk downstream of the site. The layout of the proposed surface water drainage system is shown on Figure ES11.1.
- 11.23** As set out in Section 1 of this ES the material that will be used to create the proposed landform at Cooks Hole will comprise clean, naturally occurring materials which have been extracted as part of the existing and future landfill construction operations at the ENRMF as part of the landfill construction operations at Thornhaugh. Some of the

additional void created at Thornhaugh will be filled with waste types already consented for disposal there.

- 11.24** Consistent with the consented restoration proposals at the sites stockpiled soils present at the sites will be handled, managed and spread consistent with the soil handling and management plan presented at Appendix ES4.4. Consistent with the consented proposals the soil layer at the site will comprise generally a mixture of shallow, well drained, brashy calcareous soils, shallow stony soils placed over disturbed or backfilled limestone or re-placed soils with sandy subsoils. As the sites are underlain generally by the Lincolnshire Limestone Formation it is considered that the site derived soils are likely to have a high infiltration capacity. It is therefore considered that the infiltration characteristics of the restored soils placed at the site above the imported materials used to form the restoration profile will be similar to those comprising the pre-extraction greenfield situation and the currently consented baseline situation. Naturally occurring soil forming materials excavated as part of the ongoing landfilling operations at Thornhaugh will be used as necessary in order to supplement the restoration soil resources at the sites. Restoration soils will be imported for use at Thornhaugh under the existing Environmental Permit.
- 11.25** As shown at Appendix ES1.2 as part of the consented restoration scheme runoff generated at the Thornhaugh site drains to the perimeter of the landfill where it is conveyed to the existing attenuation pond in the north eastern corner of Thornhaugh and subsequently discharged via a flow restriction device to the surface water drainage ditch adjacent to the eastern boundaries of the sites. As shown on Figure ES11.1 a small area of the Thornhaugh restoration landform which currently drains to the attenuation pond at Thornhaugh will, as part of the proposed development, drain to the proposed surface water management system within the Cooks Hole site. No other changes are proposed to the general arrangement of the existing surface water drainage system in Thornhaugh. The proposed development will not result in an increase in the rates or volumes of surface water discharging to the existing attenuation pond when compared with the consented details and will remove a small area of the catchment from the consented surface water management system at Thornhaugh. The proposed development will therefore result in a betterment in comparison with the baseline situation with respect to flood risk at Thornhaugh and with respect to flood risk elsewhere.

- 11.26** The current principles of the consented management of surface water at the sites will continue as part of the proposed development. Surface water runoff attenuation will be provided within the proposed detention basins at Cooks Hole to restrict the overall discharge from the sites for up to a 1 in 100 year rainfall event plus a 40% allowance for climate change to greenfield runoff rates consistent with the upper end allowance for the 2070s presented on the climate change allowances for peak rainfall in England map on the Gov.uk website¹⁹. Surface water attenuation will be provided by a series of detention basins. The rate at which water will leave the attenuation basins will be controlled so that during extreme rainfall events a significant proportion of runoff will be retained to attenuate the runoff peak. The surface water attenuation function will be accomplished primarily by allowing water to accumulate in the basin areas temporarily during storm events and releasing the water from the basin areas in a controlled manner following the storm event. The design of the surface water management scheme includes the necessary provisions for climate change in particular the predicted increase in frequency and intensity of rainfall storm events. Consistent with guidance, the design rainfall event used in the surface water management plan presented at Appendix ES4.1 comprises the 1 in 100 year rainfall event plus a 40% allowance for climate change.
- 11.27** Suitable outlets for the discharge of water from the surface water management system will be created so that water can drain passively by gravity and in a controlled manner to the Thornhaugh Brook and the surface water drainage ditch adjacent to the eastern boundaries of the sites.
- 11.28** The restoration profile at Thornhaugh follows the best practice principles for the design of restored landfill sites including in particular that the landform should be raised with slopes designed to shed water in order to minimise rainfall infiltration through the low permeability cap and into the waste. The revised restoration profile at Cooks Hole will allow for an integrated and coherent landform at both sites. Consistent with the approved restoration profile the highest point on the restoration profile is 71.5m Above Ordnance Datum (AOD) in the central northern area of the Thornhaugh site. The proposed landform falls in all directions around the high point with the majority of the landform sloping towards the south east towards and in the direction of flow of Thornhaugh Brook. A 20 metre wide standoff will be maintained

¹⁹ DEFRA (2024) Nene Management Catchment peak rainfall allowances
<https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall?mgmtcatid=3059>

from the vegetation which is adjacent to Thornhaugh Brook and no raising of the existing ground levels will take place within Flood Zones 2 or 3. The proposed elevations adjacent to the Thornhaugh Brook range between approximately 50mAOD in the west of the site and 40mAOD in the east of the site. The proposed landform to the south of Thornhaugh Brook at Cooks Hole will drain generally towards the north east towards and in the direction of flow of the Thornhaugh Brook from a maximum elevation of 56mAOD.

- 11.29** The site is located approximately 50km south west of the nearest coast at Herring Hill and is approximately 50m above mean sea level and therefore is extremely unlikely to be affected significantly by the predicted sea level rise of up to 1.6m by 2125 assuming an upper end allowance based on the 95th percentile scenario for the Anglian river basin district. The majority of the areas of the sites is not located in an area which is identified as sensitive to flooding from rivers or the sea hence it is considered that based on the implementation of an effective surface water management plan the proposed development can be undertaken without increasing the risk of flooding at or in the vicinity of the site.

Surface water detention basin capacities

- 11.30** Suitable flow restriction devices will be fitted to the outflows in respect of each detention basin to restrict the discharge from each basin to the greenfield runoff rates presented in Table ES11.1. The drainage channels and pipes shown on Figure ES11.1 will have sufficient capacity to convey the runoff rate generated during the 1 in 100 year six hour rainfall event plus a 40% allowance for climate change within their respective catchment areas. There is sufficient capacity within each individual detention basin to restrict the discharge of surface water runoff during the 1 in 100 year rainfall event plus a 40% allowance for climate change to the greenfield runoff rate hence the proposed development will not increase flood risk in the catchment of the River Nene including in the catchment of the Thornhaugh Brook and White Water Brook.
- 11.31** In a 1 in 100 year + 40% flood event the site will discharge at a rate of 0.699 l/s/ha which is less than that assumed when designing the existing consented surface water management scheme for the northern area of the sites.

Mitigation and monitoring

- 11.32** As the majority of the area of the sites is not located in an area which is identified as sensitive to flooding from rivers or the sea and at negligible to low risk of flooding from other sources it is considered that no other mitigation with respect to flood risk will be necessary other than the measures that are specified in the surface water management scheme presented at Appendix ES4.1.
- 11.33** Following completion of the restoration the attenuation basins will still be utilised to manage surface water at the site. A monitoring and maintenance scheme in respect of the detention basins, pipes, flow restriction devices and drainage channels is set out within the surface water management plan.

Cumulative impacts

- 11.34** The proposed development will take place in proximity to the following consented developments which have been identified by Peterborough City Council should be considered within the application with respect to cumulative impacts:
- Thornhaugh II (winning and working of minerals and restoration using waste materials approximately 600m east of the site).
 - Thornhaugh IIB (winning and working of minerals and restoration using imported inert materials approximately 350m south east of the site).
 - Cross Leys Quarry, Leicester Road (restoration of quarry workings using imported inert materials and quarry waste approximately 1.2km north west of the site).
 - A47 roadworks between Wansford and Sutton the subject of Development Consent Order 2023 (S.I. 2023 No. 218) dated 17 February 2023 (approximately 1.8km east of the site).
 - East Northants Resource Management Facility (hazardous and low level radioactive waste treatment and disposal approximately 3.3km west of the site).
- 11.35** The proposed development is situated predominantly within Flood Zone 1. No raising of ground levels is proposed within the parts of the application area comprising Flood Zones 2 and 3. During and following the completion of the proposed development the runoff rate leaving the site will be limited to the greenfield runoff rate. Surface

water management at the surrounding developments listed above will be managed consistent with the requirements of local and national planning policy. It is therefore considered that the proposed development can be undertaken without significant individual or cumulative adverse impacts on flood risk.

Conclusions

- 11.36** The proposed development will not increase flood risk at or in the vicinity of the sites. No raising of existing ground levels are proposed within the parts of the application area located within Flood Zones 2 or 3a.
- 11.37** It is concluded that due to the location of the sites and the measures proposed in the surface water management plan (Appendix ES4.1) that the proposed development can be undertaken without significant residual effects on flood risk at or in the vicinity of the site.

12. Traffic and transport

- 12.1** A Transport Statement for the proposed development has been prepared by ADC Infrastructure and is presented at Appendix ES12.1. The scope of the Transport Statement has been agreed with Peterborough City Council as the Highways Authority through the scoping process and pre-application discussions.

Methodology

- 12.2** The Transport Statement has been prepared in accordance with the government guidance Travel Plans, Transport Assessments and Statements²⁰. It examines the transport implications of the proposed development taking into account the requirements of the National Planning Policy Framework (December 2023):

“114. In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location.

b) safe and suitable access to the site can be achieved for all users.

c) the design of streets, parking areas, other transport elements and the context of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and

d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

115. Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.”

²⁰ HM Government (2014) Travel Plans, Transport Assessments and Statements. <https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements> Accessed December 2023.

Baseline

- 12.3** Access to Cooks Hole Quarry and Thornhaugh Landfill Site is from a simple T junction from the A47 Leicester Road. The A47 is subject to a national speed limit and is approximately 8 metres wide. It provides access to the strategic road network via the A1 approximately 2.5km to the east of the sites and continues east providing direct access to Peterborough. The A1 is orientated north-south providing access to London and parts of the north of England including Sheffield and Leeds (Figure ES1.1). To the west of the site the A47 is routed through the villages of Duddington, Uppingham, Tugby and Billesdon linking the sites with the eastern side of Leicester.
- 12.4** The accident records for the last five years on the highway network in the immediate vicinity of the site have been examined. There have been no recorded accidents at the site access in the last five years.
- 12.5** Paragraph 5.5.7 of the 2015 Environmental Statement confirms that planning permission reference 12/00463/MMFUL identified a maximum of 141 HGVs (282 HGV movements) entering the Thornhaugh Landfill site entrance in one day and that historic traffic generation at the site obtained from 2004 weighbridge records showed a maximum of 255 HGV arrivals per day (510 HGV total movements).
- 12.6** The HGV traffic generation in 2015 was presented in Section 5.5 of the 2015 Environmental Statement including traffic generation associated with the restoration of Thornhaugh.

Activity	Tonnage (per annum)	Payloads	Working Days	No. HGVs (per day)	Total HGV movements (per day)
Thornhaugh					
Waste imports	75,000	13t	278	21	42
Clay imports	125,000	20t	278	23	46
Restoration soils imports	11,700	20t	278	3	6
Export of recycled CDE materials	9,100	20t	278	2	4
Cooks Hole					
Mineral extraction exports	390,000			70	140
Total	610,800			119	238

- 12.7** The permitted vehicle numbers associated with the existing consented operations are 118 HGVS (236 HGV movements) per day. In 2023 there were 11,774 HGVs

associated with the operations at Thornhaugh. This equates to an average of 43 HGVs per day and 86 movements (43 in and 43 out) per day. In 2023 the mineral operations at Cooks Hole had ceased so there were no vehicles associated with mineral export.

- 12.8** It is necessary to outline the likely evolution of the baseline environment at the site without the implementation of the proposed development. It is considered that over time there would be a growth in traffic numbers on the wider traffic network in the vicinity of the site in line with national projections. If the proposed development is not undertaken the current operations would cease at Thornhaugh in 2035 and at Cooks Hole in 2042 as set out in existing planning permissions and traffic movements associated with the waste operations and the restoration of the sites would end.

Assessment of environmental effects

- 12.9** The proposed traffic generation associated with the development proposals for the revised restoration profile at the site has been calculated.

Activity	Tonnage (per annum)	Payloads	Working Days	No. HGVs (per day)	Total HGV movements (per day)
Thornhaugh					
Waste imports	120,000	13t	278	34	68
Clay imports	100,000	20t	278	18	36
Restoration soils imports	28,000	20t	278	6	12
Export of recycled CDE materials	10,000	20t	278	2	4
Cooks Hole					
Restoration materials importation (Average)	160,000	20t	278	29	58
Restoration importation (Max)	300,000	20t	278	54	108
Total (Average)	418,000			89	178
Total (Maximum)	558,000			114	228

- 12.10** There will be fluctuations in the rate of importation of clean, naturally occurring materials from ENRMF. On average it is anticipated that 160,000 tonnes per annum will be imported with a maximum importation rate of 300,000 tonnes per annum. Overall the total imports and exports from the site will be less than those anticipated in 2015. The comparison of the HGV movements associated with the proposed operations and the historic operations is presented below:

	No. of HGVs per day	Total HGV movements per day
Historic operations from 2004 data	255	510
Historic operations from 2015 data	119	238
Proposed operations (average imports)	89	178
Proposed operations (maximum imports)	114	228
<i>Net traffic generation (2004 vs average)</i>	<i>-166</i>	<i>-332</i>
<i>Net traffic generation (2004 vs maximum)</i>	<i>-141</i>	<i>-282</i>
<i>Net traffic generation (2015 vs average)</i>	<i>-30</i>	<i>-60</i>
<i>Net traffic generation (2015 vs maximum)</i>	<i>-5</i>	<i>-10</i>

12.11 The proposed development will generate between 282 and 332 fewer HGV movements per day than the maximum HGV movements in 2004. The proposed development will generate between 10 and 60 fewer HGV movements than the 2015 permitted HGV movements. The majority of the vehicle movements associated with the proposed operations are local traffic movements between ENRMF and the sites. The site will continue to operate safely with HGV movements reducing from historic operations. The existing access is suitable and provides adequate visibility in both directions.

12.12 On completion of the operations at the sites the existing site access will be closed. It will be necessary to retain an access for maintenance, landscaping and monitoring at the existing site access. An area for one vehicle to pull in from the A47 will be maintained. Access to the site will be via a locked gate. An amenity access will be provided at the former Cooks Hole access. The design of the amenity access is presented on Figure ES6.2. The access will provide suitable visibility and will provide access to a small car park.

Mitigation

12.13 No mitigation is necessary.

Cumulative impacts

12.14 The proposed development will result in fewer HGV movements than those previously and currently consented for the operations. Accordingly cumulative impacts will have been considered as the developments identified in Section 2 should have taken the existing operations at Cooks Hole/Thornhaugh into account as part of their traffic assessments.

Conclusion

- 12.15** The proposed development will result in fewer HGV movements than those previously and currently consented for the operations. The existing access is suitable and provides adequate visibility in both directions. There have been no recorded accidents at the site access in the last five years. It is concluded that the proposed development will not result in an unacceptable impact on highway safety and as a result there is no reason to refuse the application on highways grounds.

13. Noise

- 13.1** A noise impact assessment has been undertaken by Vibrock Limited and is presented at Appendix ES13.1. In the report the results of the assessment of the noise impact of the proposed development at the nearest sensitive receptors are presented.

Methodology

- 13.2** The approach to the assessment was agreed with Peterborough City Council through the scoping process (Appendix ES2.3). It was agreed that the existing noise limits within the existing planning permissions for the sites provide sufficient protection for the noise sensitive premises hence the noise assessment could be undertaken to compare the potential impacts with the existing noise limits for the site.
- 13.3** Noise level calculations have been undertaken in accordance with Annex F of BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Part 1: Noise'²¹. This guidance details methods to estimate noise from 'open sites' which can include quarries, waste sites and long-term construction projects. The attenuation due to any screening between the noise source and the receptor has been calculated in accordance with F.2.2.2.1 of BS 5228-1. For all noise prediction calculations, the ground absorption coefficient has been estimated according to the combination of soft and hard ground conditions present between the source and receiver position.
- 13.4** Noise level predictions at each assessment location have been made to a height of 1.5 metres above ground level and at least 3.5 metres from any reflecting surface other than the ground. All predictions made are 'free-field' sound levels to allow for an appropriate comparison with the noise limits outlined in the current planning conditions.
- 13.5** In order to consider the worst case scenario in the noise impact assessment the noise level predictions have been calculated with the combinations of plant working at the closest point to the receptor location. The predictions are worst case scenarios which may be of relatively short duration or may not occur at all. The predictions indicate

²¹ BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise. British Standards Institution 2014.

the potential highest LAeq,1h (free-field) noise level to which a particular property or group of properties may be exposed during the operations at the site. The worst-case situation may occur intermittently over the lifetime of the site, but longer term noise levels perceived outside of the site boundary will be significantly less under normal situations than the calculated predicted levels.

Baseline

- 13.6** Compliance monitoring was undertaken at the noise sensitive premises in the vicinity of the site in November 2023 at the locations specified in the current noise planning conditions for Cooks Hole Quarry and Thornhaugh Landfill Site (Appendix ES13.2). The noise monitoring locations are shown on Figure ES1.2. The weather conditions during the survey period were dry with a south westerly breeze. The noise monitoring was undertaken in accordance with the noise monitoring scheme for Thornhaugh Landfill. During the monitoring period Thornhaugh was fully operational. The results from the compliance monitoring are presented at Table ES13.1. At five of the six noise monitoring locations the noise limits were exceeded. However the exceedances of the noise limits were not as a result of the operations at Thornhaugh. The exceedances were related to vehicle movements on the surrounding highway network together with other industrial operations at Kings Cliffe Industrial Estate for the noise sensitive premises to the south of Cooks Hole.
- 13.7** A site inspection was undertaken in November 2023 when Thornhaugh was operating normally. The purpose of this monitoring was to obtain site specific sample measurements for specific types of plant used at the site for use as source emission data within this assessment to estimate the potential impacts from noise from the proposed development. The noise measurements taken on site comprised measurements of the noise generated by plant and activities. The noise measurements have been incorporated within the noise model.
- 13.8** It is necessary to outline the likely evolution of the baseline environment at the site without the implementation of the proposed development. If the proposed development was not implemented the operations at Thornhaugh would continue until 2035 and the operations at Cooks Hole would continue until 2042. The activities would continue to operate and to be subject to the noise limits set out in the current planning permissions. Following the completion of the operations at the sites in the

absence of any significant development in the vicinity of the site it is considered that the background noise levels would not be expected to increase significantly.

Assessment of environmental effects

- 13.9** The noise emissions associated with the proposed operations have been calculated and have been compared against the noise limits specified in the current planning permissions for the sites. A worst case scenario has been assessed for each of the short term operations such as capping and for the normal routine operations.
- 13.10** The assessment of the short term operations is presented at Table ES13.2. It is considered that some short term operations such as capping of the landfill cells in Thornhaugh are likely to have the highest noise impact when they occur at or close to the site boundary. The noise emissions from these temporary activities (such as capping, which takes place at the final levels of the sites) may not be screened from the closest residential properties. The predicted worst case site noise levels are all below the temporary 70dB $L_{Aeq,1h}$ limit. The assessment demonstrates that all short term operations can be undertaken within the temporary 70dB limit specified in the current planning permissions.
- 13.11** The assessment of the normal operations is presented at Table ES13.3. The results of the assessment demonstrate that the potential noise levels from normal operations associated with the proposed development will remain below the noise limits specified in the current planning conditions.

Cumulative impacts

- 13.12** The restoration of Cross Leys Quarry could take place simultaneously with the proposed revised restoration works at Thornhaugh and Cooks Hole. Cross Leys Quarry (planning references 19/01530/WCMM, 19/01370/WCMM and 19/01365/MMFUL dated 10 December 2020) is located in excess of 1.4 km to the west of the sites and given this separation distance it is considered that there will not be any potentially significant cumulative impacts associated with the activities at Cross Leys Quarry and at the proposed development.
- 13.13** There is extant planning permission for mineral and waste operations on land immediately adjacent to the south-east boundary of the application site. This area is

the subject of a number of planning permissions, namely Thornhaugh II (ref. M25/1/3 – M25/1/6 (97P0071) dated 8 February 1999 and APP/J0540/A/12/2179541/NWF dated 8 May 2013) and Thornhaugh IIB (14/01716/MMFUL dated 10 April 2015). It is understood that operations in the main part of Thornhaugh II ceased a number of years ago and that operations at Thornhaugh IIB are due to be completed by 2026. It is therefore considered that there are no potentially significant cumulative impacts associated with the activities at Thornhaugh II and the proposed revised restoration proposals at Thornhaugh and Cooks Hole.

Mitigation

- 13.14** A noise monitoring scheme for the proposed development is presented at Appendix ES4.5. This scheme is based on the currently approved noise monitoring schemes for the sites.

Conclusions

- 13.15** The results of the assessment demonstrate that the proposed development can be undertaken whilst adhering to the existing noise limits for the sites. It is considered by Peterborough City Council that the existing noise limits provide sufficient protection for nearby sensitive receptors. It is considered unlikely that the proposed development would result in any significant or unacceptable adverse impacts at noise-sensitive premises in the vicinity of the sites.

14. Amenity including dust

14.1 An assessment has been carried out by MJCA of the potential effects on amenity associated with dust, mud on the road and lighting as a result of the proposed development. A noise impact assessment is presented in Section 13 of this Environmental Statement. The potential for amenity impacts associated with the proposed development generally is present only in the immediate vicinity of the Cooks Hole and Thornhaugh (collectively known as the sites).

14.2 The activities associated with the proposed development with the potential to generate dust are the creation of stockpiles, the extraction of mineral arising from the construction of landfill cells, the processing of materials from mineral stockpiles, the processing of imported soil forming materials, the extraction, redeposition and processing of suitable historically deposited waste, the transportation of material at the site and off site, the importation of waste to Thornhaugh, the importation of clean naturally occurring materials to create the landform at Cooks Hole and the restoration of the sites including soil placement. HGVs leaving the site have the potential to result in the deposition of mud on the road. Lighting is installed at the site reception and parking area and mobile lighting is used as necessary in operational areas.

Methodology of the dust assessment

14.3 The methodology used for the assessment of impacts from dust is summarised below and presented in detail at Appendix ES14.1. A qualitative assessment has been carried out of the potential impacts associated with mud on the road and lighting.

14.4 The dust assessment has been undertaken generally in accordance with the Planning Practice Guidance Note for Minerals²² and the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning²³ together with MJCA experience of undertaking dust assessments for mineral extraction and processing facilities, landfill sites and waste processing facilities.

²² HM Government (2014) *Planning Practice Guidance Note for Minerals* <https://www.gov.uk/guidance/minerals>

²³ Institute of Air Quality Management (2016) *Guidance on the Assessment of Mineral Dust Impacts for Planning v1*

Baseline***Dust***

- 14.5** The annual mean air quality objective for PM₁₀ is 40µg/m³. The estimated annual mean PM₁₀ background concentration obtained from the Department for Environment, Food and Rural Affairs (DEFRA) for 2022 at the sites²⁴ is between 11.64µg/m³ and 14.29µg/m³ with mean of 13.09µg/m³. The background concentrations of PM₁₀ at the site are considerably below (i.e better than) the annual mean air quality objective of 40µg/m³. Given that the annual mean PM₁₀ background concentration at the sites is less than 17µg/m³²⁵ there is little risk that the process contribution from the operations would lead to an exceedance of the annual mean objective for PM₁₀. Accordingly it is considered not necessary to assess the potential impacts of dust on health further.
- 14.6** A dry hours wind rose prepared by ADM Limited based on data from the Meteorological Office for Wittering weather station located approximately 2.2km north north west of the site for the period 2000 to 2019 is presented at Appendix ES14.2. A dry hours wind rose only includes the hours with less than 0.2mm of rainfall. ADM Limited consider that the data collected at the Wittering weather station is representative of the conditions at the site.
- 14.7** The wind rose shows that the prevailing wind is from the west. Based on the wind rose data wind speeds, for approximately 54.72% of the dry hours wind speeds are between 0.5 metres per second (m/s) and 5m/s which is classed as calm through to gentle breeze on the Beaufort Scale. Wind speeds between 5m/s and 9m/s occur for approximately 35.5% of the dry hours which is classed as gentle breeze through to fresh breeze on the Beaufort Scale. Wind speeds greater than 9m/s occur for approximately 6.94% of the dry hours. During the remaining 2.85% of the dry hours the weather was either calm when no wind was observed (0.98%) or data was not collected at the Wittering weather station (1.87%). The wind data for the site is summarised in Table ES14.1. A copy of the Beaufort Scale is presented at Appendix ES14.3.

²⁴ DEFRA (2020) UK Ambient Air Quality Interactive Map <https://uk-air.defra.gov.uk/data/gis-mapping>

²⁵ Institute of Air Quality Management (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning v1.1

14.8 The locations of the receptors considered in the assessment are shown on Figure ES14.1 and listed in Table ES14.2.

14.9 The existing sites both have established approved Dust Management Schemes^{26,27} with procedures to manage the potential impacts of the operations on the amenity of local residents as a result of the operations at the sites. There have been no complaints in the last 5 years regarding the operations at the sites with respect to dust.

Mud on the road

14.10 Access to Thornhaugh is from the A47 Leicester Road. The site access is shared by Cooks Hole. The site access road is surfaced with tarmac along the length to the wheelwash in the site reception area which is located generally centrally within Thornhaugh. The access road to Cooks Hole is to the east of the site entrance (Figure ES3.2). The continued operation and restoration of the sites has the potential to result in mud being tracked onto the public highway if appropriate controls are not implemented. The controls applied routinely are described below.

Lighting

14.11 Currently there is no permanent lighting at Cooks Hole. There is existing permanent external lighting in the site reception, weighbridge and parking areas at Thornhaugh. All permanent lighting is directed downwards and shielded and other than security lighting is switched off at the end of the working day. There is no evidence of adverse impact on amenity as a result of existing lighting at the site and no complaints regarding lighting have been received in the last 5 years.

14.12 The lighting at the existing sites' infrastructure including at the site reception area will not change as a result of the proposed development. Mobile lighting is used currently on the operational area of Thornhaugh during dark operational hours only and will be used as necessary during operational hours only in the operational areas and haul roads in both sites.

²⁶ URS (2013) Scheme in fulfilment of Condition no. 8 attached to planning permission 12/00463/MMFUL

²⁷ Augean PLC (2010) Appendix B: Proposed Dust Management Scheme of the Supporting Statement

Assessment of environmental effects***Dust***

- 14.13** To result in an impact dust must be generated by the proposed development and carried in sufficient quantities from the source to a sensitive receptor which is dependent on site activities and meteorological conditions including wind speed, wind direction and rainfall. Dust impacts have the potential to occur mainly within 400m of the operation, even at the dustiest of sites.
- 14.14** For the purpose of this assessment and in accordance with the guidance it is assumed that significant dust blow will not occur below wind speeds of 5m/s or in the hours with rainfall on average greater than 0.2mm. Based on the dry hours wind rose data presented in Table ES14.1 during approximately 42.44% of the dry hours wind speeds are above 5m/s.
- 14.15** The generation of dust at the site is associated with restoration, mineral extraction associated with cell excavation, cell engineering, materials handling, on site transportation, mineral and waste processing, stockpiles and exposed surfaces together with off site transportation. The residual source emissions for each of the site activities have been determined based on the IAQM guidance including Table A3-1. The residual source emissions are the potential emissions without any operational controls in place. The sites have and will continue to implement operational controls in order to minimise the emissions of dust therefore the assessment is based on a worst case situation.

Activity	Residual Source Emissions with no controls in place
Site preparation/restoration	Large
Mineral Extraction	Small
Materials Handling	Large
On site transportation	Large
Mineral/waste processing	Large
Stockpile and Exposed Surfaces	Large
Off site transportation	Medium

- 14.16** Site preparation and restoration operations comprising stripping of overburden in Thornhaugh and the placement of soils and overburden in Thornhaugh and naturally occurring materials in Cooks Hole during restoration operations will be undertaken periodically throughout the life of the development due to the phased nature of the operations. Simultaneous restoration operations may be undertaken during the operation of the sites with the working area and areas under restoration moving through the sites sequentially during the development. Based on the categories provided in the IAQM guidance there will be a large working area (greater than 10ha) associated with the landfilling and restoration operations at the sites, a high volume of material movements (over 100,000m³) and a large number of mobile plant. Stockpiles will be seeded as soon as possible following construction if they are to remain in place for longer than 6 months. The naturally occurring materials, soils and overburden that will be placed during restoration will have the potential to generate dust and will be placed within 50m of the site boundary and low sensitivity receptors such as footpaths. On the basis of these factors the residual source emissions from the site preparation/restoration without any operational controls are categorised as large.
- 14.17** Cell construction will be carried out in phases in Thornhaugh. During the construction of the landfill cells mineral will be extracted. The working area for restoration could exceed 10 hectares which is classed as a large working area in the IAQM guidance. Some cell construction operations in Thornhaugh will take place within 50m of the site boundary and in close proximity to low sensitivity receptors such as footpaths. The residual source emissions for cell construction and mineral extraction are small and the residual source emissions for materials handling are large.
- 14.18** Based on the categories in the guidance, the length of the access road from the access point to the wheel wash is approximately 240m and the proposed haul roads will be longer than 500m. The number of HGV movements associated with activities at the sites are categorised as large (up to 228 movements per day). A speed restriction of 10mph will be enforced on the sites. The residual source emissions for on site transportation is categorised as large and off site transportation is categorised as medium.

- 14.19** Mineral and waste processing operations will involve sorting, screening and crushing. Less than 200,000 tonnes per annum of minerals or waste will be processed at the site. The overall dust potential of the materials being processed is medium. The residual source emissions for mineral and waste processing are categorised as large.
- 14.20** Stockpiles on site generally will not exceed 5m in height but could be higher and will be sprayed with a water bowser where necessary. The soils which currently are in stockpiles will remain in storage until needed in the restoration of the sites. The area of exposed surfaces is categorised as large. The exposed surfaces at the site are categorised as having a high dust threshold however the wind speeds at the site are small. The residual source emissions from stockpiles and exposed surfaces are categorised as large.
- 14.21** The magnitude of dust impact at each of the receptors within 400m of the application boundary without the application of any dust control measures has been assessed and the results of the assessment are presented at Table ES14.2. The locations of the receptors are shown on Figure ES14.1. Based on the assessment and the information presented in Table ES14.2 it is concluded that based on the wind direction during dry hours together with the location of sensitive receptors and without the implementation of specific mitigation or dust controls there is the potential for between a negligible and slight adverse effect of dust impact. As with the current operations at the sites good practice and standard dust management controls will be implemented at the sites to minimise the potential for dust emissions and impacts. The dust management controls that are and will continue to be implemented at the sites are presented in Table ES14.3.
- 14.22** Based on the qualitative assessment of the proposed activities it is concluded that without appropriate management there is the potential for between a negligible and slight adverse effect of dust impacts on receptors within 400m of the application boundary. Regular monitoring for deposited dust is carried out at Thornhaugh in accordance with the monitoring action plan specified in the Environmental Permit. It is concluded that dust emissions have been and will continue to be controlled effectively using common and effective methods to a standard such that it is unlikely that there will be significant dust emissions from the sites. In the planning practice

guidance for minerals it is stated that dust emissions can be controlled by good practice measures.

Mud on the road

- 14.23** The wheel cleaning facilities will continue to be used for all HGVs visiting the site before leaving the site onto the public highway. The access road from the wheel wash to the highway is hard surfaced which minimises the potential for mud and debris to be tracked onto the road network. The hard surfaced length of the site internal access road will continue to be cleaned regularly by a road sweeper and maintained in good condition. The A47 in the vicinity of the site is also cleaned regularly by a road sweeper. Based on the wheel cleaning facilities and the proposed cleaning and maintenance regime the risk of nuisance from the proposed development at the sites associated with mud and debris on the local road network is low.

Lighting

- 14.24** It is considered that there will not be an unacceptable impact on amenity as a result of the continued use of lighting as part of the proposed development. With the exception of security lighting the lighting will only be used when the site is operational and all lighting will be directed downwards and shielded to minimise the visibility of light. A review of the complaints records for the previous five years show that there were no complaints regarding lighting at the site. A lighting scheme for the sites is presented at Appendix ES4.2.

Mitigation and monitoring

- 14.25** The mitigation measures proposed to minimise the impacts of dust are described in this section of the ES and will continue to be implemented for the proposed sites. The mitigation measures proposed to minimise the impacts of dust and mud on the road are summarised in Table ES14.3. The operational measures undertaken to minimise impacts from lighting comprise the continued use only of necessary lighting and, where it is used it will be downward facing and shielded. The lighting at the site will be operated in accordance with the lighting scheme presented at Appendix ES4.2. All HGVs are required to use the wheelwash before departing the sites.

- 14.26** The dust management controls that are currently operational at the sites will continue to be implemented throughout the life of the development and the control and monitoring of emissions of particulates including dust at Thornhaugh will continue to be regulated through the Environmental Permit.

Cumulative impacts

- 14.27** There is the potential for cumulative effects with respect to dust from the continued operations at the existing sites in combination with the other developments in the vicinity of the site. It has been demonstrated in this assessment that dust emissions from the operations at the existing sites can be suitably controlled. It is therefore considered unlikely that there will be an unacceptable cumulative impact with respect to dust emissions from the proposed development in combination with dust emissions from surrounding land uses.

Conclusions

- 14.28** The potential impact of the proposed development on amenity arising from dust, mud on the road and lighting has been considered. Subject to the proposed controls it is unlikely that there will be significant dust emissions from the sites and there will not be a significant impact on air quality or PM₁₀ concentrations in the vicinity of the sites as a result of the proposed development. It is concluded that dust emissions can be controlled to a standard such that the proposed development will not result in a significant impact with respect to nuisance relating to dust. It is demonstrated that potential nuisance from the sites associated with mud and debris on the local road network is limited. There will not be any unacceptable impacts on amenity as a result of the lighting installed as part of the proposed development.

