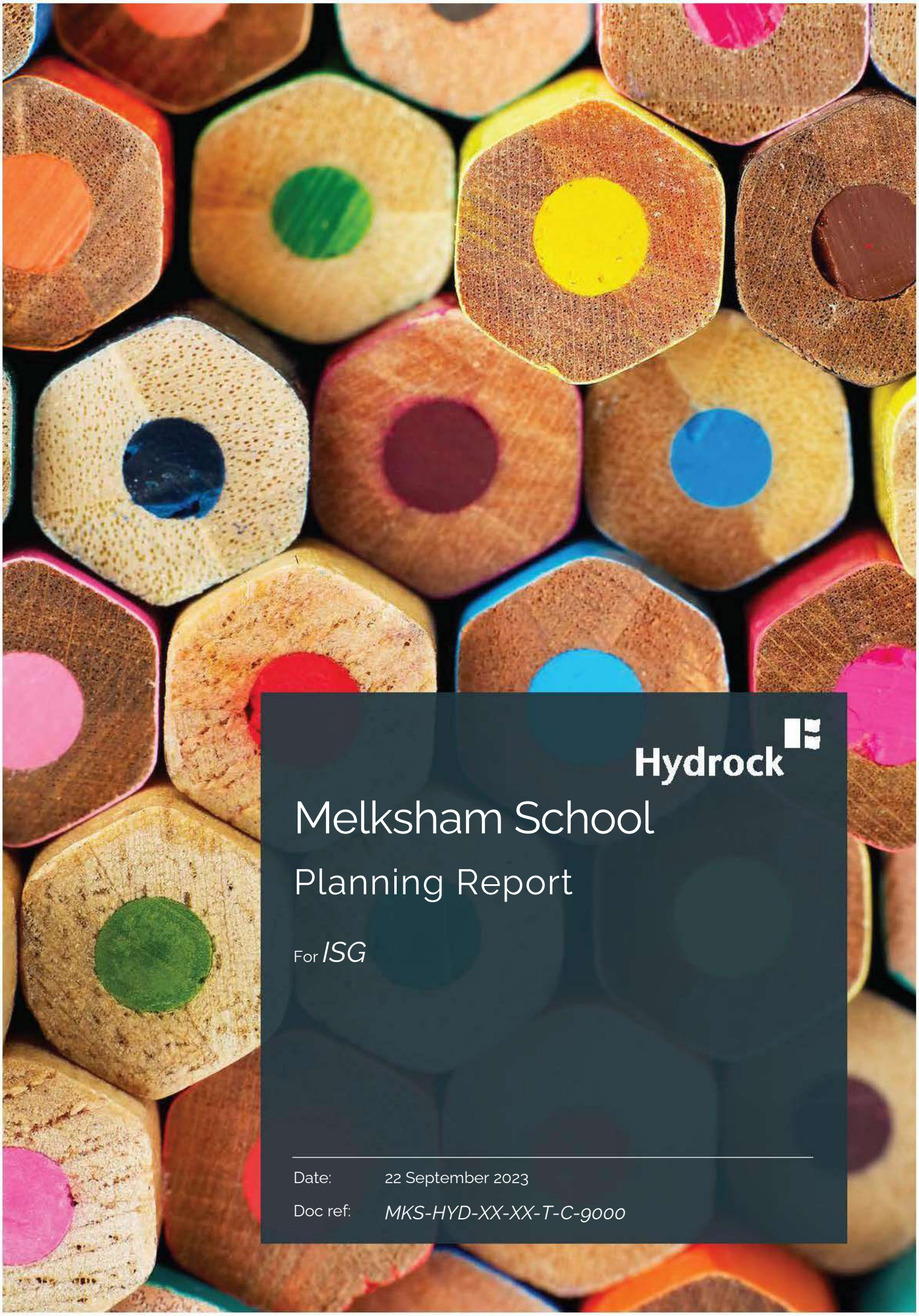

Hydrock

Melksham School

Planning Report

For *ISG*

Date: 22 September 2023

Doc ref: *MKS-HYD-XX-XX-T-C-9000*

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1. Introduction

1.1 Scope of The Report

Hydrock have been appointed by ISG to provide a Drainage Strategy report for the approval of Wiltshire Council Lead Local Flood Authority.

The proposed drainage strategy will be in accordance with national guidelines and will incorporate a 'best practise' approach in reducing the impact of the flooding caused by the new development.

The report is based upon sewer asset information provided by the sewerage undertakers Wessex Water in relation to assets within the vicinity of the development site.

The report highlights the key stakeholders in terms of ownership and maintenance to ensure the drainage system is kept well maintained and reduce the risk of failure. Should the network fail at any point, clearly defined ownership liabilities will ensure that problems can quickly be rectified thereby reducing the impact of potential damaged caused by flooding.

1.2 Limitations of The Report

This report has been prepared in connection with the scope as described above and considers the instructions and requirements of the client's needs. It is not intended for and should not be relied upon by any third party.

The information received is summarised within this report. In the event that the information is relied upon and is subsequently found to be incorrect, Hydrock Consultants accepts no responsibility for any direct and/or consequential loss that may occur as a result.

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1.3 References / Design Codes

- BS EN 752 - Drain and Sewer Systems Outside Buildings.
- Building Regulations Approved Document Part H - Drainage and waste disposals.
- Sewers for Adoption (where applicable).
- Local Authority Guidance.
- CIRIA C753 - SuDS Manual.
- National Planning Policy Framework (NPPF).
- DEFRA Non-Statutory Technical Standards for Sustainable Drainage.

2. Site Information

2.1 Site Location

The site is in Melksham, Wiltshire, and forms part of a wider residential development, The site lies between Western Way and Pathfinder Way, with the main entrance into the carpark on Pathfinder Way.

Table 2.1: Site Referencing Information

Site Address	
Address	Pathfinder Way, Melksham, Wiltshire
Postcode	Between SN12 6XG or SN12 6 6YP (Nearest)
National Grid Reference	391100, 162688

Figure 1: Site Location with Approximate Red Line Boundary



2.2 Site Topography

The site falls to the north-west corner with a difference of approx. 2.5m, but otherwise has no significant topographical features.

See **Appendix A** for Topographical Survey

2.3 Geology

See below extract from 27203-HYD-XX-XX-RP-GE-1000 (see **Appendix B**):

- 'General' Made Ground, was encountered from between 0.0m and 0.20m to depths of between 0.50m- 1.70m bgl, with an average thickness of 1.07m. It generally comprised sandy / slightly sandy, gravelly / slightly gravelly silty CLAY, with fragments of brick limestone, asphalt, and concrete. Made ground was not found in TP5 in the north-west of the site.
- Placed Topsoil was encountered in the north-east quadrant of the site and during the ground investigation, was being spread from a stockpile located within the north-east of the site (see HYD-XX-XX-DR-GE-1001 In Appendix A for the location of the stockpile). The Placed Topsoil was encountered from ground level to depths of between 0.10m and 0.50m bgl, and had an average thickness of 0.26m. It comprised slightly sandy slightly gravelly silty CLAY.
- Topsoil was identified in TP5 and TP06, in the west of the site and was approximately 0.4m thick, with an average thickness of 0.4m. The topsoil comprised firm brown slightly sandy silty CLAY with a medium organic matter content.
- Relict Topsoil was encountered underlying the general Made Ground. It was encountered at depths of between 0.70m and 1.63m bgl and had an average thickness of 0.31m. The Relict Topsoil generally comprised a dark brown to brown slightly sandy SILT with a high organic matter content
- The Oxford Clay Formation was encountered underlying the Made Ground and/or topsoil across the entirety of the site. A residual stratum of the Oxford Clay Formation was encountered at depths of between 0.40m and 1.70m bgl and proven to a maximum depth of 3.00m bgl. An average thickness of 0.71m was proven. It comprised firm to very stiff slightly sandy slightly gravelly silty CLAY and brown slightly sandy clayey SILT (encountered in SA02 only). The gravel faction comprised subangular fine to medium gravels of siltstone.
- Unweathered soils of the Oxford Clay formation were encountered at depths of between 1.9m and 3.00m bgl to a maximum recorded depth of 10.95m bgl. The base was not proven. The Oxford Clay Formation comprised a greyish brown becoming grey very stiff very high strength slightly sandy CLAY. The strata was observed between 2.90m – 7.10m bgl to be thinly laminated, with frequent (possible gypsum) crystals and with rare nodules of pyrite from 5.00m – 7.10m bgl.
- Groundwater was encountered in WS02 at 0.60m, and in TP2, TP5 and TP6 at 2.80m, 2.10m and 1.9m respectively. All encounters of groundwater indicated slow rates of seepage.
- Within the Residual Oxford Clay Formation and Oxford Clay Formation, soakaway testing produced no recorded infiltration rates. It was not possible to calculate infiltration rate due to insufficient drop in water level. Groundwater noted in the base of both soakaway pits prior to testing.

Table 2.2 Geology

Ref. for Figures	Location	Stratigraphic Name	Description
Superficial Deposits (Figure 2.7)			
1	55m east.	Head.	Clay and silt.
2	140m south.	Head.	Clay and silt.
3	362m west.	River Terrace Deposits.	Variable sands and gravels.
Solid Geology (Figure 2.8)			
1	On site.	Oxford Clay Formation.	Silicate mudstone, grey, generally smooth to slightly silty with sporadic beds of limestone nodules.

2.4 Hydrology & Hydrogeology

See below extract from 27203-HYD-XX-XX-RP-GE-1000:

'The site is not within a groundwater Source Protection Zone (SPZ) and there are no SPZs within 500m of the site. The site is situated within an unproductive aquifer. The Groundsure reports states that any groundwater within the bedrock would flow between well connected fractures. However, approximately 100m to the east and south is a Secondary superficial aquifer of medium vulnerability'.

See **Appendix B** for Ground Investigation Report and Flood Risk Assessment Report.

2.5 Fluvial Flood Risk

Fluvial flood risk is the risk of flooding from the overbank flow of rivers and watercourses.

Within England, the risk of fluvial flooding is defined by Flood Zones (FZs) which indicate the potential extent of flooding for a given Annual Exceedance Probability (i.e., the potential for of an occurrence within any one year (AEP)) without considering the benefits from flood defences, other manmade structures, or channel improvement works.

The EA Flood Map for Planning indicates that the site is located within Flood Zone 1 and is therefore considered to be at low risk (< 0.1% AEP) of fluvial flooding (see Figure 2). In addition, the site does benefit from flood defences.

Figure 2: EA Flood Map for Fluvial Flooding

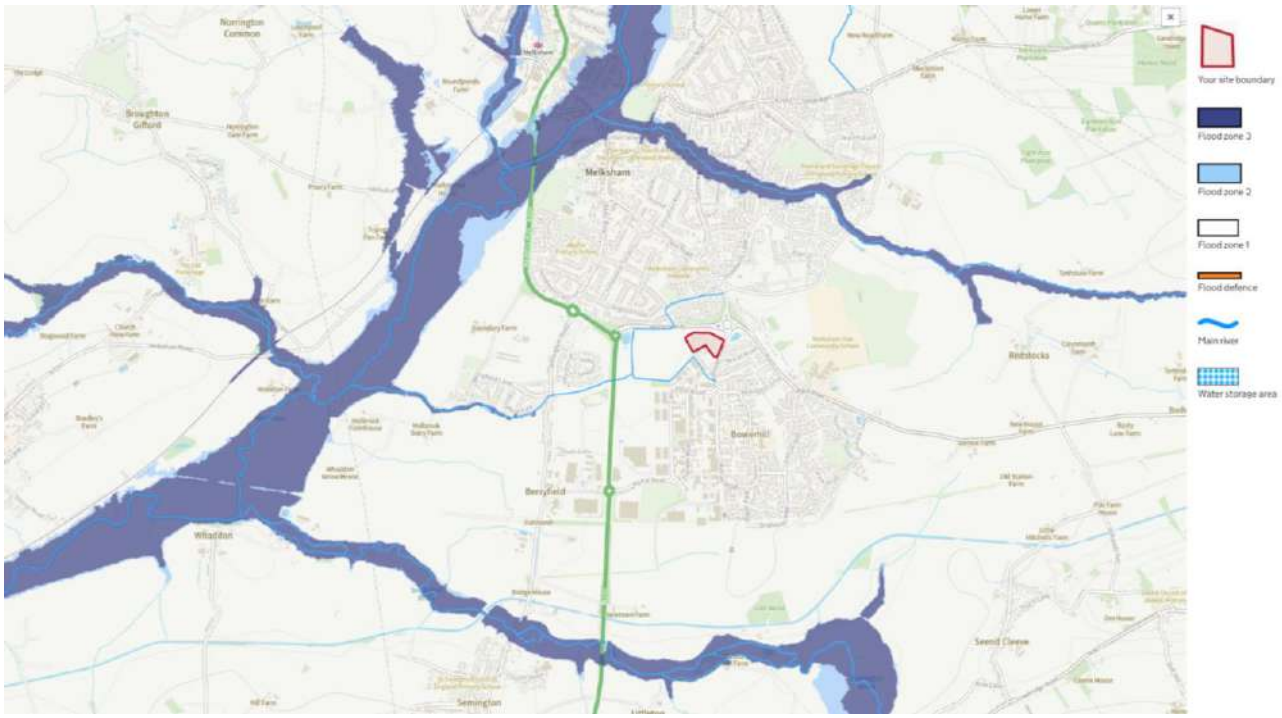


Table 2.3: Flood Zones Probability of Flooding

NPPF - Flood Zones		
Flood Zone 1	Low Probability	Less than 1 in 1000 (< 0.1%) chance of flooding occurring each year
Flood Zone 2	Medium Probability	Between 1 in 100 and 1 in 1000 (1% - 0.1%) chance of flooding occurring each year
Flood Zone 3a	High Probability	Greater than 1 in 100 (> 1%) chance of flooding occurring each year
Flood Zone 3b	Functional Floodplain	Land where water *has* to be stored in times of flood

2.6 Proposed Development

The proposed development consists of a 1FE primary school with provision to expand to a 2FE. The school building will be situated on the eastern half of the site with the carpark to the east and the playground and field to the west. The field area also contains a formal playing field and a MUGA and sports equipment store.

