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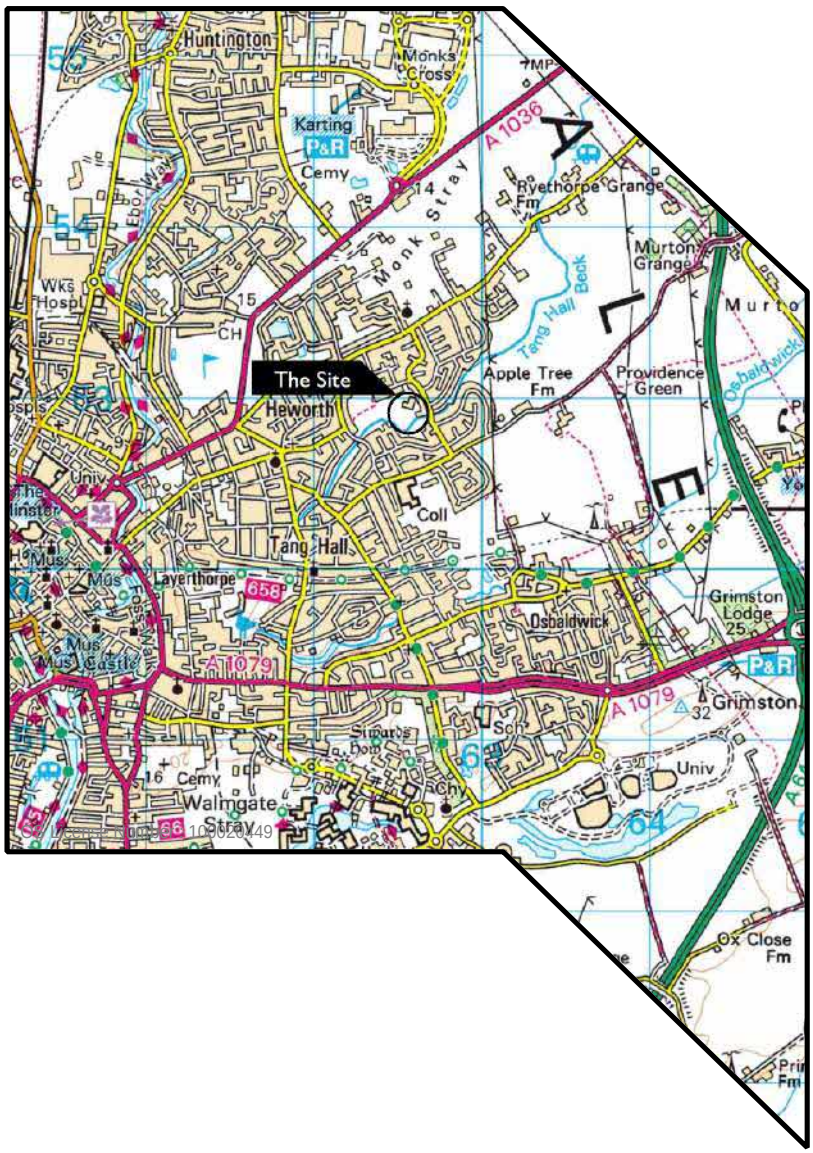

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Hempland Primary School

for

Department for Education

Engineer : Mott MacDonald

Project Number PC218325

January 2022

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Desk Study on a Site
at

Desk Study

Hempland Primary School

for
Department for Education

Engineer :
Mott MacDonald

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We have prepared this report in our professional capacity using reasonable skill, care and diligence. The assessments, conclusions and recommendations within this report pertain to the study site defined herein, and the immediate area in continuity with the Site. They are based on the established historical uses, and information available at the time of writing and the proposed use of the Site. Where any information supplied by the client or other sources have been utilised, it has been assumed that the information is correct. No responsibility can be accepted by Geotechnics for inaccuracies in data supplied by any other party.

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1.0 INTRODUCTION AND CLIENT'S BRIEF

This Phase I Desk Study was carried out to the instruction of Mott MacDonald on behalf of The Department for Education, the Client. The purpose of the Desk Study is to provide a geotechnical and geoenvironmental assessment for the proposed redevelopment of a Primary School. The proposals for the redevelopment of the site consist refurbishment of existing buildings, or demolition and rebuild of school buildings. If the rebuild option is chosen, this would consist the demolition of existing school buildings and construction of a new two-storey block either to the east, south or west of existing school buildings; the footprint of the existing building EFAA would be reinstated as a play area. A development plan for the proposals is not available however a sketch with the areas of proposed rebuild is presented in Appendix 6. A summary of the location of the site in relation to the proposed development is shown below:

Site Layout	Description
 Image from drawing number 142844-1 Drawing: 142844 Hempland Primary School Full drawing presented in Appendix 1	The proposed development options for the site are understood to comprise: • Refurbishment of existing EFAA and ANC1 buildings. or • Demolition of existing school buildings labelled EFAA, ANC1 and EFAB; • Construction of a new school of 2 storey modular construction to the east, south or west of EFAA; • Development of demolition area to form new play area.

This report comprises a geoenvironmental and geotechnical Site Survey undertaken in accordance with Stage 1 of RIBA Plan of Work 2020 Overview. It is intended to be used by the developer to aid, in later Stages, the design and construction of the proposed development. In addition, this report has been devised to generally comply with the relevant principles and requirements of a range of guidance including:

- Part IIA of the Environment Protection Act, 1990;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (HCA, February 2019);
- BS EN 1997-1:2004+A1:2013: "Eurocode 7. Geotechnical Design"
- BS5930:2015+A1:2020: "Code of Practice for Ground Investigations";
- BS10175: 2011 +A2:2017 "Investigation of Potentially Contaminated Sites - Code of Practice";
- The Building Regulations 2010. Part C (HM Government 2013);
- Environment Agency (2020) "Land Contamination Risk Management";
- Environment Agency (2011) Report GPLC1 "Guiding Principles for Land Contamination";
- Environment Agency (2017) "The Environment Agency's Approach to Groundwater Protection" November 2017 Version 1.1; and
- Sustainable Remediation Forum UK (SuRF) Framework

2.0 THE SITE

Site Location

A Site Location Plan and Site Boundary plan can be found in Appendix 1 and the site location is summarised in the table below.

Location	Hempland Primary School, Whitby Ave, Heworth, York
Grid Reference	462581, 452930
Post Code	YO31 1ET
Site Area	Approximately 2.28 Ha
Site Shape	The site is irregular in shape with maximum plan dimensions of 179m by 147m
Topography	The site is generally flat with elevations of approximately 15mOD to 16mOD around the school buildings in the northern half of the site. The southern half of the site slopes to around 13mOD along the southern boundary of the site, towards the minor valley along which Tang Hall beck flows. The topography of the surrounding land is fairly flat.

Site Description

A site visit was undertaken on 13th October 2021. A summary of the observations made is presented in the table below. Photographs of the site are presented in Appendix 2.

Current Use	The site is currently an active Primary School. As well as school buildings, the site includes areas of car parking, a playing field, playgrounds and sports courts.
Access	Vehicle and pedestrian access is off Whitby Avenue to the north of the site. Additional pedestrian access is present on the western edge of the site via a path leading from Hempland Lane.
Existing Buildings & Structures	There are 3 main buildings on site, labelled in the plan in Appendix 1 as EFAA, EFAB and ANC1. EFAA is the largest building on site with maximum dimensions of about 60m by 70m, and located in the centre of the northern half of site. The building is of brick construction and comprises a mix of single- and two-storey connected blocks. This building is the main teaching building and contains classrooms, a kitchen, toilets, the boiler room and oil tank. In the centre of the building is a chimney and flue associated with the oil boilers in the boiler room – it was not possible to inspect the condition of the chimney and flue during the walkover. EFAB is the smallest building on site, measuring approximately 6m by 8m, and is located along the southern boundary of EFAA. The building is single storey and the construction form is unknown, however it appears to be timber clad and to have been constructed more recently than EFAA and ANC1. It is used as additional teaching space. ANC1 comprises a block measuring approximately 5.5m by 37m located in the northern corner of the site and consists of a building (located in the centre) with the roofing extending east and west to form two shelters. The eastern shelter is used as a bicycle store. The western shelter is used as a scooter store and houses a clothes bank. The building itself is used for the storage of cleaning supplies. The building is single storey of brick construction with diagonal cracking being observed on the northern external wall of the building; no access to the internal wall during the walkover. A secondary bicycle store is located near the pedestrian entrance in the western area of the site. To the east of building EFAA is a wooden shelter with internal seating. A small performance platform is located in the east of the site; the platform itself is approximately 0.3m high.

	A small shed is located along the eastern boundary of the site. This is owned by the school, however it is rented by the local Parish Council for storage of grounds maintenance equipment. The storage of fuels, paints and cleaning materials is plausible, however unconfirmed. No retaining structures were observed during the walkover, likely due to the relatively flat topography around the buildings in the north of the site. The boiler room and other tanks observed during the walkover are discussed below.
Site Surface	The areas of hardstanding on site are predominantly asphalt; the exceptions to this are to the east of building EFAA where brick paving and paving slabs have been laid. The asphalt play area in the north western area of the site shows signs of cracking at the surface, radiating from a mature willow tree. The effects of trees on the site surface were not noted on any other areas of hard standing at the site. In the southern part of the site is a grassed playing field. Other areas of the site that are soft landscaped are also grass covered. In the eastern part of the site is an area used for horticultural education and included raised plant beds, the surface being covered with bark chips.
Evidence of surface staining	No evidence of surface staining from spillages or burning was observed during the walkover.
Ecology / Vegetation	Generally short field grass with mature / semi mature trees. Generally the trees are spread around the site with two rows of trees being observed along the southern boundary. A hedge runs along the western site boundary. NB – This should not be considered as an ecological survey. A survey should be commissioned and undertaken by a suitable qualified and experienced ecologist.
Storage Tanks	A boiler room is located within the main EFAA building near to the reception of the school. The boiler is oil fuelled. The surface surrounding the boiler is generally in good condition with some minor cracking as shown in Photo Location 18 in Appendix 2. There were no signs of leaks or spillages in the room. A second tank was observed on the northern side of the EFAA building, this tank containing oil. The floor beneath and surrounding the tank was stained and showed signs of spillages and the school confirmed that an incident had previously occurred where the tank had overflowed, resulting in the staining and the strong hydrocarbon odour. There are no records of any clean up of the oil spill held by the school. The surface below the tank is concrete and showed no obvious signs of cracking.
Services	Overhead services observed in the north of the site – most likely telecoms services. Lamp posts are located along the northern site entrance and in the vicinity of the reception. Evidence of underground services was also observed in the form of manhole covers.
Asbestos	No potential Asbestos Containing Materials (ACMs) was noted on the ground surface or on the external surfaces of buildings. The inside of buildings have not been assessed by Geotechnics Ltd for the possibility of ACMs. An asbestos survey has been commissioned at the site and the results are discussed in Section 7.0 below.
Waste Disposal/ Materials Storage	A bin store is located in the north of the site. No surface waste or signs of burning were observed during the walkover.
Surrounding Area	The land to the north and east of the site is for residential use. Immediately south east of the site is Heworth Community Centre and associated car park. To the south of the site is a small stream named Tang Hall Beck. The area around the stream

	was very overgrown during the walkover, however didn't appear to be full or fast flowing. Beyond the stream is a grass play area and shrub planting. To the west and southwest are grass-covered fields.
Local Water Features	No water features were observed on site. A small stream was observed just south of the site boundary. No further water features were observed.
Potential Off-Site Receptors	Residential properties to the north and east. Stream to the south.
Potential Off-Site Sources	None observed during the walkover.
Local / Background Knowledge	Conversations with the school's personnel indicated: • The chimney and flue are associated with the oil boilers in the boiler house. • The shed in the east of the site is rented by the council and used for maintenance equipment and may contain fuels, and chemicals such as paints and cleaning products.

3.0 SITE HISTORY

A search of available historic maps was undertaken to establish the previous land uses of the site. The maps discussed below are presented in Appendix 3 of this report.