15. Conclusions

- 15.1** An Environmental Impact Assessment (EIA) has been carried out of the effects of the proposed development. Technical studies have been undertaken to establish the baseline environment of the application site and the surrounding areas and an assessment has been carried out of the potential impacts associated with the proposed development. The findings of the impact assessments are presented in this Environmental Statement (ES) which is submitted with this application. This ES presents the likely significant environmental effects of the proposals identified in the EIA, the appropriate mitigation measures which will be put in place where necessary and any residual effects. The Nationally Significant Infrastructure Project operations at ENRMF are inextricably linked with the proposed development as a significant proportion of the waste inputs to Thornhaugh arise as treatment residues from the treatment of predominantly hazardous wastes at the ENRMF waste treatment facility and as the engineering clay materials arising from the formation of landfill cells at ENRMF are used in the construction of the engineered containment to the landfill cells at Thornhaugh. Importantly, the proposed development will facilitate the continued operation of the Nationally Significant Infrastructure Project at ENRMF by using the excess clean, natural excavated material arising from the landfill construction operations at ENRMF to create an integrated landform across both Cooks Hole and Thornhaugh.
- 15.2** As concluded in the assessments for each of the aspects assessed, the technical assessments demonstrate that the proposed development can be undertaken without any long term unacceptable impacts on the environment. The cumulative impacts with the other identified developments have been assessed. It is considered that in combination there will not be any unacceptable cumulative impacts as a result of the proposed development.
- 15.3** The proposed restoration of the sites will create a mosaic of habitat including woodland, scrub, grassland, scattered trees, a network of hedgerows, waterbodies and areas of open mosaic habitats. The restoration scheme will provide new and enhanced links to existing habitats and will extend the capacity of Bedford Purlieus to support notable species. The restoration scheme will contribute to the conservation aims of Nature Recovery Networks within the wider Rockingham Forest area. The

proposed new and extended habitats will generate significant Biodiversity Net Gain substantially in excess of the 10% specified in the Environment Act 2021.

TABLES

Table ES2.1

A summary of the issues raised in the Scoping Opinion and a description of the way in which the issues are addressed in the Environmental Impact Assessment and the Environmental Statement

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
Peterborough City Council	Ecology and Biodiversity	Natural England have provided some generic advice with regard to the general principles of Environmental Impact Assessment, and specifically highlight the following Sites of Special Scientific Interest which may be affected by the development, including; - Bedford Purlieus - Bonemills Hollow - Wansford Pasture - West Abbot's and Lound Woods and advise that an Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSIs and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects. The Wildlife Officer has confirmed their agreement that the proposed scoped in aspects (in relation to the Ecology section) represent the full potential impacts of the development as outlined within the report. It is noted and agreed that the Biodiversity Net Gain baseline for assessment is the currently approved restoration schemes for Cook's Hole and Thornhaugh I.	The Ecological Impact Assessment is presented at Appendix ES8.1 and summarised in Section 8 of this Environmental Statement. The methodology, baseline, environmental effects and mitigation are presented in Section 8 of this Environmental Statement. A desk study has been undertaken to identify internationally and statutorily designated sites within 5km and non statutorily designated sites within 2km of the sites using MAGIC²⁸ and Natural England's Nature on the Map. The Cambridgeshire and Peterborough Environmental Records Centre (CPERC) and Northamptonshire Biodiversity Records Centre (NBRC) were asked to provide a data report on local sites of conservation interest including County Wildlife Sites (CWS) and Local Wildlife Sites (LWS) together with records for protected or notable species within 2km of the sites. The potential impacts on the four SSSIs are considered in the EcIA and the summary of the potential impacts on the SSSIs is presented at Paragraph 8.35 of the Environmental Statement.
	Landscape and Visibility	The proposed scope of the Landscape and Visual Impact Assessment is acceptable, and the appropriate character areas identified. The proposed viewpoints have been discussed, and advice provided with regard to their suitability in an email to Sophie Serdetschniy 9 November 2023, albeit three of recommended viewpoints relate specifically to assisting with the visual assessment of the heritage setting of the Cook's Hole farmhouse.	Noted. The viewpoint locations are presented on Figure ES10.1 together with the photomontage locations. The photomontages have been prepared to show how the setting of Cooks Hole Farmhouse will be affected as a result of the proposed development. The photomontages are presented at Appendix ES10.1.
	Cultural Heritage	It is acknowledged that there is no potential for buried archaeology to be present and therefore no requirement for assessment of potential impacts on buried archaeology. The Conservation Officer (CO) advises that there are three separate aspects of the proposal which should be assessed from a conservation perspective; historical views between different heritage assets, specific views of the Listed Cook's Hole farmhouse, and views along public rights of way of the various heritage assets; these viewpoints have been identified and shared via email as for the LVIA. It is acknowledged and accepted that there will be no discernible visible impact from proposed viewpoint number 5 (i.e. that from Thornhaugh village) and as such is it not considered necessary to demonstrate this, although an additional viewpoint from Sibberton Lodge (not 'Stibbington' as mistakenly called in the CO comments) is recommended. The three proposed additional viewpoints (on footpath numbers 2 and 4) are considered appropriate to assess how the Cook's Hole farmhouse will be appreciated at a closer location.	The Heritage Statement is presented at Appendix ES9.1 and summarised in Section 9 of this Environmental Statement. The historical views between heritage assets, views of Cooks Hole Farmhouse and views from public rights of way of Cooks Hole Farmhouse have been considered. The viewpoint locations considered in the LVIA are presented on Figure ES10.1 and include a viewpoint from Sibberton Lodge (VP8). The photomontages have been prepared to show how the setting of Cooks Hole Farmhouse will be affected as a result of the proposed development. The photomontages are presented at Appendix ES10.1.
	Water resources and Flood Risk Assessment	The Environment Agency have confirmed that no further groundwater assessments would be required, and it is accepted that assessments previously undertaken in 2015 for Thornhaugh and 2011 for Cook's Hole concluded there would be no significant risk to groundwater or surface water quality as a result of previously approved operations. The proposed scope focusing on surface water run off generation	Noted. The flood risk assessment and surface water drainage assessment is presented at Section 11 of the Environmental Statement.

²⁸ DEFRA (2023) MAGIC website <https://magic.defra.gov.uk/>

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		at the sites is therefore considered to be acceptable and consideration should be given to the potential effect of future climate change on the intensity of storm events.	
	Transport	The report does not clarify the proposal with regard to how the mineral to be processed at Cook's Hole will be used; it is expected that any application would be clear as to whether any minerals to be processed at Cook's Hole are intended to be exported from the site such that an accurate traffic assessment can be undertaken. The Local Highways Authority have confirmed that the Environmental Statement should include a Transport Statement comparing the proposed development with the existing consents and the historic and current flows with regard to forecast traffic flows until 2042. Full details of the proposed access to the car park to be retained post restoration for amenity purposes should also be provided.	A Transport Statement is presented at Appendix ES12.1 and summarised in Section 12 of this Environmental Statement. A comparison of HGV movements associated with the historic operations and the proposed operations has been undertaken and is presented in Section 12 and Appendix ES12.1. The access design for the amenity access is presented at Figure ES6.2.
	Noise	The Pollution Control Officer has not identified any issues with the proposed scope of the noise assessment. It is acknowledged that there have been no new developments or activities in the vicinity of the sites that would be considered significant enough to notably change the baseline acoustic environment and that noise sensitive receptor locations remain appropriate.	Noted. A compliance noise assessment has been undertaken against the existing noise limits and is presented at Appendix ES13.2. A noise impact assessment for the proposed development has been undertaken and is presented at Appendix ES13.1.
	Amenity and dust	The Pollution Control Officer has confirmed that PM10 has not been identified as a significant risk to human health that requires further assessment as part of the proposals for the site, although a dust assessment will be required as set out in the report.	An assessment of the effects on amenity including dust is presented at Section 14 of this Environmental Statement. The dust assessment has been undertaken generally in accordance with the Planning Practice Guidance Note for Minerals²⁹ and the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning³⁰. The methodology used for the assessment of impacts from dust is presented in Appendix ES14.1. The methodology, baseline, environmental effects and mitigation measures in regard to dust are presented in Section 14 of this Environmental Statement. The magnitude of dust impact at each of the sensitive dust receptors within 400m of the application boundary has been assessed and the results of the assessment are presented at Table ES14.2. The locations of the receptors are shown on Figure ES14.1. It is considered in the dust assessment that the proposed development on amenity arising from dust, mud on the road or lighting will not have any unacceptable impacts on the surrounding areas.
	Climate change and major accidents	It is agreed that it is not necessary to provide a separate chapter on climate change, and instead ensure that the predicted effects of climate change are addressed in the flood risk and surface water assessments. Given the sites location within an Aircraft Safeguarding Zone, sufficient information needs to be presented with any application to ensure compliance with the requirements of the safeguarding zone.	A Flood Risk Assessment is presented at Section 11 of this Environmental Statement. The flood risk assessment includes a 40% allowance for climate change. Consideration has been given to the restoration proposals and the size of the ponds due to the location of the site in the RAF Wittering Aircraft Safeguarding Zone. Further information is provided at Section 6 of the Environmental Statement.
	Other issues	The EA advise that Thornhaugh landfill site currently has an environmental permit which includes groundwater monitoring, and that the proposed restoration at Cook's Hole will also require a permit as it involves the use of quarry wastes and the importation of inert material. The permit application process may require additional groundwater assessment / monitoring. Any application will require clarity as to the extent of mineral working, and whether this will be exported off site.	Noted. An Environmental Permit may not be necessary for Cooks Hole if the activities fall under the CL:AIRE protocol. At Table ES4.1 a description of the currently approved development at Cooks Hole Quarry and Thornhaugh Landfill Site is presented together with the changes

²⁹ HM Government (2014) Planning Practice Guidance Note for Minerals <https://www.gov.uk/guidance/minerals>

³⁰ Institute of Air Quality Management (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning v1

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		The proposal describes the continuation of landfilling at Thornhaugh; given that any new application would, if approved, result in a new permission, it is imperative that all aspects of the existing approved operations that are proposed for continuation are clearly set out, and will require sufficient information for assessment given the passage of time since original approvals may have been granted and any changes to the legislative framework in the intervening period.	that will be made to the consented developments as a result of the proposed development.
INDIVIDUAL CONSULTATION RESPONSES			
Environment Agency	Water resources	We agree that no further groundwater assessments would be required for this proposal. This is due to the application being mainly for continued operations at both sites with a more joined up restoration scheme. Thornhaugh Landfill site currently has an environmental permit which includes groundwater monitoring. The proposed restoration at Cooks Hole will also require an environmental permit as it involves the use of quarry wastes and will import inert material. The permit application process may require additional groundwater assessment/monitoring.	Noted. An Environmental Permit may not be necessary for Cooks Hole if the activities fall under the CL:AIRE protocol.
Conservation Officer (PCC)	Cultural Heritage	The relevant heritage relationships which are considered to potentially be impacted from these proposals are Thornhaugh Village, Sibbington Lodge and Home Farm. The proposed views 1 for Home Farm and 5 for Thornhaugh are considered to be sufficient for this towards the asset but there is a question regarding this in the other direction. If it is demonstrated that there is no impact or the impact is complete then this can be understood and assessed but if there is some intermediate impact then this may require an understanding of the relationship change from both directions. With regard Stibbington Lodge, the relationship is considered to be less and in combination where the change in landscape which is proposed to occur the any impact will be less. However there is a question why there are no landscape aspects from the east along the A47 have not been included within the analysis as this appears to be a general hole with the proposed analysis. If this were to be included, it would probably also be a good equivalent for this relationship	The Heritage Statement is presented at Appendix ES9.1 and summarised in Section 9 of this Environmental Statement. The historical views between heritage assets, views of Cooks Hole Farmhouse and views from public rights of way of Cooks Hole Farmhouse have been considered. The viewpoint locations considered in the LVIA are presented on Figure ES10.1 and include a viewpoint from Sibberton Lodge (VP8). The photomontages have been prepared to show how the setting of Cooks Hole Farmhouse will be affected as a result of the proposed development. The photomontages are presented at Appendix ES10.1. There are views of Cooks Hole Farmhouse from VP10 which is presented at Appendix ES10.1.
	Rights of Way	The proposed view numbers, 1, 3, 4 and 8 are considered sufficient to capture the impact along the route from a distance from the heritage asset. There is a question regarding the views from the heritage asset outwards along these public rights of way and also how Cooks Hole will be appreciated at a closer location. As such there needs to be views from Cooks Hole looking eastward (and southward if there are proposed material changes in this direction) and of Cooks Hole from the east and south.	
	Landscape and Visibility	All of the proposed views are from a distance and do not capture how Cooks Hole will be appreciated within the landscape from a close but not immediate distance. As such these must be views assessed. The views from the east and south along the public right of way will presumably correspond with those required above. In addition, as the building is Listed, its significance is not just from public locations but also how it is appreciated in the wider landscape. A such, in addition to the two aforementioned locations a view from the west should be considered. These three points should be sufficient to ensure that a holistic understanding of how Cooks Hole will be appreciated in its environment can be ascertained. Although not specifically heritage considerations, the LVIA is a useful tool to gain a broader understanding of the change on setting for the area. As such here is a question regarding why views from the East and South appear to have been omitted from the proposals.	
Historic England	Cultural heritage	Historic England provides advice when our engagement can add most value. In this case we are not offering detailed advice. This should not be interpreted as comment on the merits of the application. We suggest that you seek the views of your specialist archaeological and conservation advisers. It is not necessary to consult us on this application again, unless there are material changes to the proposals.	Noted.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
Local Highway Authority (PCC)	Traffic and transport	...I understand the current planning consent (i.e. 15/00230/MMFUL) related to completion of works at. The Transport Assessment (TA) pertaining to that consent considered a context relevant at that time. As such I consider that the EIA should produce, for completeness, a new TA that would relate to the current context in terms of forecast traffic flows up until 2042. This will include giving consideration to: a) assessing whether the existing access is fit for purpose up until 2042 b) the forecast flows taking account of relevant committed development at the access and other relevant junctions within the schemes sphere of influence. c) the latest 5 year recorded accident data to examine themes and cluster if relevant. d) the adequacy of the routes taken by traffic that will be importing material In conclusion, as the scheme has yet to be finalised I consider that its premature to assume that a TA will not be required. For completeness, a TA should accompany the EIA and its scope and content should be agreed with the LHA through the local planning authority in advance of the submission of the planning application.	These comments pre-date a meeting that has been held between the applicant and the Highways Authority on 16 November 2023. It was agreed at this meeting that a Transport Statement (rather than a Transport Assessment) would be appropriate including a review of the consented and proposed traffic numbers and traffic routes. A Transport Statement is presented at Appendix ES12.1 and summarised in Section 12 of this Environmental Statement.
Natural England	Cumulative and in-combination effects	The ES should fully consider the implications of the whole development proposal. This should include an assessment of all supporting infrastructure. An impact assessment should identify, describe, and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment (subject to available information): a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.	The approach to the cumulative assessment is set out in Section 2 of the Environmental Statement. Where necessary the cumulative effects are considered in the technical sections of the Environmental Statement.
	Biodiversity and Geodiversity	<u>General Principles</u> The National Planning Policy Framework (paragraphs 174-175 and 179-182) sets out how to take account of biodiversity and geodiversity interests in planning decisions. Further guidance is set out in Planning Practice Guidance on the natural environment. The potential impact of the proposal upon sites and features of nature conservation interest and opportunities for nature recovery and biodiversity net gain should be included in the assessment. Ecological Impact Assessment (EcIA) is the process of identifying, quantifying, and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal. Guidelines have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM). Local planning authorities have a duty to have regard to conserving biodiversity as part of their decision making. Conserving biodiversity can include habitat restoration or enhancement. Further information is available here.	The Ecological Impact Assessment is presented at Appendix ES8.1 and summarised in Section 8 of the Environmental Statement. The Biodiversity Net Gain Plan for the proposed development is presented at Appendix ES6.1 and the completed statutory metrics (one for the consented restoration scheme and one for the proposed restoration scheme) are presented at Appendices ES6.2 and 6.3 respectively. Opportunities for nature recovery and biodiversity have been considered.
	Designated nature conservation sites	<u>Nationally designated sites</u> The development site is within or may impact on the following Site of Special Scientific Interest: • Bedford Purlieus • Bonemills Hollow • Wansford Pasture	The potential impacts on the four SSSIs are considered in the EcIA and the summary of the potential impacts on the SSSIs is presented at paragraph 8.35 of the Environmental Statement.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		- West Abbot's and Lound Woods The development site is within the following National Nature Reserve: - Bedford Purlieus Sites of Special Scientific Interest are protected under the Wildlife and Countryside Act 1981 and paragraph 180 of the NPPF. Further information on the SSSI and its special interest features can be found at www.magic.gov. Natural England's SSSI Impact Risk Zones can be used to help identify the potential for the development to impact on a SSSI. The dataset and user guidance can be accessed from the Natural England Open Data Geoportal. The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSI and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects. The consideration of likely significant effects should include any functionally linked land outside the designated site. These areas may provide important habitat for mobile species populations that are interest features of the SSSI, for example birds and bats. This can also include areas which have a critical function to a habitat feature within a site, for example by being linked hydrologically or geomorphologically.	The proposed development does not fall within the boundary of the Beford Purlieus National Nature Reserve. The boundary of the National Nature Reserve runs to the west of Old Oundle Road which runs to the west of the application boundary.
	Regionally and Locally Important Sites	The ES should consider any impacts upon local wildlife and geological sites, including local nature reserves. Local Sites are identified by the local wildlife trust, geoconservation group or other local group and protected under the NPPF (paragraph 174 and 175). The ES should set out proposals for mitigation of any impacts and if appropriate, compensation measures and opportunities for enhancement and improving connectivity with wider ecological networks. Contact the relevant local body for further information.	The potential impacts on the County Wildlife Site within the boundary of Thornhaugh are addressed in the EclA and are presented at Paragraph 8.36 of the Environmental Statement.
	Protected species	The conservation of species protected under the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2017 is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law. Records of protected species should be obtained from appropriate local biological record centres, nature conservation organisations and local groups. Consideration should be given to the wider context of the site, for example in terms of habitat linkages and protected species populations in the wider area. The area likely to be affected by the development should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and, where necessary, licensed, consultants. Natural England has adopted standing advice for protected species, which includes guidance on survey and mitigation measures. A separate protected species licence from Natural England or Defra may also be required.	Species specific surveys have been undertaken for great crested newts, reptiles, badgers, bats, birds and invertebrates. The results of the surveys are presented in Annex 1 of Appendix ES8.1. The potential impacts on species are presented in the EclA presented at Appendix ES8.1.
	District Level Licensing for Great Crested Newts	District level licensing (DLL) is a type of strategic mitigation licence for great crested newts (GCN) granted in certain areas at a local authority or wider scale. A DLL scheme for GCN may be in place at the location of the development site. If a DLL scheme is in place, developers can make a financial contribution to strategic, off-site habitat compensation instead of applying for a separate licence or	Discussions have been held with Natural England with respect to licensing for great crested newts. A draft licence application will be submitted shortly with a view to obtaining a Letter of No Impediment from Natural England during the determination of the planning application.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		carrying out individual detailed surveys. By demonstrating that DLL will be used, impacts on GCN can be scoped out of detailed assessment in the Environmental Statement.	
	Priority habitats and species	Priority Habitats and Species are of particular importance for nature conservation and included in the England Biodiversity List published under section 41 of the Natural Environment and Rural Communities Act 2006. Most priority habitats will be mapped either as Sites of Special Scientific Interest, on the Magic website or as Local Wildlife Sites. Lists of priority habitats and species can be found here. Natural England does not routinely hold species data. Such data should be collected when impacts on priority habitats or species are considered likely. Consideration should also be given to the potential environmental value of brownfield sites, often found in urban areas and former industrial land. Sites can be checked against the (draft) national Open Mosaic Habitat (OMH) inventory published by Natural England and freely available to download. Further information is also available here An appropriate level habitat survey should be carried out on the site, to identify any important habitats present. In addition, ornithological, botanical, and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of: • Any historical data for the site affected by the proposal (e.g. from previous surveys) • Additional surveys carried out as part of this proposal • The habitats and species present • The status of these habitats and species (e.g. whether priority species or habitat) • The direct and indirect effects of the development upon those habitats and species • Full details of any mitigation or compensation measures • Opportunities for biodiversity net gain or other environmental enhancement	A habitat survey has been undertaken. The results of the habitat survey are presented in Appendix ES8.1. The Biodiversity Net Gain Plan for the proposed development is presented at Appendix ES6.1.
	Ancient woodland, ancient and veteran trees	The ES should assess the impacts of the proposal on any ancient woodland, ancient and veteran trees, and the scope to avoid and mitigate for adverse impacts. It should also consider opportunities for enhancement. Natural England maintains the Ancient Woodland Inventory which can help identify ancient woodland. The wood pasture and parkland inventory sets out information on wood pasture and parkland. The ancient tree inventory provides information on the location of ancient and veteran trees. Natural England and the Forestry Commission have prepared standing advice on ancient woodland, ancient and veteran trees.	A tree survey has been undertaken and is presented at Annex 2 of Appendix ES8.1. Protection measures for trees are included where necessary.
	Biodiversity Net Gain	Paragraph 174 of the NPPF states that decisions should contribute to and enhance the natural and local environment by minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures. Biodiversity Net Gain is additional to statutory requirements relating to designated nature conservation sites and protected species. The ES should use an appropriate biodiversity metric such as Biodiversity Metric 3.0 together with ecological advice to calculate the change in biodiversity resulting from proposed development and demonstrate how proposals can achieve a net gain. The metric should be used to: • assess or audit the biodiversity unit value of land within the application area • calculate the losses and gains in biodiversity unit value resulting from proposed development	The Biodiversity Net Gain Plan for the proposed development is presented at Appendix ES6.1 and the completed statutory metrics (one for the consented restoration scheme and one for the proposed restoration scheme) are presented at Appendices ES6.2 and 6.3 respectively. Opportunities for nature recovery have been considered.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		demonstrate that the required percentage biodiversity net gain will be achieved Biodiversity Net Gain outcomes can be achieved on site, off-site or through a combination of both. On-site provision should be considered first. Delivery should create or enhance habitats of equal or higher value. When delivering net gain, opportunities should be sought to link delivery to relevant plans or strategies e.g. Green Infrastructure Strategies or Local Nature Recovery Strategies. Opportunities for wider environmental gains should also be considered.	
	Landscape and visual impacts	The environmental assessment should refer to the relevant National Character Areas. Character area profiles set out descriptions of each landscape area and statements of environmental opportunity. The ES should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing, and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character. A landscape and visual impact assessment should also be carried out for the proposed development and surrounding area. Natural England recommends use of the methodology set out in Guidelines for Landscape and Visual Impact Assessment 2013 ((3rd edition) produced by the Landscape Institute and the Institute of Environmental Assessment and Management. For National Parks and AONBs, we advise that the assessment also includes effects on the 'special qualities' of the designated landscape, as set out in the statutory management plan for the area. These identify the particular landscape and related characteristics which underpin the natural beauty of the area and its designation status. The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. This should include an assessment of the impacts of other proposals currently at scoping stage. To ensure high quality development that responds to and enhances local landscape character and distinctiveness, the siting and design of the proposed development should reflect local characteristics and, wherever possible, use local materials. Account should be taken of local design policies, design codes and guides as well as guidance in the National Design Guide and National Model Design Code. The ES should set out the measures to be taken to ensure the development will deliver high standards of design and green infrastructure. It should also set out detail of layout alternatives, where appropriate, with a justification of the selected option in terms of landscape impact and benefit.	A landscape and visual impact assessment (LVIA) for the proposed development is presented at Appendix ES10.1. The LVIA considers the relevant character areas for the sites. The LVIA has been undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment (2013) 3 rd Edition.
	Heritage landscapes	The ES should include an assessment of the impacts on any land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific, or historic interest.	Not applicable to the proposed development.
	Connecting people with nature	The ES should consider potential impacts on access land, common land, public rights of way and, where appropriate, the England Coast Path and coastal access routes and coastal margin in the vicinity of the development, in line with NPPF paragraph 100. It should assess the scope to mitigate for any adverse impacts. Rights of Way Improvement Plans (ROWIP) can be used to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced. Measures to help people to better access the countryside for quiet enjoyment and opportunities to connect with nature should be considered. Such measures could include reinstating existing footpaths or the creation of new footpaths, cycleways, and bridleways. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Access to nature within the development site should also be considered, including the role that natural links have in connecting habitats and providing potential pathways for movements of species.	Potential impacts on the users of the public rights of way in the vicinity of the proposed development are considered in Appendix ES10.1. Details of the phasing of the operations is presented in Section 5 of the Environmental Statement. Proposals for the restoration of the site include new permissive rights of way at the site to enhance links with the wider Rights of Way network.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.	
	Soils and Agricultural Land Quality	Soils are a valuable, finite natural resource and should also be considered for the ecosystem services they provide, including for food production, water storage and flood mitigation, as a carbon store, reservoir of biodiversity and buffer against pollution. It is therefore important that the soil resources are protected and sustainably managed. Impacts from the development on soils and best and most versatile (BMV) agricultural land should be considered in line with paragraphs 174 and 175 of the NPPF. Further guidance is set out in the Natural England Guide to assessing development proposals on agricultural land. As set out in paragraph 211 of the NPPF, new sites or extensions to sites for peat extraction should not be granted planning permission. The following issues should be considered and, where appropriate, included as part of the Environmental Statement (ES): • The degree to which soils would be disturbed or damaged as part of the development • The extent to which agricultural land would be disturbed or lost as part of this development, including whether any best and most versatile (BMV) agricultural land would be impacted. This may require a detailed Agricultural Land Classification (ALC) survey if one is not already available. • Where an ALC and soil survey of the land is required, this should normally be at a detailed level, e.g. one auger boring per hectare, (or more detailed for a small site) supported by pits dug in each main soil type to confirm the physical characteristics of the full depth of the soil resource, i.e. 1.2 metres. The survey data can inform suitable soil handling methods and appropriate reuse of the soil resource where required (e.g. agricultural reinstatement, habitat creation, landscaping, allotments and public open space). • The ES should set out details of how any adverse impacts on BMV agricultural land can be minimised through site design/masterplan. • The ES should set out details of how any adverse impacts on soils can be avoided or minimised and demonstrate how soils will be sustainably used and managed, including consideration in site design and master planning, and areas for green infrastructure or biodiversity net gain. The aim will be to minimise soil handling and maximise the sustainable use and management of the available soil to achieve successful after-uses and minimise off-site impacts. Further information is available in the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites and The British Society of Soil Science Guidance Note Benefitting from Soil Management in Development and Construction. The following additional guidance is provided for minerals and waste development. The ES should consider and, where appropriate, include the following: • The methods and equipment to be used for the protection, recovery, storage, and sustainable re-use of the different types of topsoil and subsoil, including consideration of any required phasing to minimise soil handling and maximise the sustainable management of the soil. • The method of assessing whether soils are in a suitably dry condition to be handled (i.e. dry and friable), and the avoidance of soil handling, trafficking, and cultivation during the wetter winter period. • A description of the restoration criteria, including the proposed soil horizon depths and soil characteristics; normally to an overall depth of 1.2 m over an evenly graded overburden layer (or, in the case of waste reclamation, an evenly graded capping layer), suitable for the proposed end-use, including the restored ALC Grade.	For most of the areas of the sites there are no soils that remain to be stripped within the application boundary. The areas in the west of Cooks Hole have historically been worked and restored. It is considered unlikely that there will be significant soil reserves in this area that could be stripped. The stockpiles of soils that are currently in Cooks Hole will be used in the restoration of the site. The soils will be placed in accordance with the soil handling and management scheme presented at Appendix ES4.4. The restoration scheme is presented at Figure ES4.3 and details on the restoration are provided in Section 6 of the Environmental Statement.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		• The effects on land drainage, agricultural access, and water supplies, including other agricultural land in the vicinity. The impacts of the development on farm structure and viability, and on other established rural land use and interests, both during the site working period and following its reclamation. • The restoration and aftercare of the site, in line with Chapter 17 'Facilitating the Sustainable Use of Minerals' of the NPPF. • A detailed Restoration Plan illustrating the restored soil profile characteristics, landform and the intended standard of restoration including ALC Grade(s), together with details of surface features; water bodies; the availability of outfalls to accommodate future drainage requirements; and aftercare. Further guidance is contained in the Defra Guidance for Successful Restoration of Mineral and Waste Sites and the Natural England guidance note Planning and aftercare advice for reclaiming land to agricultural use. Reference could also usefully be made to the Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings which comprises separate sections, describing the typical choice of machinery and methods for handling soils at various phases. The techniques described by Sheets A-D are appropriate for the successful reinstatement of higher quality agricultural land. The Natural England Guide to reclaiming mineral extraction and landfill sites to agriculture also contains useful background information.	
	Air Quality	Air quality in the UK has improved over recent decades but air pollution remains a significant issue. For example, approximately 85% of protected nature conservation sites are currently in exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg). A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government's Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England's protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NOx and SO2 against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans (SNAPs) have also been identified as a tool to reduce environmental damage from air pollution. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Information on air pollution modelling, screening and assessment can be found on the following websites: • SCAIL Combustion and SCAIL Agriculture - http://www.scail.ceh.ac.uk/ • Ammonia assessment for agricultural development https://www.gov.uk/guidance/intensive-farming-risk-assessment-for-your-environmental-permit • Environment Agency Screening Tool for industrial emissions https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit • Defra Local Air Quality Management Area Tool (Industrial Emission Screening Tool) – England http://www.airqualityengland.co.uk/laqm	Traffic air quality was screened out of the Environmental Statement (see Appendix ES2.2). The potential impacts as a result of dust from the proposed development are addressed in Section 14 of the Environmental Statement.
	Water Quality	The planning system plays a key role in determining the location of developments which may give rise to water pollution, and hence planning decisions can have a significant impact on water quality, and land. The assessment should take account of the risks of water pollution and how these can be	The management of surface water during the operations and following restoration is presented in Appendix ES4.1 and summarised in Section 11 of the Environmental Statement.

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		managed or reduced. A number of water dependent protected nature conservation sites have been identified as failing condition due to elevated nutrient levels and nutrient neutrality is consequently required to enable development to proceed without causing further damage to these sites. The ES needs to take account of any strategic solutions for nutrient neutrality or Diffuse Water Pollution Plans, which may be being developed or implemented to mitigate and address the impacts of elevated nutrient levels.	
	Climate change	The ES should identify how the development affects the ability of the natural environment (including habitats, species, and natural processes) to adapt to climate change, including its ability to provide adaptation for people. This should include impacts on the vulnerability or resilience of a natural feature (i.e. what's already there and affected) as well as impacts on how the environment can accommodate change for both nature and people, for example whether the development affects species ability to move and adapt. Nature-based solutions, such as providing green infrastructure on-site and in the surrounding area (e.g. to adapt to flooding, drought and heatwave events), habitat creation and peatland restoration, should be considered. The ES should set out the measures that will be adopted to address impacts Further information is available from the Committee on Climate Change's (CCC) Independent Assessment of UK Climate Risk, the National Adaptation Programme (NAP), the Climate Change Impacts Report Cards (biodiversity, infrastructure, water etc.) and the UKCP18 climate projections. The Natural England and RSPB Climate Change Adaptation Manual (2020) provides extensive information on climate change impacts and adaptation for the natural environment and adaptation focussed nature-based solutions for people. It includes the Landscape Scale Climate Change Assessment Method that can help assess impacts and vulnerabilities on natural environment features and identify adaptation actions. Natural England's Nature Networks Evidence Handbook (2020) also provides extensive information on planning and delivering nature networks for people and biodiversity. The ES should also identify how the development impacts the natural environment's ability to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environment's contribution to achieving net zero by 2050.	The potential effects due to climate change have been addressed in the flood risk assessment presented at Section 11 of the Environmental Statement.
	Contribution to local environmental initiatives and priorities	The ES should consider the contribution the development could make to relevant local environmental initiatives and priorities to enhance the environmental quality of the development and deliver wider environmental gains. This should include considering proposals set out in relevant local strategies or supplementary planning documents including landscape strategies, green infrastructure strategies, tree and woodland strategies, biodiversity strategies or biodiversity opportunity areas.	The Biodiversity Net Gain Plan for the proposed development is presented at Appendix ES6.1 and the completed statutory metrics (one for the consented restoration scheme and one for the proposed restoration scheme) are presented at Appendices ES6.2 and 6.3 respectively. Opportunities for nature recovery have been considered.
Pollution officer (PCC)	Noise	As included in the scoping document, noise limits at the identified near sensitive receptors for the operations at Cooks Hole are specified planning permissions referenced 15/00229/MMFUL, 13/01372/WCMM and 13/01374/WCMM. Where the existing noise limits provide sufficient protection. As set out in Sections 5.14 - 5.17 of the document a noise assessment considering the noise impact of the proposed operations will be necessary. The results will be presented against the existing noise limits for the site.	A compliance noise assessment has been undertaken against the existing noise limits and is presented at Appendix ES13.2. A noise impact assessment for the proposed development has been undertaken and is presented at Appendix ES13.1.
	Dust and particulates	Section 5.20 of the document by MJCA states " The annual background PM10 concentration for both sites in 2021 was 13.93µg/m³ which is well below the national air quality objective for PM10. As the background annual PM10 concentration for the site is below 17µg/m³ (the screening value specified in the IAQM guidance for potential health effects) there is little risk that the process contribution from the proposed development would lead to an exceedance of the annual mean air quality objective for PM10 hence an assessment for the potential for dust to affect human health will not be undertaken and is not included in the scope of the EIA."	An assessment of the effects on amenity including dust is presented at Section 14 of this Environmental Statement. The dust assessment has been undertaken generally in accordance with the Planning Practice Guidance Note for Minerals and the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning. The methodology used for the assessment of impacts from dust is presented in Appendix ES14.1

Consultee	Subject	Specific issue raised and comments made	Comments and/or the location in the Environmental Statement or Planning Application Statement in which the issues are addressed
		PM10 has been considered previously with respect to current operations and has not been identified as a significant risk to human health that requires further assessment as part of the proposals for the site. As set out in sections 5.21 and 5.22 of the document, a dust assessment will be required to determine potential dust impacts and detail the proposed mitigation measures.	The methodology, baseline, environmental effects and mitigation measures in regards to dust are presented in Section 14 of this Environmental Statement. Dust impacts have the potential to occur mainly within 400m of the operation, even at the dustiest of sites. The magnitude of dust impact at each of the sensitive dust receptors within 400m of the site boundary has been assessed and the results of the assessment are presented at Table ES14.2. The locations of the receptors are shown on Figure ES14.1.
Tree officer (PCC)	Tree protection	I'm happy to accept the submitted detail and proposals within the Scoping Report and have no further comment to make at this time.	Noted. A tree survey has been undertaken and is presented at Annex 2 of Appendix ES8.1. Protection measures for trees are included where necessary.
Wildlife officer	Ecology	I agree with the proposed potential impacts of the development outlined within the EIA Scoping Report (MJCA, October 2023) and agree that the baseline as described represents a realistic depiction of the surrounding habitat. In respect to the ecological aspects of the proposal I agree with the EIA Scoping Report that an EIA is required and the scoped in aspects represent the full potential impacts of the development.	The Ecological Impact Assessment is presented at Appendix ES8.1 and summarised in Section 8 of this Environmental Statement. The results of the surveys are presented in Annex 1 to Appendix ES8.1. The Biodiversity Net Gain Plan for the proposed development is presented at Appendix ES6.1 and the completed statutory metrics (one for the consented restoration scheme and one for the proposed restoration scheme) are presented at Appendices ES6.2 and 6.3 respectively. Opportunities for nature recovery have been considered.