Areas for expansion into a 2FE school include a reserved area for carpark expansion south of the proposed 1FE carpark, a main building extension to the north west of the 1FE building and a field expansion to the west, which will be incorporated early during the 1FE design.

See **Appendix C** for Architect's Proposed Site Layout.

3. Pre-Development Surface Water Management Strategy

3.1 Existing Surface Water Drainage Network

3.1.1 Existing Public Drainage

A review of Wessex Water's sewer asset maps confirmed various water drainage network bodies north, west and south of the site. The northern network travels from north to west and the southern network travels south to west. Both networks link up approximately 450m south-west of the site and flow in a south westerly direction. The majority of the storm pipes lie to the east and south of the school site, in the adjacent housing developments. No sewer assets were recorded within the site boundary.

See **Appendix D** for the Sewer Asset Map.

3.1.2 Existing Private Drainage

A utilities survey was undertaken in 18/05/23.

These surveys identified a culvert that runs beneath the new bell mouth entrance to the site that connects the swale either site of the bellmouth, running along the east side of the site boundary.

A foul pipe and a storm pipe running in parallel were recorded passing through the south west corner of the site, but the chambers were noted outside of the site boundary. As the site is greenfield, no drainage was recorded within the site boundary.

See **Appendix E** for Existing Drainage Layout.

3.2 Pre-Development Surface Water Catchment Areas

Below is an indication of the pre-development catchment type area.

Table 3.1: Pre-Development Catchment Areas

Catchment	**Area** (sqm)
Impermeable	
Building / Roof	0 m^2
Roads / Hardstanding	0 m^2
Permeable	
Soft Landscaping	19,727 m^2
Total Area	19,727 m^2

See **Appendix F** for Pre-Development Catchment Plans.

3.3 Pre-Development Surface Water Run-Off Rates

In order to determine the post-development surface water flows, an assessment has been carried out on the pre-development to ensure that the run-off from the new development will not adversely affect flood risk either within the site boundary, offsite adjacent properties, or the downstream network.

This run-off is typically limited by the existing greenfield or brownfield run-off rates, however as this site is part of a wider development and will discharge into a shared attenuation basin, the offsite developer has allowed for an unrestricted discharge rate to suit a 50% impermeable area (of the 1FE site boundary), equivalent to 513 l/s.

3.3.1 Greenfield Run-Off Rates

In line with the Non-Statutory Technical Standard for Sustainable Drainage S2 (Peak Flow Control) it is a requirement that on new developments consideration be given to limit discharge as close as reasonably practical to the equivalent 'Greenfield' rate for the corresponding storm event.

Due to the reasons outlined above, this method has not been considered for the school's part of the overall development.

3.3.2 Brownfield Run-Off Rates

In line with the Non-Statutory Technical Standard for Sustainable Drainage S3 (Peak Flow Control), should the site not be suitable to discharge as close as reasonably practical to the equivalent 'Greenfield' rate, Brownfield should be considered with a % betterment on the flow. The following considers what the maximum surface water discharge from the site would be if the site was 'Brownfield' i.e., developed:

As the site is Greenfield this method has not been considered.

3.3.3 Capacity of Existing Drainage System/ Connection Point

The private storm drain to the west of the school site was initially considered as the connection point. However, this was determined to have insufficient capacity to accommodate the school site, so a new headwall has been proposed on the southern slope of the attenuation basin. This headwall will have a non-return flap valve and accommodate the requirements of the school's storm network, which are outlined below.

Table 3.2: Connection Point Capacity

Reference	Pipe Diameter (mm)	Length (m)	Gradient	Capacity (l/s)
Connection Point	450*	N/A	1:145	350 l/s

*Ultimately designed suit proposed network

The capacity values have assumed using the Hazen-Williams Equation. The Ks roughness value has been assumed as 1.50 for existing pipes. The design capacity of the headwall will ultimately be adjusted to suit the requirements of the site.

3.4 Summary of Pre-Development Flows

Table 3.3: Pre-Development Flows Summary

Greenfield	Connection Point Capacity
N/A	350 l/s

3.5 Pre-Development Flood Exceedance

Topographical survey information indicates that, should the existing drainage network fail or otherwise have its capacity exceeded, overland flows would follow the site topography and be directed towards the north west corner.

4. Surface Water Management and SuDs Assessment

4.1 Run-off Destinations

An appraisal should be undertaken to confirm the most suitable and sustainable method for managing surface water runoff from the development in accordance with the following hierarchy as highlighted in Part H of Building Regulations and the National Planning Policy Framework (NPPF):

1. Infiltration to the ground using a sustainable drainage system.
2. If this is not feasible, discharge to a watercourse or river; generally, at a controlled rate unless it does not affect flood risk e.g., if to the sea or an estuary.
3. Discharge at a controlled rate to a surface water sewer or drain.
4. Discharge at a controlled rate to a combined sewer system, with the approval from the Water Authority.
5. Only if the above have all been investigated and it has been proved that none of these options are suitable will discharge at a controlled rate to a foul sewer system, with the approval from the Water Authority.

The discharge of surface water run-off has been considered in accordance with the hierarchical approach:

Table 4.1: Review of the Drainage Hierarchy

Method	Reasoning	Suitability
Interception / Reuse	Not in keeping with architect's proposal	X
Infiltration	Infiltration rates too low to be feasible	X
Surface Water Body	Existing offsite attenuation basin	✓
Surface Water Sewer	Not considered	X
Combined Sewer	Not considered	X
Foul Water Sewer	Not considered	X

4.2 SuDs Assessment

4.2.1 Overview of SuDS

The design of the surface water drainage system should seek to implement and maximise the use of Sustainable Drainage Systems (SuDS) where possible.

The primary purpose of a SuDS system is to manage surface water run-off within a development via mimicking natural methods, attenuating additional water volume generated by the introduction of impermeable areas whilst providing a degree of water treatment to run-off alongside amenity and biodiversity benefits to the local community.

The suitability and benefits of the various potential SuDS systems for the proposed development should be considered, which will aim to maximise the 4 pillars of SuDS:

- Water Quantity (Controlling runoff);
- Water Quality (Managing quality of runoff);
- Amenity (Create and sustain better places for people);
- Biodiversity (Create and sustain better places for nature).

The implementation of SuDS can be divided into the management of sources and of the wider site and even region, with preference given to source control.

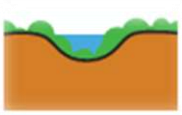
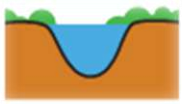
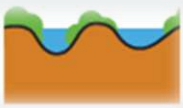
4.2.2 Suitability of SuDS Elements

The drainage design should adopt the principles of SuDS where appropriate taking into consideration the site context and location. The principals of SuDS are that they should be designed to maximise the opportunities and benefits that can be secured surface water run-off management in terms of quality, quantity, flood risk, and amenity. The implementation and selection of SuDS techniques is largely dependent on the site layout and context. Some SuDS techniques may be more appropriate than others.

The suitability of SuDS components has been assessed as follows:

Table 4.2: Suitability of SuDS Components

Hierarchy	System	Description	Suitability
Source Control	Green Roofs 	A planted soil layer on the roof of a building: stores water in the soil layer to be absorbed by vegetation. Reduces runoff and treats pollutants.	Not in keeping with architect's proposal
	Rainwater Harvesting 	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an over ground or underground tank for treatment and reuse locally.	Not in keeping with architect's proposal
	Permeable Surfaces 	Surfaces that allow water to penetrate into underlying layers to be stored, collected or made to infiltrate to groundwater.	Carpark bays and MUGA offer surfacing that can be utilised
	Bioretention Area 	A vegetated area with gravel and sand layers below designated to channel, filter and cleanse water vertically, to then be stored, collected or made to infiltrate to groundwater.	Landscaping available to be used as bioretention areas.
Hierarchy	**System**	**Description**	**Suitability**
Site and Regional Control	Filter Strip 	Grassed or planted areas that runoff is allowed to run across to promote infiltration and cleansing.	Grass areas adjacent to hardstanding available to be utilised.

Soakaway 	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	Insufficient infiltration rates on site
Swale 	Shallow depressions to convey and filter water. May be 'wet' with above ground attenuation or 'dry' with a gravel layer. Can be made to infiltrate to groundwater.	Unsuitable in a primary school setting due to standing water
Hardscape Storage 	Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.	Unsuitable in a primary school setting due to standing water
Pond / Basin 	Store and treat water. Ponds have a level of standing water whereas basins are generally dry. Can be made to infiltrate to groundwater.	Unsuitable in a primary school setting due to standing water
Wetland 	Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.	Insufficient space available and unsuitable in a primary school setting
Underground Storage 	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	Sub bases beneath carpark and MUGA available to be utilised

4.2.3 *Interception Storage*

Interception can be defined as the capture and retention on site of the first 5mm of the majority of all rainfall events. Interception mechanisms have been assessed to show the site does not fully meet zero run-off from the first 5mm for 80% of events during the summer and 50% in winter. (Ciria)

Table 4.3: Interception Storage Systems

System	Reasoning	
Green Roofs	All surfaces that have green / blue roofs	X
Rainwater Harvesting	All surfaces drained to RWH systems designed whether for surface water management or just water supply, provided the RWH system design is based on regular daily demand for non-potable water	X
Soakaways / Infiltration	Areas of the site drained to systems that are designed to infiltrate run-off for events greater than a 1 month return period.	X
Permeable Pavements	All permeable pavements, whether lined or not, can be assumed to comply, provided there is no extra area drained to the permeable pavement.	✓
Filter Strips / Swales	Roads drained by filters strips / swales, where the longitudinal gradient of the vegetated area is less than 1:100, are suitable for interception delivery for impermeable areas up to 5 times the base of the vegetated surface area receiving the runoff.	✓
Infiltration Trenches	Roads drained by infiltration trenches can be considered to provide interception	✓
Detention Basins	Areas of the site drainage to detention basin with a flat base can be assumed to comply. The area of the basin that is assumed to contribute to interception of run-off should be below the outlet of the basin.	X
Bioretention / Rain Gardens	Areas of the site drainage to unlined bioretention components can be assume to comply where the impermeable area is less than 5 times the vegetated surface area receiving run-off/ They can be designed to deliver interception for larger areas, where suitable infiltration capacity is available.	X
Ponds	Areas drained by ponds (with a permanent water pool that is effectively maintained by the outlet structure) are not assumed to deliver interception	X

5. Post-Development Surface Water Management Strategy

5.1 Proposed Surface Water Drainage Strategy

The below ground surface drainage system will connect all new rainwater pipes, channels and gullies at ground floor level and convey flows to a headwall off the northern site boundary. Here the flows will discharge freely into the attenuation basin. During storm events coinciding with high water levels in the basin, the flap valve on the headwall will engage and the storage structure beneath the carpark and MUGA will be utilised to store storm water until the surcharge on the outfall reduces. It will be a gravity system without the need for pumping.

It is assumed that this surcharge will reach 600mm (the top of the basin) and last for up to 2880 minutes. This is a conservative approach to the modelling as it ignores the likelihood that the basin was designed with a freeboard.

SuDS are provided in the form of filter strips, gravel filter trenches and permeable paving. Attenuation is provided in the voids of the sub bases beneath the carpark and the MUGA. The discharge location is the headwall or it's outfall pipe which will be constructed to the north of the site.

Where applicable, the surface water management strategy has incorporated the recommendations of the 'Non-Technical Standards for Sustainable Drainage' and general 'good practice' in terms of providing a Sustainable Drainage System (SuDS) that does not adversely impact flood risk either within the site or beyond the development boundary.