Summary of Site History

On Site

The following table summarises the significant changes in historical use on site:

On Site		
Feature & description	Date Appears on OS mapping	Date No longer shown on OS Mapping
The site is undeveloped. Most of the site boundaries align with field boundaries. Tang Hall Beck is show along the southern si boundary. A footpath crosses the southern corner of site.	1853	1961
The present day access road for the site now lies within an area of allotment gardens.	1909	1961
The site is shown as a Sports Ground. The access road is no longer within allotment gardens.	1961	1974
Hempland County Primary School is shown in the northern part of the site, where the present EFAA building is located. A playing field is shown to the south. The outline of the asphalt-surfaced play areas to the east and northwest are shown.	1974	
The present ANC1 building is shown in the northern corner of the site.	1992	

Google Earth imagery also shows the following:

- The shed in the eastern corner of site is present from 2002.
- The EFAB building and the western bicycle store to be present from 2015.

Surrounding Area

The following table summarises the significant changes in historical use on land surrounding the site:

Off Site				
Feature & description	Distance from site (m)	Direction from site	Date Appears on OS mapping	Date No longer shown on OS Mapping
Allotment Gardens	0	N	1909	1971
Allotment Gardens	0	W	1931	-
Local housing	100	SW	1937	-
School	350	S	1952	-
Local housing	5	N & NE	1971	-
Local housing	5	E & SE	1982	-
School	570	S	1982	-
School	300	S	1992	-

4.0 GEOLOGY

The following section details information published by the British Geological Survey (BGS) on geological maps of the area. Where readily available and relevant, Geological memoirs and other literature have been consulted along with the BGS website (*www.bgs.ac.uk*).

Published Geology

The documented geology of the site is summarised below:

	Map Reference	Geology
Drift	BGS 1:50,000 Sheet 63 York, 1983, Envirocheck report 285631777_1_1, BGS 3D Geology Viewer accessed on 20.10.2021	The BGS map for the site shows the Warp and Lacustrine Clay deposits to be present at the site. The Envirocheck report and online BGS viewer name this unit as the "Alne Glaciolacustrine Formation". It is indicated to typically comprise laminated clay with varved silt layers and subordinate layers of fine sand. A tract of Alluvium is shown to be present around 60m west of the site, comprising clay, silt, sand and gravel deposits. The BGS map shows Sand and Gravel superficial deposits about 220m to the north of the site. The Envirocheck report and online BGS viewer name this unit as the "Sutton Sand Formation" and to comprise fine silty sand.
Solid	BGS 1:50,000 Sheet 63 York, 1983, Envirocheck report 285631777_1_1, BGS 3D Geology Viewer accessed on 20.10.2021	The BGS map for the site indicates the Bunter and Keuper Sandstone of Triassic age is present at the site. The Envirocheck report and online BGS viewer name this as the "Sherwood Sandstone Group". It typically comprises red, yellow and brown sandstone with subordinate mudstone and siltstone layers. In the lower part of the formation, it is conglomeratic with the pebbles composed of quartz and quartzite.
Structural	BGS 1:50,000 Sheet 63 York, 1983, Envirocheck report 285631777_1_1, BGS 3D Geology Viewer accessed on 20.10.2021	There are no known faults shown within 250m of site.

The records of three boreholes (BH1 to BH3) are held by the BGS located about 340m west of the site boundary, BGS Reference SE65SW 77-79. The holes were put down using Cable Percussion drilling techniques to a depth of 10m bgl. The boreholes records can be briefly summarised as follows:-

	Depth to Top (m bgl)	Thickness (m)
Made Ground	GL	0.8 – 2.5
Various layers of firm brown silty clay, sandy to very sandy clay, thinly laminated silty clay, sandy gravelly clay and in BH2 a layer of silty clayey sand	0.8 – 2.5	2.6 – 4.0
Firm to stiff brown sandy gravelly clay	3.4 – 6.5	Proved to 10m bgl.

A groundwater seepage was encountered in BH1 at 6.40m bgl (6.80mOD) and in BH2 at 3.00m bgl (10.15m OD). No groundwater was encountered in BH3.

Details of the site geology are presented in Appendix 3.

Geological Features

The presence of recorded geological features such as BGS Mineral Sites, Man Made Mining Cavities or natural cavities within 250m of site are summarised below. Where entries are present at a radius wider than 250m from the site, further details can be found in Appendix 3.

Data type	Entries (On site)	Entries (0-250m)
BGS Recorded Mineral Sites	None	None
Man Made Mining Cavities	None	None
Natural Cavities	None	None
Artificial Ground / Made Ground	None	None
Mining instability	None	None
Coal Authority Interactive Map – Mine entries	None	None

Radon

The property is in a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the Action Level). No radon protective measures are necessary in the construction of new dwellings or extensions.

Coal

The site does not lie within an area affected by Coal Mining and as such a coal report was not obtained.

Brine

The site does not lie within an area affected by Brine subsidence and as such, a Brine report was not obtained.

5.0 HYDROLOGY & HYDROGEOLOGY

Hydrology

The presence of any hydrological licences and incidents within 250m of the proposed site is summarised below. If entries are present at a radius than 250m wider of the site then further details can be found in Appendix 3.

Data type	Entries (On site)	Entries (0-250m)
Discharge Consents	None	None
Pollution Incidents to Controlled Waters	None	Four incidents relating to one location around 230m southwest of the site, adjacent to Tang Hall Beck. The incidents occurred between 1996 and 1998, and were classed as Category 3 – Minor Incidents. In all cases, sewage was the pollutant. The incidents impacted Tang Hall Beck, however it is noted on 3 of the 4 records "No fish killed".
Water Abstractions	None	None
Nearest Surface Water Feature	None	Tang Hall Beck around 7m south of the site boundary.
Flooding	No potential for flooding from rivers or sea on site. The site is not at risk of flooding from surface water or groundwater.	The area immediately south of the site, along the course of Tang Hall Beck, has potential for flooding from rivers and a low to high risk of flooding from surface water. Where Tang Hall Beck is located around 100m southwest of the site, there is limited potential for flooding from groundwater to occur.

Hydrogeology

The Groundwater Vulnerability map is summarised in the table below:

Geology	Formation	Aquifer Type	Permeability
Drift	Alne Glaciolacustrine Formation	Unproductive Strata	Unknown
Drift	Alluvium (Off site)	Secondary A	Unknown
Drift	Sutton Sand Formation (Off site)	Secondary A	Unknown
Solid	Sherwood Sandstone Group	Principal Aquifer	Unknown

6.0 ENVIRONMENTAL DATA

The following section details environmental data available for the site and the surrounding area. Full details can be found in the Envirocheck Report by Landmark located in Appendix 3.

The tables below summarises the presence/absence of any waste, hazardous substance sites and/or industrial land uses within 250m of the site with details provided. Where there are entries present at a radius wider than 250m, then further details are provided in Appendix 3.

	Data Source	Data Summary
Environmental Database Information	Industrial Processes	There are no registered Integrated Pollution Control (IPC) Sites, Registered Radioactive Substances sites, Control of Major Accident sites (COMAH), Explosives Sites or Notification of Installations Handling Hazardous Substances (NIHHS) within 250m of the site.
Landfill & Waste Sites Search	Landfills: Ordnance Survey Historical Mapping	There are no records of historical landfills within 250m of the site. There are 5 records of potentially infilled land (water) within 250m of the site. The nearest is 72m south of the site.
	Other Waste Sites	There are no other recorded entries within 250m of the site.
Trade Directories	Trade Directory Entries recorded in 250m radius	There are 3 entries within 250m of the site – all entries are relating to cleaning services and are listed as inactive.
Fuel Stations	Fuel Stations recorded in 250m radius	There are no recorded fuel stations within 250m of the site.
Radon Potential	Building Research Establishment, 2015, 'Radon: Guidance on protective measures for new buildings'	The site is situated in an area where radon protective measures are not necessary in the construction of new buildings.
Other Radiation		No reasonable grounds for believing land to be radioactively contaminated (in accordance with 2005 extension of Part IIA of The Environme Protection Act 1990).
Unexploded Ordnance	Alpha Associates Preliminary Unexploded Ordnance (UXO) Threat Assessment – 5th October 2021 (Presented in Appendix 3)	Risk of encountering UXO assessed as being 'unlikely' with the World War II high explosive bomb density assessed as <15 bombs / 100 hectares. Report concludes that no further action is required.
Ecology	Sites of Ecological Importance	There are no Sites of Special Scientific Interest (SSSI), National Nature Reserves, National Parks, Local Nature Reserves, Areas of Outstanding Natural Beauty or RAMSAR (wetlands) within 250m of the site.

Buried and overhead Services	Site Walkover	Access covers and overhead cables were observed on site during the site walkover. A utilities report has been commissioned by the Mott MacDonald and the results are pending.
Archaeological & Building Heritage	MAGIC website accessed on 20/10/2021	None on site or within 250m of the site.
	Historic England website accessed on 20/10/2021 https://www.historicengland.org.uk	None on site or within 250m of the site.

7.0 PREVIOUS REPORTS / INVESTIGATIONS

A report titled 'Management Survey For Asbestos-Containing Materials' by Eton Environmental Group, ref J050528 and dated 26/04/2021 was made available for the site. The report identified one high-risk material (with respect to the presence of asbestos), and 36 low and very low risk materials.

The report should be made available to any demolition contractors at the site.

8.0 POTENTIAL CONTAMINANT LINKAGES & PRELIMINARY CONCEPTUAL SITE MODEL

Assumptions relating to the Proposed Redevelopment

The geoenvironmental assessment is based on the assumptions presented below:

- The site will be a Primary School facility; and
- Drinking water will be from mains supply.

Potential Sources of Contamination

For the purpose of this assessment the potential contaminants of concern have been considered according to whether they are likely to have originated from on-site or off-site sources.

Potential On-site Sources of Contamination

- Sources from the current school including hydrocarbon spillages and leaks of heating oil / fuels.
- Any buried construction wastes, including asbestos, or shallow Made Ground relating to the construction of the existing school.

Potential Off-site Sources of Contamination

- Allotment gardens located to the north and west of the site.

Potential Receptors of Contamination

Based on the data previously discussed, the following potential receptors to contamination have been identified:

- Humans – Pre-development completion, i.e. working on site during demolition and construction.
- Humans – Pupils, staff and visitors attending the school following development.
- Off-site Human Health receptors including the neighbouring residential properties.
- Surface Waters – off-site stream.
- Groundwater – Groundwater within the bedrock Principal aquifer.
- Building structure and services following development.

The possible contaminant linkages are discussed below. It should be noted not all may be formed between all sources and receptors.

Identification of Pathways

Pathways to Human Health

A potential contaminant may reach a receptor by various routes. For example, in areas where contaminated material is exposed, dermal contact with the material, inhalation or ingestion of dust may occur.

Inhalation or ingestion of dust and water could occur during the construction and development phase at the site. Pathways from dermal contact with soil and groundwater may also arise. It is considered that the risk of short term exposure for ground workers and other construction workers is low unless there are asbestos fibres in any Made Ground.

Post construction, the surface of the development area will predominantly comprise landscaped grass areas and playing fields and asphalt-surfaced hardstanding. This is significant in that a number of potential pathways are possible such as long-term direct contact and dust inhalation/ingestion is also applicable.