Table ES4.1

Description of the currently approved development for Cooks Hole Quarry and Thornhaugh Landfill Site and the proposed changes as a result of the proposed development

The boundaries of the planning permissions are shown on Figure PS4.1 in the Planning Statement

Currently approved development at Cooks Hole	Proposed changes at the sites
Planning permission references 13/01372/WCMM and 13/01374/WCMM	
The winning and working of minerals shall not take place outside the limit of excavation shown on Figure 1.8 in the application Environmental Statement Volume 1 (dated October 2012)	Other than the mineral stockpiled at the site the mineral at the site has been exhausted. There are no further viable reserves at the site. No further mineral extraction will be undertaken at Cooks Hole.
No blasting shall take place at the site	No changes proposed.
Operational hours 0600 to 1900 hours Mondays to Fridays 0700 to 1300 hours Saturdays Between 1800 and 1900 Monday to Friday and 0700 and 0800 on Saturday operations shall be limited to loading vehicles from stockpiles, traffic movements associated with the collection of minerals and associated environmental control and administrative activities. Between 0600 and 0700 Monday to Friday operations shall be limited to traffic movements only.	The operational hours for the sites will be consistent with the current operational hours for Thornhaugh: 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays Except for the operation of maintenance and control equipment including gas, leachate and water management in Thornhaugh and emergency maintenance works.
Any lighting erected on the site shall be in accordance with a lighting scheme	A lighting scheme has not been submitted for Cooks Hole to date other than for a historical parking area. A lighting scheme for the proposed development is presented at

Currently approved development at Cooks Hole	Proposed changes at the sites
	Appendix ES4.2 and covers the operations at Cooks Hole and Thornhaugh.
No vehicular access to the Public Highway shall be used in connection with the development other than: • The entrance serving Thornhaugh • The existing track linking Cooks Hole Farm to the A47 shall only be used in connection with agriculture, after care and or after use purposes only.	There are no changes proposed to the access arrangements for the importation and export of materials. The track from the existing access on the A47 to Cooks Hole Farmhouse will be retained for after care and after use purposes. A small car park will be constructed adjacent to the access from the A47 for Cooks Hole.
Prior to the winning and working of minerals the sub and topsoil will be stripped and stored.	There will be no further winning of minerals at the site. Naturally occurring materials (including imported soils and soil forming materials) will be stored prior to placement and stockpiles will be formed and maintained as necessary. The mineral which is stockpiled on Cooks Hole and which is extracted from Thornhaugh during cell construction will be processed using mobile processing plant.
Following completion of mineral extraction the void shall be graded to the final levels shown on Figure 4.9 (Rev B) and Figure 4.12. The soils present on site will be respread to depths agreed with the Minerals Planning Authority. <i>[Note the final levels on these plans were changed by subsequent planning permissions]</i>	The proposed integrated restoration profile is presented on Figure ES4.1. Naturally occurring materials (including imported soils and soil forming materials) will be stored prior to placement and stockpiles will be formed and maintained as necessary. The soils which are currently stockpiled on site will be placed following the placement of the imported naturally occurring materials.

Currently approved development at Cooks Hole	Proposed changes at the sites
The development shall be carried out in accordance with the details on the mineral processing plant in Volume 4 of the Environmental Statement	The mineral which is stockpiled on Cooks Hole and which is extracted from Thornhaugh during cell construction will be processed using mobile processing plant.
The development shall be completed by 21 February 2042	No change is proposed to the end date. It is proposed that 21 February 2042 is the end date for all operations and the completion of restoration at the sites.
Approved schemes under planning permission references 13/01372/WCMM and 13/01374/WCMM	
Dust scheme set out in Appendix B of the application supporting statement dated 29 September 2010	The operational controls for the management of dust are presented at Table ES14.3. The control and monitoring of emissions of particulates including dust at Thornhaugh will be regulated through the Environmental Permit.
The development hereby approved shall be carried out in complete accordance with the Ecological Management Plan Revision 3 (dated 13 November 2012)	Details of the habitats that will be created are presented in the Biodiversity Net Gain Plan which is presented at Appendix ES6.1.
	The details of the management and monitoring of the habitats and species will be provided in a habitat management and monitoring scheme which will be submitted under an appropriately worded planning condition.
	The scheme will cover Cooks Hole and Thornhaugh and reflect the changes as a result of the proposed development.

Currently approved development at Cooks Hole	Proposed changes at the sites
The development hereby approved shall be carried out in complete accordance with the scheme for the management of surface water and ground (dated July 2011) in Volume 4 of the updated Environmental Statement (dated October 2021) based upon the mitigation measures proposed in the Hydrogeological and Hydrological Impact assessment included at Volume 3 Appendix F of the Environmental Statement.	The drainage and surface water management strategy for the proposed development is presented at Appendix ES4.1. The strategy is for the operation and the restored sites at Cooks Hole and Thornhaugh.
Scheme for tree and hedge protection measures in the Environmental Statement Volume 4 dated October 2012 (drawing re D130030-TPM-01 Rev B dated 09/08/2011)	An arboricultural assessment has been undertaken and is presented at Annex 2 of Appendix ES8.1. The measures specified in the assessment are set out in the tree protection scheme presented at Appendix ES4.3 and will be implemented during the proposed development.
The development shall be carried out in complete accordance with the Written Scheme of Investigation for Archaeological Works (dated August 2011) in the Environmental Statement Volume 4 dated October 2012.	All the viable mineral has now been extracted from the site. The proposed development will not result in any direct impacts on below ground archaeology. A Written Scheme of Investigation is not necessary for the proposed development.
The development shall be carried out in accordance with the Landscaping and Aftercare Scheme (dated November 2011 and accompanying drawing ref Figure 1 Restoration Masterplan for Aftercare Schedules in the Environmental Statement Volume 4 (dated October 2012)	The Habitat Management and Monitoring Plan will be submitted under an appropriately worded planning condition to reflect the changes as a result of the proposed development. The integrated scheme will cover both Cooks Hole and Thornhaugh and will include landscaping management.
The development hereby approved shall be carried out in complete accordance with the landscape scheme for the treatment of frontage of the site with the A47, drawing ref D130030-PL-A47-01(dated 09/08/2011) in the Environmental Statement Volume 4 (dated October 2012)	The frontage planting on the eastern edge of Cooks Hole has been undertaken and is fenced. Maintenance of the planting will be included in the habitat management and monitoring scheme.

Currently approved development at Cooks Hole	Proposed changes at the sites
The development shall be carried out in accordance with the scheme for the maintenance of Safety of PROW users in Volume 4 of the Environmental Statement (dated October 2012), the footpath diversion corridors and details drawing ref D130030-fpd-01 (dated 9/08/2011) and alternative access details drawing ref Figure AA3a.	The rights of way will be diverted as necessary as a result of the proposed development. The footpaths at each stage of the development are presented on Figure ES3.3.
Bunds and mounds of soil stored within the site shall be managed in accordance with the details in Appendix K – Adams Land Management Report September 2010. The soil bunds and mounds shall be seeded with the approved native grass mix in accordance with the details contained within the ES Volume 4 Discharge of Conditions 26&27 dated 16/09/2011.	The soils that remain on site will be stored and managed in accordance with the soil handling, storage and management plan presented at Appendix ES4.4.
Planning permission reference 15/00229/MMFUL [North eastern corner of Cooks Hole]	
Hours of operation 0700 to 1700 Monday to Friday 0700 to 1300 Saturdays No operations outside of these hours. Between 0700 and 0800 on Saturday, operations shall be limited to loading vehicles from stockpiles, and associated environmental control and administrative activities.	The operational hours for the sites will be consistent with the current operational hours for Thornhaugh: 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays Except for the operation of maintenance and control equipment including gas, leachate and water management in Thornhaugh and emergency maintenance works.
The development hereby approved shall be carried out in complete accordance with the scheme for the crossing of the Public Right of Way as depicted on Figure TCH6 dated 12/14.	The rights of way will be diverted as necessary as a result of the proposed development. The footpaths at each stage of the development are presented on Figure ES3.3.
The only materials to be accepted on site are mineral wastes and inert wastes imported directly from Thornhaugh I.	The materials that will be used to create the restoration landform at Cooks Hole will comprise clean, excavated naturally occurring

Currently approved development at Cooks Hole	Proposed changes at the sites
	materials from the construction operations at ENRMF and Thornhaugh only.
Any trees, shrubs or hedges forming part of the approved landscaping scheme that die, are removed or become diseased within five years of the implementation of the landscaping scheme shall be replaced during the next available planting season by the developers, or their successors in title with an equivalent size, number and species to those being replaced. Any replacement trees, shrubs or hedgerows dying within five years of planting shall themselves be replaced with an equivalent size, number and species.	No changes proposed. Maintenance of the landscape planting will be included in the proposed habitat management and monitoring scheme.
The development shall be completed no later than 31 December 2034.	The duration of the operation and restoration of the sites will continue to 21 February 2042 consistent with the current completion date for the Cooks Hole site.
Approved schemes under planning permission reference 15/00229/MMFUL	
Any lighting erected on site shall be in accordance with a lighting scheme that shall have been submitted to and approved by the Local Planning Authority.	A lighting scheme has not been submitted for Cooks Hole to date other than for a historical parking area. A lighting scheme for the proposed development is presented at Appendix ES4.2 and covers the operations at Cooks Hole and Thornhaugh.
Dust generated by the development hereby approved shall be controlled in accordance with the scheme at Annexe 3 of the Environmental Statement dated February 2015.	A dust assessment has been undertaken for the proposed development. The operational controls for dust are presented at Table ES14.3. The control and monitoring of emissions of particulates including dust at Thornhaugh will be regulated through the Environmental Permit.
The development hereby approved shall be carried out in complete accordance with the; Scheme for the management of surface water and groundwater dated July 2011, Extract NCB report, Appendix F: Hydrogeology and Hydrology dated September 2010, Figure F3.2	The drainage and surface water management strategy for the proposed development is presented at Appendix ES4.1. The strategy is

Currently approved development at Cooks Hole	Proposed changes at the sites
	for the operational and the restored sites at Cooks Hole and Thornhaugh.
The development hereby approved shall be carried out in complete accordance with the Ecological Management Plan Revision 3 (Dated 13 November 2012), and the additional mitigation measures as set out in Appendix E of the Environmental statement dated February 2015	Details of the habitats that will be created are presented in the Biodiversity Net Gain Plan which is presented at Appendix ES6.1 The details of the management and monitoring of the habitats and species will be provided in a Habitat Management and Monitoring Scheme which will be submitted under an appropriately worded planning condition. The scheme will cover Cooks Hole and Thornhaugh and reflect the changes as a result of the proposed development.
Prior to commencement of development a detailed landscape and aftercare scheme based on the Proposed Restoration Masterplan, Figure TCH7 dated 12/14 shall be submitted to and approved by the Local Planning Authority. Thereafter, the development shall be carried out in complete accordance with the approved scheme. <i>[On 23 July 2018 the Landscaping and Aftercare Scheme dated November 2011 was approved for this condition]</i>	Details of the landscaping and aftercare for the habitats proposed as part of the development will be set out in a Habitat Management and Monitoring Plan submitted under an appropriately worded planning condition.
Planning permission reference 15/01708/NONMAT	
No vehicular access to the Public Highway shall be used in connection with the development hereby approved other than: the existing track linking Cook's Hole Farm to the A47, and the link to the entrance serving Thornhaugh I Quarry permitted through planning permission number 10/01442/MMFUL, or via Access route B as shown on drawing number C28/15/201 dated 07/10/2015.	There are no changes proposed to the access arrangements. The track from the A47 to Cooks Hole Farmhouse will be retained for aftercare and afteruse purposes. A small car park will be constructed adjacent to the access from the A47 for Cooks Hole.

Currently approved development at Cooks Hole	Proposed changes at the sites
The existing track linking Cook's Hole Farm to the A47 shall be used in connection with agricultural, after-care and/or after-use purposes only.	
Planning permission references 20/00977/NONMAT and 20/00978/NONMAT	
Following the completion of mineral extraction within each phase shown on Figure 1.8 (in the Environmental Statement Volume 1 dated October 2012) the resultant void shall be graded to achieve the final levels shown on "Proposed Revised Restoration Contours", drawing number C28/8/20/207, Rev E, dated 07/09/20, with the exception of the area subject of planning permission 15/00229/MMFUL, and the processing area (drawing ref. C28/15/201 dated 07.10.2015) which shall be graded to achieve the final levels shown on "Proposed Revised Restoration Contours" The soils present on site will be respread to depths agreed with the Minerals Planning Authority.	The proposed integrated restoration profile is presented on Figure ES4.1. Naturally occurring materials (including imported soils and soil forming materials) will be stored prior to placement and stockpiles will be formed and maintained as necessary. The soils which are currently stockpiled on site will be placed following the grading of the imported naturally occurring materials.

Currently approved development at Thornhaugh	Proposed changes at the sites
Planning permission reference 12/00463/MMFUL	
The development shall only be carried out in accordance with the approved phasing plan. Each phase shall be restored within one year of the landfill operations within that phase being completed.	The phasing of the landfilling, capping and restoration will be undertaken as shown on Figure ES 4.2 The phasing of the proposed development is shown on Figure ES4.2. The phases will be capped as soon as practicable following the completion of the landfilling operations. The restoration will be undertaken as soon as possible following capping.
Topsoil and subsoil shall be stripped and stored in separate mounds. No topsoil or subsoil shall be removed from the site. The material stored in the temporary stockpile in Cooks Hole shall be used to achieve the restoration of the remainder of the site.	Naturally occurring materials (including imported soils and soil forming materials) will be stored prior to placement and stockpiles will be formed and maintained as necessary. All soils stored on site will be used in restoration of the site.
Site access from the A47	No changes proposed. All vehicles associated with the operational and restoration phases of the development will use the existing access from the A47.
Wheel cleaning facilities shall be retained on site in a location adjacent to the hard surfaced access into the site.	No changes are proposed, wheel cleaning facilities shall continue to be retained on site in a location adjacent to the hard surfaced access into the site. The wheel wash will be relocated as necessary in response to the phases of the development.
Adequate space for parking, turning, loading, unloading of all vehicles associated with that phase of operation, restoration or recycling	No changes proposed.

Currently approved development at Thornhaugh	Proposed changes at the sites
Hours of operation 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays No operations outside of these hours except for environmental monitoring.	No changes proposed. The operational hours for the sites will be consistent with the current operational hours for Thornhaugh: 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays Except for the operation of maintenance and control equipment including gas, leachate and water management in Thornhaugh and emergency maintenance works.
Only inert construction and demolition waste types shall be processed through the recycling operation	No changes proposed. Mineral and clean construction and demolition waste types extracted during the construction of the landfill cells will be processed on site for use or recovery on site or elsewhere.
The recycling, processing and stockpiling of materials awaiting processing and finished materials for sale will be confined to the area shaded on the approved drawing SES 2.3 but notwithstanding this no stockpiles (both received and processed material) shall be stored below the water table or in areas susceptible to flooding. The stockpiles shall not exceed the pre-settlement levels shown on Figures ES4.2 and ES4.5 by more than 3 metres and each stockpile shall not exceed an overall height of 5 metres.	There will be temporary stockpiling of materials on the sites. The materials that will be stockpiled at the sites include: ● engineering materials, ● naturally occurring excavated materials from ENRMF and Thornhaugh, ● materials extracted from Thornhaugh during the construction of the landfill cells which are awaiting processing and/or recovery or use, ● minerals historically extracted from Cooks Hole awaiting and following processing,

Currently approved development at Thornhaugh	Proposed changes at the sites
	• minerals extracted from Thornhaugh during cell construction and • restoration materials (including imported soils and soil forming materials). The size of the stockpiles will depend on the materials that are being stocked. No stockpiles will exceed the height of the proposed consented restoration contours.
The footpaths shall be reinstated and provided in complete accordance with the details shown on drawing ES 4.1 within 6 months of the final phase of the development being landscaped and shall be retained as such thereafter.	The footpaths will be reinstated within 6 months of the final phase of the restored development being landscaped. The footpaths are shown on Figure ES3.3
The landfill of the site shall be completed by 31st December 2028 and restoration of the site shall be completed no later than 31st December 2029.	The end date of the landfilling operations and the restoration of the sites will be consistent with the currently consented timescales for Cooks Hole. All site operations and restoration shall be completed by 21 February 2042.
Unless required for continued environmental monitoring purposes, all buildings, plant and machinery and hardstanding ("the site infrastructure") shall be permanently removed from the site within 6 months of the final landscaping taking place	No changes are proposed.
Planning permission reference 20/01680/WCMM	
The footpaths shall be reinstated and provided in complete accordance with the details shown on drawing TLS 6, Rev A, dated 29/03/2017, within 6 months of the final phase of the development being landscaped and shall be retained as such thereafter.	The footpaths will be reinstated within 6 months of the final phase of development being landscaped. The footpaths are shown on Figure ES3.3
Phased development, filling, capping and restoration of the landfill areas as shown on phasing scheme drawings in the 2020 application (drawing references AU/TH/09-20/21960 to AU/TH/09-20/21970)	The phasing of the landfilling and restoration activities will be undertaken as shown on Figure ES 4.2.

Currently approved development at Thornhaugh	Proposed changes at the sites
	The order of capping and restoration of the landfill areas are shown on Figure ES4.2
Each phase shall be restored within one year of the landfill operations within that phase being completed	The phasing of the proposed development is shown on Figure ES4.2. The phases will be capped as soon as practicable following the completion of the landfilling operations. The restoration will be undertaken as soon as practicable following capping once the restoration profile has been achieved for each area. The phasing of the operations will be reviewed every 2 years and an update will be provided to Peterborough City Council on the progress of the operations and the expected operations in the following 2 years.
Site access from the A47	No changes proposed. All vehicles associated with the operational and restoration phase of the development will continue to use the existing access from the A47.
Wheel cleaning facilities shall be retained on site in a location adjacent to the hard surfaced access into the site.	No changes are proposed, wheel cleaning facilities shall continue to be retained on site in a location adjacent to the hard surfaced access into the site. The wheel wash will be relocated as necessary in response to the phases of the development.
Adequate space for parking, turning, loading, unloading of all vehicles associated with that phase of operation, restoration or recycling	No changes proposed.
Hours of operation 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays	No changes proposed.

Currently approved development at Thornhaugh	Proposed changes at the sites
No operations outside of these hours except for emergency maintenance	The operational hours for the sites will be consistent with the current operational hours for Thornhaugh: 0700 to 1800 Monday to Friday 0700 to 1300 Saturdays Except for the operation of maintenance and control equipment including gas, leachate and water management in Thornhaugh and emergency maintenance works.
Only inert construction and demolition waste types shall be processed through the recycling operation	No changes proposed. Only mineral and clean construction and demolition waste types will be processed on site for use or recovery on site or elsewhere.
The recycling, processing and stockpiling of materials awaiting processing and finished materials for sale will be confined to the area shaded on the approved drawing SES 2.3 but notwithstanding this no stockpiles (both received and processed material) shall be stored below the water table or in areas susceptible to flooding. The stockpiles shall not exceed the pre-settlement levels shown on Figure TLS5 by more than 3 metres and each stockpile shall not exceed an overall height of 5 metres.	There will be temporary stockpiling of materials on the sites. The materials that will be stockpiled at the sites include: ● engineering materials, ● naturally occurring excavated materials from ENRMF and Thornhaugh, ● materials extracted from Thornhaugh during the construction of the landfill cells which are awaiting processing and/or recovery or use, ● minerals historically extracted from Cooks Hole awaiting and following processing, minerals extracted from Thornhaugh during cell construction and

Currently approved development at Thornhaugh	Proposed changes at the sites
	restoration materials (including imported soils and soil forming materials). The size of the stockpiles will depend on the materials that are being stocked. No stockpiles will exceed the height of the proposed consented restoration contours.
The temporary storage of Hi-pod containers in a concrete surfaced central area of the site.	No change proposed. The storage area may be relocated as necessary in response to the phases of the development.
The approved date for cessation of landfilling and completion of restoration are 31 December 2034 and 31 December 2035 respectively.	The end date of the landfilling operations and the restoration of the sites will be extended to be consistent with the currently consented timescales for Cooks Hole All site operations and restoration shall be completed by 21 February 2042
Unless required for continued environmental monitoring purposes, all buildings, plant and machinery and hardstanding ("the site infrastructure") shall be permanently removed from the site within 6 months of the final landscaping taking place	No changes are proposed.
Any trees, shrubs or hedges forming part of the approved landscaping scheme that die, are removed or become diseased within five years of the implementation of the landscaping scheme shall be replaced during the next available planting season by the developers, or their successors in title, with an equivalent size, number and species to those being replaced. Any replacement trees, shrubs or hedgerows dying within five years of planting shall themselves be replaced with an equivalent size, number and species.	No changes proposed. Maintenance of the landscape planting will be included in the proposed habitat management and monitoring scheme.
Approved schemes under planning permission reference 20/01680/WCMM	
The development shall be carried out in complete accordance with the Landscaping Scheme as set out on the Phased Restoration Scheme drawing ref. TLS6, Rev A, dated	A Habitat Management and Monitoring Scheme will be submitted under an appropriately worded planning condition to

Currently approved development at Thornhaugh	Proposed changes at the sites
29/03/2017, with each phase to be landscaped within 12 months of restoration being completed.	reflect the proposed development. The integrated scheme will cover both Cooks Hole and Thornhaugh.
The development hereby approved shall be carried out in complete accordance with the details of the Ecological Management Plan dated April 2013, included at Annex 7 of the Environmental Statement dated February 2015.	Details of the habitats that will be created are presented in the Biodiversity Net Gain Plan which is presented at Appendix ES6.1. The details of the management and monitoring of the habitats and species will be provided in a habitat management and monitoring scheme which will be submitted under an appropriately worded planning condition. The scheme will cover Cooks Hole and Thornhaugh and reflect the changes as a result of the proposed development.
The approved scheme for external lighting (17/007/26/WCMM Lighting Scheme dated March 2017 included at Appendix D of the Environmental Statement dated March 2017.)	A lighting scheme for the proposed development is presented at Appendix ES4.2. The lighting scheme has been updated to reflect the changes as a result of the proposed development and includes details on the mobile lighting used at the sites.
The development hereby approved shall be carried out in complete accordance with the mitigation measures outlined in Section 7 of the Environmental Statement dated February 2015 and the Dust and Odour Control Scheme dated April 2013 included at Annex 3 of the Environmental Statement dated February 2015.	A dust assessment has been undertaken for the proposed development. The operational controls for dust are presented at Table ES14.3. The control and monitoring of emissions of particulates including dust at Thornhaugh will

Currently approved development at Thornhaugh	Proposed changes at the sites
	be regulated through the Environmental Permit. The control and monitoring of emissions of odour at Thornhaugh will be regulated through the Environmental Permit.
The development hereby approved shall be carried out in complete accordance with the Flood Risk Assessment (FRA) (MJCA, ref AU/TH/JRC/2826/01 FRA, dated December 2014) included at Appendix G of the Environmental Statement dated February 2015.	A Flood Risk Assessment for the proposed development has been undertaken and is presented at Section 11. The drainage and surface water management strategy for the proposed development is presented at Appendix ES4.1.
The development hereby approved shall be carried out in complete accordance with the Aftercare / Ecological Management Plan dated February 2014 included at Annex 5 of the Environmental Statement.	Details of the habitats that will be created are presented in the Biodiversity Net Gain Plan which is presented at Appendix ES6.1. The details of the management and monitoring of the habitats and species will be provided in a Habitat Management and Monitoring Scheme which will be submitted under an appropriately worded planning condition. The scheme will cover Cooks Hole and Thornhaugh and reflect the changes as a result of the proposed development.

Currently approved development at Thornhaugh	Proposed changes at the sites
The development hereby approved shall be carried out in complete accordance with the Noise Monitoring Scheme dated April 2013 as set out at Annexe 6 of the Environmental Statement.	An updated version of the noise monitoring scheme for the sites is presented at Appendix ES4.5. The noise limits remain the same as those previously permitted for the operations at Cooks Hole and Thornhaugh.
Permitted activities not explicitly referred to in planning conditions for Thornhaugh	Proposed changes at the sites
The excavation of waste from Phases 1 and 2 for disposal in engineered containment landfill cells and the use of excavated minerals and other suitable materials either in the landfill or for export from the site	There are no changes proposed to the currently consented excavation of waste from Phases 1 and 2 and for the disposal of contaminated waste in engineered containment landfill cells at Thornhaugh. The excavation works are consented and will be regulated through the Environmental Permit.
Landfill cell engineering containment measures for Phases 1, 2, 4 and 7	Engineering containment measures will continue to be constructed as specified in the Environmental Permit for all continuing and remaining landfill areas.
The access road to Cooks Hole Quarry will be diverted through Phase 2 East and Phase 4C East prior to extraction work commencing in Phase 1 East with no need for it to be returned to the original alignment	There is a need to provide continued access to Cooks Hole when operations commence in Phase 1 East of Thornhaugh. Access will be provided over the other landfill areas as necessary.
The permitted waste types which can be accepted comprise non hazardous waste, stable non-reactive hazardous waste, asbestos, gypsum and other high sulphate bearing wastes	There are no changes proposed to the waste types that can be accepted at Thornhaugh. The waste types which can be accepted at the site are specified in the Environmental Permit.
A non hazardous waste and stable non reactive hazardous waste input rate of 75,000tpa	The waste input rate to Thornhaugh has increased. The input rate for non hazardous

Permitted activities not explicitly referred to in planning conditions for Thornhaugh	Proposed changes at the sites
	waste and stable non reactive waste will be up to 120,000 tonnes per annum.
Up to 28,000 tonnes per annum of construction, excavation and demolition waste will be imported to create restoration soils	No change is proposed.
The relocation of the site welfare facilities to near the site offices during the development of Phase 4B	The buildings have been relocated. The buildings will be relocated as necessary in response to the phases of the development.
The relocation of the landfill gas flare from Phase 2 West to a permanent location north of Phase 7A towards the end of development in phase 4C North	The gas flare will be retained on site as required by the Environmental Permit. The permanent location of the gas flare on the restored site will be as shown on Figure ES3.2. During the landfilling and operational period the gas flare may be relocated to temporary position(s) in order to reflect the phased nature of the landfilling and restoration operations.
Periodic use of crushing and processing plant to produce restoration soils and engineering materials	No changes proposed.
Export of recycled materials off site	No changes proposed.
Temporary leachate storage in accordance with the Environmental Permit followed by removal from site by tanker for treatment and disposal	No changes are proposed.

Table ES4.2

Mitigation measures identified in the Environmental Statement for the proposed development

Environmental Statement section	Mitigation measures	Method of securing the mitigation
	Identification and implementation of a Root Protection Area.	The Construction Exclusion Zones (based on the Root Protection Areas) within the sites together with the appropriate protection measures are presented in the Tree Protection Scheme which is presented at Appendix ES4.3. It is anticipated that implementation of the Tree Protection Scheme will be secured through a condition of the planning permission.
	Phased operation and restoration	The site operations and final restoration will be phased as shown on Figure ES4.2. The final restoration will be undertaken as soon as practicable once the restoration profile has been achieved for each area. The phasing of the operations will be reviewed on a bi-annual basis and an update will be provided to Peterborough City Council on the progress of the operations and the expected operations in the following 2 years. The principles of the phased operations are shown on Figure ES4.2.
	Creation of ponds for great crested newts (GCNs)	Twelve GCN ponds will be created as part of the proposed development as shown on Figure ES4.3. The creation of the ponds will be undertaken under the terms of a European Protected Species Licence (EPSL). The management of the GCN ponds and surrounding habitats will be set out in the Habitat Management and Maintenance Plan under the EPSL. It is anticipated that implementation of the Habitat Management and Monitoring Plan will be secured through a condition of the planning permission.
	Habitat manipulation prior to vegetation clearance to protect amphibians, reptiles and birds.	The approach to the manipulation of habitats prior to vegetation clearance to protect amphibians, reptiles and birds will be set out in the Habitat Management and Monitoring Plan. It is anticipated that implementation of the Habitat Management and Monitoring Plan will be secured through a condition of the planning permission.
	The clearance of all vegetation suitable for the use of nesting birds will be undertaken outside of the breeding season. Where this is not possible the area will be searched for active nests by an ecologist in advance of the works. Any active nests will be cordoned off and protected until the young have fledged.	The approach to vegetation clearance to protect nesting birds will be set out in the Habitat Management and Monitoring Plan. It is anticipated that implementation of the Habitat Management and Monitoring Plan will be secured through a condition of the planning permission.
	Trees subject to felling will be subject to a bat roost reassessment	The appropriate protection measures prior to tree felling are set out in the Tree Protection Scheme presented at Appendix ES4.3. It is anticipated that implementation of the Tree Protection Scheme will be secured through a condition of the planning permission.
	Erection of bat boxes on suitable trees	The proposals for the erection of bat boxes will be set out in the Habitat Management and Monitoring Plan. It is anticipated that implementation of the Habitat Management and Monitoring Plan will be secured through a condition of the planning permission.
	Temporary lighting will be managed as to avoid unnecessary light spill onto sensitive habitats in accordance with best practice, in particular the CWS/western interface with Bedford Purlieu and the brook/wet woodland corridor.	The lighting at the site will be used in accordance with the Lighting Scheme presented at Appendix ES4.2. It is anticipated that implementation of the lighting scheme will be secured through a condition of the planning permission.
	Control of dust emissions which may affect ecological receptors	The dust controls that are and will continue to be implemented at the sites are presented at Table ES14.3.
9. Cultural heritage	No mitigation is necessary	No mitigation related to the proposed development is necessary. Existing legal requirement and the actions necessary will be carried by Augean following discussions with the Conservation Officer.
10. Landscape and visibility	All soil placement operations will be carried out in accordance with the Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings (2021).	The soil placement following restoration will be undertaken in accordance with the Soil Management Scheme presented at Appendix ES4.4. It is anticipated that implementation of the Soil Management Scheme will be secured through a condition of the planning permission.
	Reinstatement of the dry stone wall along Footpath Thornhaugh No 3 Sections 3 and 4	The dry stone wall which currently runs adjacent to Footpath Thornhaugh No 3 Sections 3 and 4 will be reinstated following restoration as shown on Figure ES4.3. The exact location will be agreed.

Environmental Statement section	Mitigation measures	Method of securing the mitigation
	The proposed restoration plan will result in significant biodiversity net gain which benefits landscape features and character	The Restoration Plan is presented at Figure ES4.3. Maintenance of the landscape planting will be set out in the proposed Habitat Management and Monitoring Plan. The Biodiversity Net Gain Plan is presented at Appendix ES6.1. The management and monitoring of the habitats will be included in the Habitat Management and Monitoring Plan. It is anticipated that implementation of the Restoration Plan and the Habitat Management and Monitoring Plan will be secured through conditions of the planning permission.
11. Flood risk assessment and surface water drainage	Operational and post restoration surface water management	The operational surface water management for Cooks Hole and the post restoration surface water management for the sites is set out in the Surface Water Management Scheme presented at Appendix ES4.1. The operational surface water management for Thornhaugh will continue to be undertaken in accordance with the Environmental Permit. It is anticipated that implementation of the Surface Water Management Scheme will be secured through a condition of the planning permission.
	Monitoring and maintenance scheme in respect of the detention basins, pipes, flow restriction devices and drainage channels is set out within the surface water management plan.	The monitoring and maintenance proposals are set out in the Surface Water Management Scheme presented at Appendix ES4.1. It is anticipated that implementation of the Surface Water Management Scheme will be secured through a condition of the planning permission.
12. Traffic and transport	No mitigation is necessary	
13. Noise	Noise limits for operations	The Noise Monitoring Scheme for the proposed development is presented at Appendix ES4.5. It is anticipated that noise limits for site operations and the implementation of the Noise Monitoring Scheme will be secured through conditions of the planning permission.
14. Amenity	Measures will be continued to be implemented to minimise the impacts of dust and mud on the road.	Control measures to minimise the generation of dust and mud on the road are presented at Table ES14.3. These control measures will continue to be implemented as standard practice for all site operations.
	Dust control measures	
	Lighting control measures	A Lighting Scheme for the proposed development is presented at Appendix ES14.2. It is anticipated that the implementation of the Lighting Scheme will be secured through conditions of the planning permission.

Table ES5.1

Status of the rights of way and permissive paths which currently cross Cooks Hole and Thornhaugh

Rights of Way (shown on Figure ES3.3)

Footpath reference	Current status	Start date of status Current end date of status	Changes as a result of the proposed development
FP Th No 3 Sect 3	Open	Not applicable	It will be necessary for the footpath to be temporarily diverted during the operations in the northern part of Cooks Hole. The footpath will be diverted along the permissive path to the south of Thornhaugh Brook. The footpath will be reinstated on its current route on completion of the operations at the sites.
FP Th No 3 Sect 4	Open	Not applicable	It will be necessary for the footpath to be temporarily diverted during the operations in the northern part of Cooks Hole. The footpath will be diverted along the permissive path to the south of Thornhaugh Brook. The footpath will be reinstated on its current route on completion of the operations at the site.
FP Th No 2	Diverted along the southern boundary of Thornhaugh on the route of FP Th No 3 Sect 4.	1995 Unknown	No change proposed. The original route will be reinstated on restoration of the site.
FP Th No 2 Sect 2	Stopped up.	12 January 2012 21 February 2042	No change proposed. The original route will be reinstated on restoration of the site.

Footpath reference	Current status	Start date of status Current end date of status	Changes as a result of the proposed development
FP Th No 4 Sect 1	Diverted. Currently diverted along the southern and eastern boundary of Cooks Hole as shown on Figure ES3.3.	November 2011 21 February 2042	No change proposed. The original route will be reinstated on restoration of the site.