5.1.1 Notes on Storm Network Modelling

The system will be designed to accommodate/ retain on site up to a 1 in 100 year storm + 50%CC, including the areas reserved for the 2FE expansion. It will be assumed that 95% of the rainfall that falls on hardstanding and 40% of rainfall that lands on the pitch will enter the system (Cv = 0.95) within 5 minutes. A surcharge on the headwall of 39.600mAOD will be assumed to last for 2880mins during each storm event. Modelling assumes a contributing area of 8510m², as ~400m² of the hardstanding drains to soft.

5.2 Post-Development Surface Water Catchment Areas

Below is an indication of the post-development catchment type areas.

Table 5.1: Pre vs Post-Development Catchment Areas

Catchment	**Area** (sqm)
Impermeable	
Building / Roof	1516 m²
Roads / Hardstanding	4568 m²
Landscaping considered impermeable/ drained	
40% of Football Pitch*	1643 m²
2FE Future Hardstanding**	1186m²
Permeable	
Soft Landscaping	10,814 m²
Total Area	**19,727 m²**

*40% of the pitch is assumed to be drainage via perforated pipes and enter the storm water system.
**The areas reserved as 2FE will be left as undrained soft landscaping in the 1FE design but modelled as impermeable to ensure the network can accommodate the 2FE expansion.

5.3 Post-Development Surface Water Run-Off Rates

In order to determine the post-development surface water flows an assessment has been carried out to ensure that the flows from the new development will not adversely affect flood risk either within the site boundary, offsite adjacent properties, or the downstream network:

5.3.1 Greenfield Run-Off Rates

Due to the nature of the development and its current arrangement, it is considered unnecessary for this site to reduce to Greenfield Run-off Rates due to the flows being attenuated offsite along with the flows from the rest of the wider development.

5.3.2 Brownfield Run-Off Rates

As the site is Greenfield this method has not been considered.

5.3.3 Capacity of Existing Drainage

Since the connection is yet to be provided, it will be designed to accommodate the flows from the site and a capacity check is not yet required.

5.3.4 Allowance for Climate Change and Urban Creep

In accordance with EA guidance, an allowance for climate change has been incorporated into the design to ensure that the proposed surface water network has a suitable degree of resilience. These allowances vary with the expected lifetime of the development. A 50% allowance for climate change has been considered in this case.

Urban Creep Factor (UCF) is defined as any increase in the impervious area that is drained to an existing drainage system without planning permission being required, such as the construction of patios, small extensions, etc. Since the future 2FE expansion has already been mapped out, the additional hardstanding from this (~900m²) will be considered instead of an urban creep factor. This is equivalent to an UCF of 14.6%.

5.4 Post-Development Surface Water Volumes

In line with the Non-Statutory Technical Standard for Sustainable Drainage S4 & S5 (Volume Control), where reasonably practicable, for Greenfield developments the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6-hour rainfall event should never exceed the Greenfield Run-Off Volume for the same event.

Due to the increase in hardstanding area, there will be as increase in the volume of run-off. Furthermore, due to the soil type onsite, minimal infiltration will occur therefore infiltration techniques are considered unsuitable for the site. It is therefore proposed to utilise porous sub bases to attenuate storm water on site prior to discharge into the existing downstream network.

In line with the Non-Statutory Technical Standard for Sustainable Drainage S6 (Flood Risk), as it has not been possible to reduce all the additional volume by infiltration or other SuDS techniques, the volume of run-off should be discharged in accordance with one of the following rates of run-off, whichever is the higher.

- The peak discharge rate has been reduced to pre-development 1-year peak flow rate
- The peak discharge rate has been reduced to the site's estimated mean annual flood flow rate (Qbar)
- The peak discharge rate has been reduced to 2l/s/ha.
- The limiting discharge rate requires a flow rate of less than 5l/s at a discharge point, therefore up to 5l/s

However, since the school site is part of a larger development and the main attenuation will occur off site to reduce the discharge to a level in line with the above, the discharge rate will remain unrestricted into the offsite attenuation basin.

5.4.1 Post-Development Surface Water Storage

In line with the Non-Statutory Technical Standard for Sustainable Drainage S7 & S8 (Flood Risk), all storm events up to and including the 1 in 30 AEP storm event will be retained within the proposed surface water drainage network and exceedance volumes from all other storm events up to and including the 1 in 100 AEP plus 50% allowance for climate change will be retained within the site and manged to minimise the risk to people and property.

Attenuation flood storage will be distributed across the development with porous sub bases beneath the MUGA and carpark attenuating at source. In the event that one part of the system fails through blockage the remainder of the system will still be able to function effectively.

Expected attenuation requirements are shown below:

Table 5.2: Attenuation Requirements

Impermeable Area (ha)	Maximum Discharge Rate (l/s)	Additional 1 in 100 AEP +50% CC Volume (m3)
0.89*	260 l/s assumed from outfall pipe capacity**	134m^3

**Includes allowance for 2FE area and 40% of the football pitch **Outfall ultimately to be designed to accommodate flows*

5.5 Post-Development Flood Exceedance

In line with the Non-Statutory Technical Standard for Sustainable Drainage S9 (Flood Risk) In the event that there is a failure of the surface water drainage network beyond the design storm or through other circumstances, exceedance flows will be directed away from buildings and will flow north west over the school field towards the offsite attenuation basin.

See **Appendix H** for Overland Flow Routes

5.6 Summary of Post-Development Flows

The post-development flows will discharge unrestricted into the offsite attenuation basin below the maximum rate confirmed with the offsite developer. Flows will also be attenuated on site by the sub bases of the MUGA and carpark before discharging through the headwall. In the event of a surcharged outfall, the flap valve will engage and the onsite attenuation will be utilised to accommodate the reduced discharge.

See **Appendix I** for the Drainage Strategy Layout.

5.7 Water Quality

Consideration must be given both during construction and post-development to ensure that water quality is not negatively impacted.

Table 26.2 of The SuDS Manual identifies the pollution hazard indices from the site are as shown below.

Table 5.3: Pollution Hazards

Land Use	Hazard Level	TSS	Metal	Hydro-carbons	
Residential roofs	Very Low	0.2	0.2	0.05	X
Other roofs (typically commercial / industrial roofs)	Low	0.3	0.2-0.8	0.05	✓
Individual property driveways, residential car parks, low traffic roads (e.g., cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., <300 traffic movements/day	Low	0.5	0.4	0.4	✓
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals, retail), all roads except low traffic roads and trunk roads / motorways	Medium	0.7	0.6	0.7	X
Sites with heavy pollution (e.g., haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9	X

Table 26.3 of The SuDS Manual provides various mitigation indices for discharge to surface waters. The mitigation indices for SuDS elements that are included within the proposed development are shown below.

Table 5.4: Pollution Mitigation

Indicative SuDS mitigation indices for discharge of surface water			
	Mitigation indices		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately 1 in 1 year return period event, for inflow concentration relevant to the contributing drainage area		

Refer to below tables for a summary comparing the mitigation and pollution indices for each identified land usage classification.

Other Roofs	TSS	Metals	Hydrocarbons
Pollution Index	0.3	0.2-0.8	0.05
Mitigation Index	0	0	0
Net Pollution	0.3	0.2-0.8	0.05
Comments	Due to very low risk of pollution from a 2-storey primary school roof, no mitigation solution proposed.		

Non-residential Carpark	TSS	Metals	Hydrocarbons
Pollution Index	0.5	0.4	0.4
Mitigation Index (Permeable Paving)	0.7	0.6	0.7
Net Pollution	-0.2	-0.2	-0.3
Comments	Permeable paving effectively mitigates the pollution risk from the residential car park.		

Based on the above tables the water quality criteria of document Ciria C753 - The SuDS Manual is satisfied.

Although potential SuDS options have been stated, alternative options may be considered provided that the management train meets or exceeds the water quality requirements.

Provided that the mitigation indices of the various treatment trains meet or exceed the requirements of each pollutant, it is expected that there will be no reduction in the quality of water being discharged into the public sewer network.

5.7.1 Quality of Surface Water Run-off: Post-Development

In line with the SuDS suitability, the design should seek to provide an appropriate level of water treatment to effectively mitigate the pollution risk associated with the site and not affect the quality of water downstream.

The proposed layout has 2 primary drivers of pollutant risks to the discharge point. The sources, pollutants and mitigations are as follows:

Carpark

In accordance with Environment Agency Document PPG3 (now withdrawn but considered best practice guidance) the proposed as the car park is less than 50 spaces or 800m2 it is considered to be 'low risk' in terms of pollution to the surface water network and as such an oil interceptor is not deemed to be required.

Gullies

Gullies and drainage channels will be specified with silt traps and catch pits will be incorporated in the drainage system to reduce the risk of silts / salts getting into the surface water network.

5.7.2 Quality of Surface Water Run-off: During Construction

It is anticipated that the during construction adequate provisions will be put in place to ensure the existing drainage is protected to prevent material which could have a negative impact on water quality entering the system.

Some pollution mitigation techniques that are to be considered include:

- Monitoring and managing disposal of site waste. Make sure all waste is correctly dealt with to stop it from spreading.
- Keeping materials such as sand and cement secure. Materials should be located where there isn't risk of them being washed into the drainage system.
- Covering up all drains to prevent waste from ending up in the system.
- Keep the road and paths to the site clean at all times. This will prevent silt and other pollutants from running off into any bodies of water.
- Properly collect and treat any wastewater that is produced.
- Temporary installation of screens within manholes to capture any debris.

5.8 Design Standards for Surface Water Drainage

The surface water drainage strategy for the new development should aim to deliver a safe, functional, cost effective and, as far as possible, sustainable drainage system (SuDS) which considers the following design principles to ensure:

- That natural drainage features are protected;
- That public health and safety risks are taken into account and managed;
- The constructability of the surface water system;
- The maintainability of the surface water system;
- The long-term economic viability of the system;
- That sustainability issues are taken into account;
- That the information requirements of stakeholders are adequately addressed;
- That the potential value of the surface water system, in enhancing the rural and urban environment is recognized and optimized.

The surface water below ground gravity drainage system is to provide connections from all new rainwater pipes, channels, gullies and road gullies at ground floor level. The locations of the drainage components are to be fully coordinated with all relevant architectural, landscaping and services drawings. All materials and products relating to the below ground drainage system shall be specified in accordance with their intended use and meet all relevant British Standards and BBA accreditations.

In accordance with best practice storm drainage will be designed to the following performance criteria:

1 in 2-year storm return period:	Pipes running under full conditions with no surcharge.
1 in 30-year storm return period:	No flooding.
1 in 100-year storm:	Extreme flooding to be retained on site.

6. Foul Water Management Strategy

6.1 Pre-Development Foul Water Drainage

6.1.1 Existing Public Drainage:

A review of Wessex Water's sewer asset maps confirmed various water drainage network bodies north, west and south of the site. The northern network travels from north to west and the southern network travels south to west. Both networks link up approximately 450 south-west of the site and flow in a south westerly direction. Most notably, a foul sewer pipe runs outside of the northern site boundary, parallel to the A365/ Western Ways. No sewer assets were recorded within the site boundary.

6.1.2 Existing Private Drainage:

A utilities survey was undertaken in 18/05/23. No foul networks were identified within the site boundary.

6.2 Post-Development Foul Water Drainage

To meet the requirement set out within Building Regulations: Approved Document Part H - Drainage and Waste Disposal, any drainage management strategy proposed should adhere to the following foul discharge hierarchy in the following preferential order:

1. Discharge to local foul water sewer network.
2. Discharge to local combined water sewer network
3. Onsite treatment and discharge of foul effluence through drainage field or watercourse
4. Storage of produced effluence and removal offsite

The below-ground foul drainage system will connect all new soil, waste and ventilating pipes, sanitary appliances and gullies at ground level and discharge into an existing pipe as part of the wider development at the south west corner of site.

It is intended that only waste flows considered to be 'Domestic' shall be discharged into the foul drainage system. If the site wishes to discharge 'Trade Effluent' into the foul drainage system then will be required to make a formal application to the Sewerage Undertaker accordingly.

It will be a gravity system without the need for pumping.

The design of all foul sewers and lateral drains must conform to BS EN 752, BS EN 16933, Building Regulations 2010 Part H, planning policy and best practice guidelines (such as SSG Appendix C – Design and Construction Guidance) wherever applicable. Sanitary systems within building should be designed in accordance with BS EN 12056-2.

See **Appendix I** for the Drainage Strategy Layout.

6.3 Post-Development Foul Water Flow Rates

The assessment of the proposed foul flow rates considers both daily average volumes and estimated peak flow rates. Main criteria outlined below:

Type	Occupancy
Residential	260*

**1FE occupancy*

6.3.1 Peak onsite flow rate

The peak onsite design flow rates have been calculated using Estimated F&L Peak

'Estimated' F&L Peak

It is widely used practice to estimate the peak flows by concentrating the average daily usage over an 8-hour period (i.e., assuming total daily flows only happen during the day), and applying an additional multiplier.

Therefore: (Occupancy x LHD / 28800) x DWF.