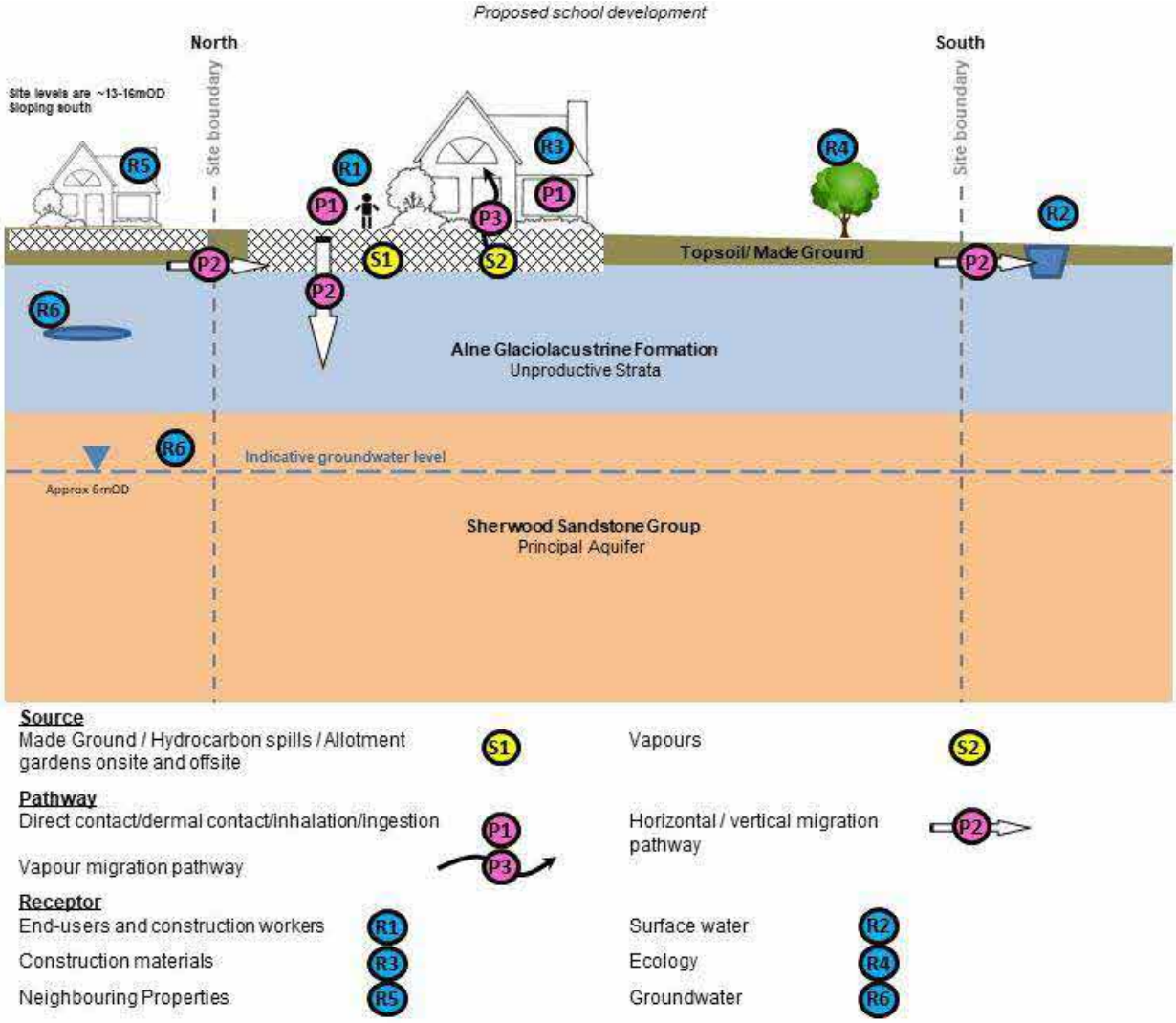
Ground Gas and Vapour related Pathways

Ground gas and vapour entry into buildings is considered to be a potential pathway for the proposed development due to the possibility of advection and diffusion into buildings, which may occur regardless of the presence of hard standing across the majority of the site.

Pathways to Controlled Waters

Groundwater levels at the site are anticipated to be around 7-10m bgl and within the Sherwood Sandstone Formation. This is based on the 1:100,000 Institute of Geological Sciences Hydrogeological Map of South Yorkshire and Adjoining Areas dated 1982. From the BGS borehole records, shallow groundwater was encountered sporadically in Drift deposits at depths of between 3.00m and 6.40m (10.15m OD and 6.80m OD respectively). This suggests that groundwater in Drift deposits occurs in hydraulically isolated lenses of relatively permeable strata.

The vertical leaching of contaminants from any Made Ground or hydrocarbon spills into the groundwater is a potential pathway for contaminants to impact groundwater. The presence of Drift deposits across the site creates a barrier between any Made Ground contaminated materials, if present, and the bedrock Principal Aquifer. Groundwater in drift deposits has been shown to occur in hydraulically isolated lenses and the downward migration of any contaminants through the Drift deposits is likely to be very slow.



Other Pathways

Other potential pathways that are possibly less significant to the site but still require consideration are; potential phytotoxic effects on sensitive landscaping plants; chemical attack on foundations and services, potential for surface run-off to transport soils off-site during construction works and permeation of contaminants through domestic water pipes.

Initial Conceptual Site Model

In accordance with BS 10175 and LCRM, a schematic Initial Conceptual Site Model has been developed based on the source-pathway-receptor data presented above. Further details of the risk assessment methodology are presented in Appendix 4.

The model shows the predicted geology and topography, the major on site potential contamination sources and vulnerable receptors. Levels shown are relative to Ordnance Datum and are based on published data previously presented in the report, although the drawing may not be considered to scale. The information presented above represents the preliminary conceptual ground model that may need to be revised based on information obtained as part of any future intrusive investigation. A number of sensitive receptors and potential pathways and sources (in association with a list of likely contaminants) have been identified.

The ground model and proposed end use described above have been considered in relation to Nathaniel et al. 2015, The LQM/CIEH S4ULs for Human Health Risk Assessment. The proposed development generally does not conform to the conceptual models defined in Nathaniel et al. 2015 however for the purpose of this geoenvironmental assessment, the site is closest to public open space (parkland) and residential without home grown produce.

Potential Contaminant Linkages Assessment

For each contamination source there are potential contaminant linkages with all receptors. However, in the context of this site, not all of the contaminant linkages are plausible. The likelihood of the various pathways linking the contaminants to the receptors is presented in the table below:

The preliminary contaminant linkage assessment is based on current available guidance published by a number of sources and is summarised in Appendix 4.

The preliminary hazard assessment is a qualitative assessment of the risks posed by each viable pollution link identified. The hazard assessment leads to a recommended subsequent activity that could be:

- Action Required (AR) in the short term to break existing contaminant-pathway-receptor (CPR) link;
- Site Investigation Required (SIR) with objectives for risk estimation; or
- No Action Required (NAR) at this stage.

Hazard Identification				Hazard Assessment			
Link	Contaminant	Pathway	Receptor	Probability	Consequence	Risk	Contaminant Linkage Assessment
1	Contaminated soil / groundwater	Ingestion (via soil dust) and inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	A- Humans using the site during construction.	Medium/ Reasonably foreseeable	Medium	Medium	SIR: Proposed development is shown in the area of asphalt playground in the east, however the existing buildings will be reinstated as a playground. Potential for contaminants to be present in Made Ground, demolition wastes and from spillages. Confirmation of contaminant status in existing school footprint required.
2		Ingestion (via soil dust) and inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	B- Humans using the site after development completion.	Medium/ Reasonably foreseeable	Medium	Medium	SIR: As above.
3		Downward / Lateral migration	D – Unproductive strata D – Principal Aquifer	Medium	Low	Low / Medium	SIR: Concentrations of contaminants in groundwater (soil leaching samples if groundwater not encountered) required to quantify risks to sensitive receptors.
4		Inhalation	B- Humans using the site after development completion.	Medium	Medium	Medium	SIR: Potential for volatile organic compounds as well as asbestos fibres.
5	Gas – methane & carbon dioxide	Ingestion, inhalation, dermal / direct contact	E- Ecology (Flora/Fauna)	Low	Negligible	Low	NAR
6		Ingestion, inhalation, dermal / direct contact	B - Humans using the site after development completion.	No significant sources of ground gases identified		Low	NAR: No significant sources of ground gases identified e.g. thick made ground containing labile carbon, active landfills, recently closed landfills or coal mining activity.
7	Contaminated soil / waste / groundwater	Unproductive Strata	E- Ecology (Flora/Fauna)	Negligible	Negligible	Low	NAR
8	Contaminated groundwater	Direct contact.	F- Building structures.	Negligible	Mild	Low	NAR

9.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

In addition to the environmental hazards, there are also geotechnical hazards associated with the stability of the ground (including load bearing capacity, slope stability and effects of ground (mining) cavities). Local Authorities follow the NPPF (2019) which requires that "site is suitable for its new use taking account of ground conditions and land instability…includes risks arising from natural hazards or former activities such as mining…". A summary of the geotechnical hazards and considerations is provided below:

Geohazards	
Highly Compressible Ground	Plausible in the clay soils of the Alne Glaciolacustrine Formation.
Collapsible Soils	Unlikely.
Swelling Clay	Plausible in the clay soils of the Alne Glaciolacustrine Formation.
Running Sand	Negligible
Ground Dissolution	Negligible
Landslip	Negligible.
Mining & Quarrying	Negligible. There is no evidence of mining or mineral extraction or quarrying at the site.
Geotechnical Design Considerations	
Site Clearance	The current redevelopment proposals include the option of demolition and clearance of all buildings present on site. The floor slab of the current school and the hardstanding in the north and east will require breaking out in order to facilitate the redevelopment.
Trees	There are a number of trees across the site that would affect the rebuild development option. The asphalt-surfaced area in the east is tree-lined along the southern and western edges. A handful of trees are also located to the north and east of this area. Numerous trees are spread across the north of the site, in the vicinity of the school buildings. Within the southern boundary of site are 2 rows of trees. A hedge runs along the western site boundary. If the rebuild option is chosen, the design of future foundations needs to take account of the trees and hedgerows.
Existing Buildings / Obstructions	All permanent school buildings and structures still present on site with associated foundations and floor slabs. The foundation type and depth of the school is unknown, however it is probable that they are shallow pads or strip foundations as most buildings on site are of single storey. Some lightweight structures are also present, also likely to be on shallow pad foundations.
Foundations	The rebuild option shows possible development areas over the footprint of the existing play areas surfaced with asphalt, and grass covered fields. It is very unlikely there are any obstructions beneath these areas. Should the development progress as demolition and rebuild, spread foundations are likely to be suitable at this site but must take into account the presence of the trees and hedges and be founded in competent ground below the depth of any Made Ground and broken out hardstanding. The foundations will likely founded in the drift deposits only. The strength, compressibility and volume change potential of the foundation-bearing stratum must be confirmed. Ground investigation will be required in order to fully inform the design of such foundations.
Floor Slabs	The rebuild option shows possible development areas over the footprint of the existing play areas surfaced with asphalt, and grass covered fields. Ground bearing slabs may be suitable if placed on natural strata and any Made Ground is either removed or treated. The presence of trees and hedgerows must also be considered. Ground investigation will be required in order to fully inform the design of any floor slabs.
Groundwater	Shallow groundwater is unlikely to be encountered in the drift deposits. Ground investigation will be required to determine whether any groundwater control measures will be required during construction.
Earthworks	No significant bulk earthworks are likely to be required to produce the development platform. However should any earthworks be required, it is likely that site excavated soils can be reused.
Slopes	Slope instability is likely to be low risk as the topography over the development area is generally flat.
Retaining Walls	No retaining structures were observed during the walkover. No significant retaining structures are anticipated as part of the proposed development.
Pavements / Hard Standing	Depending on the development levels, the formation levels for areas of hard standing and for road pavements should be reasonably consistent and likely to be within the clay and silt of the Alne Glaciolacustrine Formation. This needs to be confirmed by the investigation.
Chemically aggressive ground conditions	Adverse pH and sulphate levels are unlikely but this needs to be confirmed as part of the investigation, particularly in any Made Ground.

The Geotechnical Risk Register is included in Appendix 5. This should be reviewed and refined following the preliminary investigation proposed in Section 10 below and further developed as the geotechnical design and assessment progresses.

A detailed ground investigation is imperative in the redevelopment of the site. The proposed investigation detailed below in Section 10 below and in Appendix 6 is for preliminary purposes. Contractors for the construction of the new school should obtain any additional investigation work that may be required to prepare their own detailed Ground Investigation Report and Geotechnical Design Report to Eurocode 7 and to prepare their own contaminated land risk assessment in line with Land Contamination Risk Management (LCRM, 2020) guidance including further ground investigation and risk assessment, remediation options appraisal and remediation strategy and verification (if required), which are to be used as the basis of the contractors detailed design.