Permissive paths (shown on Figure ES3.3)

Footpath reference	Current status	Current end date of status	Changes as a result of the proposed development
Permissive footpath on the restored part of Thornhaugh	Open	Not applicable.	No change. The permissive path will remain in place.

Table ES11.1

Capacities of the surface water detention basins as part of the proposed surface water management system at the site following restoration

Attenuation basin number	Catchment area (ha)	Storage capacity of basin (m ³)	Greenfield discharge rate (m ³ /day)	Maximum storage volume required (m ³)
1	19.938	8523	1543	6020
2	9.023	6256	698	2725
3	4.355	2576	337	1314.966
4	0.945	5040	73	285.226
5	5.558	2202	430	1678.015
6	3.473	1363	269	1048.672
7	6.973	2287	539	2105.741
Total	50.265	28248	3890	15177.555

Table ES13.1

Compliance noise monitoring results

Location No.	Description	dB LAeq,1h		Dominant noise source
		Measured	Criterion in the planning permissions	
1	Home Farm House	72	55	Regular vehicle movements along the A47.
2	Leedsgate Farm	56	50	Traffic movements on Kings Cliffe Road and Kings Cliffe industrial estate.
3	Nightingale Farm	57	50	Traffic movements on Kings Cliffe Road
4	Sibberton Lodge	69	51	Regular vehicle movements along the A47.
5	Oaks Wood Cottage	59	55	Regular vehicle movements along the A47.
6	Toll Cottage	55	55	Regular vehicle movements along the A47.

Table ES13.2

Assessment of noise associated with short term operations

Location	Predicted worst case site noise level dB LAeq,1h (free-field)	Criterion in the planning permissions dB LAeq,1h (free-field)
Home Farm House	54	70
Leedsgate Farm	43	70
Nightingale Farm	49	70
Sibberton Lodge	46	70
Oaks Wood Cottage	51	70
Toll Cottage	55	70

Table ES13.3

Assessment of noise associated with normal operations

		Criterion in the planning permissions dB LAeq,1h (free- field)	Predicted worst case site noise level dB LAeq,1h	Difference between site noise and noise limit
Home Farm House	Mon-Fri	55	49	-6
	Saturday	55	49	-6
Leedsgate Farm	Mon-Fri	50	39	-11
	Saturday	50	39	-11
Nightingale Farm	Mon-Fri	50	45	-5
	Saturday	46	45	-1
Sibberton Lodge	Mon-Fri	51	43	-8
	Saturday	51	43	-8
Oaks Wood Cottage	Mon-Fri	55	48	-7
	Saturday	55	48	-7
Toll Cottage	Mon-Fri	55	45	-10
	Saturday	55	45	-10

Table ES14.1

Summary of the dry hours wind data for 2000 to 2019 from the Wittering weather station located approximately 2.2km north north west of Cooks Hole and Thornhaugh

Mean wind speed (m/s)	True wind direction (% of the total dry hours)																All observations
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0																	0.975%
0.5 to 2	0.552%	0.381%	0.344%	0.324%	0.467%	0.527%	0.735%	0.701%	0.924%	0.533%	0.527%	0.470%	0.584%	0.382%	0.382%	0.335%	8.168%
2 to 3	1.045%	0.807%	0.677%	0.600%	0.631%	0.679%	0.796%	0.762%	1.190%	0.911%	0.800%	0.871%	1.283%	0.899%	0.755%	0.684%	13.391%
3 to 4	1.405%	1.035%	0.862%	0.759%	0.584%	0.488%	0.560%	0.602%	1.407%	1.202%	1.023%	1.365%	2.476%	1.170%	1.056%	0.902%	16.895%
4 to 5	1.223%	0.997%	0.831%	0.658%	0.434%	0.337%	0.368%	0.458%	1.300%	1.337%	1.134%	1.656%	2.497%	1.138%	1.077%	0.821%	16.264%
5 to 7	1.291%	1.276%	1.213%	0.767%	0.412%	0.359%	0.265%	0.602%	2.153%	2.470%	2.489%	3.398%	3.046%	1.745%	1.179%	0.919%	23.584%
7 to 9	0.321%	0.363%	0.549%	0.269%	0.117%	0.050%	0.048%	0.226%	1.066%	1.771%	1.839%	2.114%	1.673%	0.882%	0.350%	0.278%	11.915%
Equal to or greater than 9	0.063%	0.071%	0.182%	0.115%	0.017%	0.009%	0.002%	0.050%	0.566%	1.353%	1.402%	1.299%	1.274%	0.391%	0.083%	0.061%	6.939%
Missing/Incomplete																	1.868%
All observations	5.901%	4.930%	4.657%	3.491%	2.662%	2.448%	2.774%	3.401%	8.607%	9.577%	9.215%	11.172%	12.833%	6.607%	4.883%	4.000%	100.000%
% year wind between 0.5- 5m/s	4.22%	3.22%	2.71%	2.34%	2.12%	2.03%	2.46%	2.52%	4.82%	3.98%	3.48%	4.36%	6.84%	3.59%	3.27%	2.74%	54.72%
% year wind greater than 5m/s	1.68%	1.71%	1.94%	1.15%	0.55%	0.42%	0.32%	0.88%	3.79%	5.59%	5.73%	6.81%	5.99%	3.02%	1.61%	1.26%	42.44%

Notes: The true wind direction is the direction from which the wind is blowing
The percentage of dry hours with calm wind is 0.98%
There is missing data for 1.87% of the dry hours

Table ES14.2

Summary of potential dust disamenity effects at specific receptors within 400m of the application boundary without operational controls in place

The receptors are shown on Figure ES14.1. The worst case residual source emissions have been assessed for each location where a number of activities could take place at the same location. The residual source emissions have been determined and the assessment has been undertaken in accordance with the IAQM dust guidance (See Appendix ES14.1).

Receptor details and location		Approximate location relative to nearest dust source	Residual source emissions	Frequency of potentially dusty winds	Receptor distance from source	Pathway effectiveness	Dust impact risk	Magnitude of dust effect
HIGH SENSITIVITY RECEPTORS								
R1	Nightingale Farm	335m south of the planning application boundary	Large	Infrequent (1.68%)	Distant	Ineffective	Low risk	Slight adverse effect
R2	Toll Cottage	40m north west of the planning application boundary	Large	Infrequent (0.32%)	Close	Ineffective	Low risk	Slight adverse effect
R3	Home Farm House and five other properties	70m north of the planning application boundary	Large	Infrequent (3.79%)	Close	Ineffective	Low risk	Slight adverse effect
R4	Thornleigh House and Owl Corner	45m north of the planning application boundary	Large	Infrequent (3.79%)	Close	Ineffective	Low risk	Slight adverse effect
R5	The Cottages and surrounding properties	135m north of the application boundary	Large	Infrequent (3.79%)	Intermediate	Ineffective	Low risk	Slight adverse effect
R6	Oaks Wood Cottage	290m north of the planning application boundary	Large	Infrequent (3.79%)	Distant	Ineffective	Low risk	Slight adverse effect
MEDIUM SENSITIVITY RECEPTORS								
R7	Bedford Purlieus (SSSI and NNR)	Adjacent to the west of the planning application boundary	Large	Infrequent (0.55%)	Close	Ineffective	Low risk	Negligible effect
LOW SENSITIVITY RECEPTORS								
R8	Footpath Th No 2 Section 1	Adjacent to the south of the planning application boundary	Large	Infrequent (1.68%)	Close	Ineffective	Low risk	Negligible effect
R9	Footpath Th No 9 Section 1	Adjacent to the south west of the planning application boundary	Large	Infrequent (1.94%)	Close	Ineffective	Low risk	Negligible effect
R10	Footpath Th No 3 Section 2	Adjacent to the west of the planning application boundary	Large	Infrequent (0.55%)	Close	Ineffective	Low risk	Negligible effect
R11	Footpath Th No 2 Section 4	15m to the north of the planning application boundary	Large	Infrequent (3.79%)	Close	Ineffective	Low risk	Negligible effect
R12	Footpath Th No 10 Section 1	160m north of the planning application boundary	Large	Infrequent (3.79%)	Intermediate	Ineffective	Low risk	Negligible effect
R13	Footpath Th No 2 Section 3	15m to the north of the planning application boundary	Large	Infrequent (3.79%)	Close	Ineffective	Low risk	Negligible effect

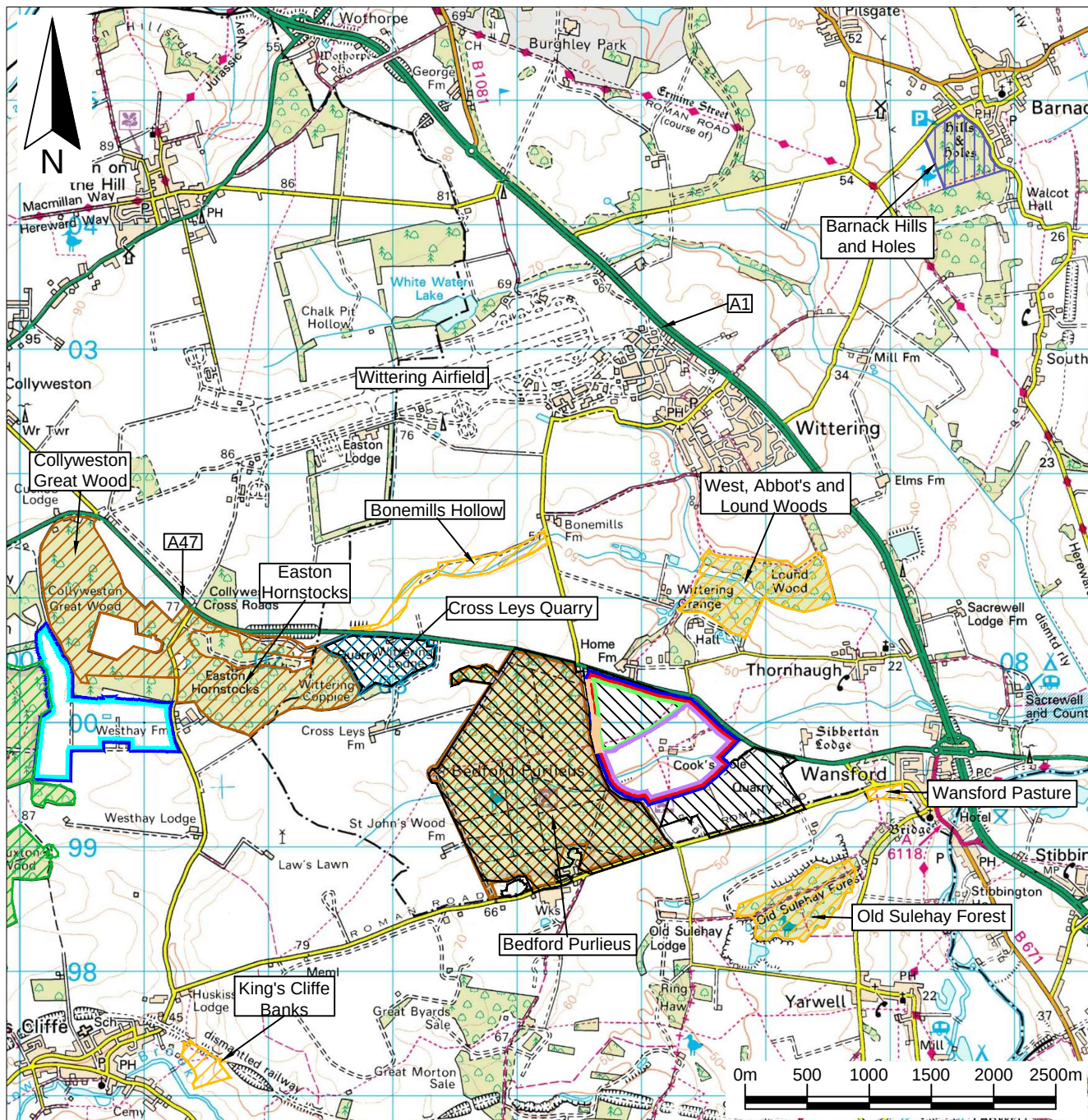
Receptor details and location		Approximate location relative to nearest dust source	Residual source emissions	Frequency of potentially dusty winds	Receptor distance from source	Pathway effectiveness	Dust impact risk	Magnitude of dust effect
R14	Footpath Th No 4 Section 2	25m to the north of the planning application boundary	Large	Infrequent (3.79%)	Close	Ineffective	Low risk	Negligible effect
R15	Footpath Th No 4 Section 1	Adjacent to the south and south east of the planning application boundary	Large	Infrequent (1.68%) Infrequent (1.61%)	Close	Ineffective	Low risk	Negligible effect
R16	Footpath Th No 3 Section 3 This footpath will be diverted during the operations. The diverted route will follow footpaths already included in this table.	Crosses the centre of the sites in a generally west to east direction	Large	Moderately frequent (6.81%) The wind blowing from any direction could affect the footpath which crosses the site so the worst case has been assessed.	Close	Moderately effective	Medium risk	Negligible effect
R17	Footpath Th No 3 Section 4 This footpath will be diverted during the operations. The diverted route will follow footpaths already included in this table.	Crosses the centre of the sites in a generally west to east direction	Large	Moderately frequent (6.81%) The wind blowing from any direction could affect the footpath which crosses the site so the worst case has been assessed.	Close	Moderately effective	Medium risk	Negligible effect
R18	Old Oundle Road	Adjacent to the west of the application boundary	Large	Infrequent (0.55%)	Close	Ineffective	Low risk	Negligible effect
R19	Permissive footpath established on restoration of the area to the south of Thornhaugh Brook	Crosses the centre of the sites in a generally west to east direction	Large	Moderately frequent (6.81%) The wind blowing from any direction could affect the footpath which crosses the site so the worst case has been assessed.	Close	Moderately effective	Medium risk	Negligible effect

Table ES14.3

Dust control measures which will be implemented at Cooks Hole and Thornhaugh

Activity	Controls	Effectiveness of controls
Extraction of mineral and construction of landfill cells	Spray the working area as necessary	High
Mineral and waste processing	The processes will incorporate dampening systems	High
Movement of HGVs, plant and machinery	- Mobile plant will be regularly serviced. - The site haul road is hard-surfaced to the wheelwash area of the sites to reduce the mud and debris which may be carried by vehicles onto the local road network. - Other site haul roads are formed of compacted hardcore or similar material. - The movement of mobile plant and site traffic is restricted to defined haul roads. - Haul roads will be sprayed as necessary. - The hard-surfaced areas of the haul roads will be checked daily and cleaned as necessary. - The hard surfaced haul roads will be swept regularly to clear mud or debris. - The running surface of unsurfaced roads will be maintained to prevent the formation of ruts and potholes. - All vehicles leaving the site following delivery or the collection of materials are inspected visually by site operatives before leaving the site and are obliged to use the wheel wash. - Vehicle exhausts will point above the horizontal. Vehicle speed limits of 10mph will be enforced to minimise the potential for dust generation during vehicle movements. - Careful loading to minimise spillage and drop heights.	High
Soil placement during restoration	- Soils must be handled when dry and friable therefore only limited use can be made of water sprays to dampen the material. - Minimise drop heights for tipping. - Movement of materials within the site will cease during high winds if it could generate dust emissions beyond the application site boundary.	High

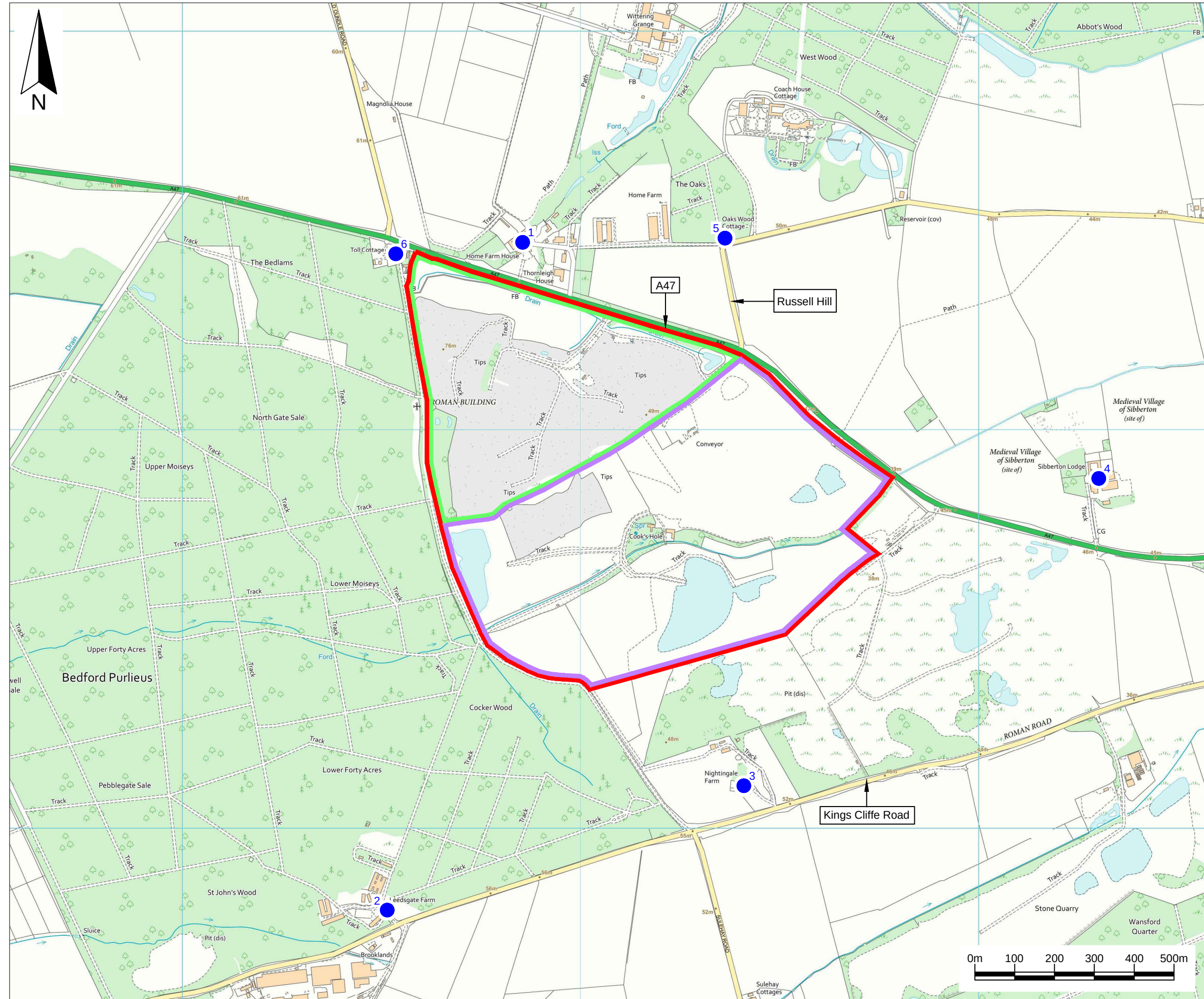
Activity	Controls	Effectiveness of controls
	• Stockpiles which will be in place for a long period will be seeded where necessary to minimise wind blow as soon as conditions permit following formation. • Restored areas will be planted with vegetation as soon as possible after soil placement.	



Key / Notes

	Application boundary		Approximate location of a Site of Special Scientific Interest (SSSI) and a National Nature Reserve (NNR)
	Land in the control of the Applicant		Approximate location of a Regionally Important Geological Site
	Boundary of Cooks Hole Quarry		Approximate location of a Local Geological site
	Boundary of Thornhaugh Landfill Site		Approximate location of a County Wildlife site
	Boundary of East Northants Resource Management Facility		Approximate location of a Brownfield Biodiversity site
	Approximate location of a Site of Special Scientific Interest (SSSI)		Approximate location of a Special Area of Conservation (SAC)
	Approximate location of a Local Wildlife Site		

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date
Site Cooks Hole Quarry and Thornhaugh Landfill Site					
Client 					
Title The site location					
Figure ES 1.1		Scale 1:50,000@A4			
Drawing Ref AU/CH/02-24/24185					
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Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Noise monitoring locations
- 1 Home Farm House
- 2 Leedsgate Farm
- 3 Nightingale Farm
- 4 Sibberton Lodge
- 5 Oaks Wood Cottage
- 6 Toll Cottage

Note:
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cooks Hole Quarry is out of date and does not reflect the current ground conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client

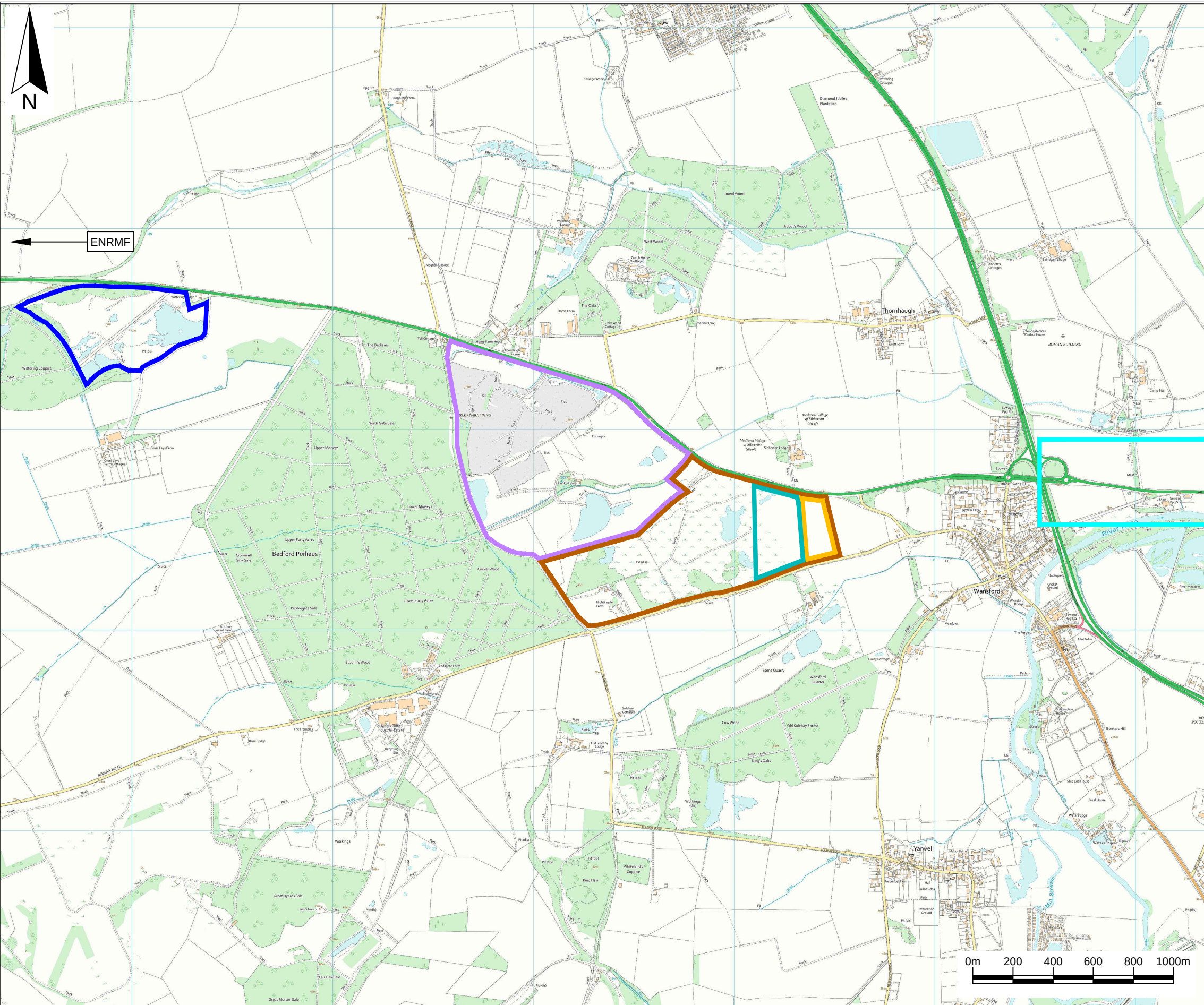
Title
The planning application boundary

Figure ES 1.2
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Drawing Ref
AU/CH/02-24/24186

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Key / Notes

- Cooks Hole Quarry and Thornhaugh Landfill Site
- Thornhaugh II Quarry
- Thornhaugh II Quarry 2013 permission
- Thornhaugh IIB Quarry
- Cross Leys Quarry
- A47 Wansford DCO

Note:
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cooks Hole Quarry is out of date and does not reflect the current ground conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client

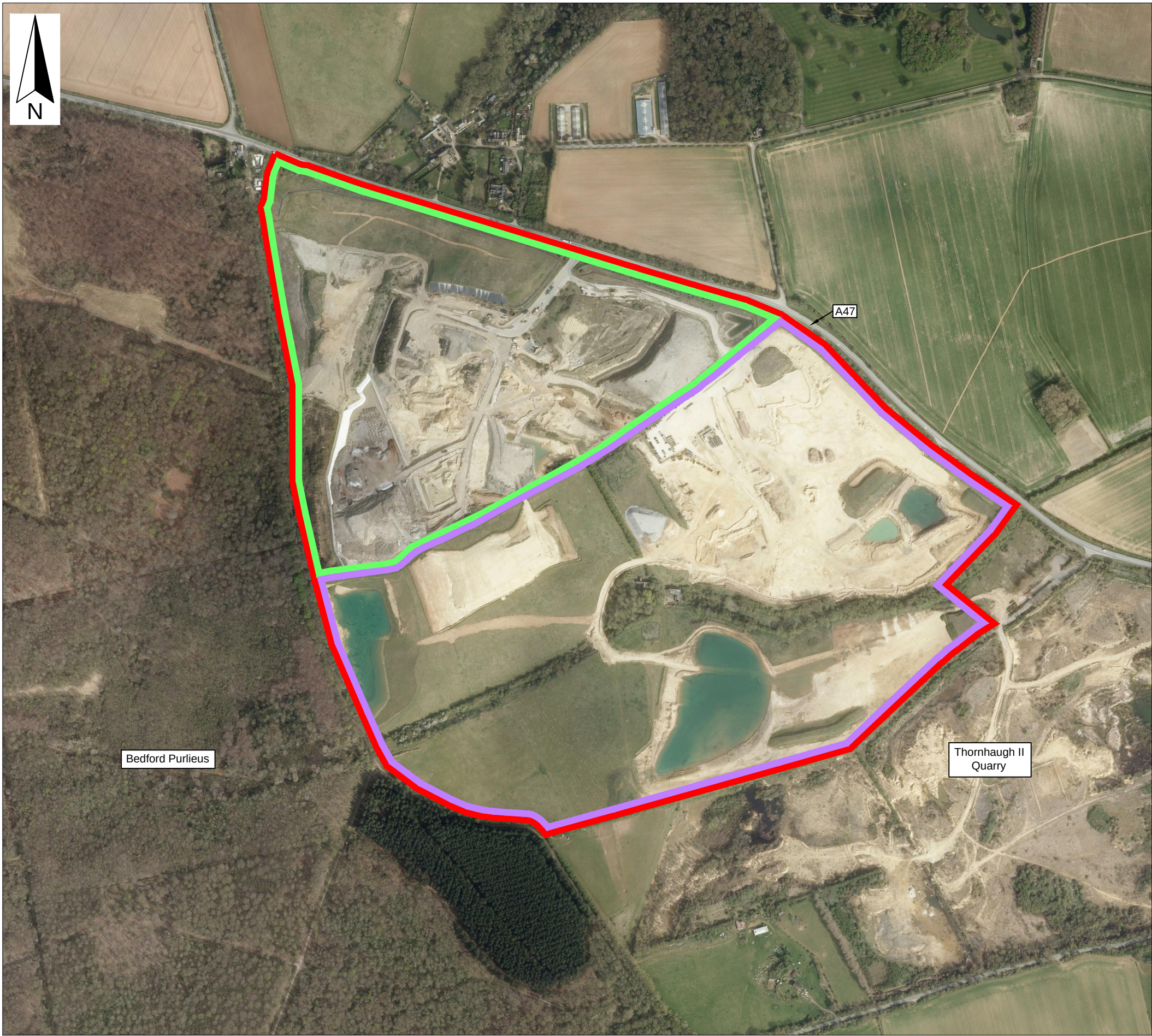
Title
Locations of the developments considered in the cumulative impact assessment

Figure ES 2.1
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Drawing Ref
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Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site
Client

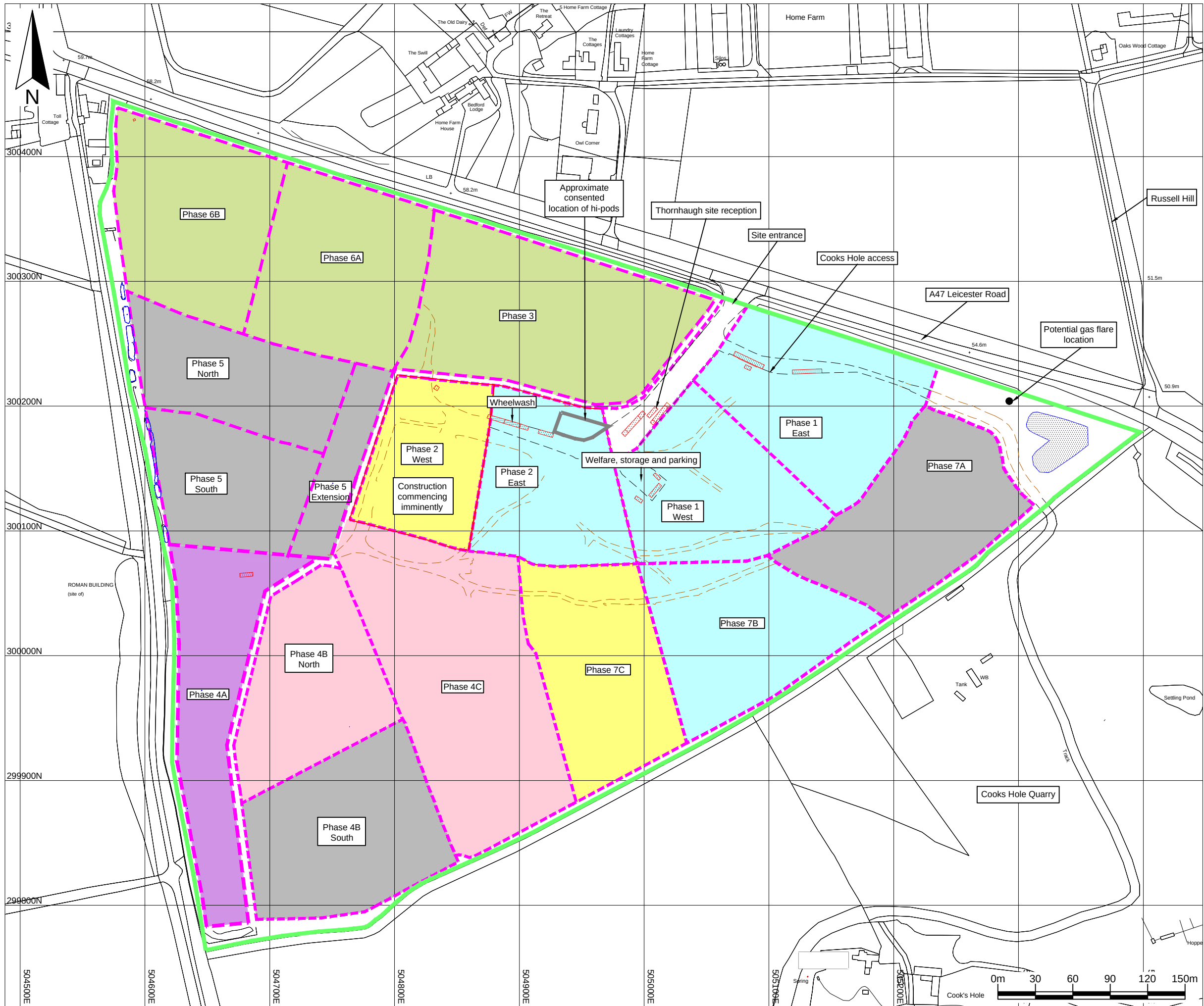


Title
Aerial photograph of the sites taken in 2020

Figure ES 3.1
Scale
NTS

Drawing Ref
AU/CH/02-24/24188

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Key / Notes

- Boundary of Thornhaugh Landfill Site
- Approximate phase boundaries
- Phase 2 East Original name of phase area
- Surfaced section of internal haul road
- Approximate route of haul roads
- Existing building
- Current surface water collection areas
- Unprepared area
- Excavation and preparation for landfilling
- Active landfill area
- Infill complete. To be capped
- Restored
- Nature conservation habitat for great crested newts