Occupancy	Flow (l/h/person)	Hours	Peak Factor	Total
260	90	8	3	2.44 l/s

It is assumed that after a 2FE extension, the occupancy will double (520), therefore the estimated peak will rise to 4.88 l/s.

6.3.2 Offsite flow rate assessment

Further assessment will have to be carried out by the offsite consultant to determine the capacity of the connection point and its potential for connection as part of the foul water drainage strategy for the new development.

Any capacity improvements to the sewerage undertakers' network to accommodate new developments will be managed, prioritised, and funded by them from their overall infrastructure charging arrangements

7. Ownership and Maintenance

The key elements of the foul and surface water drainage system will require periodic maintenance to prevent failure of the system and/or a reduction in capacity of the networks as a whole and the following matrix therefore sets out the various drainage items to be maintained, identifies who is responsible and the frequency of maintenance.

The proposed SuDS features will require maintenance including litter and debris removal, sediment removal, vegetation maintenance and remediation to any damaged structures.

The maintenance requirements will be the responsibility of a private maintenance company. All inspection and maintenance works should take into consideration the implications of 'lone working'. An assessment should be carried out and the risks mitigated accordingly.

Table 7.1: Proposed Schedule of Maintenance for Below Ground Drainage

Permeable Paving - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual		
Maintenance Schedule	**Required Action**	**Frequency**
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required.
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).
Monitoring	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48 h after large storms in first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

Reference should be made to the manufacturer recommendations where applicable

Filter Strip - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual		
Maintenance Schedule	**Required Action**	**Frequency**
Regular maintenance	Remove litter and debris	Monthly, (or as required).
	Cut grass - to retain height within specified design range	Monthly (during growing season), or as required.
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Inspect filter strip surface to identify evidence of erosion, poor vegetation growth, compaction, ponding, sedimentation and contamination (e.g. oils).	Monthly (at start, then half yearly).
	Check flow spreader and filter strip surface for evens gradients.	Monthly (at start, then half yearly).
	Inspect gravel flow spreader upstream of filter strip for clogging.	Monthly (at start, then half yearly).
	Inspect silt accumulation rate and establish appropriate removal frequencies.	Monthly (at start, then half yearly).
Occasional maintenance	Re-seed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over > 10% of the filter strip area.
Remedial actions	Repair erosion or other damage by re-turfing or reseeding.	As required.
	Relevel uneven surfaces and reinstate design levels	As required.
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required.
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required.
	Remove and dispose of oils or petrol residues using safe standard practices.	As required.

Bioretention System/ Raingarden - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual		
Maintenance Schedule	**Required Action**	**Frequency**
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and access standing water levels in underdrain (if appropriate) to determine if maintenance is necessary.	Quarterly
	Check operation of underdrains by inspection of flows after rain.	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds.	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density.	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays.	Quarterly to biannually
Occasional maintenance	Infill any holes of scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch,	As required
Remedial actions	Remove and replace filter medium and vegetation above.	As required but likely to be > 20 years

The following information should be passed to the development operator to ensure that future maintenance is carried out in a safe and proper manner.

A formal review of the risks should be undertaken on an annual basis:

Table 7.2: Proposed Operational Schedule for Below Ground Drainage

Operation	Risks	Mitigating Measures
Access to manholes for Inspection and Maintenance.	1. Confined spaces	1. Entry to confined space to be minimised and, where unavoidable, to be carried out by appropriately trained personnel
Removal of silt from outfall	1. Risk to members of the public 2. Open Water	1. Access to hazardous areas by members of the public to be prohibited. 2. To be carried out by appropriately trained personnel
Removal of silt from drainage channel	1. Risk to members of the public	1. Access to hazardous areas by members of the public to be prohibited

Provided that the surface and foul water strategies as set out in this report, are implemented, it is expected that the primary residual failure would be as a result of some form of failure of the site drainage system during the life of the development. Therefore, regular, ongoing maintenance as set out in the Operations and Maintenance Manual, will be required to ensure that the capacity of the system is maintained as designed.

8. Consent / Planning

Summary of expected consents required:

- Ordinary Watercourse Consent – N/A, not discharging into a public watercourse
- Sewerage Undertaker Consent – N/A, not connecting into a public sewer
- Section 104 / 106 Drainage Adoption – N/A, drainage not to be adopted
- Build Over / Build Near – Offsite Consultant to confirm surface and foul flows

In addition to the above it is anticipated that details of the drainage scheme will need to be approved by Wiltshire Council Lead Local Flood Authority (LLFA) through a formal planning application.

9. Conclusions

This report concludes that the foul and surface water drainage strategy for the development will be designed in accordance with both national and local standards and best practice. The following key items have been summarised below:

- The foul and surface water drainage systems for the new development will be designed to accommodate the required flows for the lifetime of the development.
- It has been determined that the post-dev surface water flow rates can flow unrestricted into an offsite attenuation basin in accordance with national guidelines and non-statutory technical standards, so as to not adversely impact downstream flooding of the site as a result of the new development.
- All surface water run-off from storm events up to and including the 100-year plus 50% climate change will be retained within the overall site.
- Attenuation provided 'at source' by way of porous sub bases prior to discharging into the main drainage system.
- In the event that flows from rainfall exceed the 1 in 100-year rainfall event or system failure through lack of maintenance, surface water run-off will be directed via exceedance routes away buildings and/or critical infrastructure.
- The use of permeable paving and filter drains/ strips for rainwater run-off mitigation, satisfies the water quality criteria of document Ciria C753 - The SuDS Manual for the carpark.
- Ownership and maintenance liabilities for the foul and surface water drainage system will be clearly defined so that in the event of failure the drainage system appropriate action can be taken to ensure that the drainage system continues to work efficiently.

Appendix A Topographical Survey

10446 -Topo

10446 – Utilities Survey

Notes :

- THE SURVEY IS BASED ON OSGB36 NATIONAL DATUM, DERIVED FROM OSTN15 & OSGM15 GPS NATIONAL GRID TRANSFORMATION AND GEOID MODELS.
- THE SURVEY WAS MEASURED FOR A DRAWING SCALE OF 1:200 AND FEATURES SURVEYED AND SHOWN TRUE TO SCALE WILL BE IN LINE WITH THE RICS 3RD EDITION SPECIFICATION.
- ALL SERVICES AND CRITICAL DIMENSIONS SHOULD BE FIELD VERIFIED PRIOR TO DESIGN.

KEY

SURVEY STATION — SS05

KERB CHANNEL
TOP OF KERB
DROP KERB
VERGE
ROAD MARKINGS
FENCE
WALL
OVERHEAD ELECTRIC
OVERHEAD TELECOM
FOUL SEWER
SURFACE SEWER
BUILDING
BUILDING OVERHANG
NO ACCESS
CONTOUR
SPOT LEVEL — + 127.19
BORE HOLE — BH
TREES — SPREAD & GIRTH SHOWN TO SCALE
HEDGE SPREADS
WOODLAND CANOPY
GATE
BANKING SYMBOL

ABBREVIATIONS

AIR VALVE	AV
BACK DROP	BD
BRICK	BK
BOLLARD / ILLUMINATED BOLLARD	BOL/IB
BT MANHOLE	BT
BT INSPECTION COVER	BT
CABLE TV COVER	CATV
CONTROL BOX	CB
COVER LEVEL	CL
CABLE RISER	CR
CATCH PIT	CP
DRAINAGE CHANNEL	DCH
ELECTRICITY POLE	EP
EARTH ROD	ER
FIRE HYDRANT	FH
FLOOR LEVEL	FL
FLOWER BED	FB
FOUL WATER SEWER	FW
GAS RISER	GR
GAS VALVE	GV
GULLY	GY
INSPECTION COVER	IC
INVERT LEVEL	IL
KERB OUTLET	KO
LADDER	LD
LAMP POST	LP
LETTER BOX	LB
LITTER BIN	BIN
MANHOLE	MH
MARKER POST	MK
RODDING EYE	RE
ROAD SIGN	RS
RAIN WATER PIPE	RWP
SOIL VENT	SV
STREET NAME PLATE	SNP
SOIL PIPE	SP
STAY CABLES	STAY
STOP VALVE	SV
STORM WATER SEWER	SW
SOIL VENT PIPE	SVP
THRESHOLD LEVEL	THL
TELEPHONE CALL BOX	TCB
TRAFFIC LIGHT	TL
TREE STUMP	SU
TELECOM POLE	TP
UNABLE TO LOCATE	UTL
UNABLE TO RAISE	UTR
UNABLE TO SURVEY	UTS
VENT PIPE	VP
WASH OUT	WO
WATER LEVEL	WL
WATER METER	WM
WATER RISER	WR

FENCE ABBREVIATIONS

ARMCO BARRIER	ARM
BARBED WIRE	B/W
CHAIN LINK	CHL
CLOSE BOARD	C/B
HAND RAIL	H/R
HERAS	HERAS
IRON RAILING	I/R
PALISADE	PAL
PICKET	PIC
POST AND CHAIN	P/C
POST AND RAIL	P/R
POST AND WIRE	P/W
WROUGHT IRON	W/I

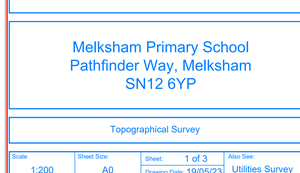
WALL ABBREVIATIONS

BRICK	BK
CONCRETE	CO
METAL	MET
RETAINING WALL	RET
STONE	ST
TIMBER	TIM

Coordinate Table

Station	Description	Easting	Northing	Level
SS01	ROAD NAIL	391199.015	162679.856	40.717
SS02	ROAD NAIL	391211.035	162664.755	41.068
SS03	ROAD NAIL	391237.007	162728.046	40.497
SS04	ROAD NAIL	391183.106	162591.641	42.085

SHEET LAYOUT



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Drawing Revision

No	Date	Description
R0	16/05/23	Topographic Survey Completed
R1		
R2		
R3		
R4		

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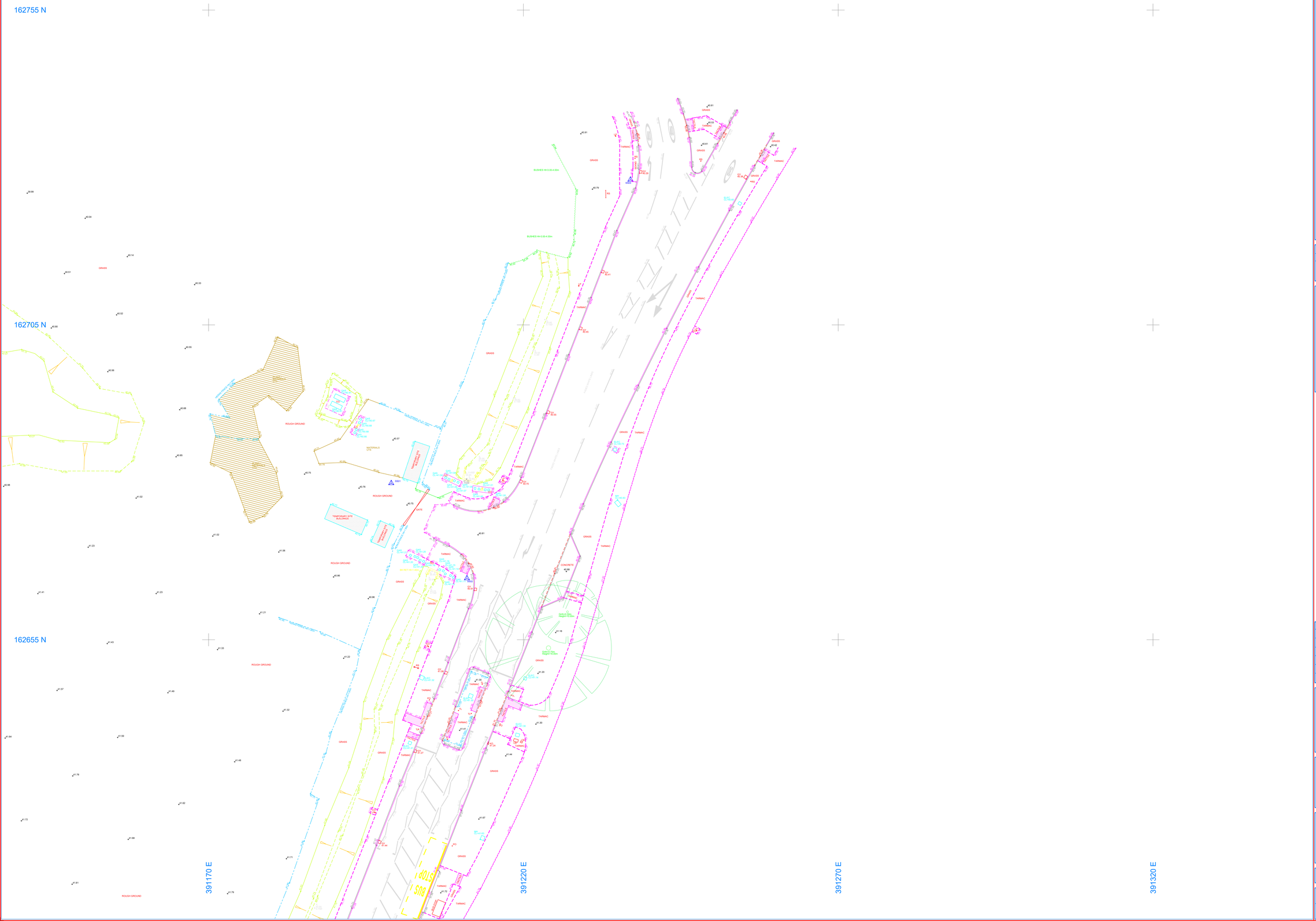
Topographical Survey