10.0 CONCLUSION & RECOMMENDATIONS

Environmental Risk Assessment

The results of the risk assessments indicate that there are potentially moderate sources of contaminants present at the site, primarily related to the existing development over the northern half of the site as a school and the oil tank showing potential historical spillages or leaks. There is the potential for further spillages of fuel and other chemicals, as well as the presence of demolition waste in the foreseeable future when the existing buildings are demolished. There is a moderate risk to receptors including human receptors during construction and to site users following development. A cover system may be required within any new playground areas dependent on the results of any future investigations at the site.

There are no identified significant sources of ground gases on or close to the site and without the presence of any viable sources of ground gas further assessment is not required. No specific precautions are required with respect to radon for the development.

There is limited potential for contaminants in Made Ground to migrate vertically down into the underlying bedrock aquifer due to the presence of the overlying non-productive drift deposits. Lateral migration may occur from off and on site sources potentially along the topsoil /Made Ground boundary and the underlying Drift deposits.

If any soils are to be removed from site and disposed of at a Permitted facility, these should be chemically analysed to ensure appropriate waste classification and characterisation.

Geotechnical Risk Assessment

The risk assessment has concluded that there are no significant geotechnical risks associated with the proposed redevelopment. Information is required in order to design appropriate foundations and floor slabs for any proposed rebuild option, as well as assess the potential for aggressive ground conditions for concrete design purposes. If bulk earthworks (cut and fill) are proposed for relating structures and features at the site, information will be required to assess the soils compaction characteristics etc. and examine any slopes / retaining structures.

Identified Geotechnical and Geoenvironmental Abnormal Conditions.

The following Geotechnical Abnormal Conditions have been identified:

- Deepening of foundations relating to the swelling / shrinking of clay soils due to the influence of trees and shrubs in the vicinity of the proposed development.
- Possibility of compressible clay soils in the Glaciolacustrine deposits.

The following Geoenvironmental Abnormal Conditions have been identified:

- Elevated concentrations of contaminants may be present associated with existing buildings and structures on site. This may include construction and demolition materials resulting from the redevelopment as well as from waste and spillages of fuels.
- Potential for hydrocarbon based contaminants to be present in shallow soils in the vicinity of the oil tank.
- Abnormal costs may arise should the importation of clean material be required for use in a cover system, from any localised remediation required around any tanks, and from the disposal of wastes from the site.

Recommendations for Further Works and Proposed Investigation Strategy

Re-use of soils

It is recommended that a U1 exemption is applied for in order to re-use up to 1,000 tons of soil at the site. If any cut/fill operations will exceed the limit of a U1 exemption, then soils should be assessed and re-used in accordance with the requirements of the CL:AIRE Definition of Waste: Code of Practice (DoWCoP). The works requires are as follows:

- A baseline contaminant assessment should be undertaken in order to allow screening of clean naturally occurring soils for importation to assess for potential increased contaminant loading;
- As most developments require a portion of excess soil to be sent to a landfill sites, we would propose making an assessment of the any made ground and natural strata to classify them in accordance with Landfill Waste Acceptance Criteria;
- If soils are re-used in accordance with the CL:AIRE DoWCoP these soils may potentially still be classified as waste until a Verification Report has been submitted; and,
- If contamination is found during excavation or construction, stop work and make excavations safe and contact an experienced geoenvironmental engineer to re-assess potential risks.

Proposed intrusive investigation strategy

In order to make a quantitative assessment of the potential risks and so any required remedial measures can be designed, we recommend that a Phase 2 Investigation is carried out in accordance with BS 10175: 2011+A2:2017. This should be combined with a geotechnical investigation carried out in accordance with BS 5930:2015+A1:2020 to assist with the proposed development design. We recommend that the aims of future investigations are:

- Determine whether any contaminative substances are present at site associated with any Made Ground and historical spillages.
- To confirm the depth and extent of any Made Ground that may be present across the site.
- Determine the geotechnical properties of the natural soils at the site, and any Made Ground that may be present, to allow for the design of the proposed development foundations, the aggressiveness of the soils to buried concrete and provide information for pavement / hard-standing design and any earthworks including slopes and retaining structures.
- Determine the presence of any groundwater and also determine if it has been impacted by onsite sources.
- Determine the presence of any sources of ground gases via soil descriptions and chemical analysis for Total Organic Carbon only.

In order to fulfil the aims detailed above, we recommend that this preliminary investigation comprises:

- Exploratory holes comprising 3 cable percussive boreholes, to a depth of up to 8m bgl and 5 dynamic (window) sample holes to depths of around 4m bgl for the proposed school building as well as investigating hardstanding in the north.
- In situ testing comprising DCP tests for areas of hardstanding and proposed playing areas.
- Recovery of samples from boreholes to undertake chemical testing including asbestos, heavy metals, speciated TPH plus BTEX and speciated PAH;
- Soil leaching tests of Made Ground materials to asses any potential impact to the underlying strata, if shallow groundwater is not encountered;
- Recovery of samples of the appropriate Sample Class for classification, strength, compressibility, earthworks classification and buried concrete classification;
- Sampling of 'natural' soils to allow the establishment of baseline soil chemical concentrations to allow assessment of any proposed soil importation via the CL:AIRE DoWCoP, if soil importation is likely to be required;
- For each contaminant identified, a quantified application of risk assessment models in accordance with LCRM;
- Installation of groundwater monitoring wells and their subsequent groundwater sampling;
- Commissioning of a Phase 2 report following the completion of the intrusive investigations; and,
- Review and update the Geotechnical Risk Assessment.

The figure in Appendix 6 shows a sketch of the proposed exploratory hole locations.

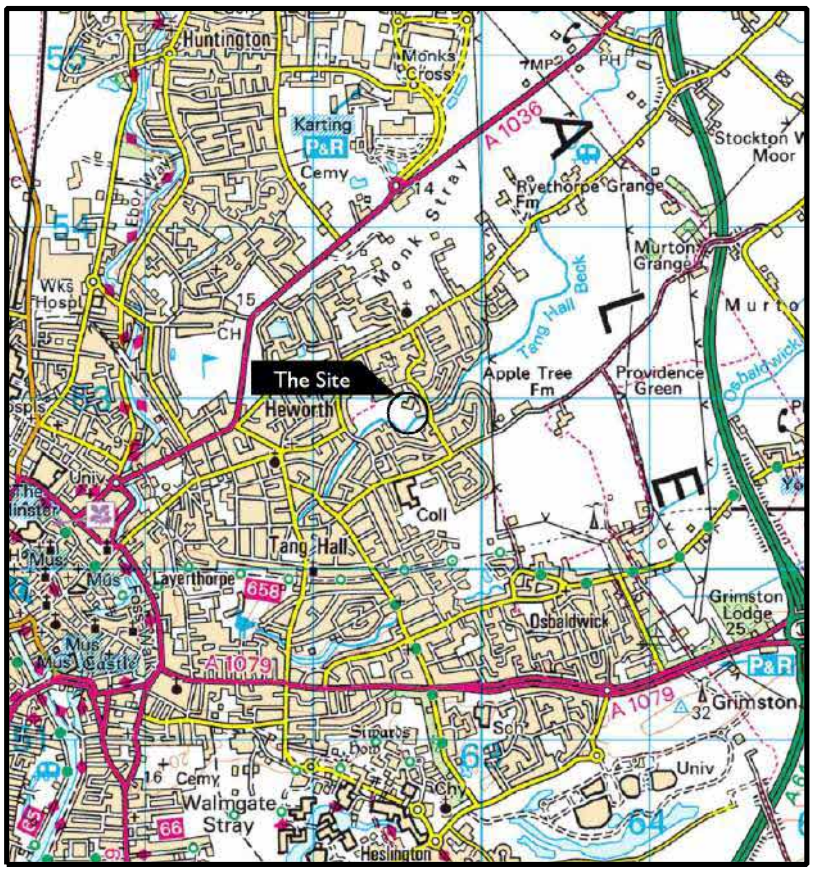
11.0 REFERENCES

1) Environmental Protection Act 1990: Part IIA, Contaminated Land Statutory Guidance, HM Government, April 2012.
2) BS 5930: 2015 + A1: 2020 : Code of practice for site investigation. British Standards Institution.
3) BS 10175: 2011+ A2 2017: Investigation of potentially contaminated sites – Code of Practice. British Standards Institution
4) Building Research Establishment : 2010 : Part C.
5) Building Research Establishment : 2015 : Radon: Guidance on protective measures for new buildings.
6) Environment Agency : 2010 : GPLC1 – Guiding principles for land contamination. GPLC2 – FAQs, technical information and references. GPLC3 – Reporting checklists.
7) Environment Agency : 2020: Land Contamination Risk Management
8) HM Government : 2013 : The Building Regulations 2010. Part C. Site Preparation and resistance to contaminants and moisture. 2004 Edition with Amendments 2010 & 2013.
9) Ministry of Housing, Communities & Local Government: 2019: National Planning Policy Framework, February 2019.
10) Statutory Instruments: 2012: Environmental Protection, England. Contaminated Land (England) (Amendment) Regulations 2012 No. 263 coming into force 6th April 2012.
11) Statutory Instruments: 2015: The Construction (Design and Management) Regulations 2015 (CDM 2015) coming into force 6th April 2015.
12) Nathaniel et al. 2015, The LQM/CIEH S4ULs for Human Health Risk Assessment.

APPENDIX 1

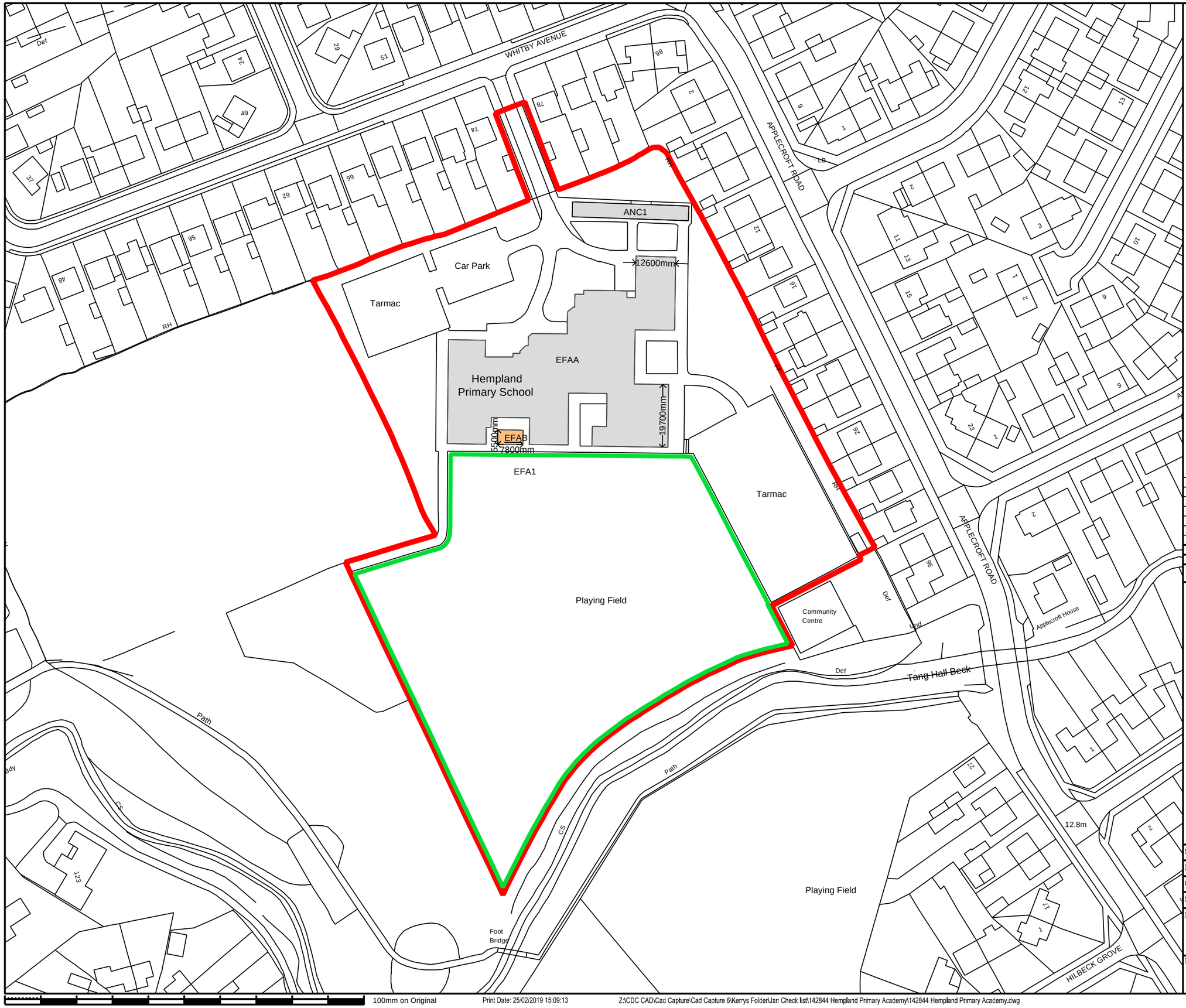
Site Location Plan

SITE LOCATION PLAN



Desk Study
at
Hempland Primary School
for
Department for Education

GEOTECHNICS
geotechnical and geoenvironmental specialists



NOTES:

- School Site Boundary
- School Playing Field Boundary
- Separation of 2 adjoining blocks
- 18mm — Typical Block dimensions
- EFA1 — CDC Site Reference
- EFAD — CDC Block Reference
- ANC1 — Ancillary Block Reference
- Car Park, etc. — Annotation to specific areas
- Blocks - NEW
- Blocks - DEMOLISHED
- Blocks - EXISTING

Rev	Date	Description	Drn	Ch

Education & Skills Funding Agency

Education Funding Agency

CDC 17 - 19

SCHOOL:

142844
Hempland Primary Academy

Site Address

Whitby Avenue, Stockton Lane
York, North Yorkshire
YO13 1ET

Survey Organisation	CAPITA		
Drawn	K.TIBBS	Date	16JAN18
Checked	C.STEWART	Date	23JAN18
Scale:	NTS	Original Size:	A3

Document Staus:

FINAL

Drawing Number:	Revision:
142844-1 of 1	REV

100mm on Original

Print Date: 25/02/2019 15:09:13

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APPENDIX 2

Site Walkover Photos

Photograph Location Plan

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 01 facing North West - Vehicle entrance for the site

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 02 facing North East - ANC1 Building

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 03 - Oil Tank (1)

PHOTOGRAPHS

Project Number : PC218325

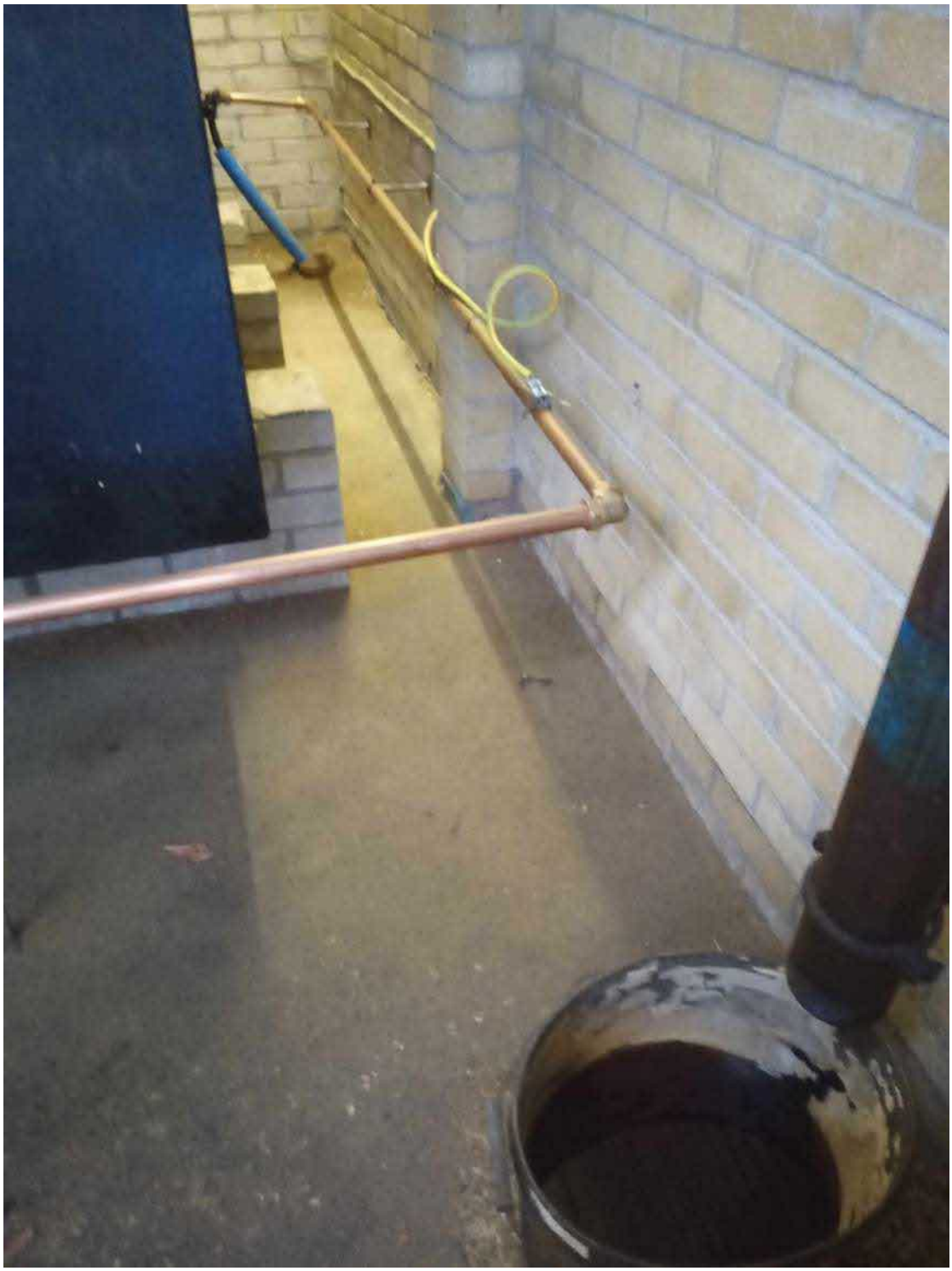
Project : Hempland Primary School

Location 03 - Oil Tank (2)

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School



Location 03 facing South - Oil Tank (3)

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 04 facing South West - Towards school reception

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 04 facing West - Staff car park and access

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 05 facing East - ANC1 Building

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 05 facing South East - Bin area

PHOTOGRAPHS

Project Number : PC218325

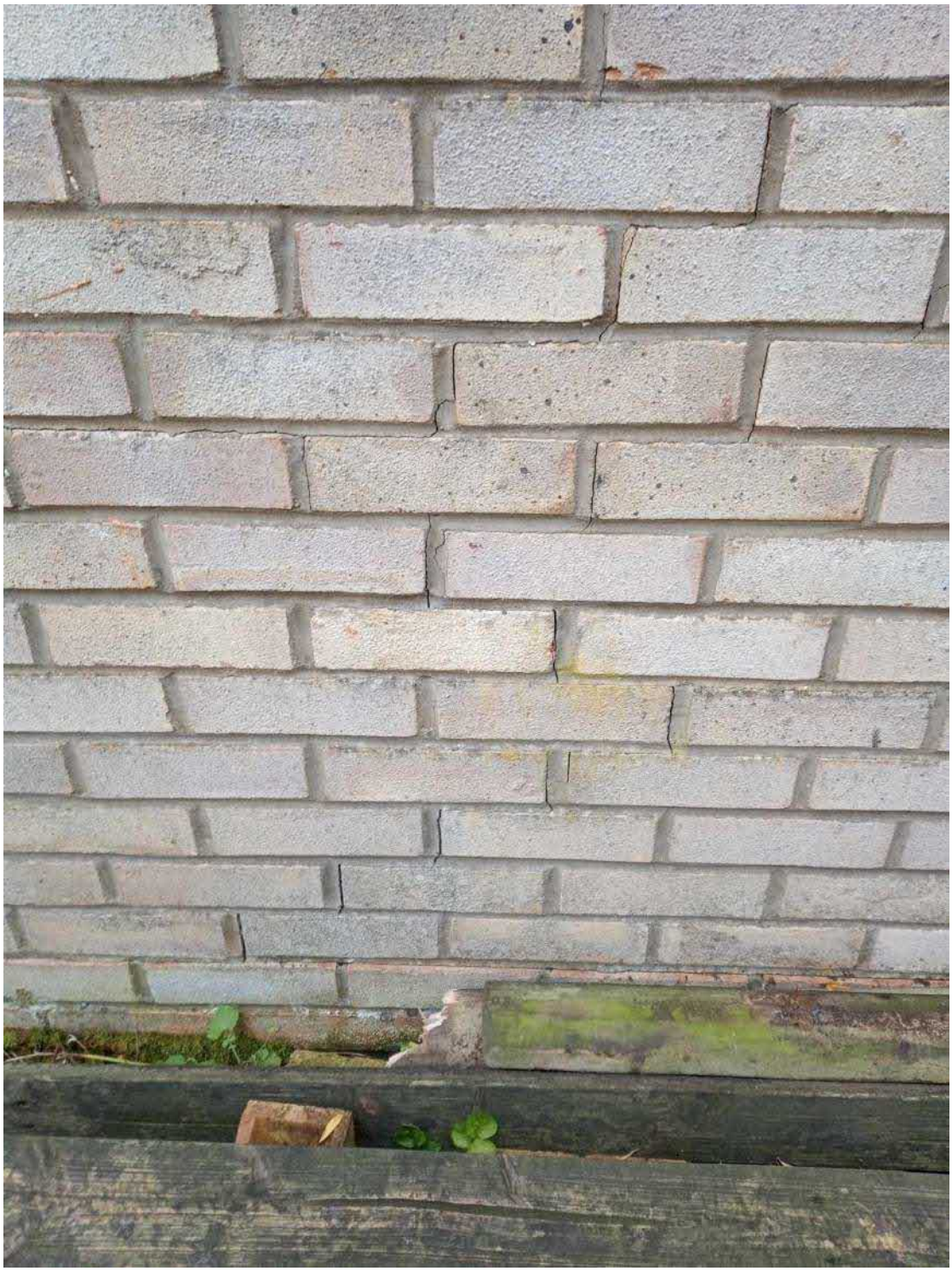
Project : Hempland Primary School

Location 06 facing South - Cracking on northern wall of ANC1 (1)

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School



Location 06 facing South - Cracking on northern wall of ANC1 (2)

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 07 facing South West - Access gate to the south of the site

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 08 facing East - Horticultural area

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 09 facing East - Wooden shelter

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 09 facing North West - One storey section of EFAA

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 09 facing West - Two storey section of EFAA building, Chimney and outdoor seating

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 10 facing East - Performance platform

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 10 facing South - Tarmac playground and playing field

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 10 facing South East - Tarmac playground

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 11 facing South East - Shed

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 12 facing South West - Trees along southern boundary

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 13 facing North West - Hedge lined boundary

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 14 facing North - Bicycle shelter

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 14 facing North East - Playing field, EFAA and EFAB

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 15 facing North East - Play area and EFAA

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 15 facing North West - Hedge lined boundary

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 16 facing North - Outdoor seating surrounding on site tree