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client



Title
The currently consented phases of Thornhaugh Landfill Site

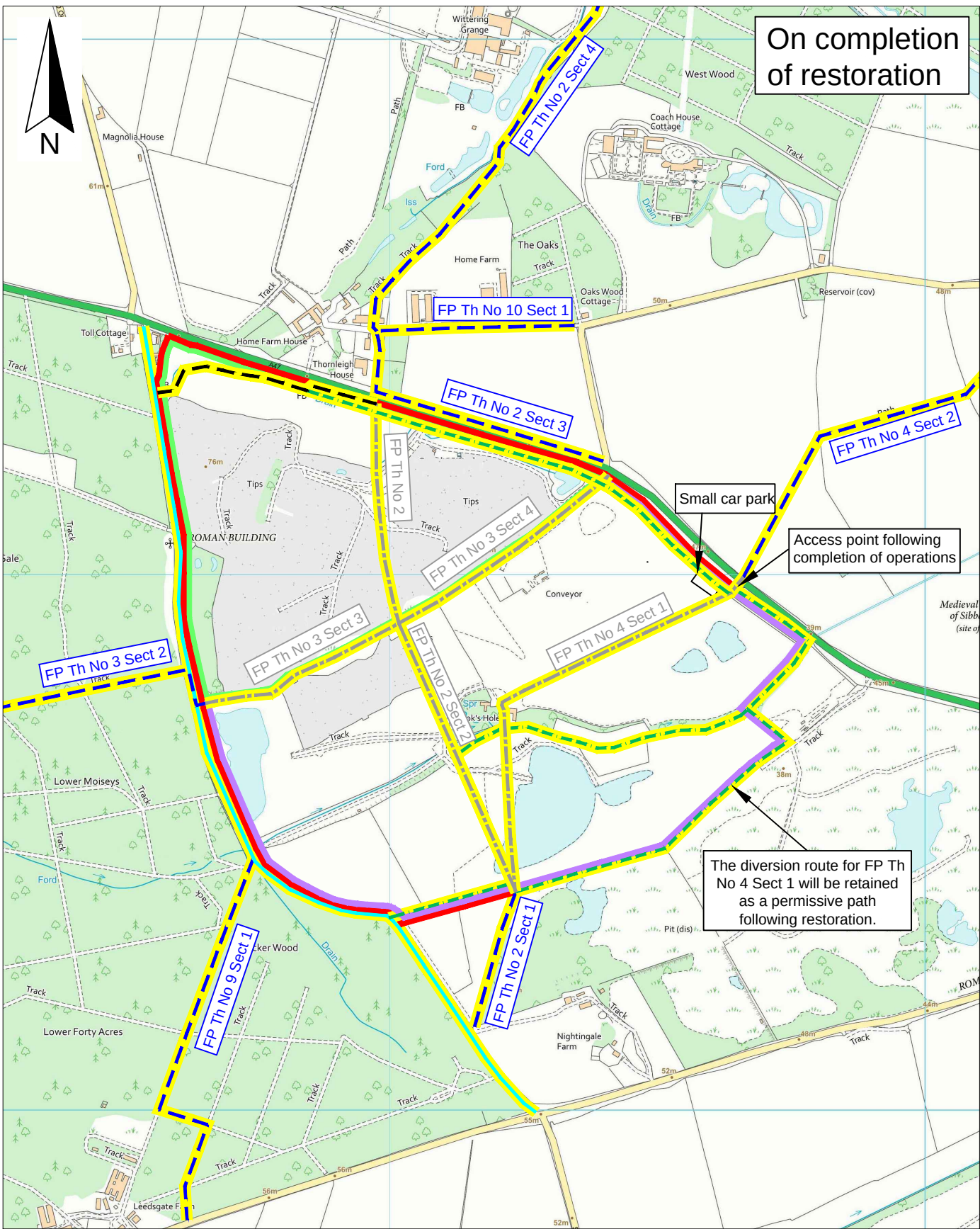
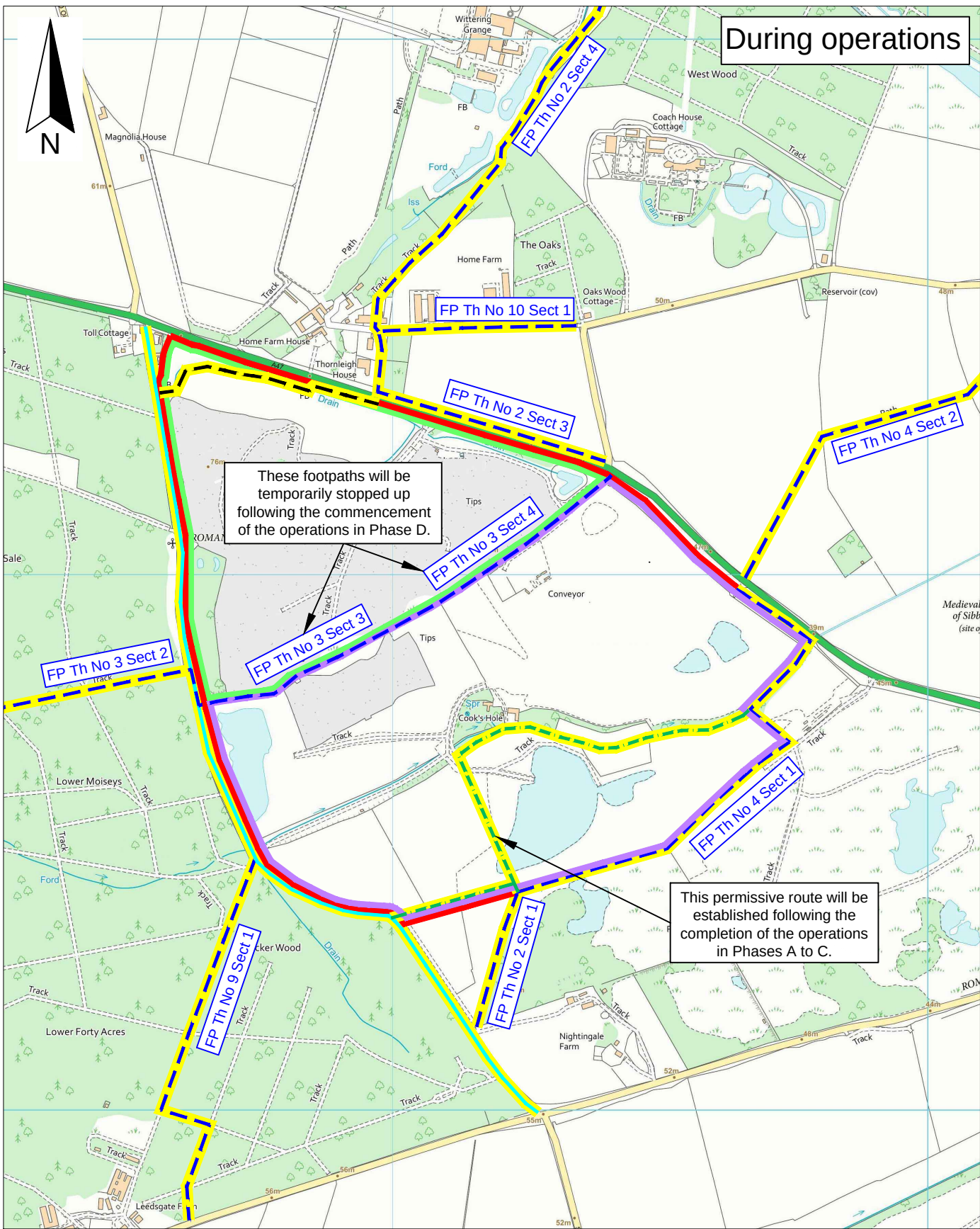
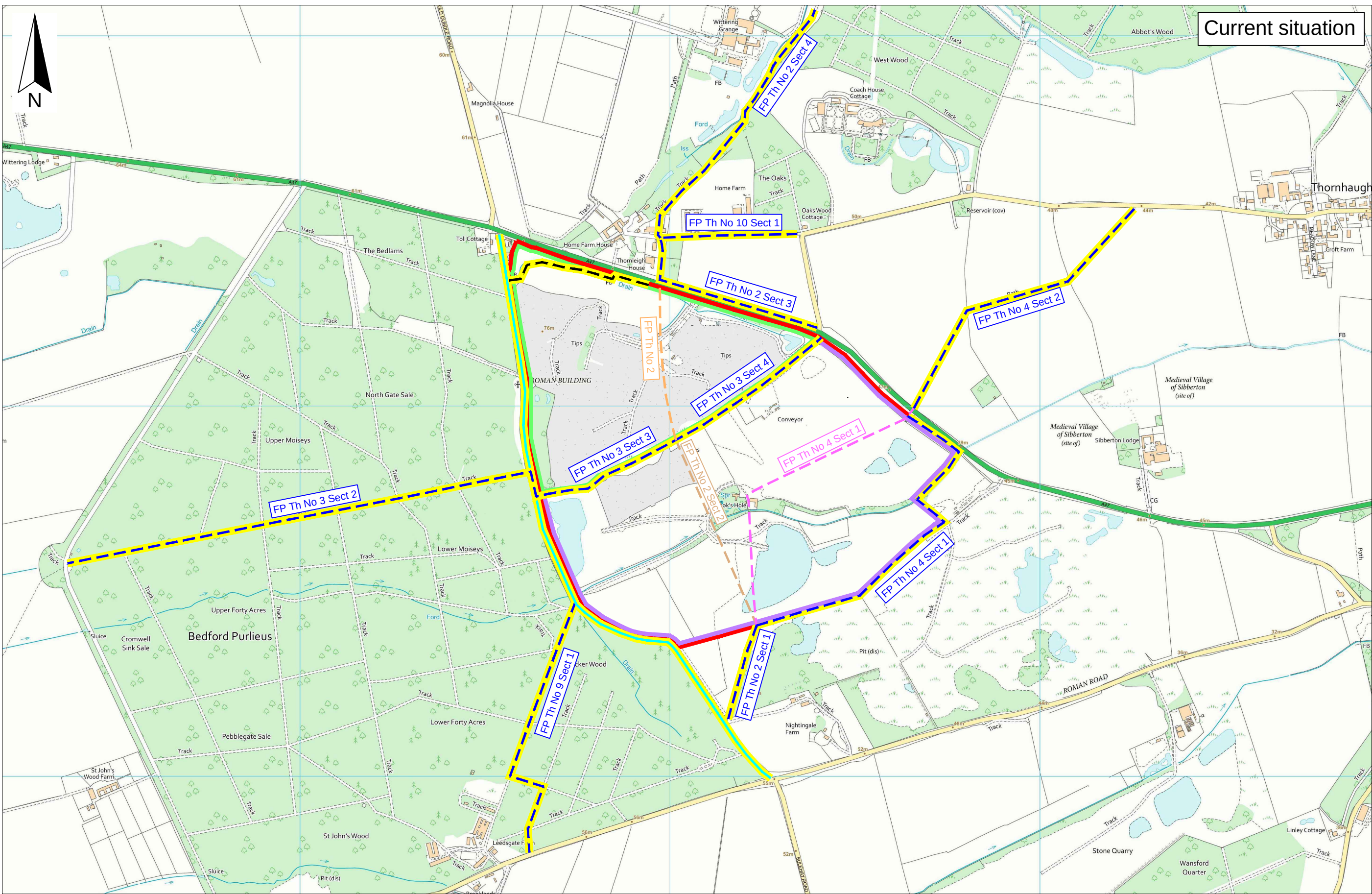
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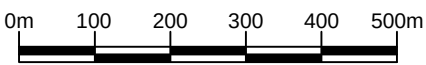
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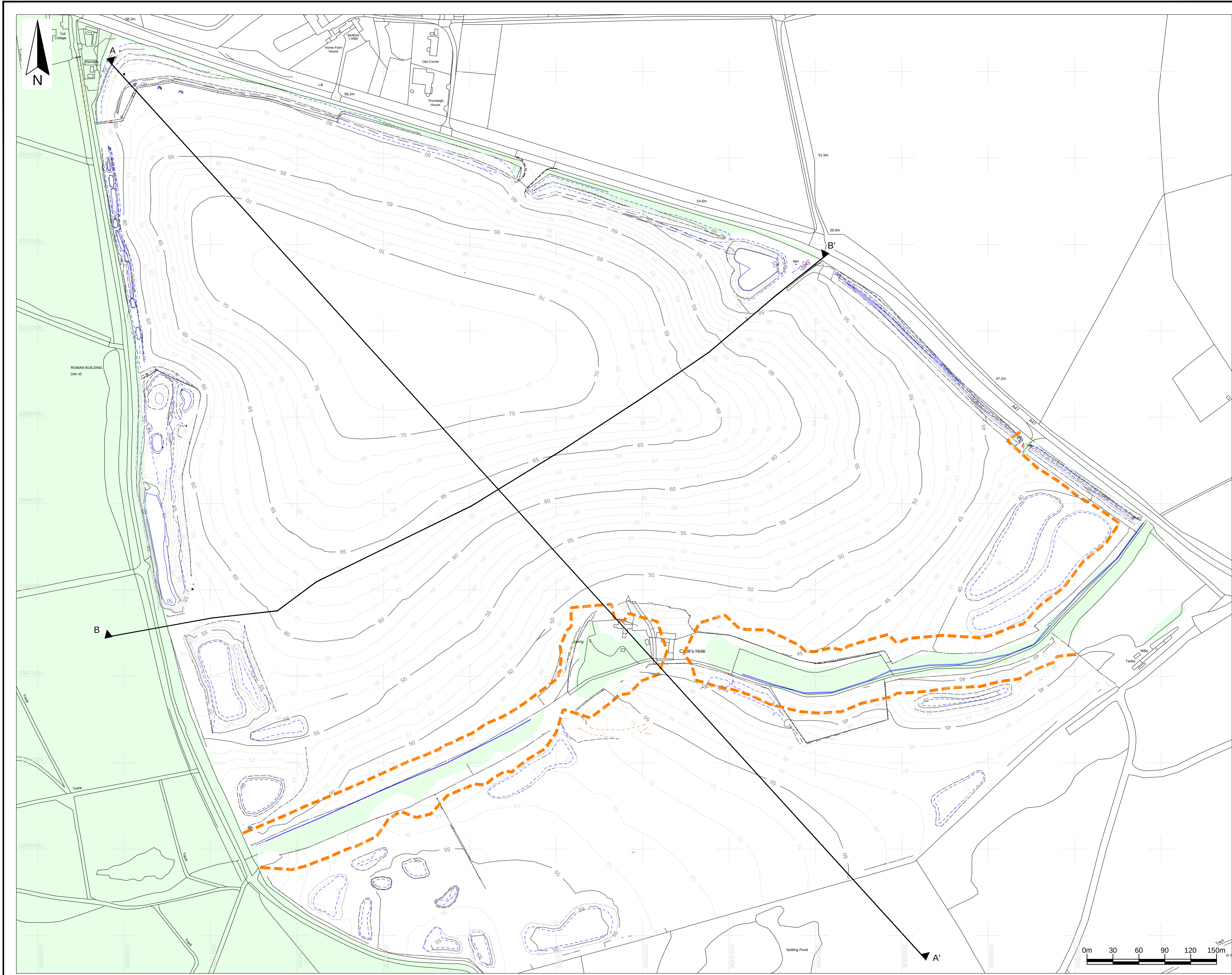
Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Approximate location of existing footpaths in the vicinity of Cooks Hole Quarry/Thornhaugh Landfill Site
- Approximate route of Footpath No 2 to be reinstated on restoration of Thornhaugh Landfill Site
- Old Oundle Road (Public highway. No cars permitted)
- Footpath which is currently diverted
- Footpath which is currently stopped up
- Existing permissive footpath
- Permissive footpaths created as part of the proposed development
- Footpaths which are reinstated following restoration
- The highlighted routes are those accessible during the period shown



Notes:
Existing footpaths taken from the Peterborough City Council Interactive Map.
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cooks Hole Quarry is out of date and does not reflect the current ground conditions.

		Final	KR	SPS	LH
					07/02/24
Rev		Status	Dm	App	Chk
					Date
Site					
Cooks Hole Quarry and Thornhaugh Landfill Site					
Client					
					
Title					
Public rights of way and permissive rights of way at different stages of the development					
Figure ES 3.3			Scale		
			1:10,000@A2		
Drawing Ref					
AU/CH/02-24/24190					
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Key / Notes

- 2 — Contours (mAO)
- - - Change of surface
- - - Top of bank
- - - Bottom of bank
- - - Ditch invert
- - - Verge
- - - Fenceline
- - - Building/Road
- - - Track
- - - Overhead power line
- △ Survey station
- - - 20m standoff from existing vegetation
- Existing vegetation
- Cross section locations (shown on Figure ES 6.1 drawing reference AU/CH/02-24/24193)

This drawing may not include all of the features listed in the above key

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drm	App	Chk	Date

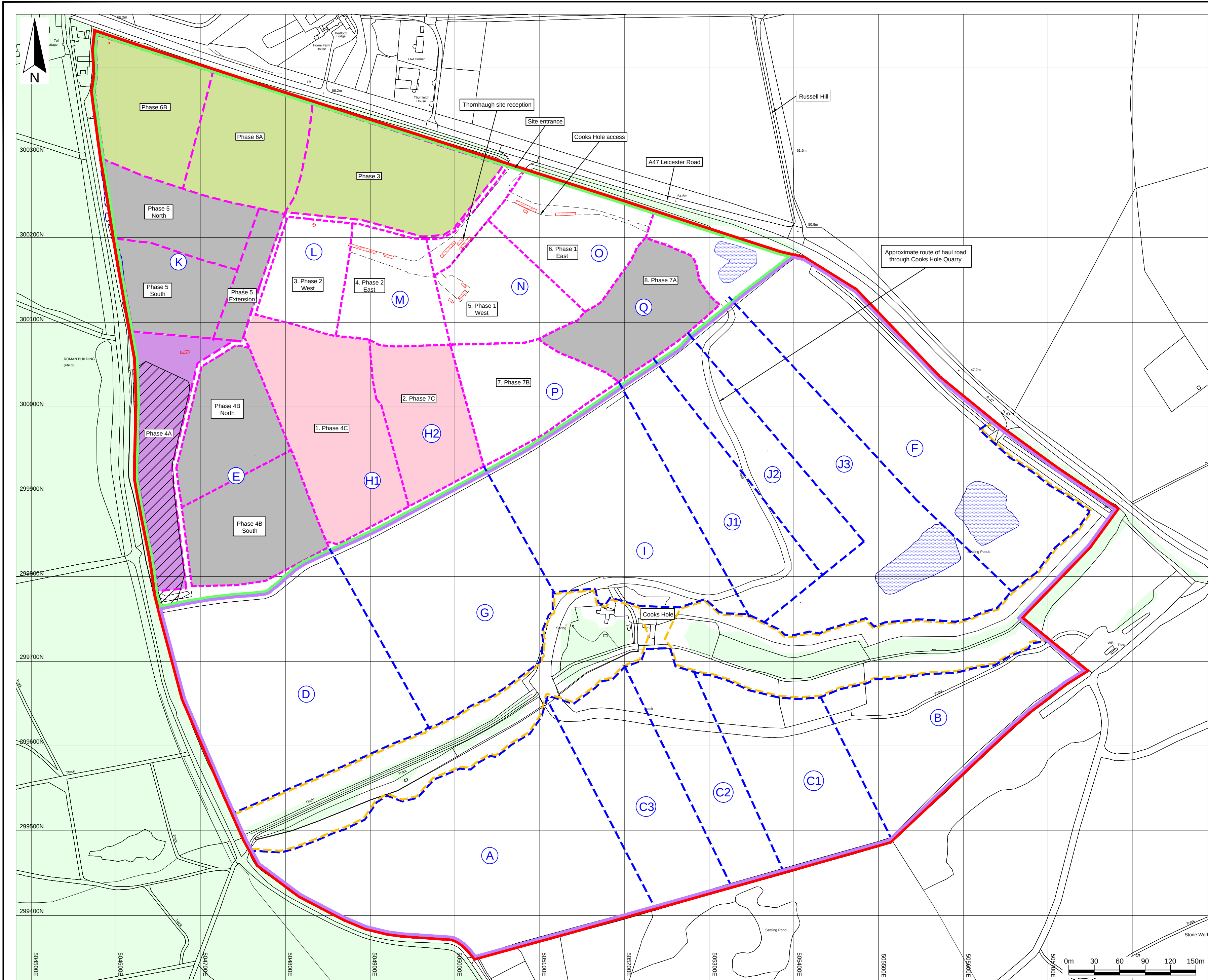
Site
Cooks Hole Quarry and Thornhaugh Landfill Site
Client

Title
The proposed restoration profile

Figure ES 4.1
Scale
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Key / Notes

Application boundary

Boundary of Cooks Hole Quarry

Boundary of Thornhaugh Landfill Site

Thornhaugh Landfill Site approximate phase boundaries

Cooks Hole Quarry approximate phase boundaries

D

Proposed order of phasing for remaining phases in Cooks Hole Quarry and Thornhaugh Landfill Site

Phase 5 North

Original name of phase area

4, Phase 2 East

Original name of phase area with proposed order of phasing for remaining phases in Thornhaugh Landfill Site

Surfaced section of internal haul road

Existing building

Current surface water collection areas

County Wildlife Site

Unprepared area awaiting excavation and engineering

Active landfill area

Current Infill complete. Awaiting capping

Restored

Nature conservation habitat for great crested newts

Existing vegetation

20m offset from existing vegetation

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drm	App	Chk	Date

Site

Cooks Hole Quarry and Thornhaugh Landfill Site

Client

Title

The proposed phasing of the operations at the sites

Figure ES 4.2

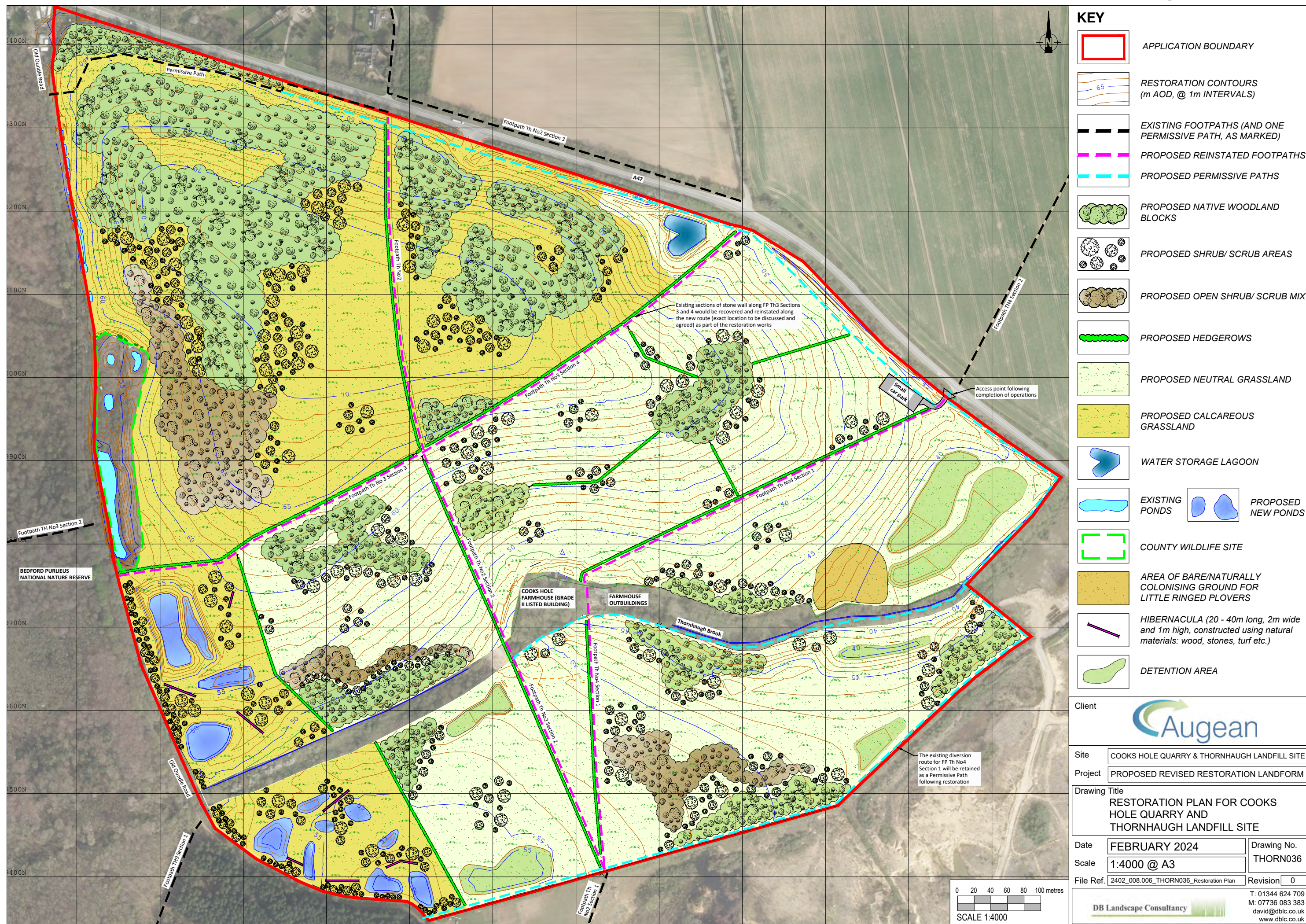
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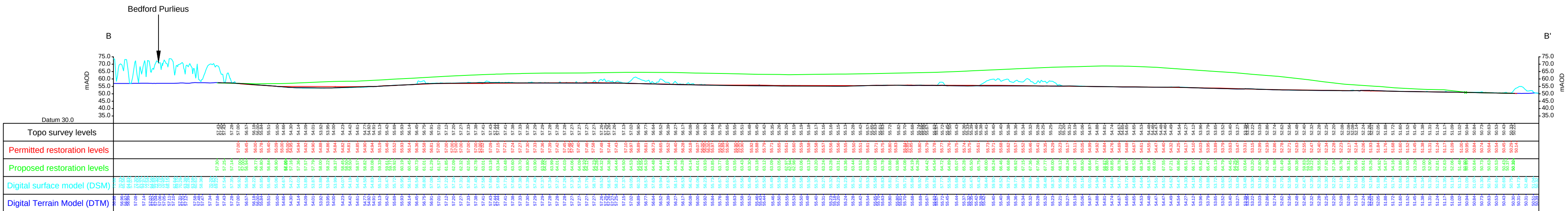
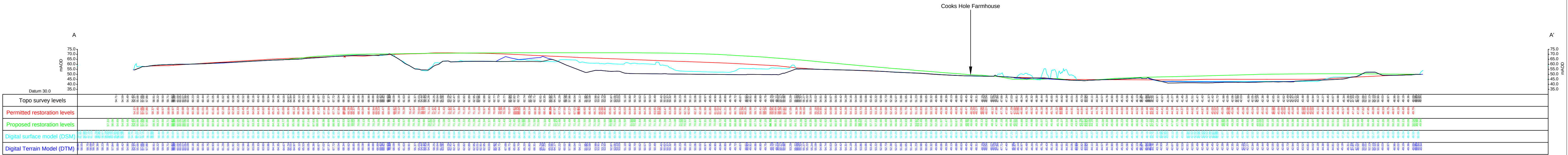
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Figure ES4.3





Key / Notes

Note:
Cross section locations shown on drawing reference
AUC/H02-24/24191

Rev	Status	Drn	App	Chk	Date
	Final	KR	SPS	LH	07/02/24

Site:
Cooks Hole Quarry and Thornhaugh Landfill Site

Client:
Augean

Title:
Cross sections through the existing ground levels and the permitted and proposed restoration contours

Figure ES 6.1

Scale:
1:2,000@A1

Drawing Ref:
AUC/H02-24/24193

MJCA
Technical advisers on environmental issues

Baddesley Colliery Offices,
Main Road, Baddesley, Atherstone,
Warwickshire, CV3 2LE
Telephone : 01827 717891
Fax : 01827 718057

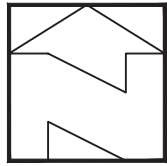
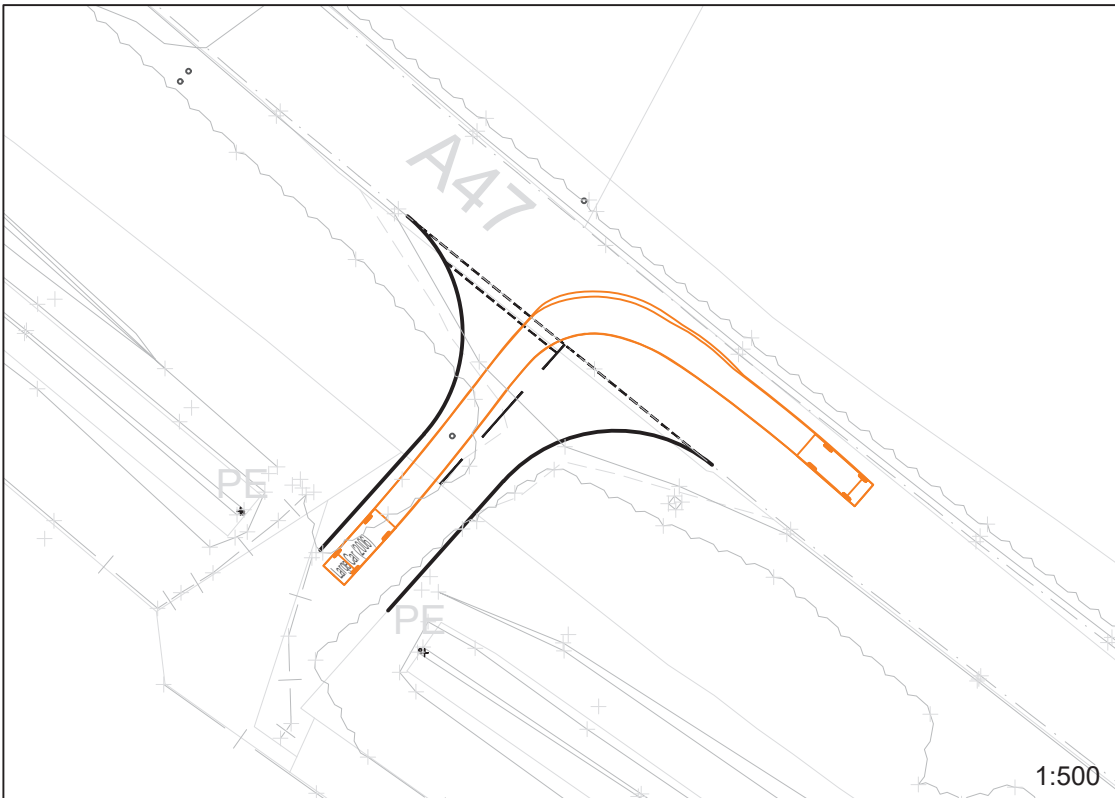
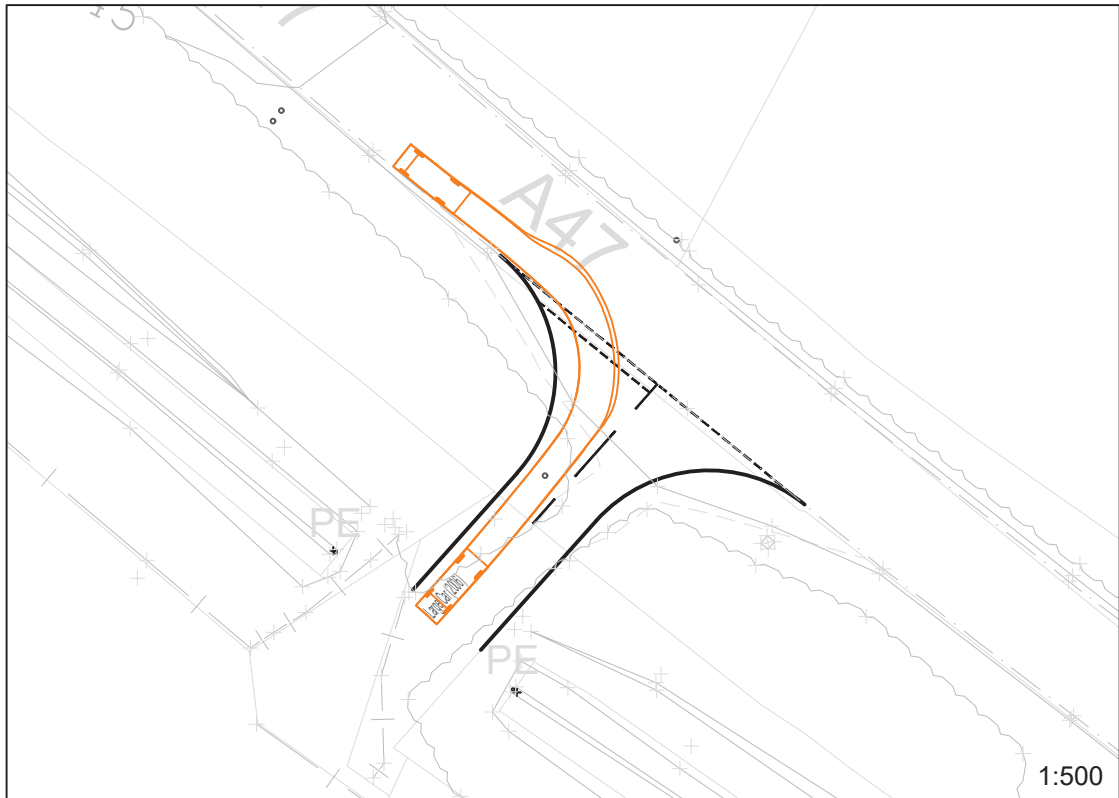
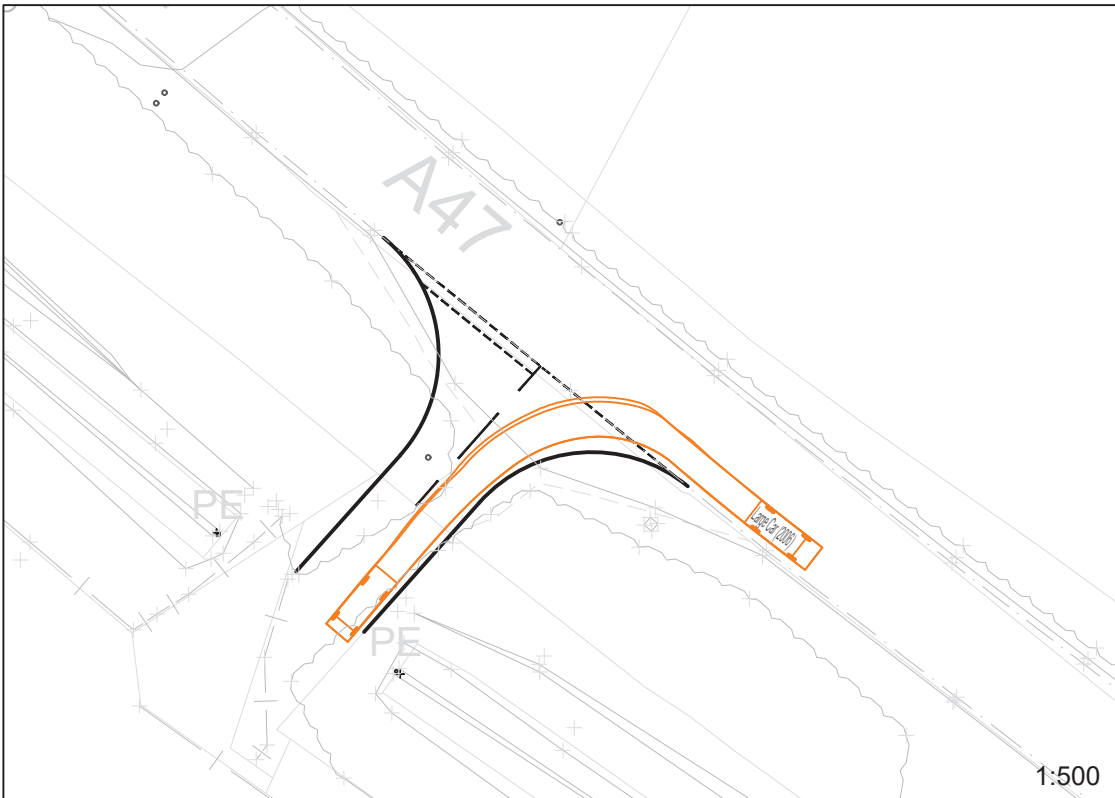
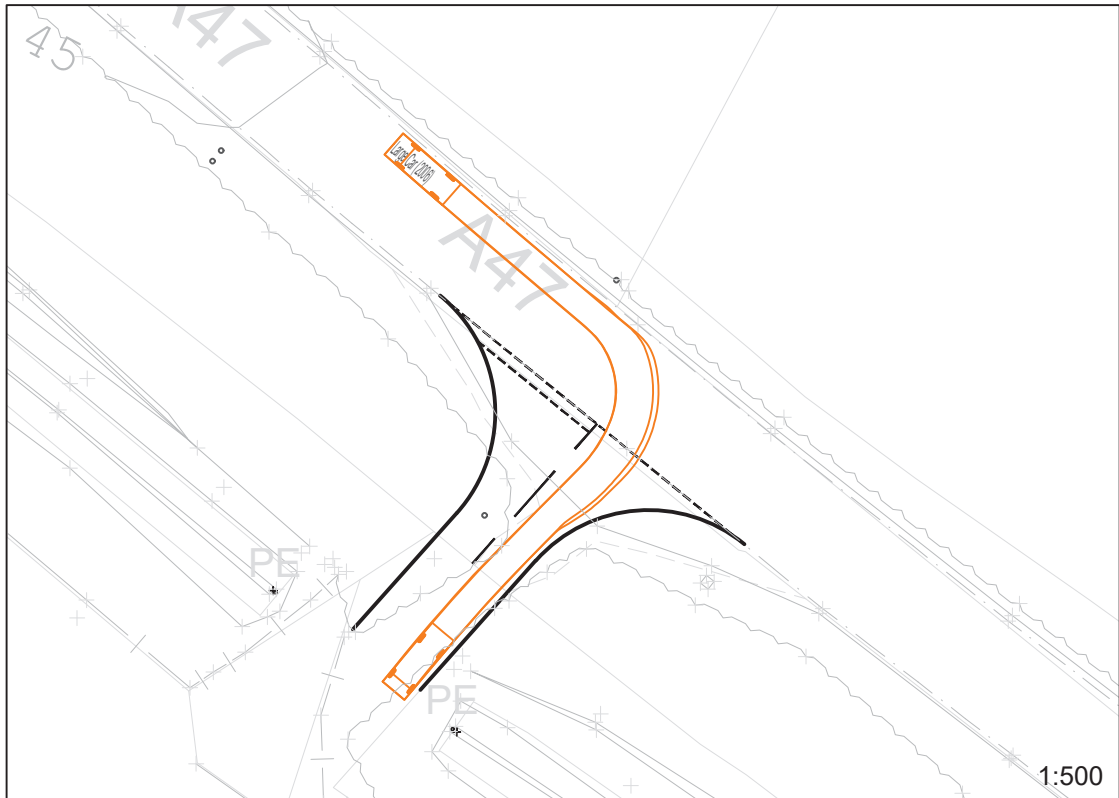
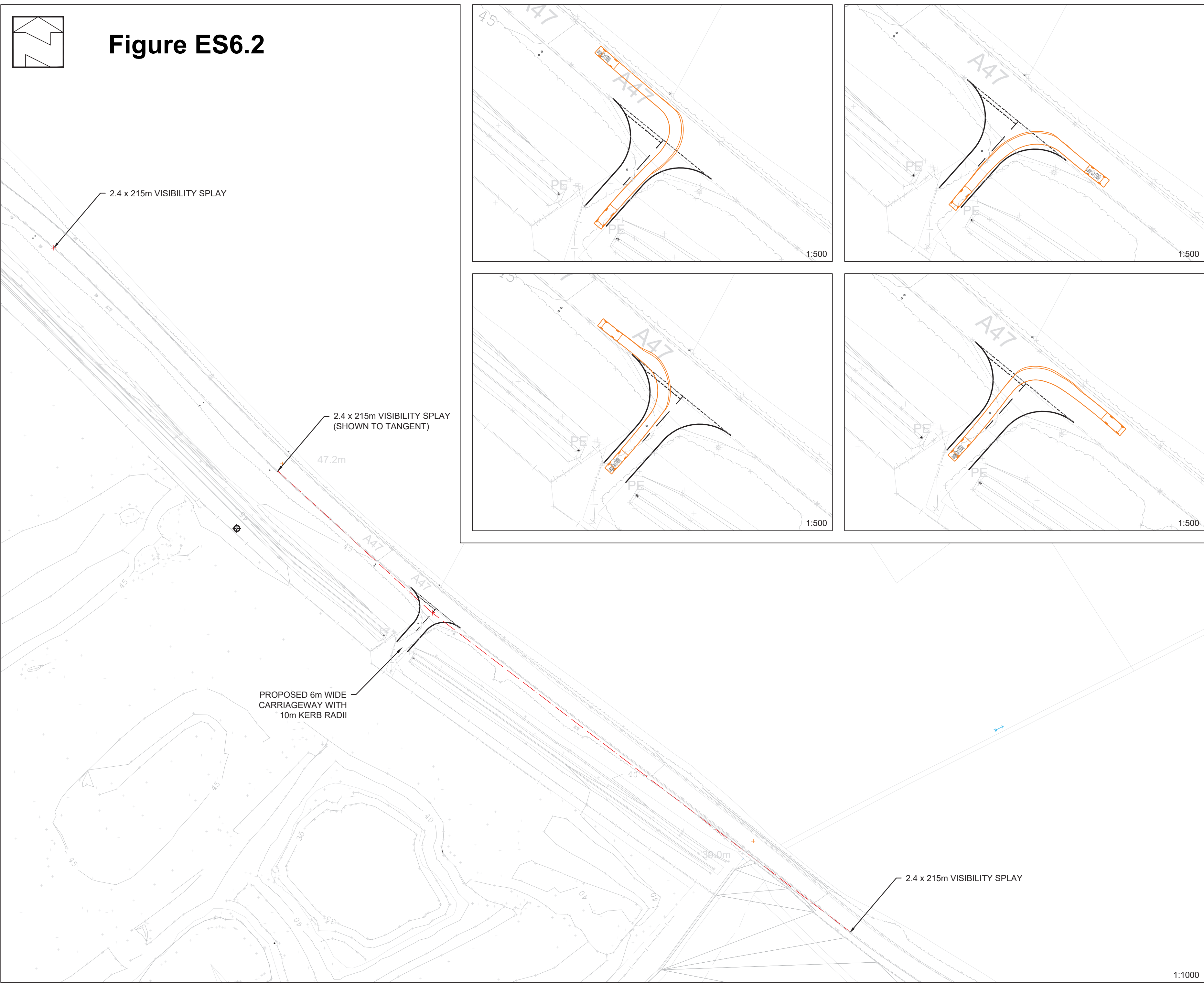