Scale	Sheet Size:	Sheet:	Also See:
1:200	A0	1 of 3	
		Drawing Date: 19/05/23	Utilities Survey
Project Number:	Rev:	Surveyed By: CR	Checked By:
10446	R0	Drawn By: CR	SD



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BUILDING OVERHANG
NO ACCESS
CONTOUR
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CABLE RISER	CR
CATCH PIT	CP
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ELECTRICITY POLE	EP
EARTH ROD	ER
FIRE HYDRANT	FH
FLOOR LEVEL	FL
FLOWER BED	FB
FOUL WATER SEWER	FW
GAS RISER	GR
GAS VALVE	GV
GULLY	GY
INSPECTION COVER	IC
INVERT LEVEL	IL
KERB OUTLET	KO
LADDER	LD
LAMP POST	LP
LETTER BOX	LB
LITTER BIN	BIN
MANHOLE	MH
MARKER POST	MK
RODDING EYE	RE
ROAD SIGN	RS
RAIN WATER PIPE	RWP
SOIL VENT	SV
STREET NAME PLATE	SP
SOIL PIPE	SP
STAY CABLES	STAY
STOP VALVE	SV
STORM WATER SEWER	SW
SOIL VENT PIPE	SVP
THRESHOLD LEVEL	THL
TELEPHONE CALL BOX	TCB
TRAFFIC LIGHT	TL
TREE STUMP	SU
TELECOM POLE	TP
UNABLE TO LOCATE	UTL
UNABLE TO RAISE	UTR
UNABLE TO SURVEY	UTS
VENT PIPE	VP
WASH OUT	WO
WATER LEVEL	WL
WATER METER	WM
WATER RISER	WR

FENCE ABBREVIATIONS

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BARBED WIRE	B/W
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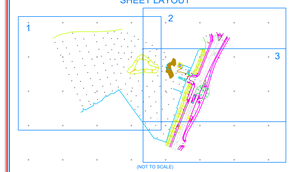

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Drawing Revision

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R2		
R3		
R4		

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Topographical Survey

Scale: 1:200	Sheet Size: A0	Sheet: 2 of 3	Also See: Utilities Survey
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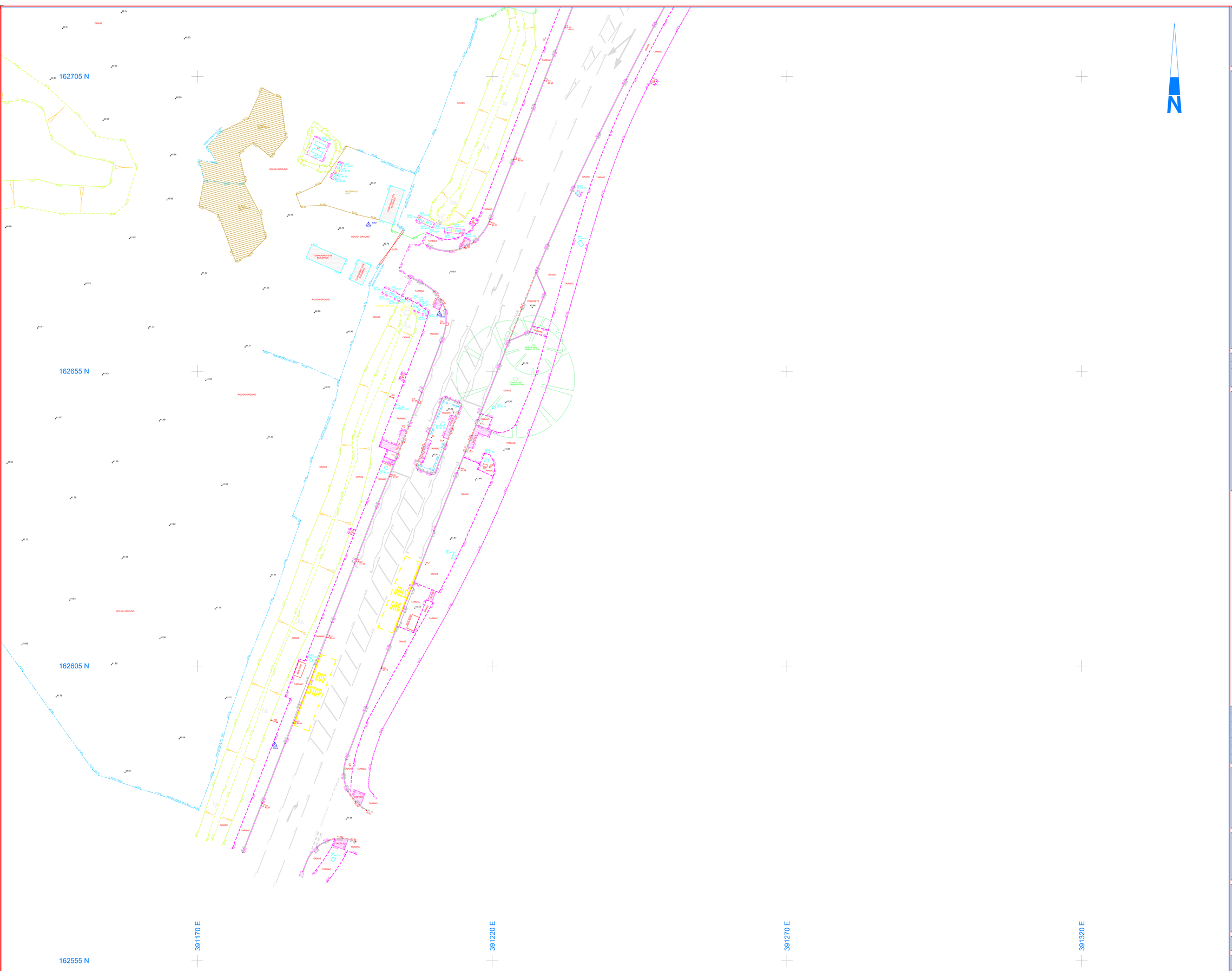
Project Number: 10446	Rev: R0	Surveyed By: CR	Checked By: SD
		Drawn By: CR	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SS02
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SS04
SS05
GRASS
TARMAC
ROUGH GROUND
CONCRETE
GATE
BUS STOP
TEMPORARY SITE BUILDINGS
MATERIALS SITE
CONTRACTORS COMPOUND
PLANTER
Garden Area Height 10.50m
Garden Area Height 10.50m
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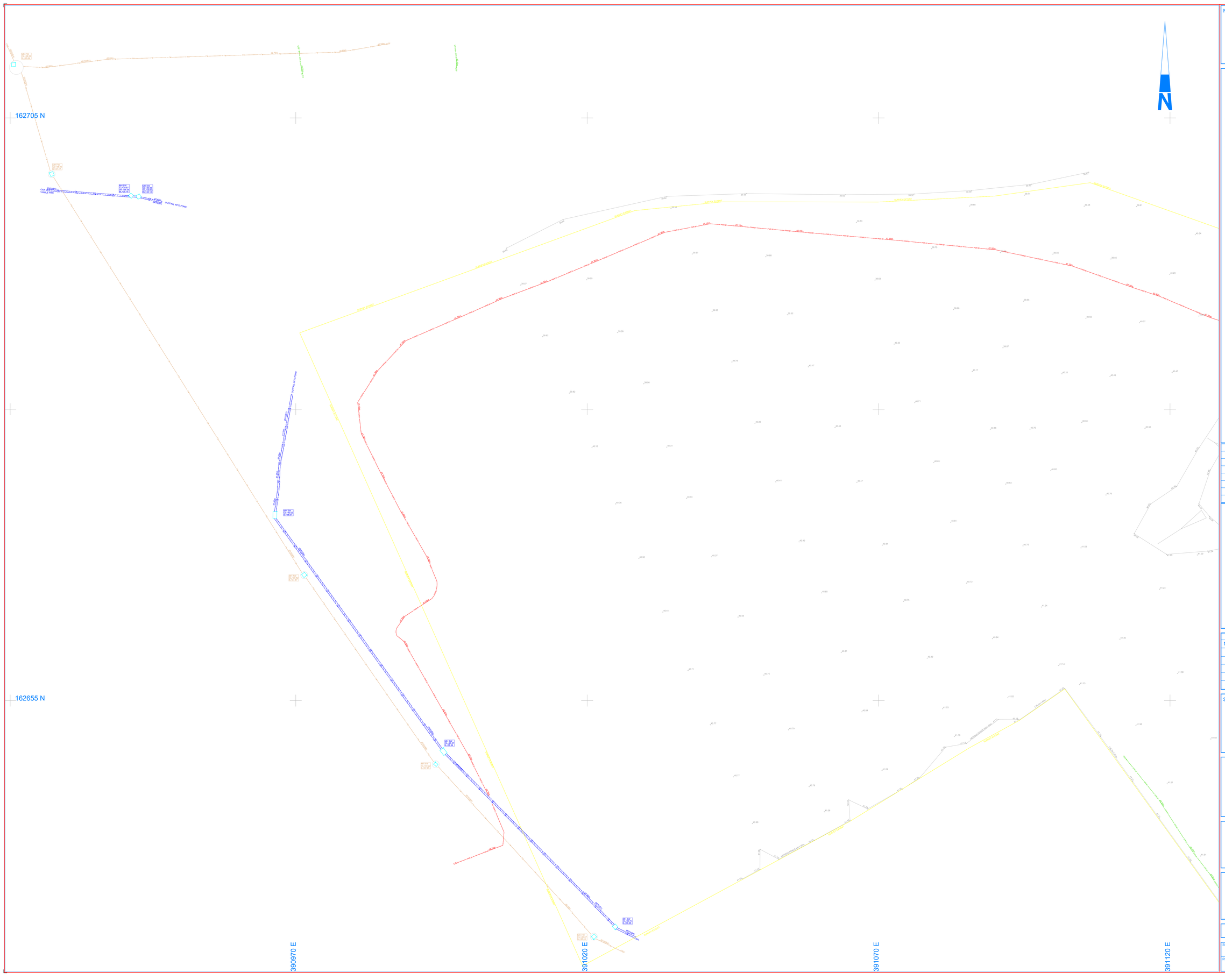

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OFFSET FUEL B2 (PAS128)	GPR B1 (PAS128)
OFFSET FUEL B4 (PAS128)	GPR B2 (PAS128)
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	GPR B4 (PAS128)

DRAINAGE CCTV REFERENCE

(x) Indicates Pipe Reference
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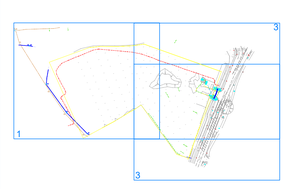

(NOT TO SCALE)

Drawing Revision

No	Date	Description
R0	18/05/23	UTILITY SURVEY COMPLETED
R1		
R2		
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R4		