PHOTOGRAPHS

Project Number : PC218325

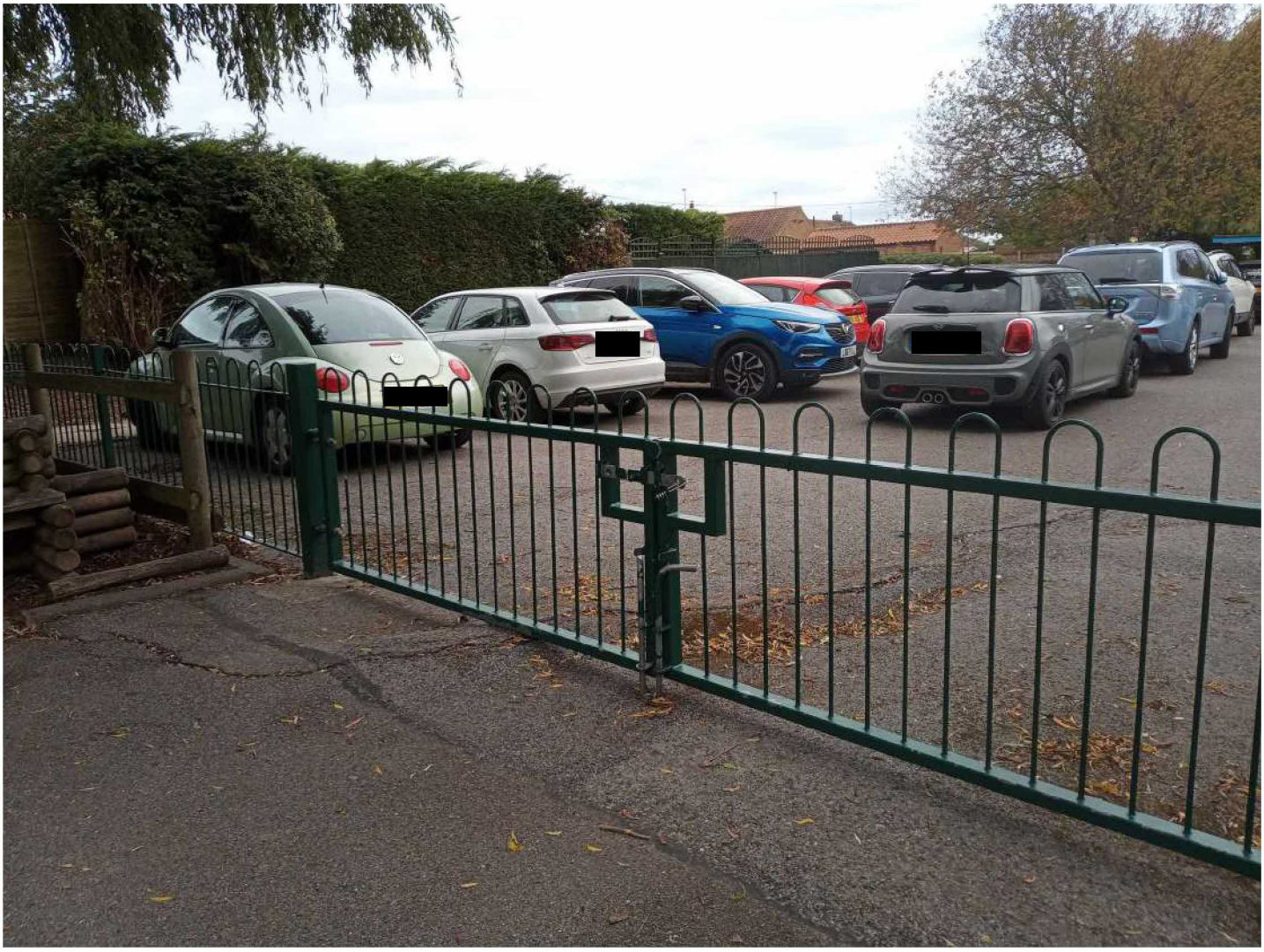
Project : Hempland Primary School

Location 16 facing North - Tarmac cracking radiating from tree

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School



Location 16 facing North East - Access gate from staff car park

PHOTOGRAPHS

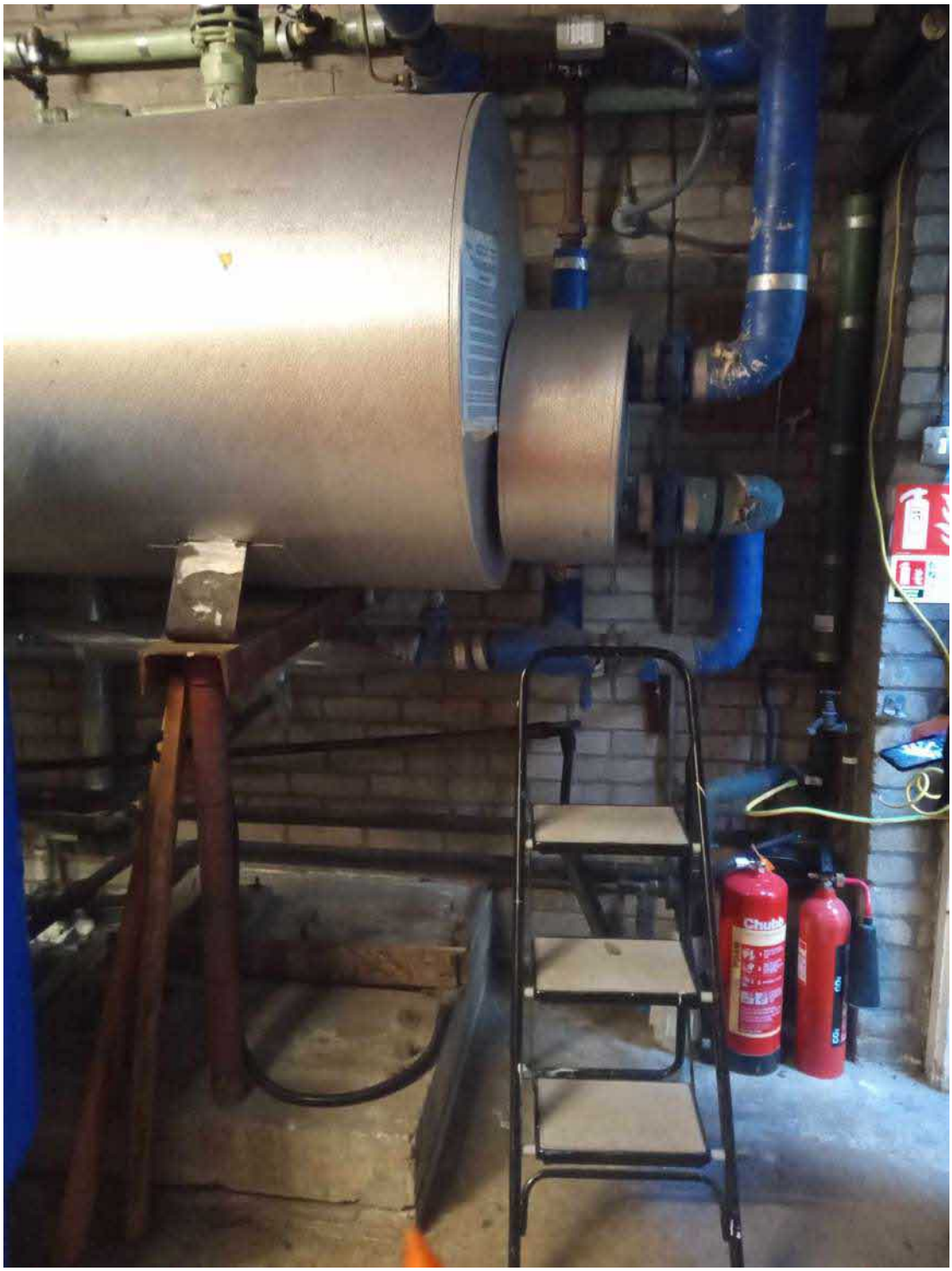
Project Number : PC218325

Project : Hempland Primary School

Location 17 facing North East - Staff car park and surface cracking

Project Number : PC218325

Project : Hempland Primary School



Location 18 - Inside the Boiler Room (1)

PHOTOGRAPHS

Project Number : PC218325

Project : Hempland Primary School

Location 18 - Inside the Boiler Room (2)

PHOTOGRAPHS

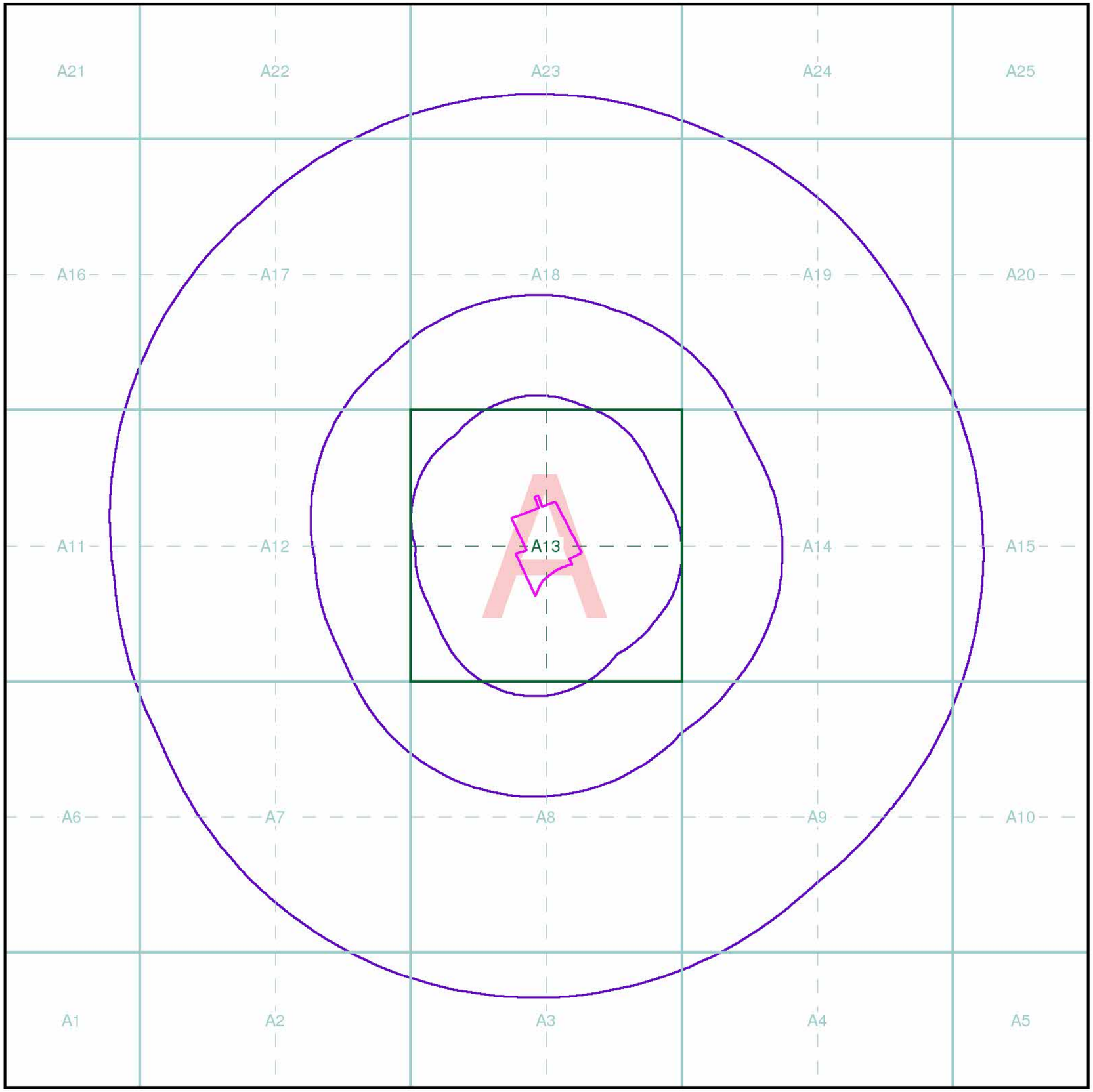
Project Number : PC218325

Project : Hempland Primary School

Location 18 - Inside the Boiler Room (3)

APPENDIX 3

Envirocheck Report, Historical and Geological Mapping, UXO Report



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Index Map

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

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

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

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

A selection of organisations who provide data within this report:

Map data | British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL | Environment Agency | NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mrs N Kingdon, Mott Macdonald, 2nd Floor, East Wing, 69-75 Thorpe Road, Norwich, Norfolk, NR1 1UA