Figure ES6.2



Notes

1. Do not scale this drawing. All dimensions must be checked/verified on site. If in doubt ask.

2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.

4. Any discrepancies noted on site are to be reported to the engineer immediately.

P2	06.02.24	Topo survey included	MT	TC
P1	15.12.23	First issue	MT	TC
Rev	Date	Description	Dr	Rev

Client:

MJCA

Project:

Land at Cook's Hole and Thornhaugh, Peterborough

Title:

Proposed Amenity Access

ADC

INFRASTRUCTURE

Drawn:

M. Tatler

Reviewed:

T. Cooke

Size:

A2

Scale:

As Shown

Date:

15 / 12 / 2023

Status:

PRELIMINARY ISSUE

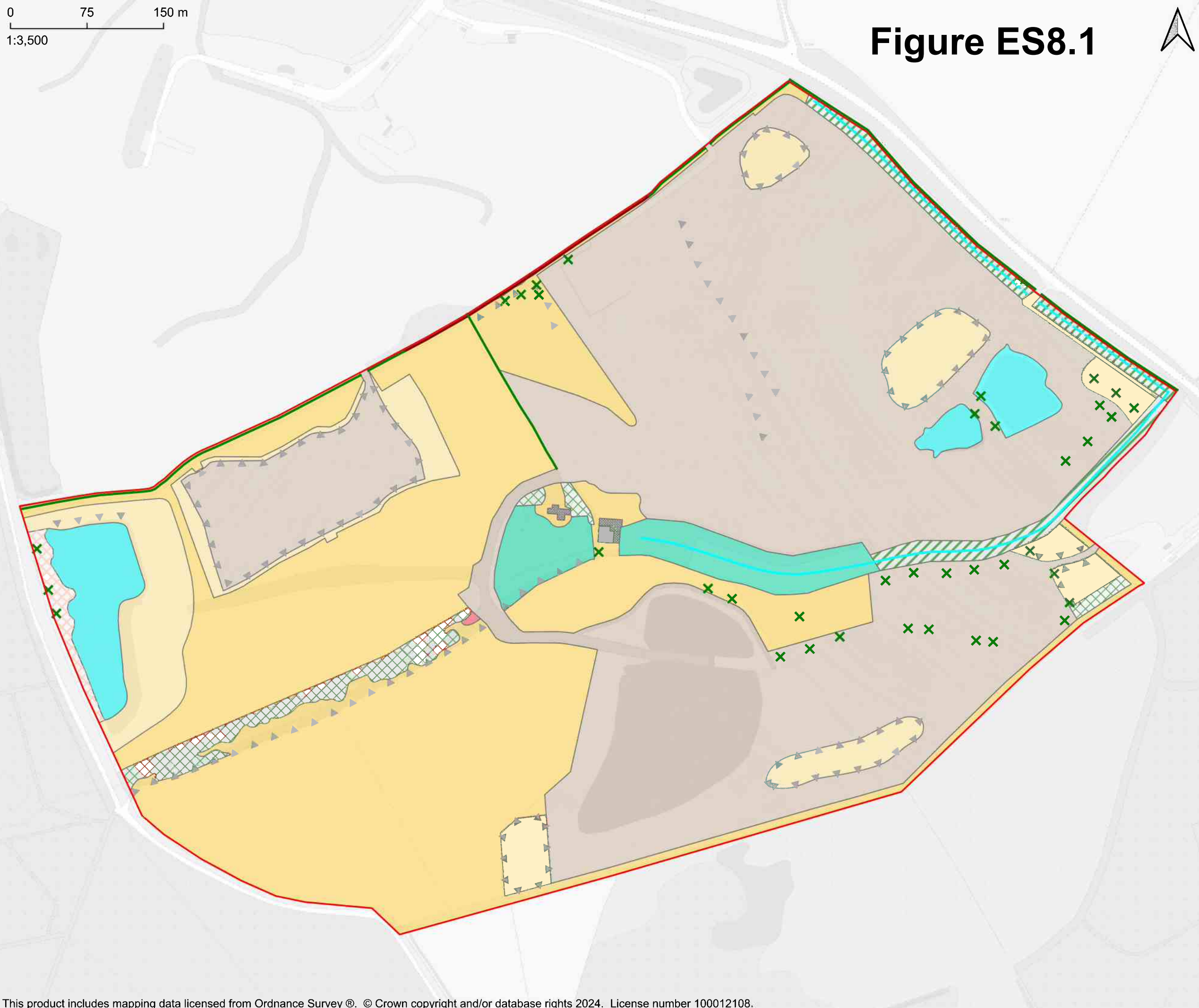
Project Reference	Type	Number	Revision
ADC3418-DR-	002		P2

- KEY**
- Site boundary - Cooks Hole Quarry
 - x 10 - Scattered scrub
 - r1f - Other standing waters: 191 - Ditch
 - r1f - Other standing waters: 191 - Ditch, 500 - Dry
 - h2a6 - Other native hedgerow
 - 114 - Dry stone wall
 - ▲ 112 - Earthbank
 - g4 - Modified grassland
 - g3c - Other neutral grassland
 - h3h - Mixed scrub
 - r1f - Other standing waters: 40 - Ponds (priority habitat)
 - s1d - Other inland rock and scree
 - u1f - Sparsely vegetated urban land: 81 - Ruderal or ephemeral, 510 - Bare ground, 831 - Landfill
 - u1b5 - Buildings
 - u1b6 - Other developed land
 - f2d - Aquatic marginal vegetation
 - w1g - Other woodland; broadleaved
 - w1d - Wet woodland

SITE NAME:
Cooks Hole Quarry and Thornhaugh Landfill Site, Peterborough.

DRAWING TITLE:
Habitat map (Cooks Hole Quarry).

Figure 2
 Dwg no.: MJCA125-L032-008 Date: Jan 2024

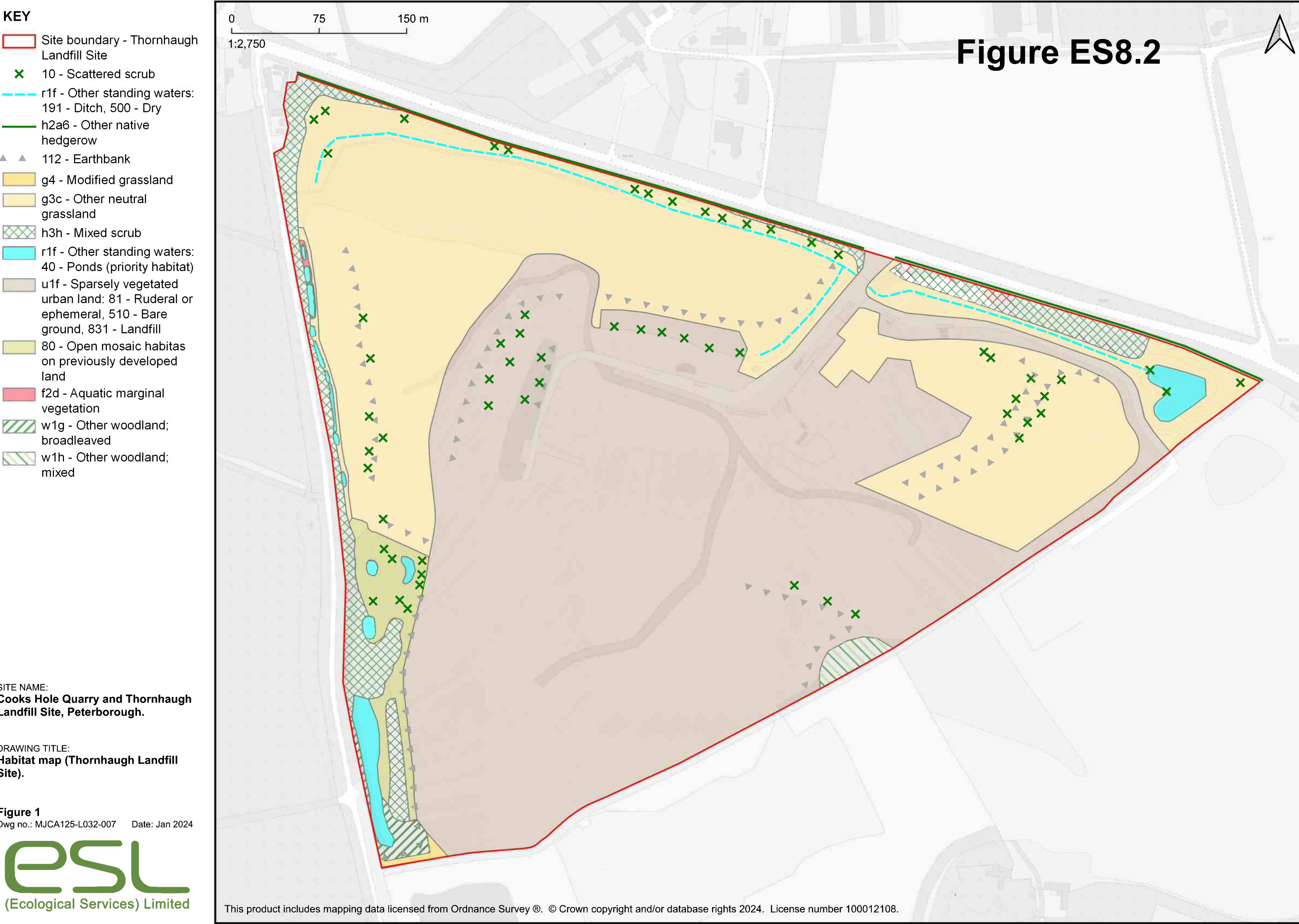


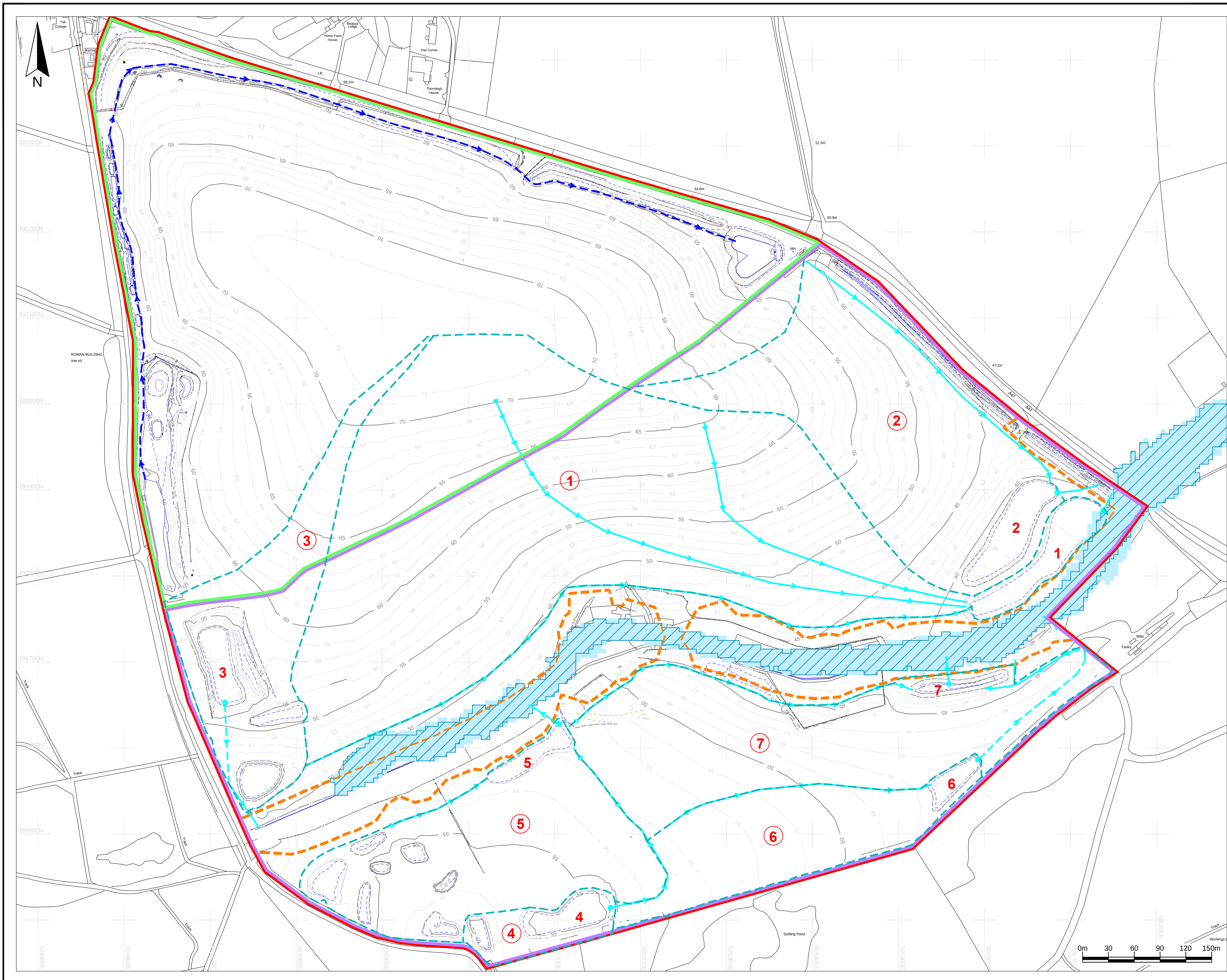
- KEY**
- Site boundary - Thornhaugh Landfill Site
 - 10 - Scattered scrub
 - r1f - Other standing waters: 191 - Ditch, 500 - Dry
 - h2a6 - Other native hedgerow
 - 112 - Earthbank
 - g4 - Modified grassland
 - g3c - Other neutral grassland
 - h3h - Mixed scrub
 - r1f - Other standing waters: 40 - Ponds (priority habitat)
 - u1f - Sparsely vegetated urban land: 81 - Ruderal or ephemeral, 510 - Bare ground, 831 - Landfill
 - 80 - Open mosaic habitats on previously developed land
 - f2d - Aquatic marginal vegetation
 - w1g - Other woodland; broadleaved
 - w1h - Other woodland; mixed

SITE NAME:
Cooks Hole Quarry and Thornhaugh Landfill Site, Peterborough.

DRAWING TITLE:
Habitat map (Thornhaugh Landfill Site).

Figure 1
Dwg no.: MJCA125-L032-007 Date: Jan 2024





Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Contours (mAOD)
- Change of surface
- Top of bank
- Bottom of bank
- Ditch invert
- Verge
- Fenceline
- Building/Road
- Track
- Overhead power line
- Survey station
- 20m standoff from existing tree groups
- Drain
- Basin out flow via flow restriction device
- 1 Detention basin
- 2 Detention basin catchment area
- Underground drainage pipe
- Area draining to consented surface water management system at Thornhaugh Landfill Site
- Flood zone 2
- Flood zone 3

This drawing may not include all of the features listed in the above key

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drm	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client

Title
Current and proposed surface water management infrastructure

Figure ES 11.1

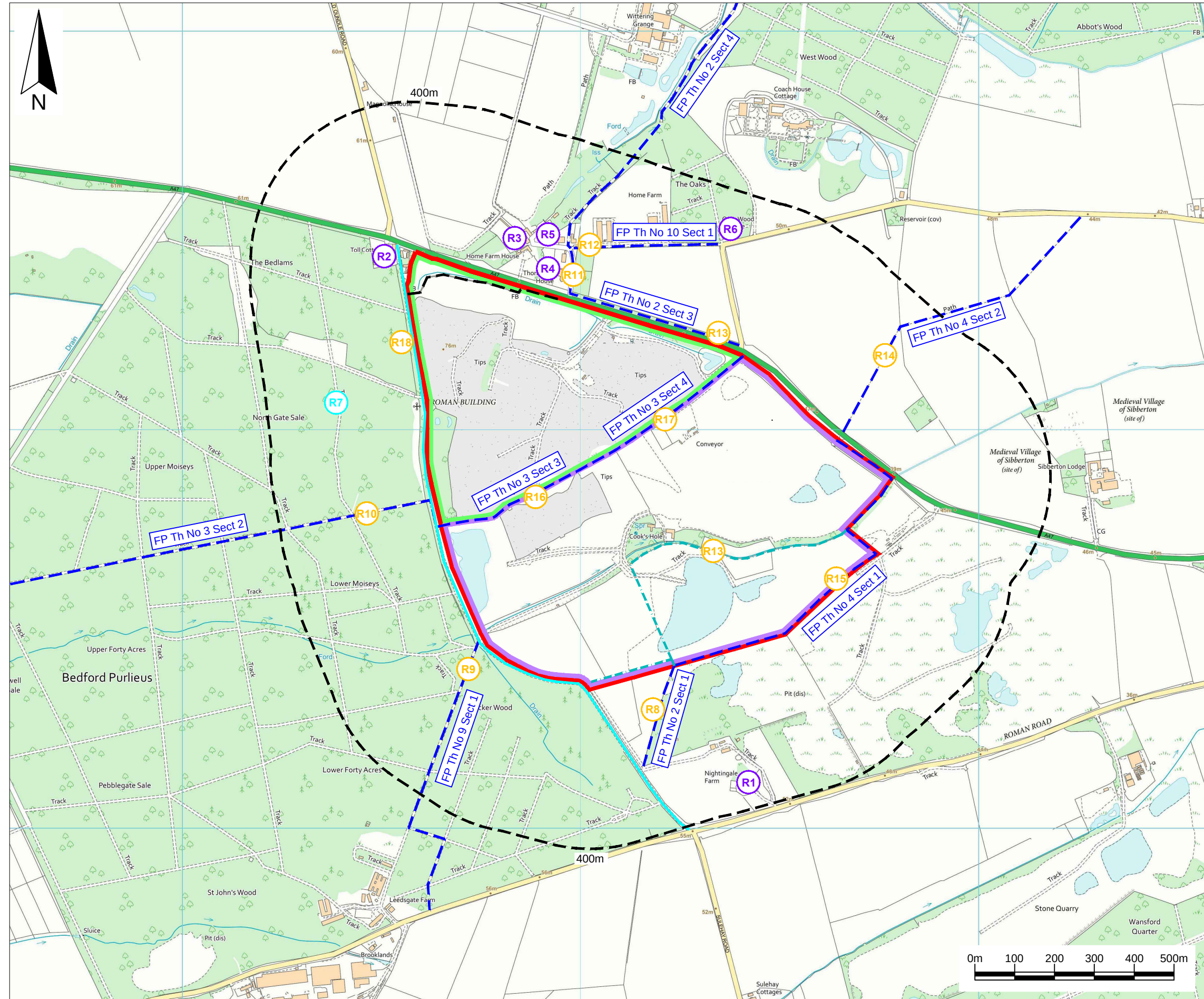
Scale
1:3,000@A2

Drawing Ref
AU/CH/02-24/24195

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Technical advisers on environmental issues

Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE
Telephone : 01827 717891
Fax : 01827 718507



Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- 400m offset from the application boundary
- Approximate location of existing footpaths in the vicinity of Cooks Hole Quarry/Thornhaugh Landfill Site
- Old Oundle Road (Public highway. No cars permitted)
- Permissive route that will be created on completion of the restoration of the area to the south of Thornhaugh Brook
- Existing permissive footpath
- R1 High sensitivity receptor
- R7 Medium sensitivity receptor
- R8 Low sensitivity receptor

Note:
Existing footpaths taken from the Peterborough City Council Interactive Map.

The details shown on the Ordnance Survey base plan for the ground in Thornhaugh and Cooks Hole is out of date and does not reflect the current ground conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client

Title
Location of dust sensitive receptors within 400m of the site boundary

Figure ES 14.1 Scale
1:10,000@A3

Drawing Ref
AU/CH/02-24/24196

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**TO MINIMISE THE FILE SIZE APPENDICES HAVE NOT BEEN INCLUDED BUT
ARE AVAILABLE UPON REQUEST**

APPENDIX ESID C

**A COPY OF PLANNING PERMISSION PLANNING REFERENCE 24/00210/MMFUL
DATED 26 SEPTEMBER 2024 TOGETHER WITH THE APPROVED PLANS**

Telephone: 01733 453410 (9am - 1pm Mon, Wed, Fri)
Email: planningcontrol@peterborough.gov.uk
Case Officer: Mr A O Jones
Our Ref: 24/00210/MMFUL
Your Ref: Cooks Hole Quarry & Thornhaug...



Planning Services
Sand Martin House
Bittern Way
Fletton Quays
Peterborough
PE2 8TY

DX 12310 Peterborough 1
01733 747474

Ms Leslie Heasman
MJCA
Baddesley Colliery Offices
Main Road
Baxterley
Atherstone
Warwickshire
CV9 2LE

26 September 2024

Dear Ms Heasman

Application for Planning Permission

Proposal: Continuation of landfilling operations and the importation of clean naturally occurring materials to create an integrated restoration landform with nature conservation habitats

Site address: Cooks Hole Quarry And Thornhaugh Landfill Site Leicester Road Thornhaugh Peterborough

Your client: Mr Peter Oldfield

Further in the above matter, please find enclosed our formal decision notice relating to your client's application for planning permission. Please be sure to remind your client that the scheme should be carried out in line with the approved plans. This will avoid the need for any enforcement action.

Making changes to the approved plans

In the event that you wish to change your proposal, please contact your case officer who will advise you on whether the change can be dealt with as a "non-material" or "material" amendment. In either case you will have to complete a form and provide fresh drawings.

Complying with the approved plans

We would like to draw your attention to 'precedent conditions':- these are conditions which require you to either do certain works or submit something for approval prior to starting any work. These conditions must be complied with. Please check your Decision Notice carefully and familiarise yourself with its requirements, allowing plenty of time for the conditions to be complied with before work commences. If these conditions are overlooked you may invalidate your consent, risk enforcement action being taken and may need to submit a further application.

In addition you should be aware that failing to build in accordance with the approved plans or properly discharging conditions often causes problems and delays if selling the property.

Complying with conditions

Please read the conditions attached to this permission carefully. Some conditions may require you to submit more information to us before you can start work.

If further information is required you will need to submit a separate application together with the required supporting documentation. The relevant application form (PF27) for discharge of conditions can be downloaded from our application One Stop Shop at www.peterborough.gov.uk/planningoss

Please ensure that the required details are submitted in duplicate and if you are applying to discharge more than one condition that the supporting information is clearly separated and referenced to each individual condition.

There is a fee required with an application to discharge planning conditions, however this is chargeable per application rather than per condition, please ensure that this is enclosed as part of your application. For further information please visit our application One Stop Shop or contact Planning Services on 01733 453410.

Appeals against conditions

You should also be aware that the applicant has the right to appeal against any conditions attached to this Notice, please see <https://www.gov.uk/government/organisations/planning-inspectorate> for details. If you are concerned about any condition you should contact the case officer in the first instance for advice.

Your feedback on our service is welcomed

We are interested in finding out what you thought of our service and how we might make it better. To give us feedback please go to <http://consult.peterborough.gov.uk/portal/pscscs>.

Yours sincerely



Adrian Chapman
Executive Director: Place and Economy

NOTICE OF PLANNING PERMISSION

Town and Country Planning Act 1990

Reference	24/00210/MMFUL
Proposal	Continuation of landfilling operations and the importation of clean naturally occurring materials to create an integrated restoration landform with nature conservation habitats
At	Cooks Hole Quarry And Thornhaugh Landfill Site Leicester Road Thornhaugh Peterborough
Applicant	Mr Peter Oldfield Augean South Ltd
Date valid	16 February 2024

Environmental Impact Assessment Regulations 2017

The NPPF states that there is a presumption in favour of sustainable development - in terms of decision taking this means approving development proposals that accord with the development plan without delay. The application has been considered in light of the Cambridgeshire and Peterborough Minerals and Waste Local Plan, the Peterborough Local Plan, the NPPF and accompanying Planning Practice Guidance and the National Planning Policy for Waste.

The material considerations focus on addressing waste management needs, ecology and the provision of biodiversity netgain, cultural heritage, traffic and transport, flood risk and surface water management and the landscape and visual impacts of the proposal. The conditions outlined below, which include relevant updates offer appropriate mitigation in line with Policies 1, 3, 4, 5, 6, 10, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 and 26 of the Cambridgeshire and Peterborough Minerals and Waste Local Plan.

An Environmental Statement has been provided which demonstrates that the proposal will not have significant impacts on the environment that would warrant refusal of the application.

A legal agreement confirming the cessation of mineral extraction, securing the management of permissive paths, and securing the onsite provision of biodiversity netgain and sale of any additional biodiversity netgain units will be secured. Comments of consultees have been taken into account and suitable conditions to address any issues raised are presented below, and in all other respects the proposal is acceptable. As such, there is no reason not to approve the application in line with Section 38(6) of the Planning and Compulsory Purchase Act.

Conditions

Permission is granted subject to the following conditions and reasons:

- C 1 The development hereby permitted shall be begun before the expiration of three years from the date of this permission.

Reason: In accordance with Section 91 of the Town and Country Planning Act 1990 (as amended).

- C 2 Advance notification shall be provided within 7 days of the commencement of operations to the Local Planning Authority advising of the date the phasing of the development will begin to be undertaken in accordance with the approved phasing plans as set out in Condition 4.

Reason: Due to the extant permission and current operations on site, the date of commencement may not be readily apparent. It is in the proper planning interests that the Local Planning Authority can both ensure that development is taking place in accordance with the permission hereby granted and to agree a proper monitoring regime for the site with the developer.

- C 3 The development hereby permitted shall be carried out in complete accordance with the submitted and approved documents and plans:

- The site location, Figure PS1.1 Drawing ref. AU/CH/02-24/24197 dated 07/02/24
- The planning application boundary Figure PS1.2 Drawing ref. AU/CH/02-24/24198 dated 07/02/24
- The proposed restoration profile Figure PS3.1 Drawing ref. AU/CH/02-24/24202 dated 07/02/24
- The proposed phasing of the operations at the sites Fig.PS3.2 Ref. AU/CH/02_24/24203revA dated 24/07/24
- Restoration Plan for Cook's Hole Quarry and Thornhaugh Landfill Site Drawing No. THORN036 Rev A dated June 2024
- Areas in which materials can be stockpiled Figure C1 Ref. AU/CH/07-24/24414revA dated 24/07/24
- Areas for Hi-Pods and material processing Fig C2 Ref. AU/CH/07-24/24415rev A dated 24/07/24
- Vehicular access to the site at various stages of the development Figure C3 Ref. AU/CH/07-24/24416revA dated 24/07/24

Reason: To clarify what is hereby approved.

- C 4 The landfilling of only inert waste, non-hazardous waste and Stable Non-Reactive Hazardous Waste shall be undertaken only in engineered cells as shown on "The proposed phasing of the operation at the sites" Figure PS3.2 Drawing ref. AU/CH/02-24/24203revA dated 24/07/24. Only clean, naturally occurring materials arising at Thornhaugh I Landfill site and the East Northants Resource Management Facility shall be used as restoration fill material at Cook's Hole Quarry and Thornhaugh Landfill Site.

Development shall be carried out in accordance with "The proposed phasing of the operation at the sites" Figure PS3.2 Drawing ref. AU/CH/02-24/24203 dated 07/02/24.

Each phase in Thornhaugh I Landfill Site shall be restored within one year of the landfill operations within that phase including the placement of the final capping layer, being completed.

Immaterial deviations in the phasing boundaries shown on Figure PS3.2 (Drawing ref. AU/CH/02-24/24203revA dated 24/07/24) may be acceptable to allow for the engineering requirements of landfilling and capping at Thornhaugh Landfill Site and for the construction of supporting gradients needed for earthworks in adjacent phases at the sites to provide the final approved contours.