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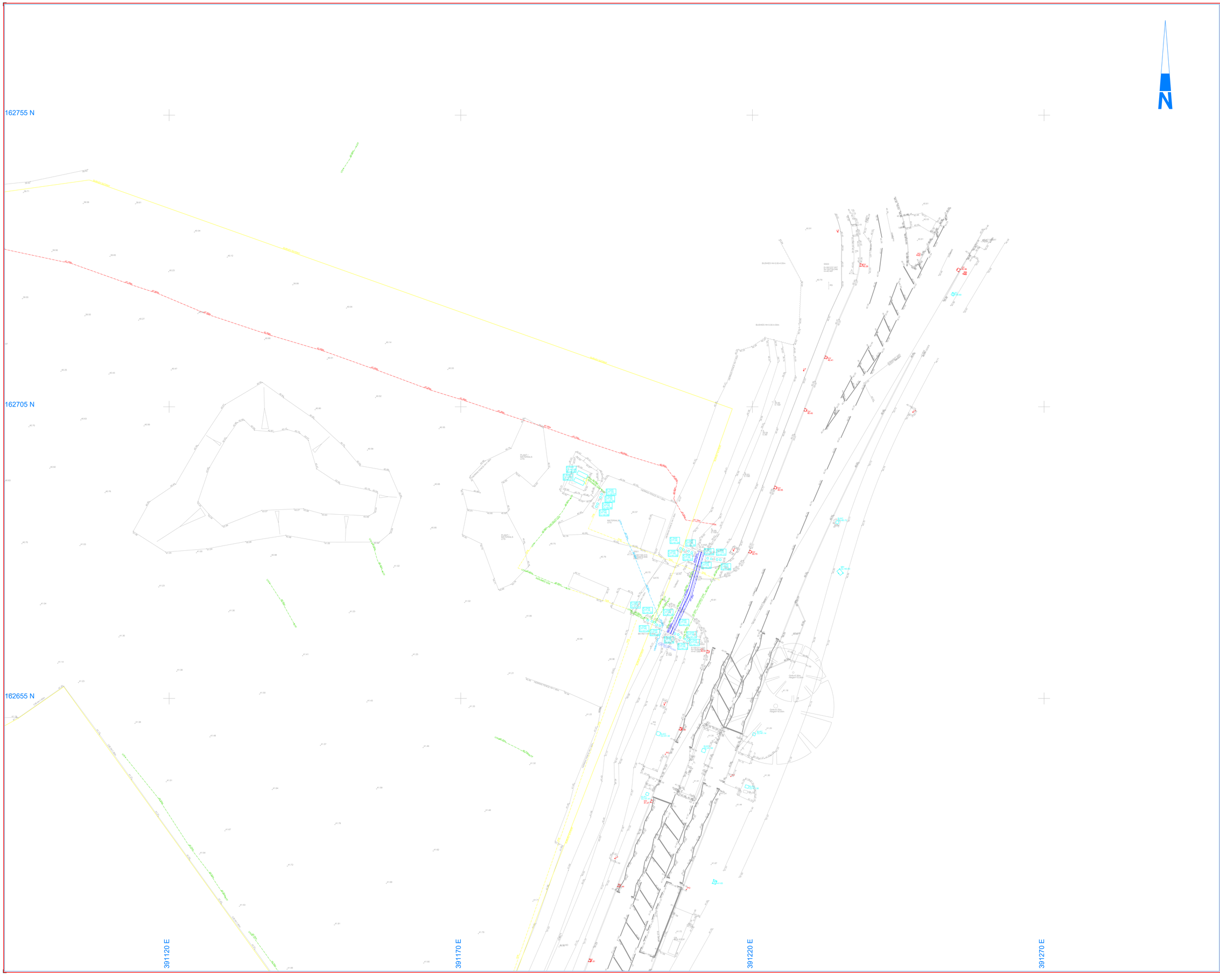
chartered ICES
Regulated by RICS

ISG CONSTRUCTION

MELKSHAM PRIMARY SCHOOL
PATHFINDER WAY
SN12 6YP

PAS128 Utility Survey

Scale: 1:200	Sheet Size: A0	Sheet: 1 of 1	ALSO SEE DRAWING: 10446-TOPO
Project Number: 10446	Rev: R0	Drawing Date: 19/05/23	
		Surveyed By: JM	CHECKED BY: MP
		Drawn By: JM	



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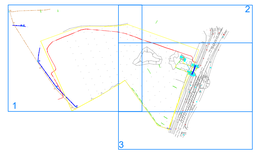

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PAS128 Utility Survey

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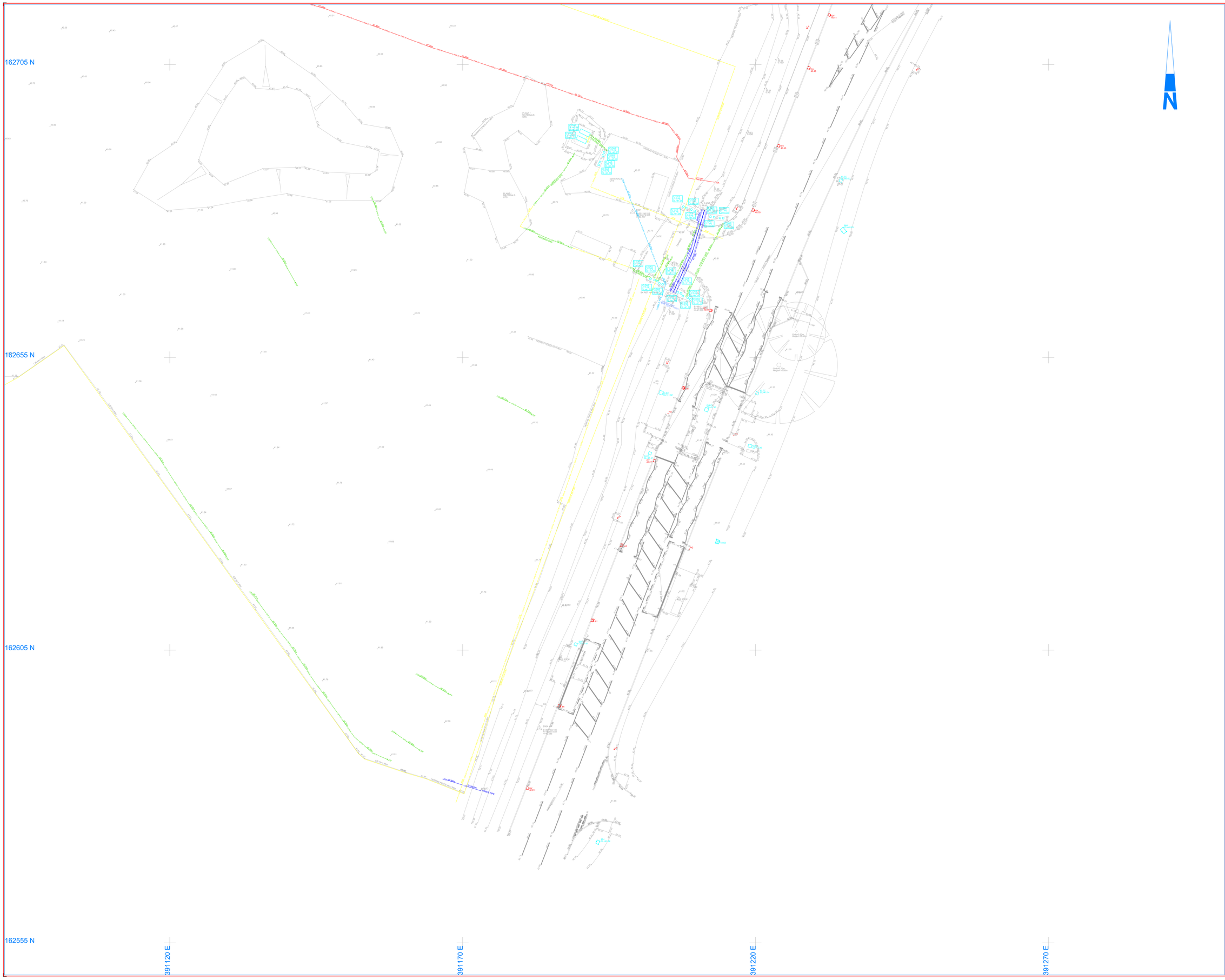

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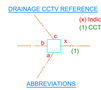

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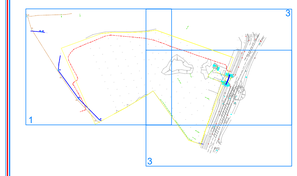

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1:200	A0	Drawing Date: 19/05/23	10446-TOPO
Project Number: 10446	Rev: R0	Surveyed By: JM	CHECKED BY: MP
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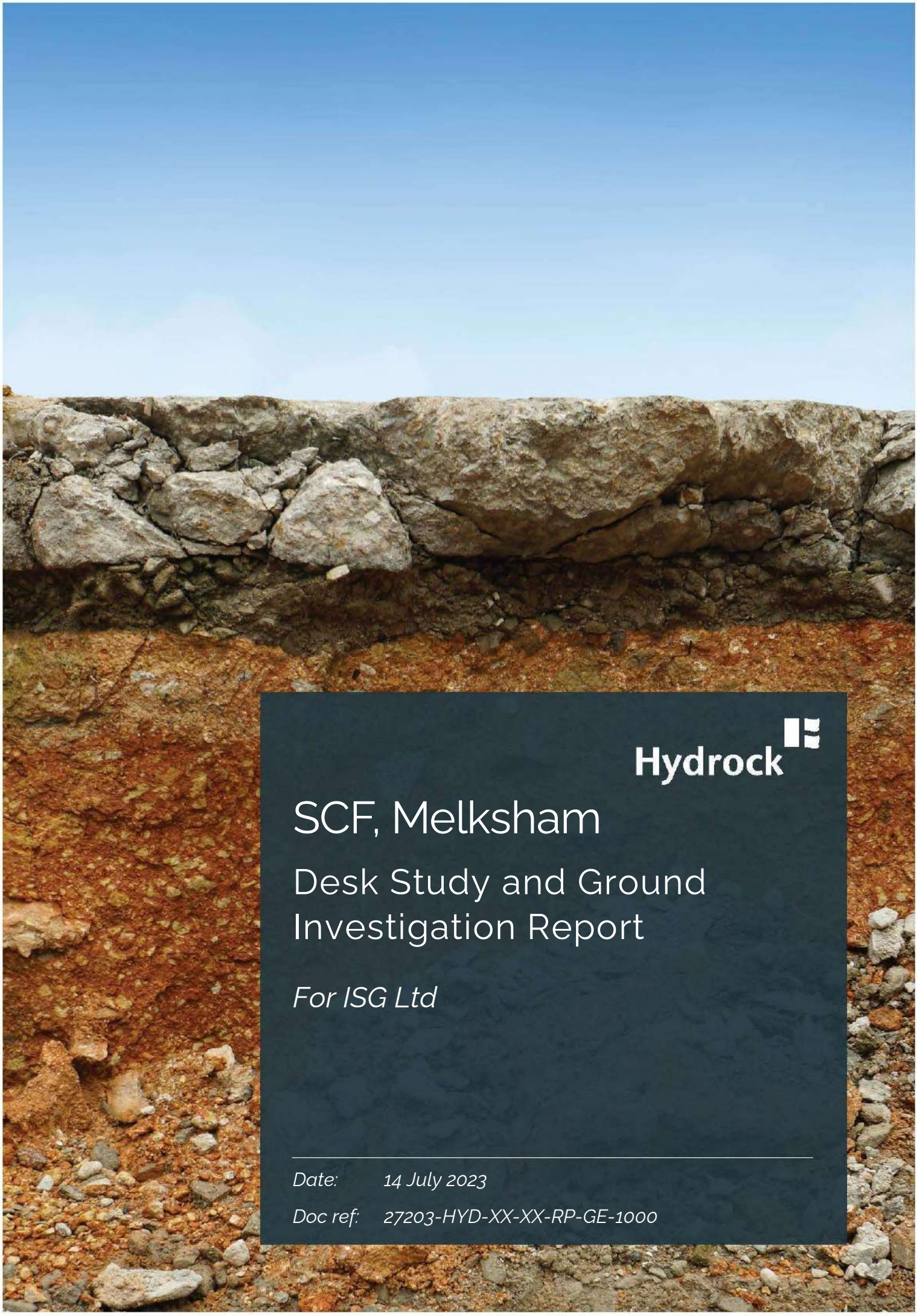
Appendix B Ground Investigation Report & Flood Risk Assessment Report

27203-HYD-XX-XX-RP-GE-1000-S2-P01

27203-HYD-XX-XX-WET-RP-0001



Hydrock

SCF, Melksham

Desk Study and Ground Investigation Report

For ISG Ltd

Date: *14 July 2023*

Doc ref: *27203-HYD-XX-XX-RP-GE-1000*

Document control sheet

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Executive summary

Site information and setting	
Objectives	Phase 1 Desk Study and Phase 2 Ground Investigation to support the planning application and to assist with design.
Client	ISG Ltd.
Site name and location	Pathfinder Way, Melksham, SN12 6YP.
Proposed development	Hydrock understands that the proposed development is to construct a primary school comprising a single-storey building with associated car parking, playgrounds and playing fields.
Site description	The site is irregular in shape and has an area of approximately 2ha. Presently the land is being used by the Principal Contractor as a storage area for the residential development to the south of the site with a small compound and hardstanding area in immediate proximity to the gate. The rest of the site has been used for the stockpiling of various material for the adjacent development The site is bound on the southern and eastern sides by recent residential developments, to the north by Western Way and to the west by arable fields. There are young trees and hedges around the perimeter of the site and sporadic patches of grass, however, the majority of the site is unvegetated.
Desk study summary	
Topography	The site is flat, with no significant topographical features.
Hydrology	There is an attenuation pond to the north west of the site within the wider site boundary.
Site History	Since the earliest available Ordnance Survey map (1885 - 1886) the site has been occupied by open fields up until the present day. Topsoil-stripping and material stockpiles are visible in aerial photography from 2020. Presently the land is being used by the Principal Contractor as a staging area for the residential development to the south of the site with a small compound and hardstanding area in immediate proximity to the gate. The rest of the site has been used for the stockpiling of various material for the adjacent development. It looks as though the site has been subject to a ground level raise with the potential for Made Ground to be encountered across the site
Geology	**Made Ground:** Made Ground fill is anticipated across the entire site. **Superficial:** No superficial deposits on site. Head deposits consisting of clay and silt are recorded 55m east of the site. **Solid:** Oxford Clay Formation, silicate mudstone with grey generally smooth sporadic beds of limestone nodules. Likely weathers to clays and silts at shallower depths.