Order Details

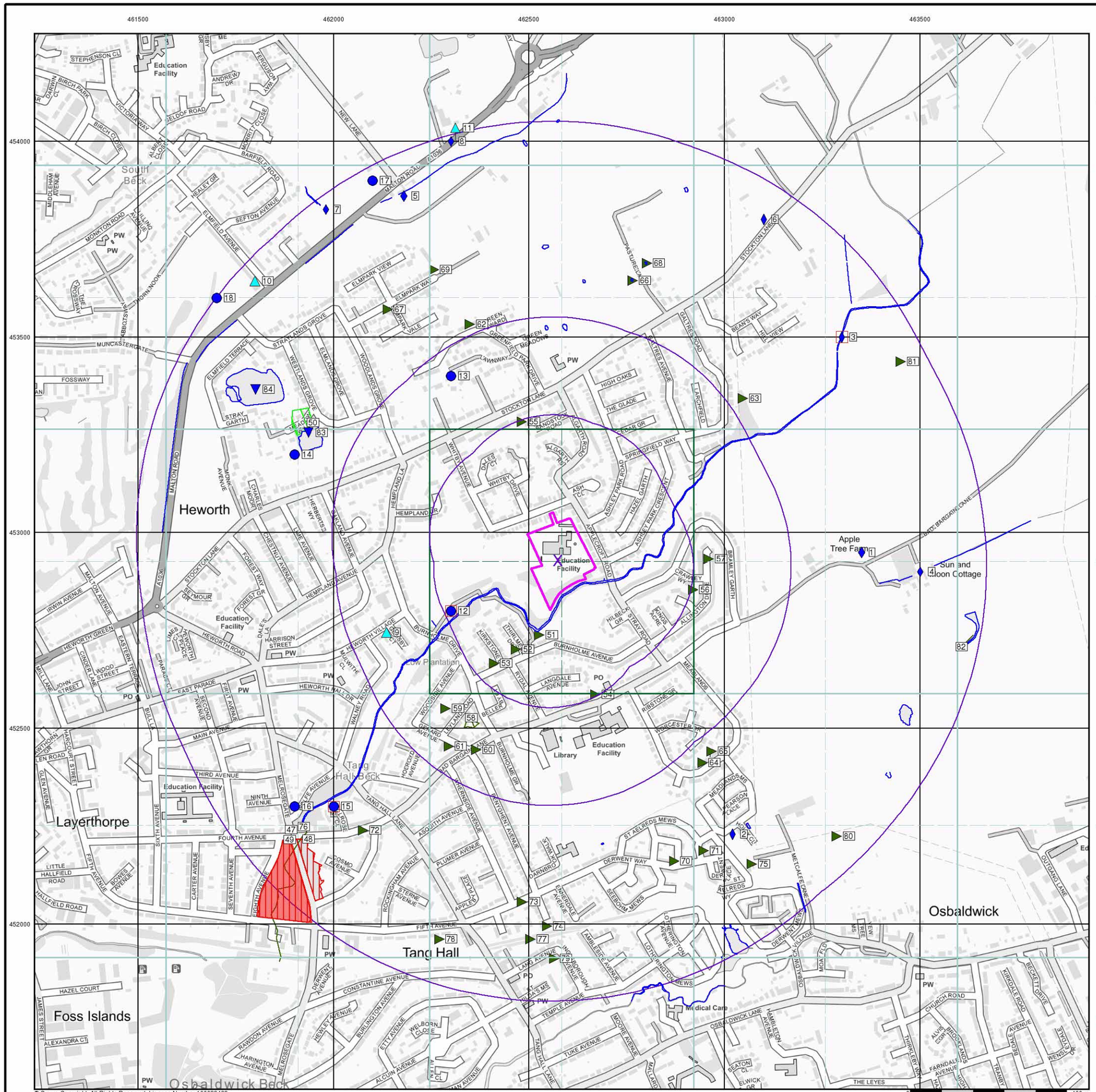
Order Number:	285631777_1_1
Customer Ref:	100418273 (note: to transfer to Hempland)
National Grid Reference:	462580, 452930
Site Area (Ha):	2.22
Search Buffer (m):	1000

Site Details

Hempland Primary ACADemy, Whitby Avenue, YORK, YO31 1ET

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

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



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General

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

Several of Type at Location

Agency and Hydrological

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

Hazardous Substances

COMAH Site | Explosive Site | NIHHS Site

- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

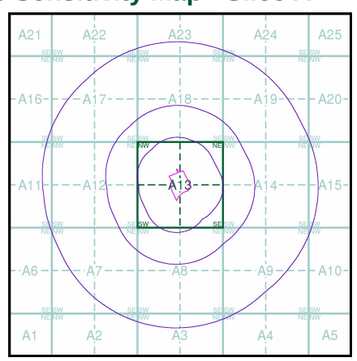
Geological

- BGS Recorded Mineral Site

Waste

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

Site Sensitivity Map - Slice A



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National Grid Reference:	462570, 452930
Slice:	A
Site Area (Ha):	2.22
Search Buffer (m):	1000

Site Details

Hempland Primary ACADemy, Whitby Avenue, YORK, YO31 1ET

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
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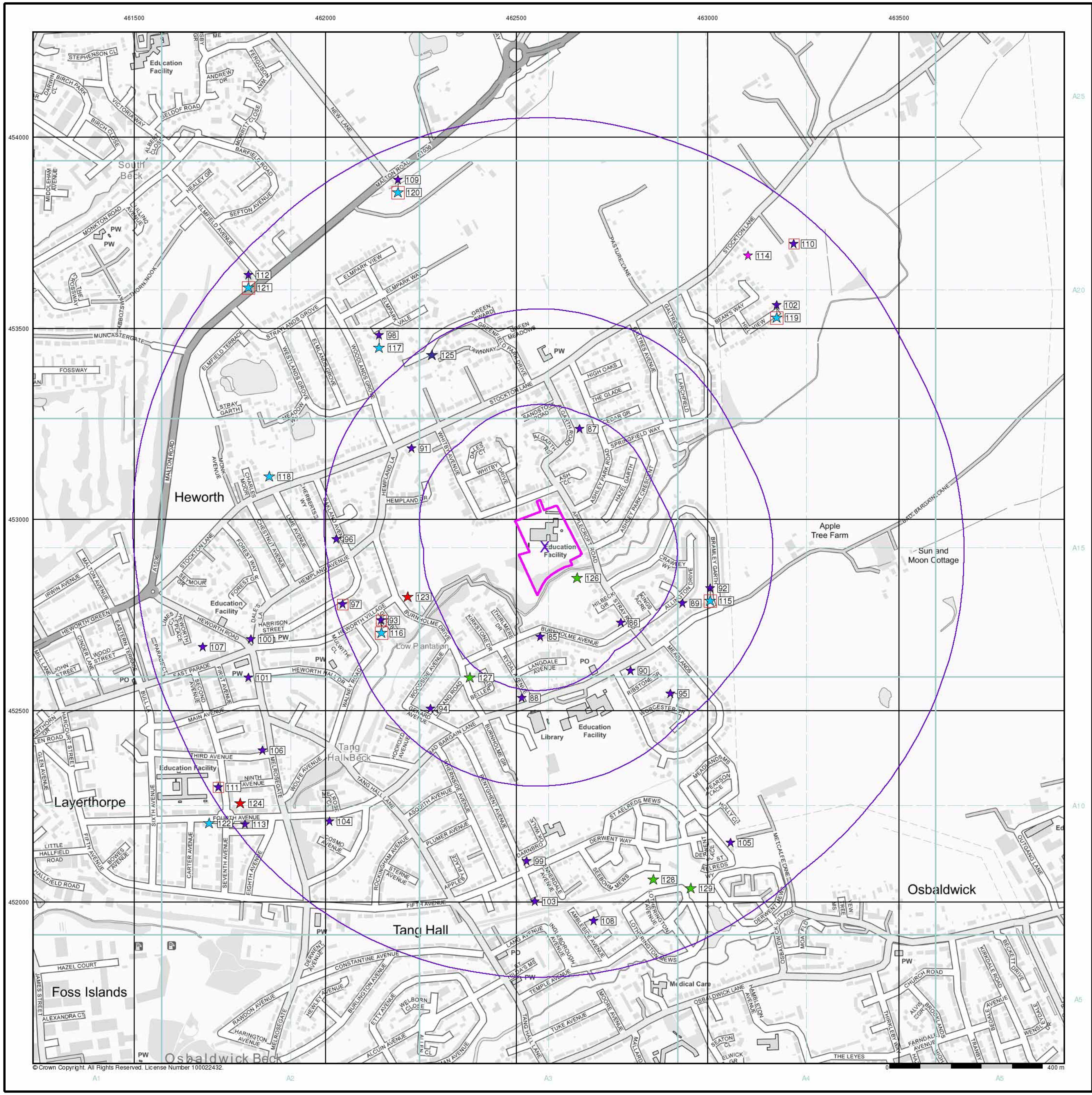

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Industrial Land Use Map

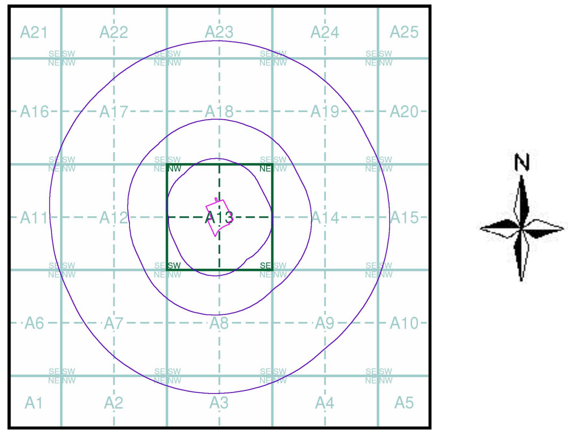
General

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

Industrial Land Use

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

Industrial Land Use Map - Slice A



Order Details

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Slice:	A
Site Area (Ha):	2.22
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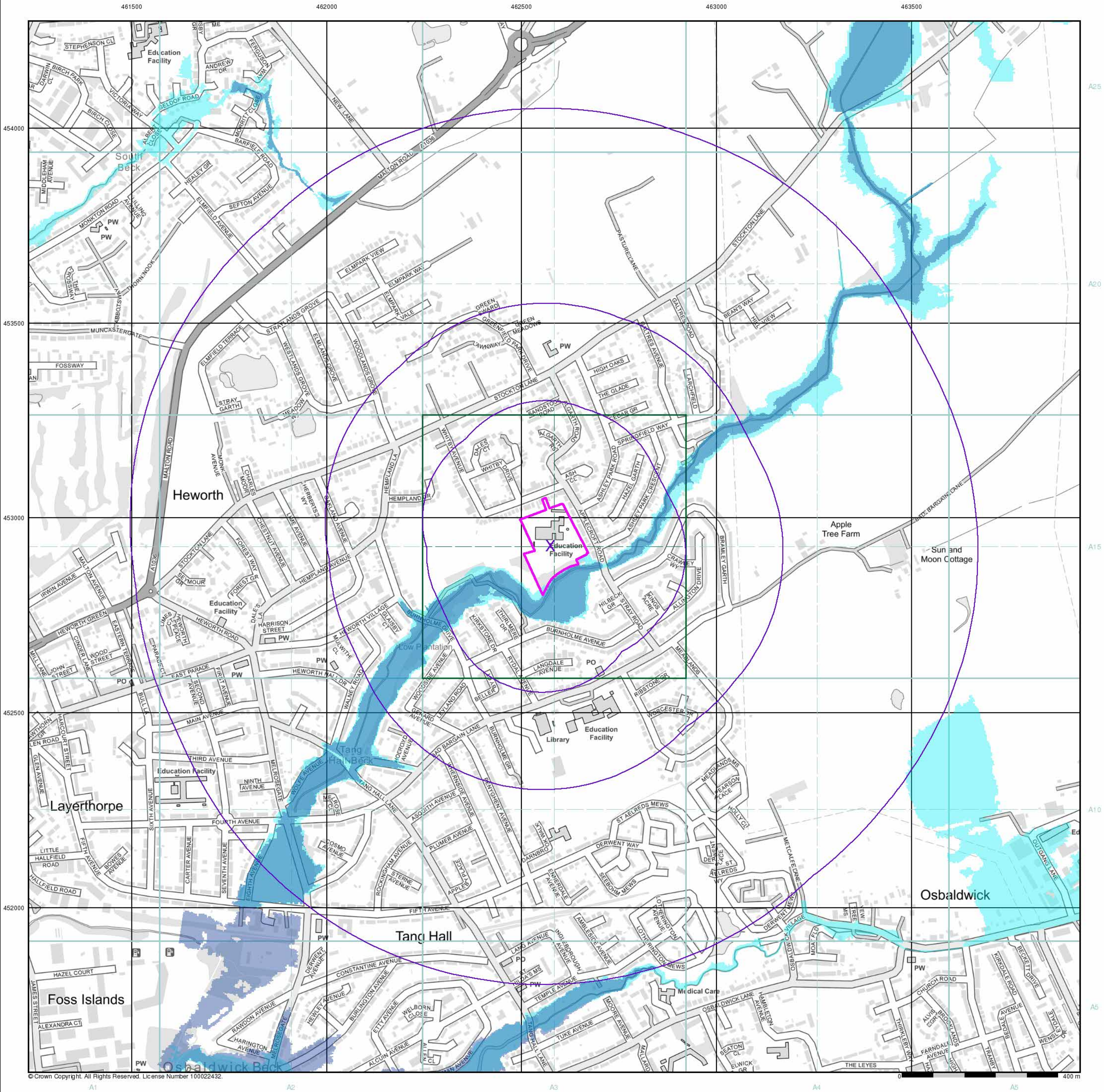
Hempland Primary ACADemy, Whitby Avenue, YORK, YO31 1ET