The landfilling of Thornhaugh I Landfill shall be completed by 21 February 2041 and restoration of the entire site shall be completed no later than 21 February 2042.

Reason: To ensure that the site is restored in a timely manner and to reduce the visual impact of the landfill operations as development progresses in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 3 and 19.

- C 5 Minerals stockpiled on site and extracted during the construction of the landfill cells in Thornhaugh will be processed using mobile plant in the area shown on "Areas for hi-pods and material processing" Figure C2 Drawing ref. AU/CH/07-24/24415revA.

Reason: In the interests of general amenity and minimising the risk pollution in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policies 17 and 18.

- C 6 Only inert construction and demolition waste types shall be processed through the recycling operation. Inert waste processing can only be undertaken in the areas hatched in yellow on "Areas for hi-pods and material processing" Figure C2 drawing ref. AU/CH/07-24/24415revA.

Reason: The scheme for recycling that has been submitted is limited to the consideration of recycling inert waste only.

- C 7 The stockpiles of materials awaiting processing for use in engineering and restoration will be confined to the area shown on "Areas in which materials can be stockpiled" Figure C1 Drawing ref AU/CH/07-24/24414revA.

No stockpiles shall be stored below the water table or in areas susceptible to flooding. The stockpiles shall not exceed the restoration profile levels shown on "The proposed restoration profile" Figure PS3.1 Drawing ref. AU/CH/02-24/24202 dated 07/02/24 by more than 3 metres.

Reason: In the interests of minimising the visual appearance of the stockpiles and minimising the risk of flooding and pollution accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policies 18 and 22.

- C 8 Only the area marked for the location of hi-pod storage on the "Areas for hi-pods and material processing" Figure C2 drawing ref. AU/CH/07-24/24415revA can be used for the purpose of the storage of hi-pods until that area is required for the purposes of landfilling in accordance with the approved phasing plans.

Reason: To clarify what is hereby approved and to secure a safe and suitable access to the site in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

- C 9 No soils (top or subsoils) shall be removed from the site and the development hereby permitted shall be carried out in complete accordance with The Soil Handling and Management Scheme dated February 2024 as set out at Appendix ES4.4.

Reason: To minimise any adverse impacts for surrounding users and ensure the sustainable use of soils in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policies 18 and 24.

- C10 Any facilities, above ground, for the storage of oils, fuels or chemicals should be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound should be at least equivalent to the capacity of the tank plus 10%. All filling points, vents, gauges and sight glasses must be located within the bund and the drainage system should be sealed with no discharge to any watercourse, land or underground strata. Associated pipework should be located above ground and protected from accidental damage. All filling points and tank overflow pipe outlets should be detailed to discharge into the bund.

Reason: In order to prevent pollution of the natural environment in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policies 18 and 22.

- C11 Unless required for continued environmental monitoring purposes, all buildings, plant and machinery and hardstanding ("the site infrastructure") shall be permanently removed from the site within 6 months of the final landscaping taking place. Should any site infrastructure be required to be retained for environmental monitoring purposes beyond this date, a plan/scheme shall be submitted to and approved in writing by the Local Planning Authority which identifies the retained infrastructure and the length of time it is to remain on site. The site infrastructure shall thereafter be retained and removed from the site in accordance with the approved plan / scheme.

Reason: In the interest of achieving a proper restoration of the site to nature conservation and in the interest of the long-term visual appearance of the suite in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policies 17 and 19.

- C12 The development hereby permitted shall be carried out in complete accordance with Appendix ES4.3 Tree Protection Scheme (V1) June 2024 including the Tree Protection Plan (updated 2024) Dwg. no. 125-L032-018 dated Jun 2024 Fig 1-01.

Reason: In order to protect and safeguard the amenities of the area, in accordance with Policies LP16 and LP29 of the Peterborough Local Plan (2019).

- C13 Development must not begin unless a biodiversity gain plan has been submitted to and agreed by the planning authority, which shall include the specific matters:

- (a) information about the steps taken or to be taken to minimise the adverse effect of the development on the biodiversity of the onsite habitat and any other habitat,
- (b) the pre-development biodiversity value of the onsite habitat,
- (c) the post-development biodiversity value of the onsite habitat,
- (d) any registered offsite biodiversity gain allocated to the development and the biodiversity value of that gain in relation to the development,
- (e) any biodiversity credits purchased for the development, and
- (f) such other matters as the Secretary of State may by regulations specify.

The development shall be carried out in accordance with the agreed details and thereafter maintained in accordance with the approved management arrangements specified in the HMMP approved under Condition 14.

Reason: In accordance with the requirements of Schedule 14, Part 1 of paragraph 14 of the Environment Act 2021. This must be a pre-commencement condition because it relates to the creation and retention of biodiversity net gain in accordance with schedule 7A to the

Town and Country Planning Act 1990 and this information is required before works commence on site.

- C14 Within 12 months of implementation of the planning permission a 30-year Habitat Management and Monitoring Plan (HMMP) for the provision of Biodiversity Net Gain (BNG) shall be submitted to the Local Planning Authority for approval. The HMMP shall be prepared in general accordance with the "Biodiversity Gain Plan" approved under Condition 13 and the "Restoration Plan for Cooks Hole Quarry and Thornhaugh Landfill Site" (Drawing No. THORN036 Rev. A dated June 2024). The HMMP shall be based upon Natural England's Habitat Management and Monitoring Plan Template, completed in accordance with Natural England Guidance and supported by the submission of the HMMP Checklist.

The development shall be carried out in accordance with the documents and timings as approved, for the duration of the HMMP.

Reason: To ensure measurable net gains to biodiversity and in accordance with the Environment Act 2021 and Peterborough Local Plan Policy LP28.

- C15 No operations, including the working of any plant or machinery, transport of excavated materials, delivery of infill materials and restoration shall be undertaken outside the hours of;

0700 to 1800 on Mondays to Fridays
0700 to 1300 on Saturdays.

No operations other than emergency maintenance works or pumping associated with gas and surface water management and environmental monitoring shall be undertaken outside these hours.

Prior to the commencement of any temporary operations, which may take place for no more than 8 weeks per calendar year, the operator may notify the Local Planning Authority 7 days prior to the commencement of any such temporary operations of a change to operational hours for that temporary period. The Local Planning Authority reserve the right to remove the allowance for a temporary change to operational hours in the event of reasonable complaint.

Reason: In the interests of the amenity of the nearest residential occupiers in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C16 Except for temporary operations, the rating level of noise emitted from the site shall not exceed the specified noise criteria levels (measured as LAeq, 1 hour (free field) during working hours as set out below.

Location Site Noise Limits

Home Farm House 55
Leedsgate Farm 50
Nightingale Farm (Mon-Friday) 50
Nightingale Farm (Saturday) 46
Sibberton Lodge 51
Oaks Wood Cottage 55
Toll Cottage 55

At the locations listed above, the noise emitted from the site shall not exceed 42dB, LAeq, 5mins (free field) at any other time.

The noise levels shall be determined at the nearest noise sensitive properties as listed above. Measurements taken to verify compliance shall have regard to the effects of extraneous noise and shall be corrected for such effects.

The development hereby approved shall be carried out in complete accordance with the Noise Monitoring Scheme dated February 2024 as set out at Appendix ES4.5

Reason: In the interests of the amenity of the nearest residential occupiers in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C17 For temporary operations such as site preparation, soil stripping and replacement and screen bund formation and removal, the free field noise level due to operations determined at the nearest noise sensitive dwellings (as listed in condition 16) shall not exceed 70dB LAeq, 1 hour (free field). Temporary operations shall not take place for more than eight weeks in any calendar year.

Reason: In the interests of the amenity of the nearest residential occupiers in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C18 No reversing alarms shall be used except quieter option alarms, such as adjustable or broadband "whitenoise" systems.

Reason: In the interests of the amenity of the nearest residential occupiers in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C19 The development hereby permitted shall be carried out in complete accordance with the Dust Control Measures as set out at Table ES14.3 in the Environmental Statement dated February 2024

Reason: In the interests of protecting nearby residential properties and users of public rights of way from dust and odour in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C20 The development hereby permitted shall be carried out in complete accordance with the Lighting Scheme as set out at Appendix ES4.2 dated February 2024.

Reason: In order to protect the amenity of nearby residents and to reduce light pollution in a predominantly rural environment in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 18.

- C21 The development hereby permitted shall be carried out in complete accordance with the Surface Water Management Scheme as set out at Appendix ES4.1 dated February 2024.

Reason: To prevent the increased risk of flooding and to improve and protect water quality, in accordance with Cambridgeshire and Peterborough Minerals and waste Local Plan policy LP32 and Chapter 14 of the National Planning Policy Framework 2023.

- C22 The footpaths shall be reinstated and provided in complete accordance with the details shown on the "Public rights of way and permissive rights of way at different stages of the development" Figure PS2.3, drawing ref. AU/CH/02-24/24201 dated 07/02/24, within 6 months of the final phase of the development being landscaped and shall be retained as such thereafter.

Reason: In order to maintain and enhance public rights of way provision on the site in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

- C23 Throughout operations, the site shall be accessed by vehicles by the single point of access off the A47 only, as shown on the "Vehicular access to the site at various stages of the development" Figure C3. Drawing ref. AU/CH/07-24/24416revA.

Following restoration access to Cook's Hole Farmhouse will be provided at the point of access as shown on "Vehicular access to the site at various stages of the development" Figure C3. Drawing ref. AU/CH/07-24/24416revA.

Reason: In the interests of highway safety in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

- C24 Wheel cleaning facilities shall be retained on site in a location adjacent to the hard surfaced access into the site. Should the wheel cleaning facility break down, temporary wheel cleaning measures shall be deployed until the permanent wheel cleaning facility is operable. The wheel cleaning facility shall remain in use on site until the final landscaping has been completed.

Reason: In the interests of highway safety in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

- C25 Prior to the commencement of each phase of the operation or restoration, adequate space shall be provided within the site for the parking, turning, loading and unloading of all vehicles associated with that phase of the operation, restoration or recycling activities and this space shall be kept available for such purposes for the duration of that phase of the landfill operation, restoration or recycling activity.

Reason: In the interest of highway safety and free flow of traffic on the A47 in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

- C26 Details of the post-restoration monitoring access shall be submitted to, and approved in writing by, the Local Planning Authority, prior to its first use for the intended purpose.

Reason: In the interests of highway safety in accordance with Cambridgeshire and Peterborough Minerals and Waste Local Plan Policy 23.

Statement of compliance

The proposal as submitted was not in accordance with local and national planning policy. The local planning authority have worked with the applicant in a positive and proactive manner based on seeking solutions to problems arising in relation to dealing with the planning application. Amendments were discussed and agreed with the applicant to bring the proposal into compliance with policy, and the application can therefore be approved in accordance with Paragraph 38 of the National Planning Policy Framework (2023).

Authorisation

Authorised by:



Adrian Chapman

Executive Director: Place and Economy

Date the decision was made: 26 September 2024

General Notes

- 1.1 Planning permission does not constitute approval under the Building Regulations or Bye-law approval relating to new streets and buildings.
- 1.2 It is an offence under Section 171 of the Highways Act 1980 to temporarily deposit building materials, rubbish or other things on the public highway or make a temporary excavation on it without the written consent of the Highway Authority. The Highway Authority may give its consent subject to such conditions as it thinks fit.
- 1.3 The applicant is reminded that under the Wildlife and Countryside Act 1981(Section 1) (as amended) it is an offence to take, damage or destroy the nest of any wild bird while that nest is in use or being built. Trees and scrub are likely to contain nesting birds between 1 March and 31 August. Trees within the application site and/or in close proximity to the development should be assumed to contain nesting birds between the above dates unless a survey has shown it is absolutely certain that nesting birds are not present.

Appeals to the Secretary of State

- 1 The applicant has a right to appeal to the Secretary of State against any conditions of this planning permission, under Section 78 of the Town & Country Planning Act 1990.
- 2 If you want to appeal against your local planning authority's decision then you must do so within **6 months** of the date of this notice.
- 3 Appeals can be made online at: <https://www.gov.uk/planning-inspectorate>.
If you are unable to access the online appeal form, please contact the Planning Inspectorate to obtain a paper copy of the appeal form on tel: 0303 444 5000.
- 4 The Secretary of State can allow a longer period for giving notice of an appeal but will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.
- 5 The Secretary of State need not consider an appeal if it seems to the Secretary of State that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.
- 6 If you intend to submit an appeal that you would like examined by inquiry then you must notify the Local Planning Authority and Planning Inspectorate (inquiryappeals@planninginspectorate.gov.uk) at least 10 days before submitting the appeal. Further details are on GOV.UK.

Purchase Notices

If the Local Planning Authority or the Secretary of State grants permission subject to conditions the owner may claim that he/she can neither put the land to a reasonably beneficial use in its existing state nor render the land capable of a reasonably beneficial use by the carrying out of any development which has been or would be permitted. In these circumstances the owner may serve a purchase notice on the Council to purchase his interest in the land in accordance with the provisions of Part VI of the Town and Country Planning Act 1990.

Starting Work too soon

If you start work on this development before complying with conditions that require to be met before work starts, your action has made this planning permission invalid. A fresh planning application will then be required, with the associated cost and delay.

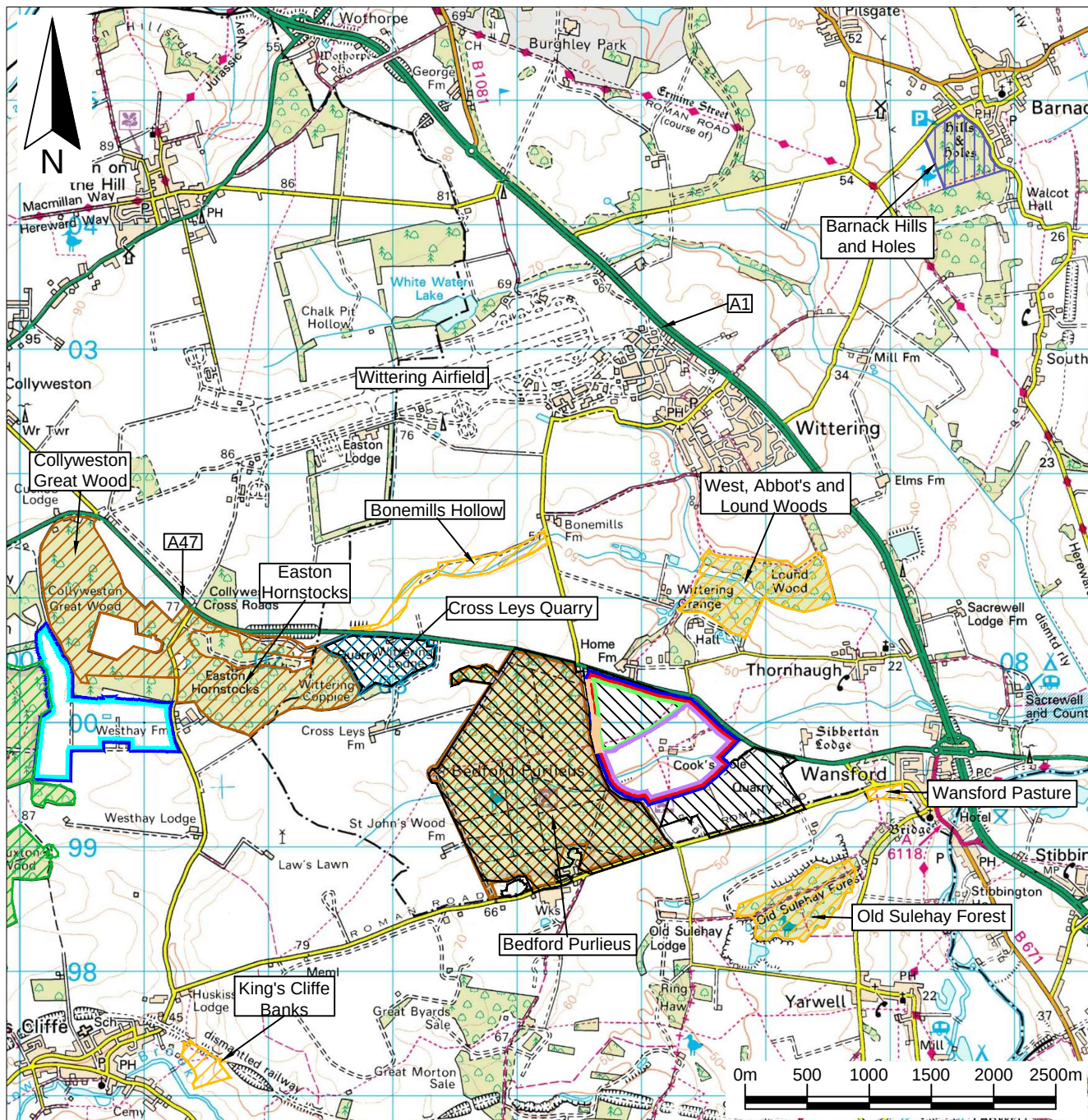
Third Party Rights to challenge a planning decision

Currently there are no third party rights of appeal through the planning system against a decision of a Local Planning Authority. Therefore, if you have concerns about a planning application and permission is granted, you cannot appeal that decision.

Any challenge under current legislation would have to be made outside the planning system through a process called Judicial Review.

A 'claim for judicial review' includes a claim to review the lawfulness of a decision, action or failure to act in relation to the exercise of a public function, in this case, a planning decision. The court's permission to proceed is required in a claim for Judicial Review. A claim for Judicial Review is dealt with by the Administrative Court and if leave to judicially review a planning decision is granted, the Judicial Review will be decided by a judge at the High Court.

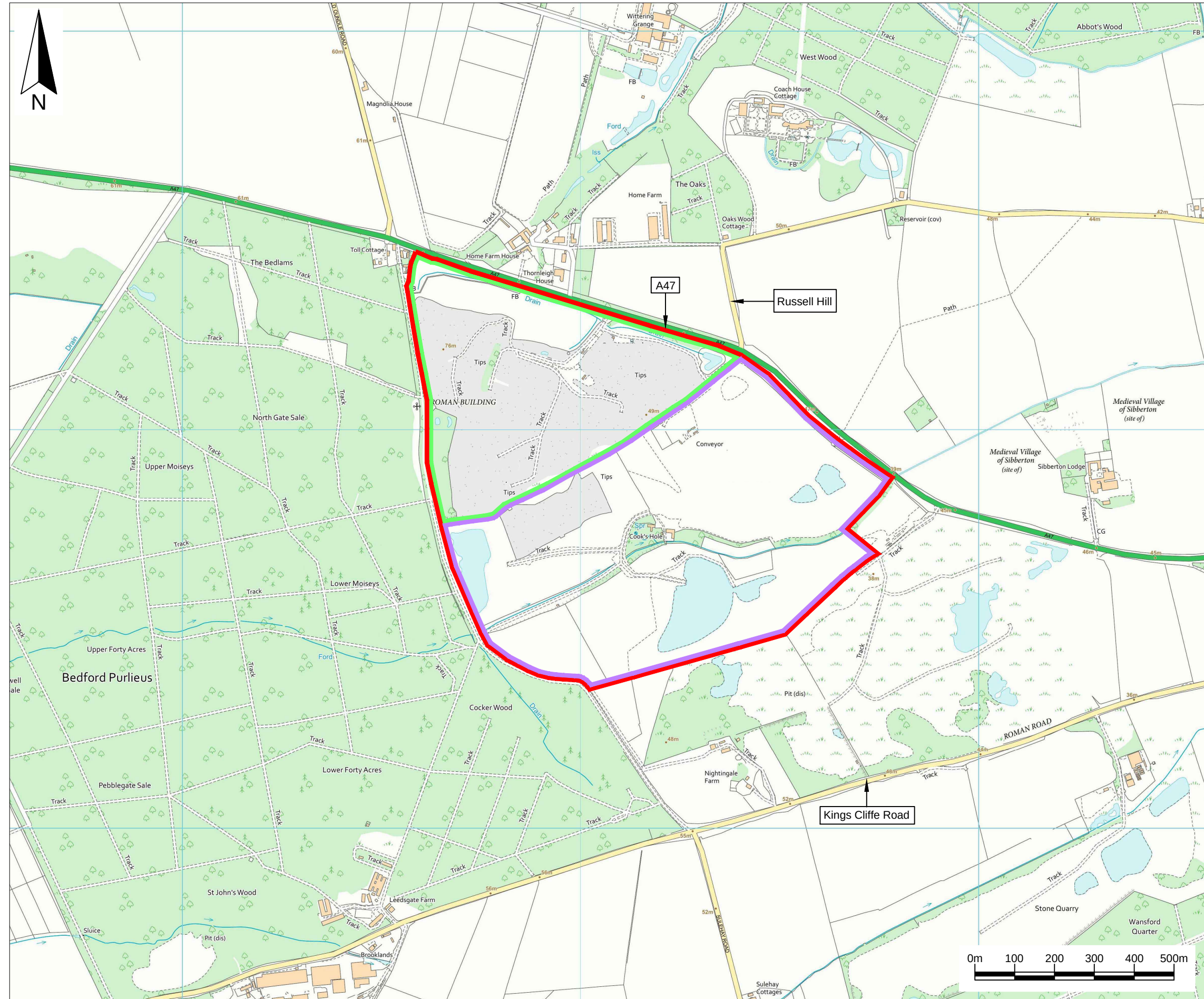
An application to Judicial Review a decision must be made within **6 weeks** of the decision about which you have a grievance being made. For further information on judicial review and the contact details for the Administrative Courts, please go to <http://www.justice.gov.uk/>



Key / Notes

	Application boundary		Approximate location of a Site of Special Scientific Interest (SSSI) and a National Nature Reserve (NNR)
	Land in the control of the Applicant		Approximate location of a Regionally Important Geological Site
	Boundary of Cooks Hole Quarry		Approximate location of a Local Geological site
	Boundary of Thornhaugh Landfill Site		Approximate location of a County Wildlife site
	Boundary of East Northants Resource Management Facility		Approximate location of a Brownfield Biodiversity site
	Approximate location of a Site of Special Scientific Interest (SSSI)		Approximate location of a Special Area of Conservation (SAC)
	Approximate location of a Local Wildlife Site		

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date
Site Cooks Hole Quarry and Thornhaugh Landfill Site					
Client 					
Title The site location					
Figure PS 1.1		Scale 1:50,000@A4			
Drawing Ref AU/CH/02-24/24197					
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Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site

Note:
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cooks Hole Quarry is out of date and does not reflect the current ground conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drn	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

Client

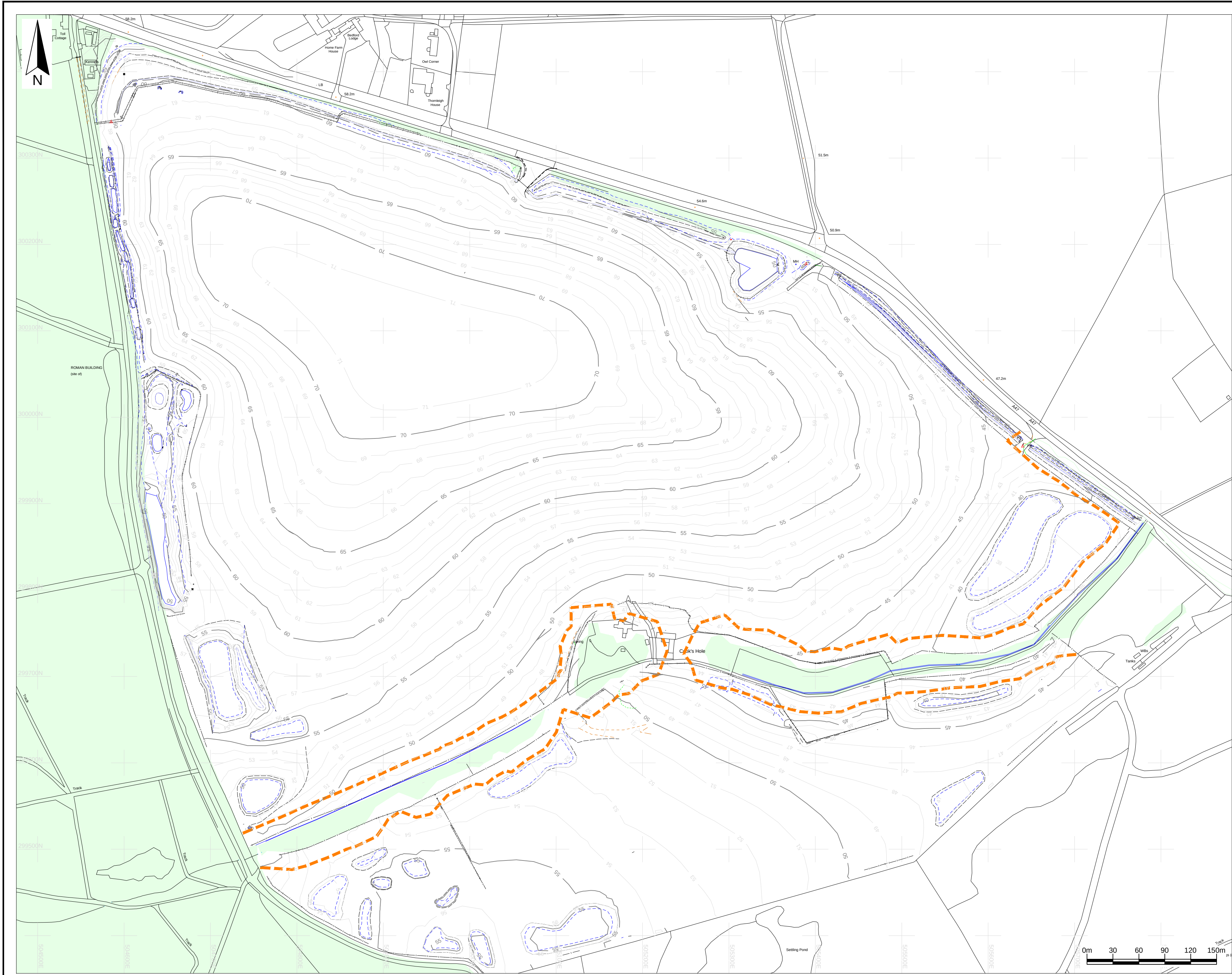

Title
The planning application boundary

Figure PS 1.2 Scale
1:10,000@A3

Drawing Ref
AU/CH/02-24/24198

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Technical advisers on environmental issues Fax : 01827 718507



Key / Notes

- Contours (mAD)
- Change of surface
- Top of bank
- Bottom of bank
- Ditch invert
- Verge
- Fenceline
- Building/Road
- Track
- Overhead power line
- Survey station
- 20m standoff from existing vegetation
- Existing vegetation

This drawing may not include all of the features listed in the above key

	Final	KR	SPS	LH	07/02/24
Rev	Status	Drm	App	Chk	Date

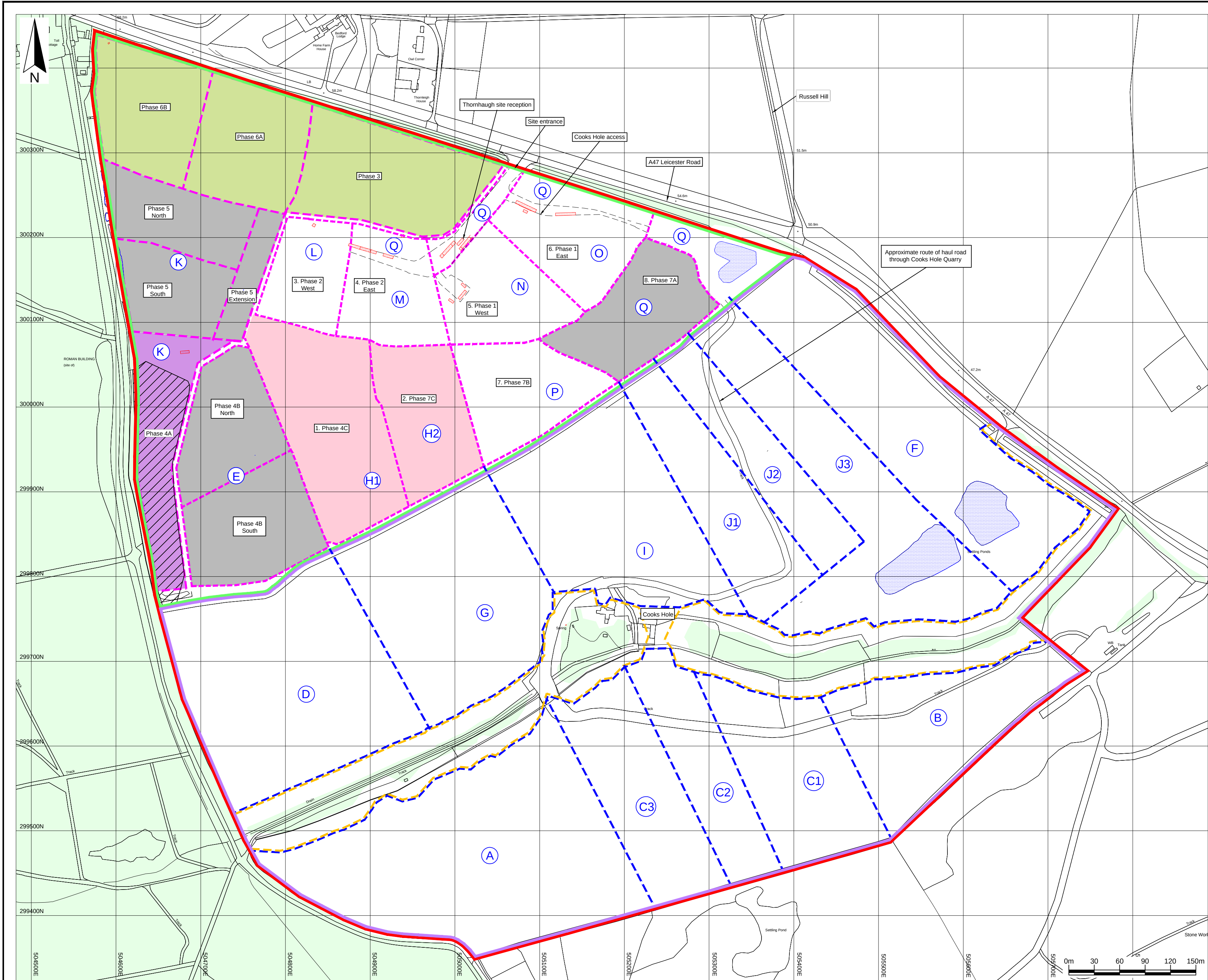
Site
Cooks Hole Quarry and Thornhaugh Landfill Site
Client

Title
The proposed restoration profile

Figure PS 3.1
Scale
1:3,000@A2

Drawing Ref
AU/CH/02-24/24202
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Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Thornhaugh Landfill Site approximate phase boundaries
- Cooks Hole Quarry approximate phase boundaries
- Proposed order of phasing for remaining phases in Cooks Hole Quarry and Thornhaugh Landfill Site
- Original name of phase area
- Original name of phase area with proposed order of phasing for remaining phases in Thornhaugh Landfill Site
- Surfaced section of internal haul road
- Existing building
- Current surface water collection areas
- County Wildlife Site
- Unprepared area awaiting excavation and engineering
- Active landfill area
- Current Infill complete. Awaiting capping
- Restored
- Nature conservation habitat for great crested newts
- Existing vegetation
- 20m offset from existing vegetation

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions

A	Minor amends	KR	SPS	LH	24/07/24
	Final	KR	SPS	LH	07/02/24
Rev	Status	Drm	App	Chk	Date

Site
Cooks Hole Quarry and Thornhaugh Landfill Site

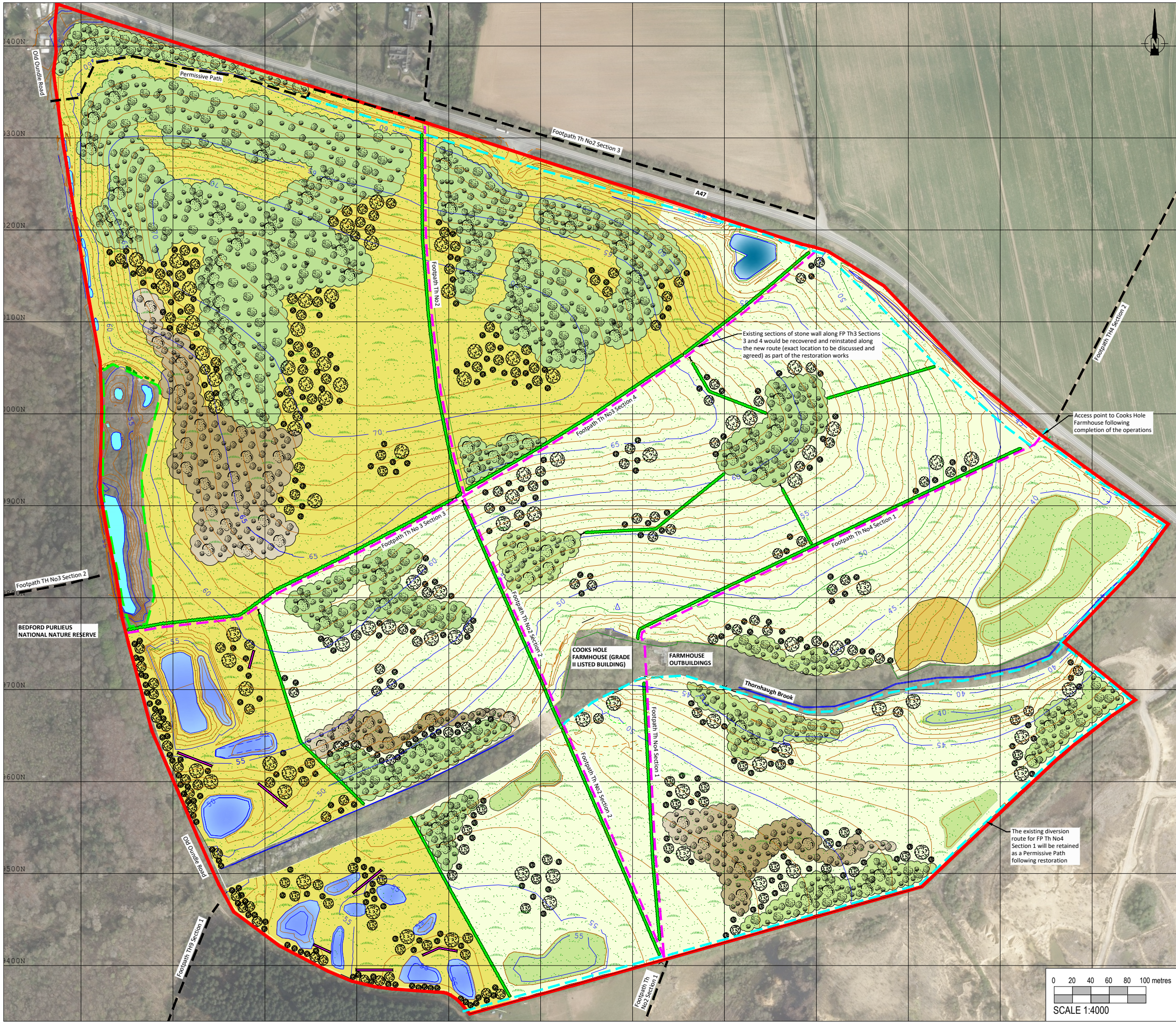
Client

Title
The proposed phasing of the operations at the sites

Figure PS 3.2
Scale 1:3,000@A2

Drawing Ref
AUCH/02-24/24203revA
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KEY