Natural geological hazards	Shrink-swell clays. Naturally elevated Sulphates within the Oxford Clay Formation.
Anthropomorphic geotechnical hazards	Made Ground - it's plausible that a thickness of Made Ground is present across the site, remnant from the surrounding construction activities. This is unlikely to be a suitable bearing stratum or a good subgrade for road construction.
Hydrogeology	Oxford Clay Formation: Unproductive Aquifer.
UXO risk	Specialist UXO report commissioned from 1st Line Defence by the Client states a medium risk from military ordnance. For all works, a UXO management plan and site specific UXO awareness briefings are required for all personnel conducting intrusive works. For shallow intrusive works/open excavations, UXO specialist presence on site is required to support open excavations.
Initial Conceptual site Model based on desk study	
Potential contaminant sources	» Made Ground, associated with historical construction activities and imported fill, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials, PAH and petroleum hydrocarbons (S01). » Ground gases (carbon dioxide and methane) from organic materials in the Made Ground / natural soils (S02). » Offsite Ground gases (carbon dioxide and methane) from organic materials in the Made Ground (S03).
Potential contaminant linkages (for receptors for which there is or will be a pathway)	» People (neighbours, site end users) (R01). » Development end use (buildings, utilities and landscaping) (R02). » Surface water: features off-site (R03). » Flora and fauna (R04)
Ground model proven by investigation	
Ground and groundwater conditions encountered by investigation	The ground conditions as proven by the investigation undertaken at the site comprise: » 'General' Made Ground, was encountered from between 0.0m and 0.20m, to depths of between 0.50m - 1.70m bgl, with an average thickness of 1.07m. It generally comprised sandy / slightly sandy, gravelly / slightly gravelly silty CLAY, with fragments of brick limestone, asphalt, and concrete. Made ground was not found in TP5 in the north-west of the site. » Placed Topsoil was encountered in the north-east quadrant of the site and during the ground investigation, was being spread from a stockpile located within the north-east of the site (see HYD-XX-XX-DR-GE-1001 In Appendix A for the location of the stockpile). The Placed Topsoil was encountered from ground level to depths of between 0.10m and 0.50m bgl, and had an average thickness of 0.26m. It comprised slightly sandy slightly gravelly silty CLAY. » Topsoil was identified in TP5 and TP06, in the west of the site and was approximately 0.4m thick, with an average thickness of 0.4m. The topsoil comprised firm brown slightly sandy silty CLAY with a medium organic matter content. » Relict Topsoil was encountered underlying the general Made Ground. It was encountered at depths of between 0.70m and 1.63m bgl and had an average thickness of 0.31m. The Relict Topsoil generally comprised a dark brown to brown slightly sandy SILT with a high organic matter content

	» The Oxford Clay Formation was encountered underlying the Made Ground and/or topsoil across the entirety of the site. A residual stratum of the Oxford Clay Formation was encountered at depths of between 0.40m and 1.70m bgl and proven to a maximum depth of 3.00m bgl. An average thickness of 0.71m was proven. It comprised firm to very stiff slightly sandy slightly gravelly silty CLAY and brown slightly sandy clayey SILT (encountered in SA02 only). The gravel faction comprised subangular fine to medium gravels of siltstone. » Unweathered soils of the Oxford Clay formation were encountered at depths of between 1.90m and 3.00m bgl to a maximum recorded depth of 10.95m bgl. The base was not proven. The Oxford Clay Formation comprised a greyish brown becoming grey very stiff very high strength slightly sandy CLAY. The strata was observed between 2.90m - 7.10m bgl to be thinly laminated, with frequent (possible gypsum) crystals and with rare nodules of pyrite from 5.00m - 7.10m bgl. » Groundwater was encountered in WS02 at 0.60m, and in TP2, TP5 and TP6 at 2.80m, 2.10m and 1.90m respectively. All encounters of groundwater indicated slow rates of seepage.
Summary of geotechnical conclusions	
Groundwork	The site is previously undeveloped and no buried man-made obstructions were encountered by this investigation. However, it is noted that fill activities have taken place previous to the ground investigation in order to level the site. It is noted that buried services run parallel to the northern, eastern and western site boundaries. Excavation of shallow soils should be readily undertaken by conventional plant and equipment. Based on site observations, the rate of water ingress to the proposed excavations is likely to be slow. In these circumstances, groundwater control by sump pumping is likely to be sufficient.
Foundations	The Made Ground is considered unsuitable in its present condition for use as founding soils on the basis of its unpredictable nature and likely deposition in an uncontrolled manner and should be fully penetrated by all new foundations. On the basis of the ground conditions indicated from the current ground investigation, the foundations will likely comprise: » Strip foundations, or » Pad foundations. **Strip Foundations:** All foundations should fully penetrate any Made Ground and be founded at least 0.9m into the undisturbed natural strata, which generally comprise firm to very stiff clay of the Residual Oxford Clay Formation. A safe net bearing pressure of 100kN/m^2 is considered appropriate for footings founded within the firm to very stiff residual clays of the Residual Oxford Clay Formation typically found at 0.9m into the natural soils. Based on the medium volume change potential residual clay soils of the Oxford Clay Formation, the minimum founding depth for strip foundations is 0.9m bgl. **Pad Foundations:** A safe net bearing pressure of 100kN/m^2 is also considered appropriate for pad foundations up to 2.5m by 2.5m founding on the residual firm to very stiff clay of the Oxford Clay Formation.

	Based on the medium volume change potential residual clay soils of the Oxford Clay Formation, the minimum founding depth for pad foundations is 0.9m bgl. **Roads and Pavements:** An allowable CBR of 2.5% should be assumed for design purposes.
Sustainable drainage	Soakaway drainage is considered unsuitable for this site.
Buried concrete	Made Ground: Design Sulfate Class - DS-2 and ACEC Class AC-2. Relict Topsoil Design Sulfate Class - DS-2 and ACEC Class AC-1. Oxford Clay Formation: the buried concrete class requirements for the Oxford Clay Formation are to be confirmed on receipt of the laboratory testing, which are not available at this time.
Summary of geo-environmental assessment	
Human Health	No significant risk to human health identified.
Phytotoxicity	No significant risk to plant life identified.
Controlled waters	No significant risk to controlled waters identified.
Construction materials:	Standard construction materials are envisaged.
Potable water supply pipes	Standard pipework is envisaged. However, confirmation should be sought from the water supply company at the earliest opportunity.
Ground gases or vapours:	No gas protection is required CS-1 conditions apply.
Enabling works	
Waste management	Excavated soils to be disposed of as waste, are likely to be classed as non-hazardous waste.
Future considerations	
Further work	Following the ground investigation works undertaken to date, the following further works will be required: » completion and reporting of the ongoing gas monitoring, hence the conclusions in this report are provisional, subject to the completion of monitoring; » assessment of tree influence on foundations and design of foundations; » discussion and agreement with utility providers regarding the materials suitable for pipework; » Further consideration regarding the desired performance of the existing earthworks and whether buried topsoil, encountered within a number of holes required removal. An earthworks specification report maybe required if re-engineering of the Made Ground is adopted. » discussions with regulatory bodies and the warranty provider regarding the conclusions of this report; and » production of a Materials Management Plan relating to reuse of soils at the site and import of soils to the site.

This Executive Summary forms part of Hydrock Consultants Limited report number 27203-HYD-XX-XX-RP-GE-1000 and should not be used as a separate document.

1. Introduction

1.1 Terms of reference

In May 2023, Hydrock Consultants Limited (Hydrock) was commissioned by ISG Ltd (the Client) to undertake site investigation, comprising a Phase 1 desk study and Phase 2 ground investigation at the site of the proposed primary School off Pathfinder Way, Melksham, SN12 6YP.

The site currently comprises an area of open land within the wider development, with an attenuation pond located adjacent to the in the north-west boundary as shown in Drawing 27203-HYD-XX-XX-DR-GE-100 included in Appendix A.

Hydrock understands that the proposed development is to construct a primary school. The proposed development will comprise a single-storey building with associated car parking, playgrounds and playing fields. A proposed development layout (AWW Drawing 'Ground floor Context Plan - Extension Flipped Option') (4669-AQQ-XX-XX-D-A-SK009-P01, is presented in Appendix A.

The investigation works have been undertaken in accordance with Hydrock's proposal referenced (27203-HYD-XX-XX-FP-GE-1001-P03, dated April 2023) and the Client's instructions to proceed (Email from Danny Coupland (ISG) to Tim Hatrey (Hydrock) dated 05/05/23).

1.2 Objectives

The works have been commissioned to support the planning application (pertaining to contaminated land and surface water drainage) and to assist with the design of the development.

The objectives of the Phase 1 Desk Study are to formulate a preliminary Ground Model and an initial Conceptual Site Model (CSM) of the site to identify and make a preliminary assessment of any potential geo-environmental and geotechnical risks to the proposed development.

The objectives of the Phase 2 Ground Investigation are:

- to resolve any geotechnical and geo-environmental uncertainties identified in the Phase 1 Desk Study by refining and updating the preliminary Ground Model, based on the conditions met in accordance with the principles of Environment Agency (EA) 'Land Contamination: Risk Management' (LCRM) (2021);
- to identify any geo-environmental mitigation requirements to enable development to progress; and
- to provide preliminary geotechnical recommendations for design.

1.3 Scope

The scope of the Phase 1 Desk Study comprises:

- a field reconnaissance (walkover) to determine the nature of the site and its surroundings including current and former land uses, topography and hydrology;
- acquisition and review of:
  - historical Ordnance Survey maps, to identify any; former potentially contaminative uses shown at the site and immediately surrounding it, and an assessment of the associated contamination risks;
  - a third-party environmental report to identify any; flooding warning areas, local landfills, pollution incidents, abstractions, environmental permits etc. All of which may have had the potential to have environmental impact on the site;
  - topographical, geological and hydrogeological maps;
  - British Geological Survey (BGS) archive records;

    - regional UXB risk maps;
- development of a preliminary Ground Model representing ground conditions at the site;
- development of an initial CSM, including identification of potential contaminant linkages;
- a qualitative assessment of any geo-environmental risks identified; and
- identification of any plausible geotechnical hazards.

The scope of the Phase 2 Ground Investigation comprises:

- a ground investigation including trial pitting, soakaway testing, windowless sampling, dynamic probing and rotary drilling to:
    - obtain data on the ground and groundwater conditions of the site;
    - allow collection of samples for geotechnical and chemical laboratory analysis;
    - allow geotechnical field tests to be undertaken;
    - install gas and groundwater wells;
- gas concentration and groundwater level monitoring;
- geotechnical and chemical laboratory analysis;
- updating of the preliminary Ground Model;
- preparation of a geotechnical risk register;
- presentation of initial geotechnical design recommendations;
- formulation of an updated CSM, including identification of any plausible contaminant linkages;
- of completion a generic quantitative risk assessment of any identified chemical contaminants to establish 'suitability for use' under the current planning regime;
- discussion of any potential environmental liabilities associated with land contamination (soil, water and gas); and
- identification of outline mitigation requirements to ensure the site is 'suitable for use'.

1.4 Available information

The following documents have been provided to Hydrock by ISG Ltd for use in the preparation of this report:

- AWW 22.05.23. 'Ground Floor Context Plan - Extension Flipped Option'. Drawing Number: 4669-AWW-XX-XX-D-A-SK009-P01. For ISG.
- Peter Evans Partnership. 12.09.17. 'Indicative Masterplan and Access Arrangement'. Drawing Number 2592.43D. For Mactaggart & Mickel.
- 1st Line Defence. 19.05.2023. Detailed Unexploded Ordnance (UXO) Risk Assessment. Melksham Primary School. Report Ref: DA4478a-00. For ISG Ltd.
- Solum Surveying Ltd. 19.05.23. Melksham Primary School Pathfinder Way, Melksham SN12 6YP PAS128 Utility Survey. Project No.: 10446. Revision 0. Drawn by JM. For ISG Ltd.

It is understood that the Client has obtained assignment of the above documents and Hydrock has assumed full reliance can be placed upon their contents. Should this not be the case, Hydrock should be informed at the earliest opportunity.

1.5 Regulatory context and guidance

The investigation work has been carried out in general compliance with recognised best practice, including (but not limited to) BS 5930:2015, BS 10175:2011+A2:2017 and the AGS (2006) 'Good Practice Guidelines for Site Investigations'.

The geo-environmental section of this report is written in broad accordance with BS 10175:2011+ A2:2017, EA LCRM), (2021) and the AGS (2006) 'Good Practice Guidelines for Site Investigations'.