Landmark INFORMATION GROUP

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



MOTT MACDONALD

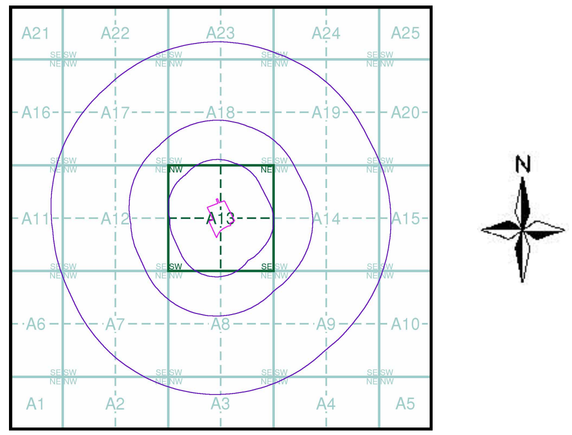
General

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

Agency and Hydrological (Flood)

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

Flood Map - Slice A



Order Details

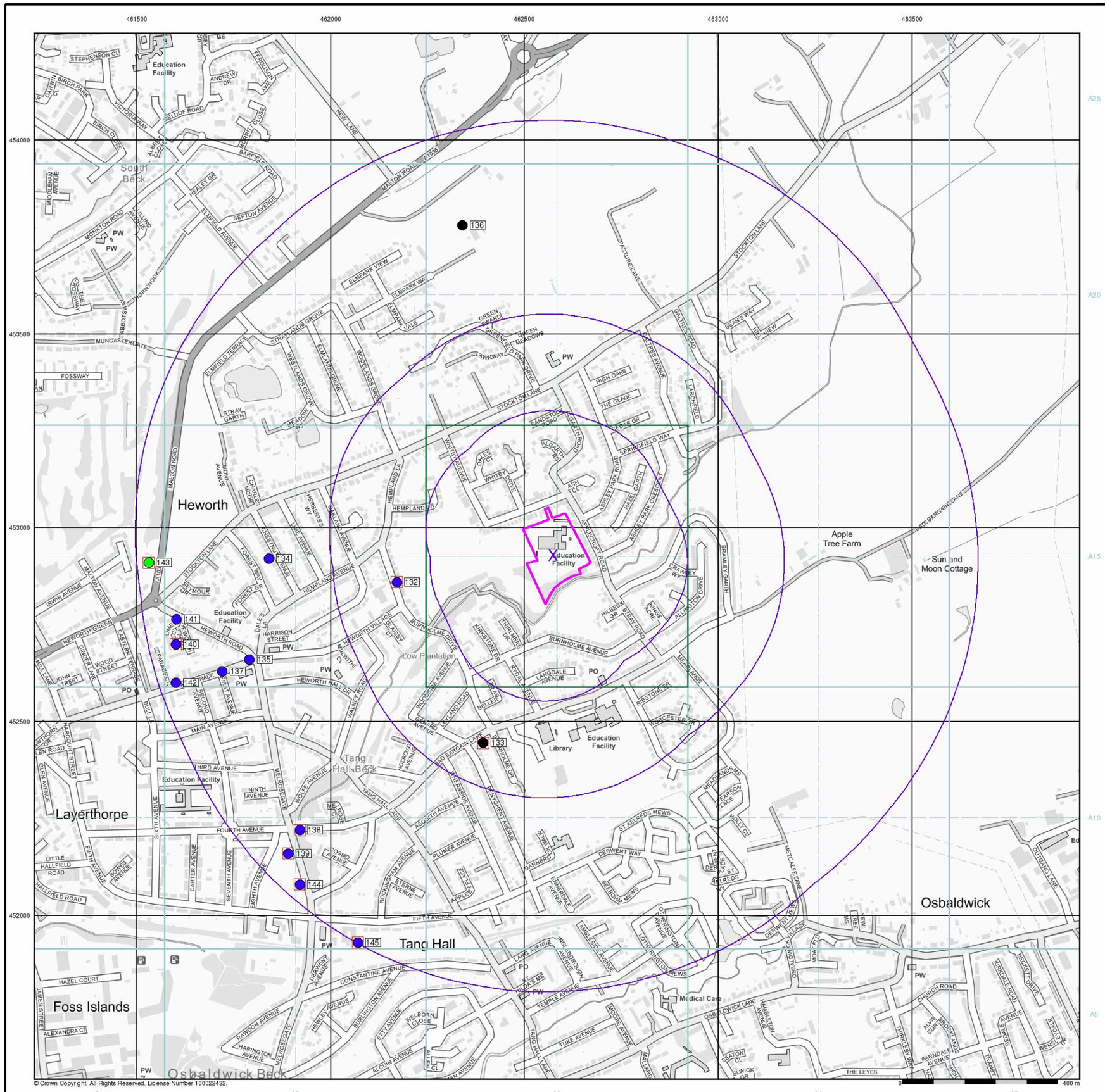
Order Number:	285631777_1_1
Customer Ref:	100418273 (note: to transfer to Hempland)
National Grid Reference:	462570, 452930
Slice:	A
Site Area (Ha):	2.22
Search Buffer (m):	1000

Site Details

Hempland Primary ACADemy, Whitby Avenue, YORK, YO31 1ET

Landmark INFORMATION GROUP

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



0 400 m

MOTT MACDONALD

General

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

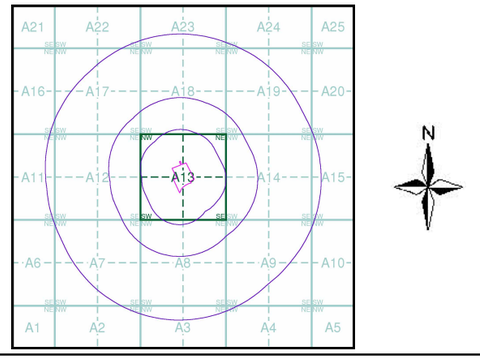
Agency and Hydrological (Boreholes)

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

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

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

Borehole Map - Slice A



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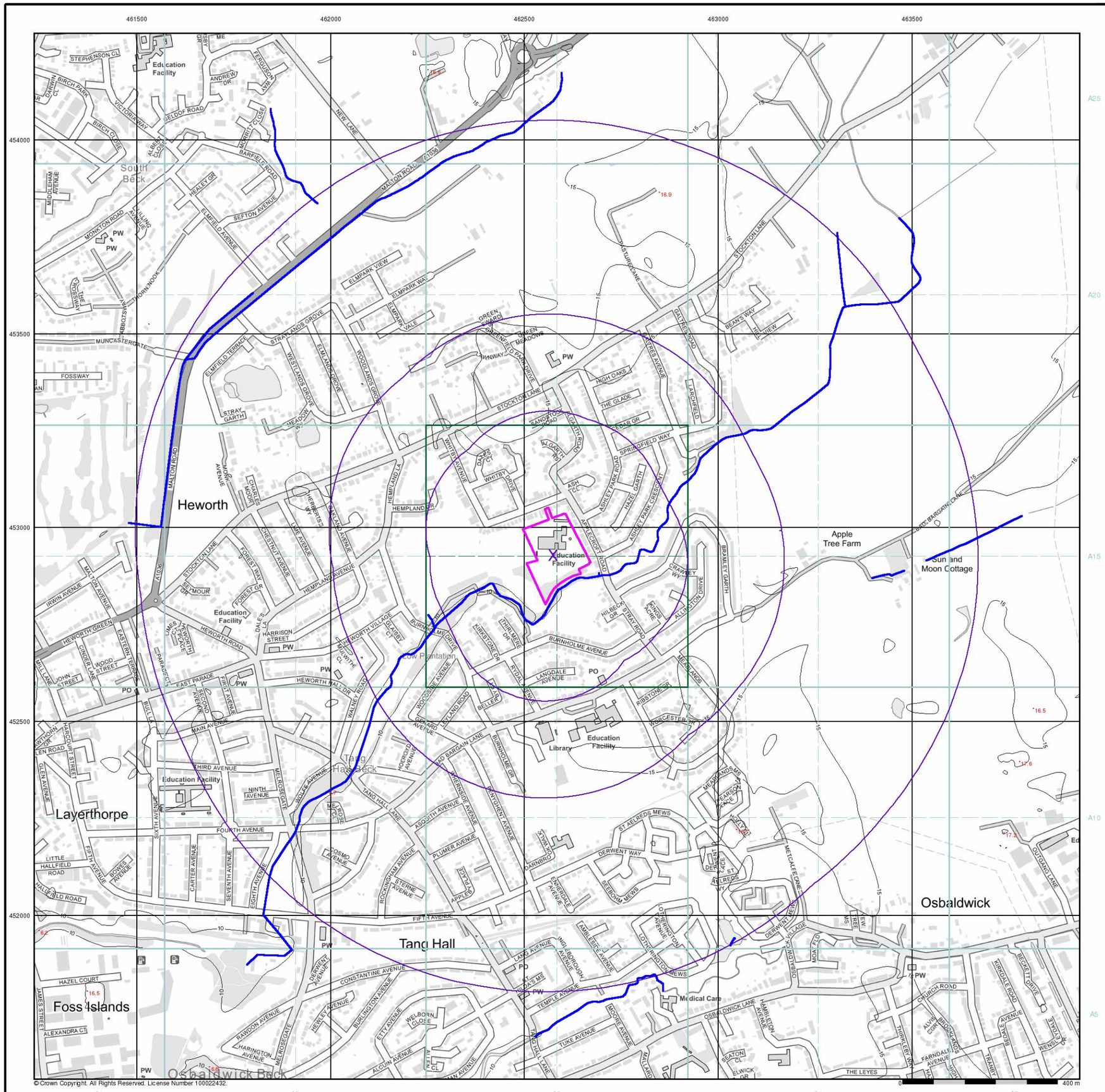


MOTT MACDONALD

General

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

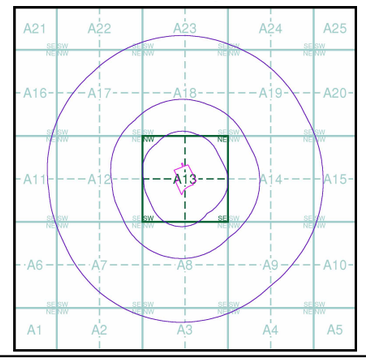
OS Water Network Data

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

Contours (height in meters)

- Standard Contour
- Master Contour
- Spot Height 167.3
- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



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