- APPLICATION BOUNDARY
- RESTORATION CONTOURS (m AOD, @ 1m INTERVALS)
- EXISTING FOOTPATHS (AND ONE PERMISSIVE PATH, AS MARKED)
- PROPOSED REINSTATED FOOTPATHS
- PROPOSED PERMISSIVE PATHS
- PROPOSED NATIVE WOODLAND BLOCKS
- PROPOSED SHRUB/ SCRUB AREAS
- PROPOSED OPEN SHRUB/ SCRUB MIX
- PROPOSED HEDGEROWS
- PROPOSED NEUTRAL GRASSLAND
- PROPOSED CALCAREOUS GRASSLAND
- WATER STORAGE LAGOON
- EXISTING PONDS
- PROPOSED NEW PONDS
- COUNTY WILDLIFE SITE
- AREA OF BARE/NATURALLY COLONISING GROUND FOR LITTLE RINGED PLOVERS
- HIBERNACULA (20 - 40m long, 2m wide and 1m high, constructed using natural materials: wood, stones, turf etc.)
- DETENTION AREA

Client **Augean**

Site **COOKS HOLE QUARRY & THORNTAUGH LANDFILL SITE**

Project **PROPOSED REVISED RESTORATION LANDFORM**

Drawing Title **RESTORATION PLAN FOR COOKS HOLE QUARRY AND THORNTAUGH LANDFILL SITE**

Date **JUNE 2024**

Scale **1:4000 @ A3**

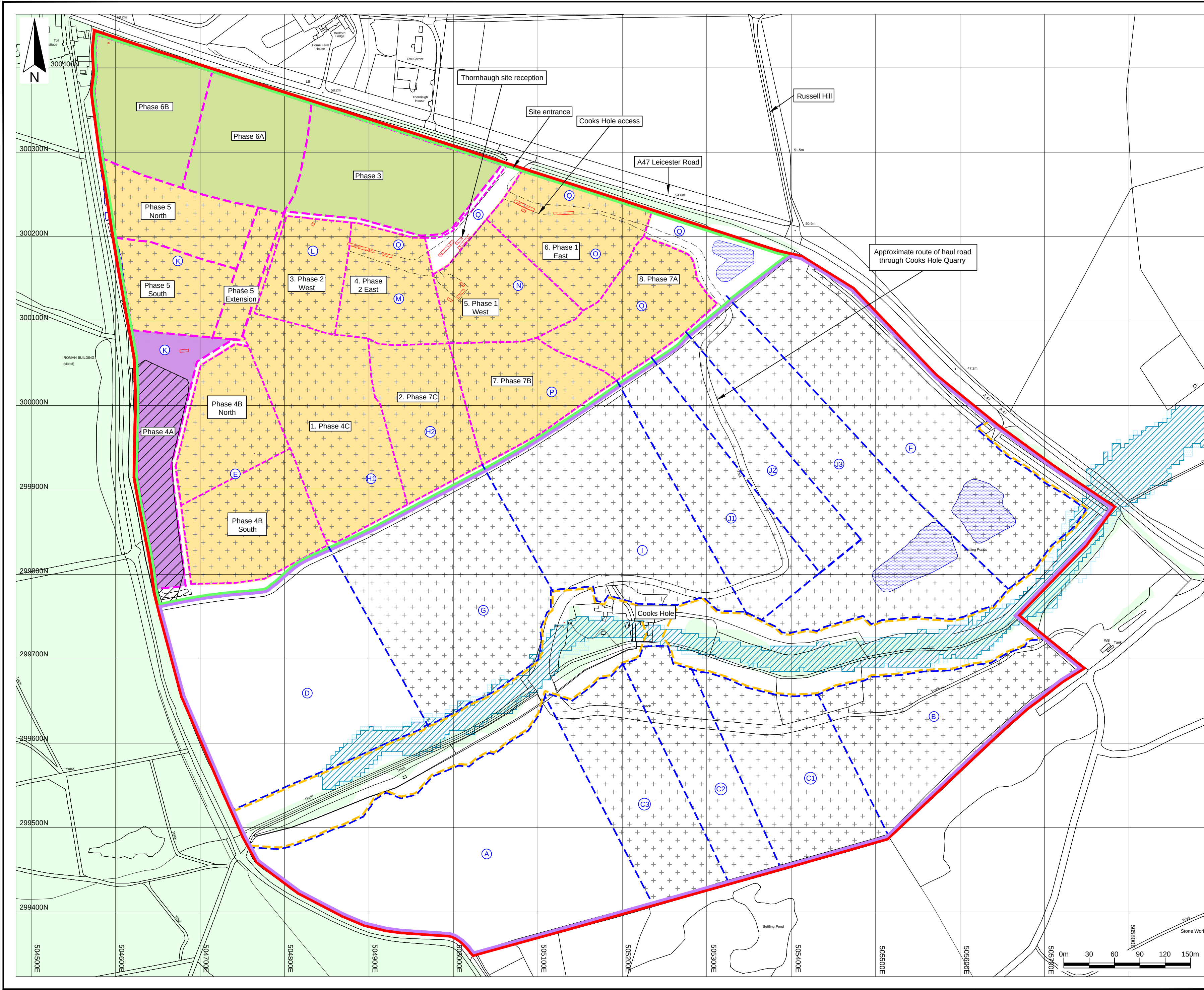
File Ref. **2407_008.006_THORN036Rev.A_Restoration Plan**

Drawing No. **THORN036Rev.A**

Revision **A**

T: 01344 624 709
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DB Landscape Consultancy



Key / Notes

Application boundary

Boundary of Cooks Hole Quarry

Boundary of Thornhaugh Landfill Site

Thornhaugh Landfill Site approximate phase boundaries

Cooks Hole Quarry approximate phase boundaries

Proposed order of phasing for remaining phases in Cooks Hole Quarry and Thornhaugh Landfill Site

Phase 5 North

Original name of phase area

4. Phase 2 East

Original name of phase area with proposed order of phasing for remaining phases in Thornhaugh Landfill Site

Surfaced section of internal haul road

Existing building

Current surface water collection areas

County Wildlife Site

Restored

Nature conservation habitat for great crested newts

Existing vegetation

20m offset from existing vegetation

Flood zone 2

Flood zone 3

Areas in which material for restoration and engineering can be stockpiled

Areas in which waste can be stockpiled

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions.

A	Minor amends	KR	SPS LAH	24/07/24
	Draft	KR	SPS LAH	04/07/24
Rev	Status	Drm	App Chk	Date

Site

Cooks Hole Quarry and Thornhaugh Landfill Site

Client

Title

Areas in which materials can be stockpiled

Figure C1

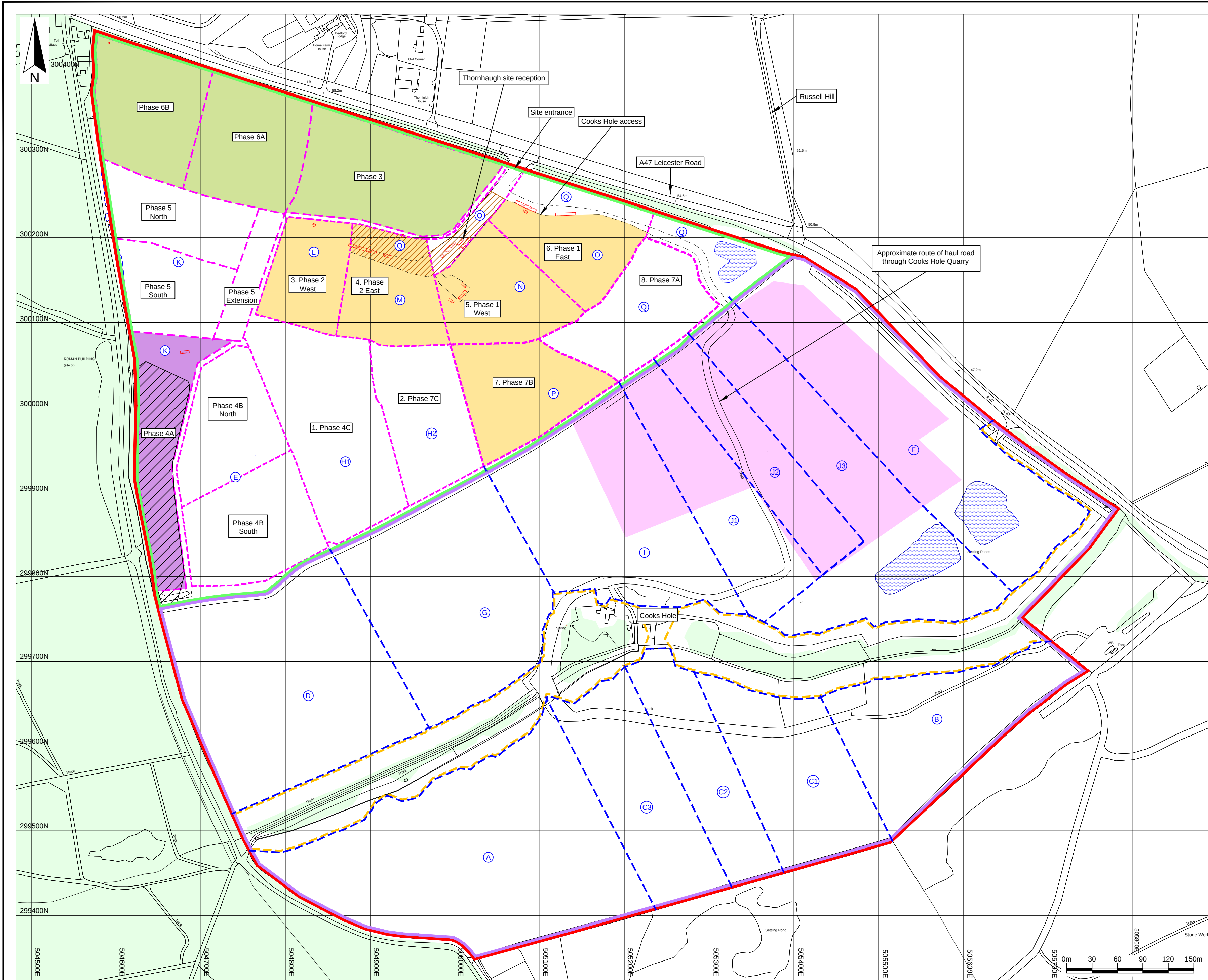
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Drawing Ref

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Key / Notes

Application boundary

Boundary of Cooks Hole Quarry

Boundary of Thornhaugh Landfill Site

Thornhaugh Landfill Site approximate phase boundaries

Cooks Hole Quarry approximate phase boundaries

Proposed order of phasing for remaining phases in Cooks Hole Quarry and Thornhaugh Landfill Site

Phase 5 North

Original name of phase area

4. Phase 2 East

Original name of phase area with proposed order of phasing for remaining phases in Thornhaugh Landfill Site

Surfaced section of internal haul road

Existing building

Current surface water collection areas

County Wildlife Site

Restored

Nature conservation habitat for great crested newts

Existing vegetation

20m offset from existing vegetation

Location where inert waste processing can be undertaken

Mineral processing area

Areas where Hi-Pods could be stored

Note:
The proposed phasing is approximate, and while the principles are unlikely to change, phase boundaries may change in response to operational conditions.

A	Minor amends	KR	SPS LAH	24/07/24	
	Draft	KR	SPS LAH	04/07/24	
Rev	Status	Drm	App Chk	Date	

Site

Cooks Hole Quarry and Thornhaugh Landfill Site

Client

Title

Areas for Hi-Pods and material processing

Figure C2

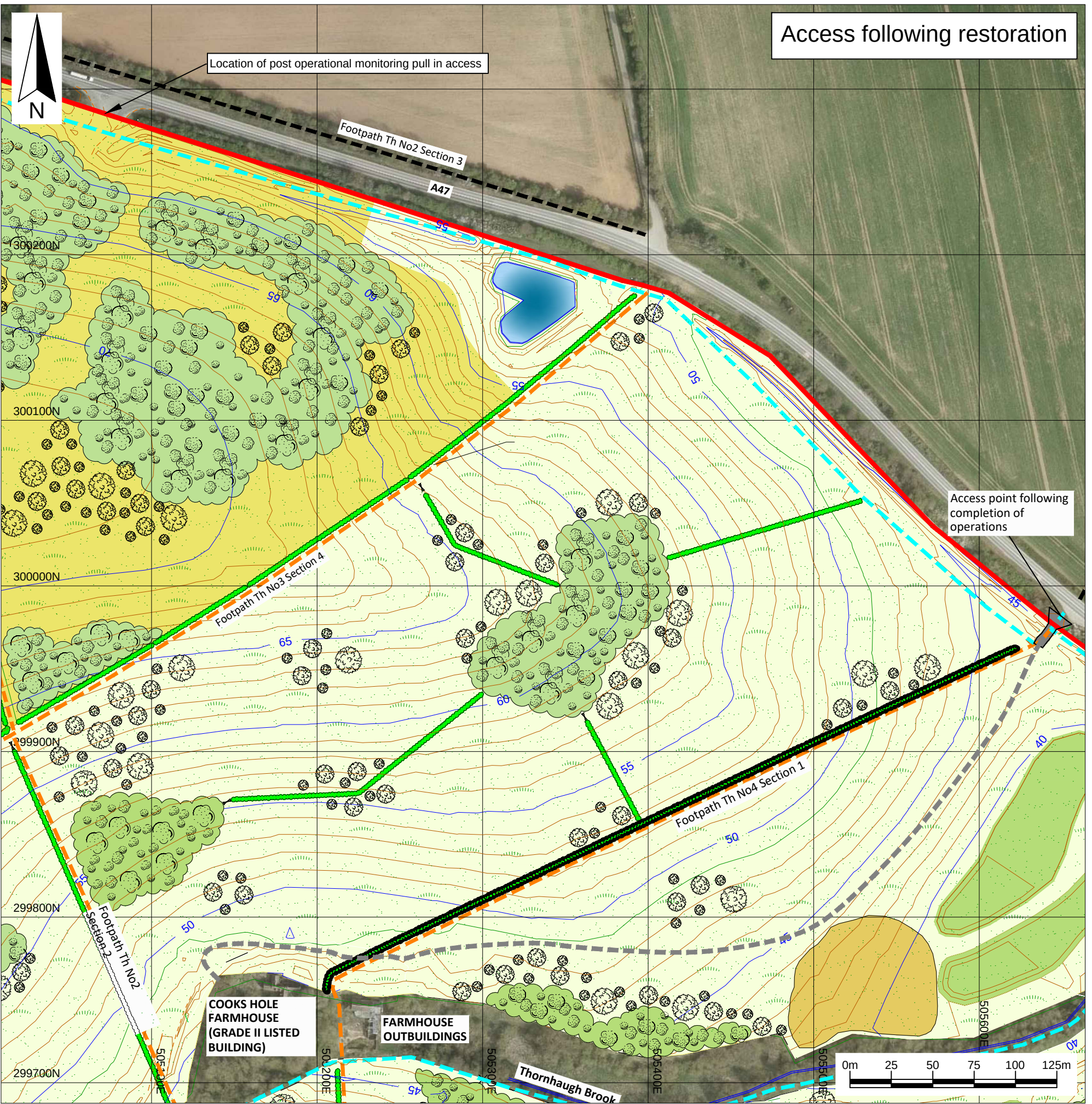
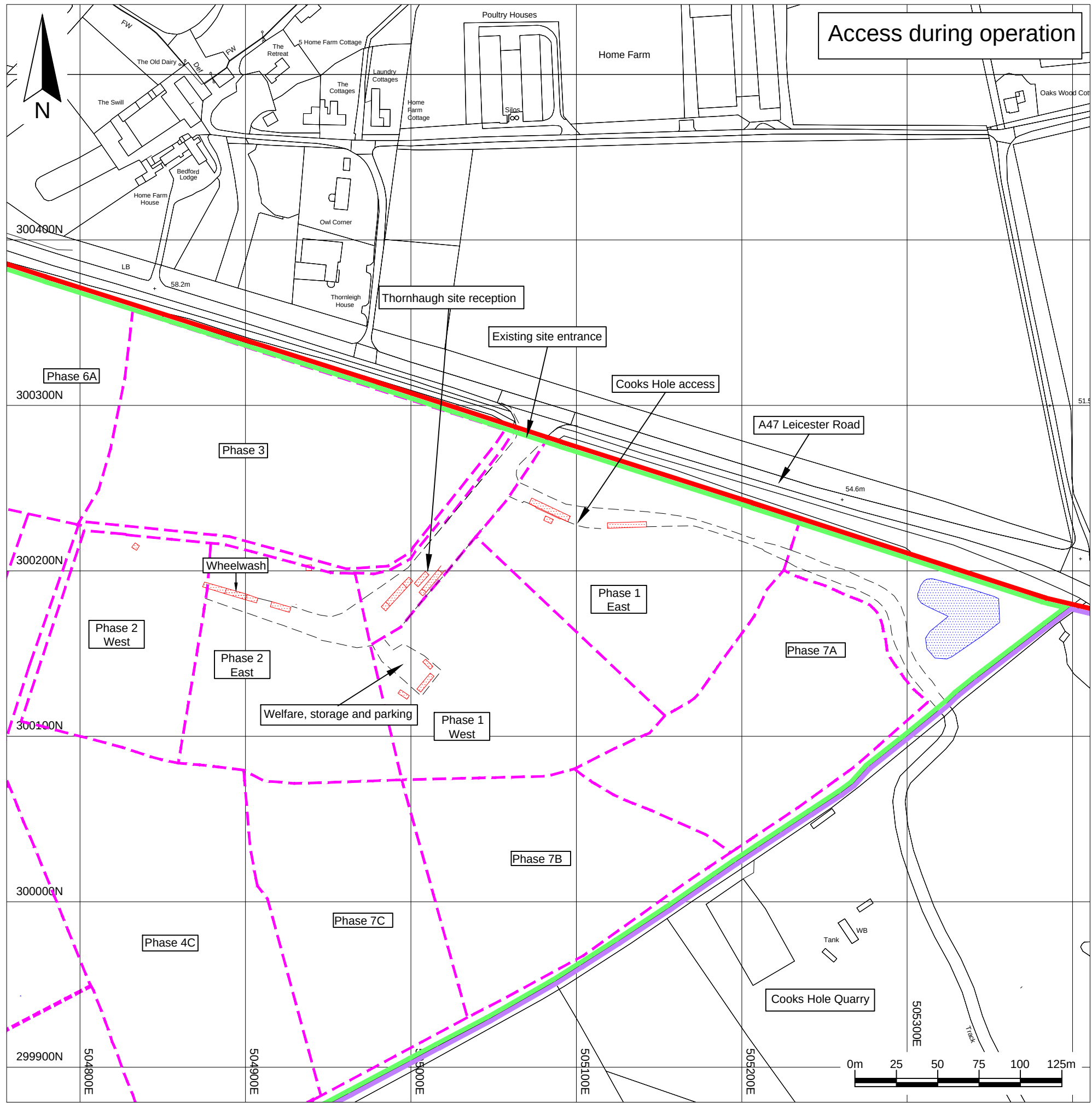
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Drawing Ref

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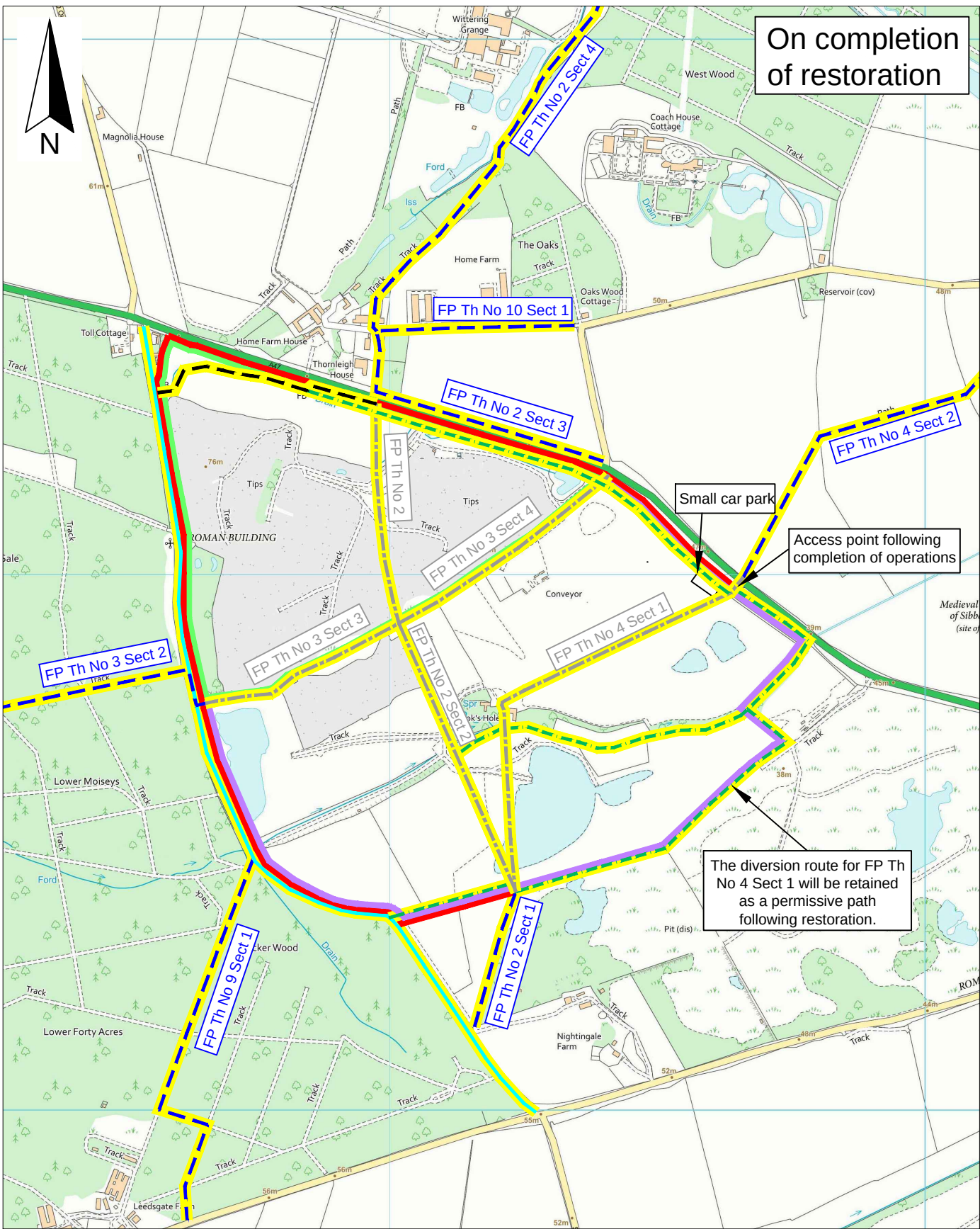
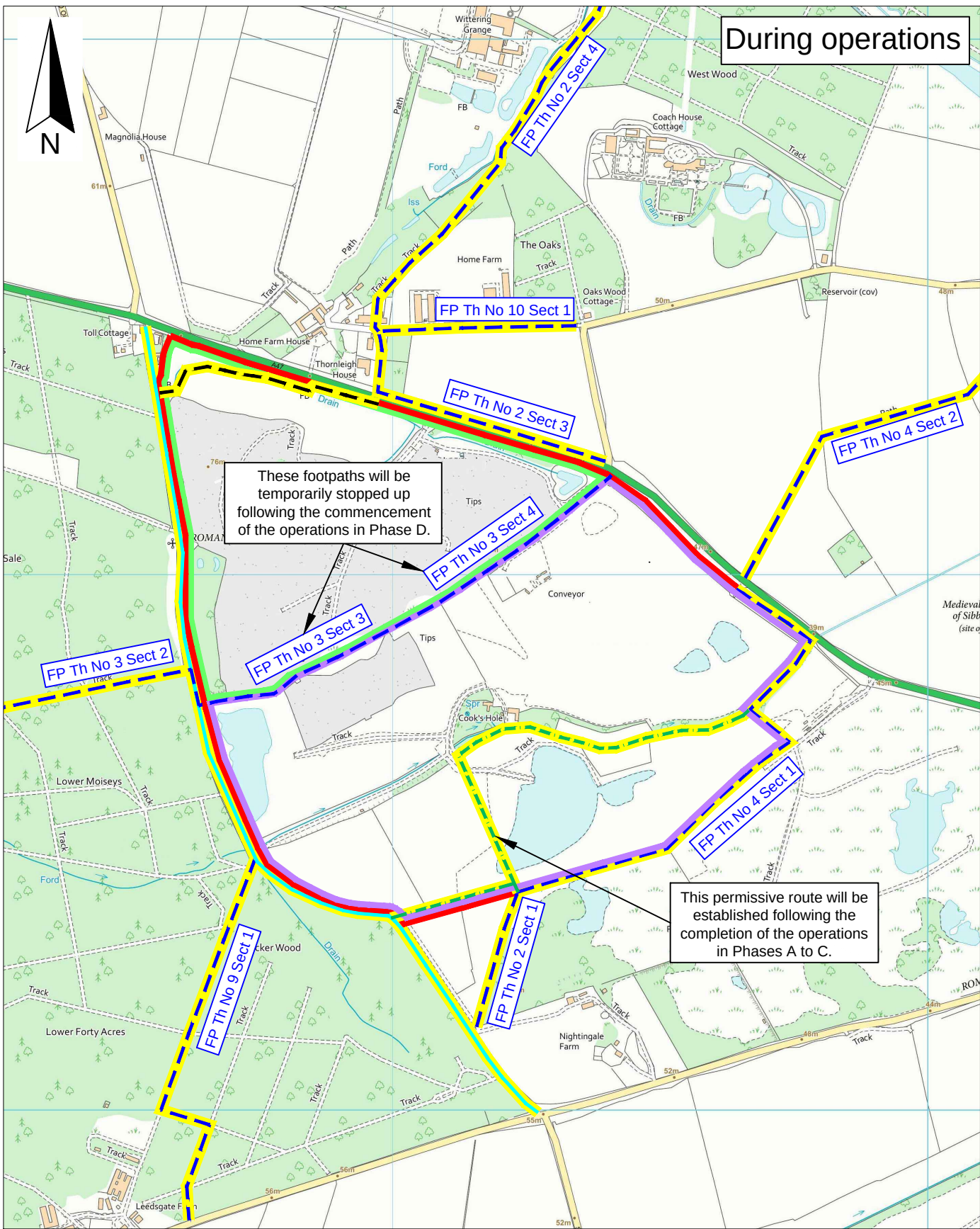
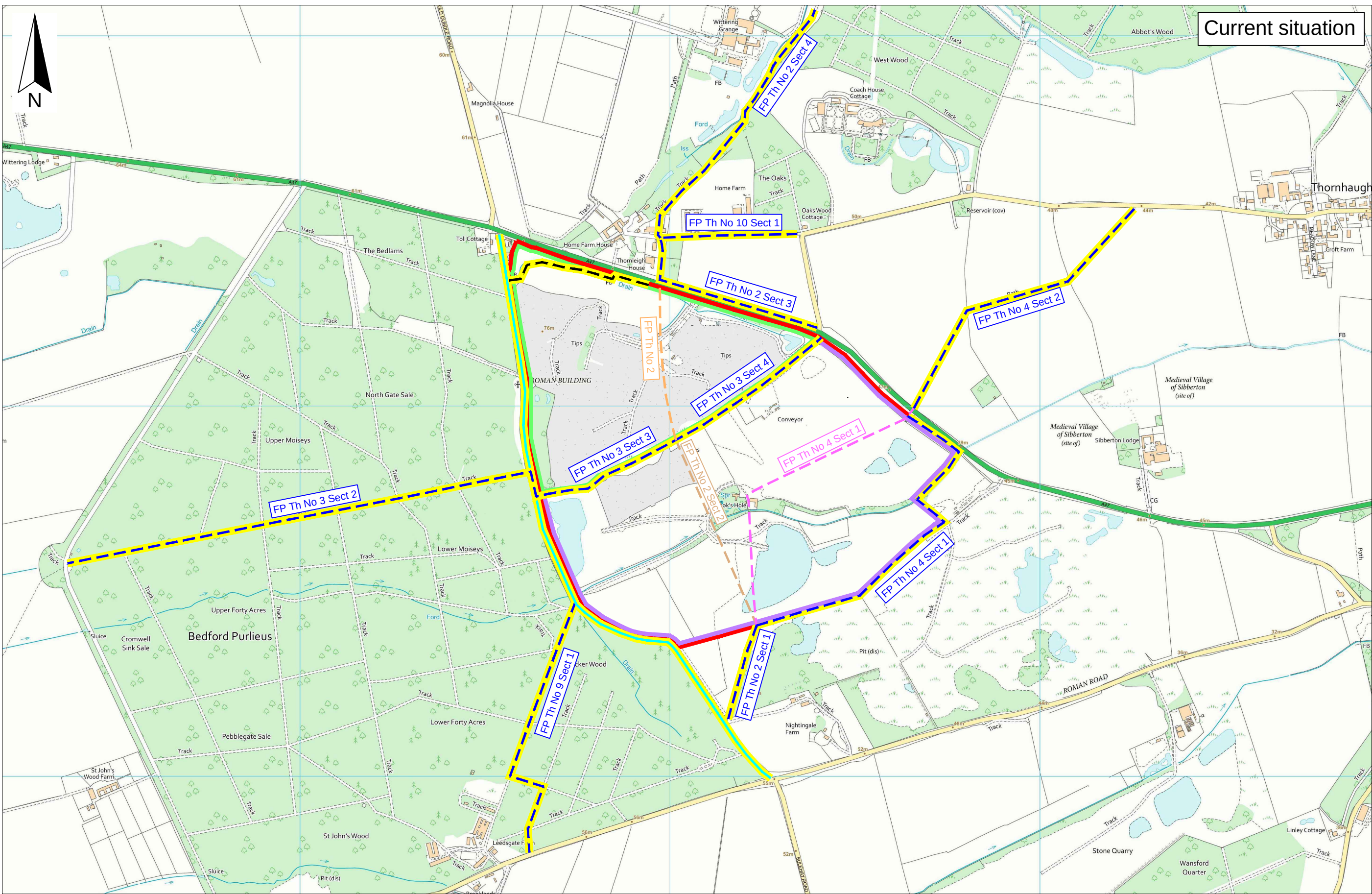


Key / Notes

- | | | | |
|---|---|--------------------------------|--|
| Application boundary | Current surface water collection areas | Proposed shrub/ scrub areas | County wildlife site |
| Boundary of Cooks Hole Quarry | Indicative future access track to Cooks Hole Farmhouse | Proposed open shrub/ scrub mix | Area of bare/naturally colonising ground for little ringed plovers |
| Boundary of Thornhaugh Landfill Site | Restoration contours (mAOD, @ 1m intervals) | Proposed hedgerows | Hibernacula (20 - 40m long, 2m wide and 1m high, constructed using natural materials: wood, stones, turf etc.) |
| Thornhaugh Landfill Site approximate phase boundaries | Existing footpaths (and one permissive path, as marked) | Proposed neutral grassland | Detention area |
| Surfaced section of internal haul road | Proposed reinstated footpaths | Proposed calcareous grassland | Existing ponds |
| Existing building | Proposed permissive paths | Water storage lagoon | Proposed new ponds |
| | Proposed native woodland blocks | | |

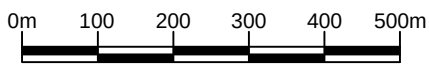
Note :
Based on DBLC Ltd drawing reference
THORN036.dwg dated February 2024

A	Minor amends	KR	SPS	LAH	24/07/24
	Draft	KR	SPS	LAH	04/07/24
Rev	Status	Drn	App	Chk	Date
Site	Cooks Hole Quarry and Thornhaugh Landfill Site				
Client					
Title	Vehicular access to the site at various stages of the development				
Figure C3		Scale 12,500@A2			
Drawing Ref AU/CH/07-24/24416revA					
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Key / Notes

- Application boundary
- Boundary of Cooks Hole Quarry
- Boundary of Thornhaugh Landfill Site
- Approximate location of existing footpaths in the vicinity of Cooks Hole Quarry/Thornhaugh Landfill Site
- Approximate route of Footpath No 2 to be reinstated on restoration of Thornhaugh Landfill Site
- Old Oundle Road (Public highway. No cars permitted)
- Footpath which is currently diverted
- Footpath which is currently stopped up
- Existing permissive footpath
- Permissive footpaths created as part of the proposed development
- Footpaths which are reinstated following restoration
- The highlighted routes are those accessible during the period shown



Notes:
Existing footpaths taken from the Peterborough City Council Interactive Map.
The details shown on the Ordnance Survey base plan for the ground in Thornhaugh Landfill Site and Cooks Hole Quarry is out of date and does not reflect the current ground conditions.

	Final	KR	SPS	LH	07/02/24
Rev	Status	Dm	App	Chk	Date
Site Cooks Hole Quarry and Thornhaugh Landfill Site					
Client 					
Title Public rights of way and permissive rights of way at different stages of the development					
Figure PS 2.3		Scale 1:10,000@A2			
Drawing Ref AU/CH/02-24/24201					
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