The methods used follow a risk-based approach, the first stage of which is a Phase 1 desk study and field reconnaissance, with any potential geo-environmental risks assessed qualitatively. This is done using the 'source-pathway-receptor contaminant linkage' concept to assess risk as introduced in the Environmental Protection Act 1990 (EPA, 1990). Any potential geotechnical risks are also assessed from the Phase 1 desk study and site reconnaissance stage.

Phase 2 comprises intrusive ground investigation work and testing. The factual information from the desk study and the ground investigation are used to develop the CSM. This CSM is based on a ground model of the site physical conditions and an exposure model of the possible contaminant linkages. The CSM forms the basis for Generic Quantitative Risk Assessment (GQRA) in accordance with current guidelines. This GQRA might lead to more Detailed Quantitative Risk Assessment (DQRA).

Professional judgement is then used to evaluate the findings of the risk assessments and to provide recommendations for the development.

The geotechnical section of this report is prepared in general accordance with BS EN 1997-1+A1: 2013, BS EN 1997-2:2007 and BS 8004:2015. This report constitutes a Ground Investigation Report (GIR) as described in Part 2 of Eurocode 7 (BS EN 1997-2) (EC7). However, it is not intended to fulfil the requirements of a Geotechnical Design Report (GDR) as specified in EC7.

The geo-environmental and geotechnical aspects are discussed in separate sections. Throughout the report the term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential contamination). However, it should be appreciated that this is an integrated investigation and these two main aspects are inter-related. Designers should take all aspects of the investigation into account.

Remaining uncertainties and recommendations for further work are listed in Section 9 and Section 10.

2. Desk study (and field reconnaissance)

2.1 Data

A number of desk study sources have been used to assemble the following information and include:

- Third-party environmental report (Groundsure report, reference GS-5IW-7NC-84W-AR1) (Appendix D);
- Historical Ordnance Survey mapping (Appendix C);
- BGS Archive Records (Appendix D);
- Zetica UXB Risk Map (https://zeticauxo.com/downloads-and-resources/risk-maps/) (Appendix D); and
- Specialist UXO Risk Assessment, 1st Line Defence (Reference: DA4478a-00) (Appendix D).

2.2 Site referencing

Table 2.1: Site referencing information

Item	Brief Description
Site name	SCF, Melksham.
Site address	Pathfinder Way, Melksham, SN12 6YP.
Site location and grid reference	The site is located west off of Pathfinder Way, Melksham, SN12 6YP. The National Grid Reference of the approximate centre of the site is 391095E, 162692N. The site is approximately 2Ha in area and irregularly shaped. Along the northern boundary the site measures approximately 200m, the eastern and western boundaries measure approximately 100m and the southern boundary forms an 'L' shape and measures approximately 160m.
Site boundaries	The site is bound to the east by a drainage ditch and Pathfinder Way and to the south by residential housing. The western boundary lies within the wider plot of land that the school parcel as shown in Figure 2.1 . The site is bound to the north-west by an attenuation pond and to the north by land belonging to the wider site area. The north-east corner of the site is located at the access point to the site off of Pathfinder Way.



Figure 2.1: Site location

(Reproduced with permission from Groundsure)



Figure 2.2: Extract from the Ordnance Survey Map.

(OS licence 100023353).

A site location plan (Hydrock Drawing (27203-HYD-XX-XX-DR-GE-1000) is presented in Appendix A.

2.3 Site description and field reconnaissance survey

A field reconnaissance survey was undertaken on 18th May 2023 to visually identify assess potential geotechnical hazards, contaminant sources for future investigation and identification of possible source-pathway-receptor linkages. The weather during the field reconnaissance survey was sunny.

A description of the site is presented in Table 2.2 and selected photographs are presented in Figure 2.3 to Figure 2.6. Additional photographs are presented in Appendix B.

Table 2.2: Site description

Item	Brief Description
Site access	The site was accessed from Pathfinder Way.
Site area	The site is irregular in shape and has an area of approximately 2Ha.
Elevation, topography and any geomorphic features	The site is flat, with no significant topographical features apart from a large stockpile of topsoil in the centre of the site, approximately 40m from the site entrance. The stockpile is approximately 36m in length and 21m in width with an average hight of 2.5m, therefore an approximate volume of 1,911m^3.
Site boundaries and surrounding land	The site is bound on the south by a recent residential development. It is bound to the east by a drainage ditch with Pathfinder Way beyond running in an approximate north to south orientation. Further recent residential developments are located immediately east of Pathfinder Way. To the north it is bound by the wider site area, with a drainage ditch and Western Way beyond the wider site boundary. To the west the site is bound by the larger site area and arable fields beyond.

Present land use	Presently the land is being used by the Principal Contractor as a storage area for the residential development to the south of the site with a small compound and hardstanding area in immediate proximity to the gate. The rest of the site has been used for the stockpiling of various material for the adjacent development. It looks as though the site has been subject to a ground level raise with the potential for Made Ground to be encountered across the site.
Vegetation	There are young trees and hedges around the perimeter of the site and sporadic patches of grass, however, the majority of the site is unvegetated.
General site sensitivity	The site is within a generally residential area and not in any known areas of special scientific interest.

A Site Features Plan (Hydrock Drawing 27203-HYD-XX-XX-DR-GE-1001) is presented in Appendix A.



Figure 2.3: Compound area at entrance to site.



Figure 2.4: Existing topsoil stockpile



Figure 2.5: Residential development to south of the site



Figure 2.6: Residential development to south of the site.

2.4 Site history

A study of historical Ordnance Survey maps (Appendix D) has been undertaken to identify any former land uses at the site and surrounding areas which may have geotechnical or geo-environmental implications for the proposed development. The key findings are summarised in Table 2.3.

Table 2.3: Site history review

Reference	Key features on site	Key features off-site
OS Map[1] 1885: 1:10,560	The site occupies an area spanning across two open fields.	The northern field is surrounded by a line of trees to the northern, eastern, and western boundaries approximately 50m from the site boundary. In the southern field, there are trees along the western and southern boundaries, approximately 100m and 200m from the site, respectively. There are two ponds situated approximately 50m west of the site. Bowerhill Farm is positioned in the south-eastern corner of the southern field, approximately 200m away from the site.
OS Map 1938 - 1942: 1:10,560	A new field boundary is now located in the south-east corner of the site running north-west to south-east.	Melksham Hospital is located 400m from the site.
OS Map 1956 - 1960: 1:10,560	No significant changes.	Major offsite development between 250m and 800m south of the site understood to be buildings related to the RAF Melksham training base.
OS Map 1973: 1:2,500	No significant changes.	One of the ponds to the west of the site is no longer shown. A road to the north and east, and roundabout are shown as per the current layout.
OS Map 1975-1976 1:10,000	No significant changes.	Sewage works shown 600m south-west of the site.
OS Map 1983: 1:2,500	No significant changes.	Approximately 90m - 200m south of the site are buildings listed as 'works', 'depot' and 'garage'. A drainage ditch is located 50m south-west of the site (orientated south-west then west).
OS Map 1986: 1:10,000	No significant changes.	A drainage ditch network is shown north and west of the site, approximately 100m west of the site at its closest point.
OS Map 2001: 1:10,000	No significant changes.	Further residential development north of the A365.

[1] Ordnance Survey Historical Map Information provided by Groundsure.

2017 Aerial Photograph[2]	Site is a green field. No significant changes.	No significant changes.
2020 Aerial Photograph	The site has been stripped of topsoil and material stockpiles appear to be present.	Residential development immediately east of Pathfinder Way. An attenuation pond is located adjacent to the north-west of the site (part of the development of the wider site). Immediately south of the site appears to be material spread across the wider site area for development works.

2.5 Geology

The geology of the site area is shown on the 1:10,000 British Geological Survey (BGS) map extract reproduced as part of the Groundsure and is summarised below:

Table 2.4: Geology

Ref. for Figures	Location	Stratigraphic Name	Description
Superficial Deposits (Figure 2.7)			
1	55m east.	Head.	Clay and silt.
2	140m south.	Head.	Clay and silt.
3	362m west.	River Terrace Deposits.	Variable sands and gravels.
Solid Geology (Figure 2.8)			
1	On site.	Oxford Clay Formation.	Silicate mudstone, grey, generally smooth to slightly silty with sporadic beds of limestone nodules.

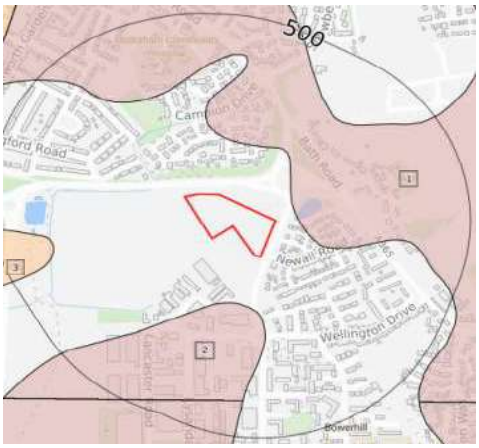

Figure 2.7: Superficial deposits.

(Reproduced with permission from Groundsure)



Figure 2.8: Solid geology.

(Reproduced with permission from Groundsure)

[2] Historical Aerial photograph, provided as part of the historical map Information provided by Groundsure.

The Groundsure report does not show any Made Ground to be present on site; however, during the site walkover stockpiles of topsoil were observed, and fill material was noted to be present to raise site levels.

2.6 Hydrogeology

2.6.1 Aquifer designations

Based on the inferred geological sequence presented in Section 2.5 and the Environment Agency's interactive aquifer designation map, the aquifer system presented in Table 2.5 applies.

Table 2.5: Aquifer system

Stratum	Aquifer Designation	Comments
Superficial Deposits		
On Site	None Recorded	No recorded superficial deposits on site.
Solid Geology		
Oxford Clay Formation.	Unproductive Aquifer.	Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules. Strata with low permeability that have negligible significance for water supply or river base flow.

2.6.2 Groundwater abstraction

There are no active licensed groundwater abstractions within 1000m of the site.

2.6.3 Groundwater source protection zones and groundwater vulnerability

The site is not within a groundwater Source Protection Zone (SPZ) and there are no SPZs within 500m of the site.

The site is situated within an unproductive aquifer. The Groundsure reports states that any groundwater within the bedrock would flow between well connected fractures. However, approximately 100m to the east and south is a Secondary superficial aquifer of medium vulnerability, see Figure *2.9*.

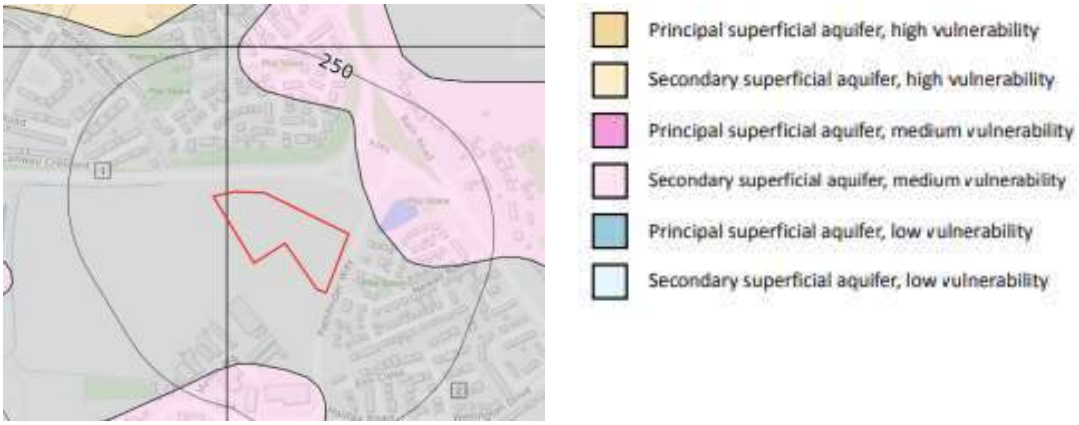

Figure 2.9: Aquifer Vulnerability

2.6.4 Groundwater quality

There are no groundwater bodies recorded below the site.

2.6.5 Groundwater flooding

The environmental data report indicates a negligible risk of groundwater flooding.

2.7 Hydrology

2.7.1 Surface water system and drainage

The surface water features in the vicinity of the site are listed in Table 2.6.

Various water drainage network bodies are recorded north, west and south of the site. The northern network travels from north to west and the southern network travels south to west. Both networks link up approximately 450m south-west of the site and flow in a south westerly direction.

Table 2.6: Surface water features

Feature	Location Relative to Site
3, 4 & C. Water drainage network listed as 'inland river not influenced by normal tidal action'.	50m to 239m south-west of the site.
5, 7, A & B. Water drainage network listed as 'inland river not influenced by normal tidal action'.	89m - 233m north and north-west of the site.
Water features greater then 5m wide	Approximately 100m north-west and 400m west.

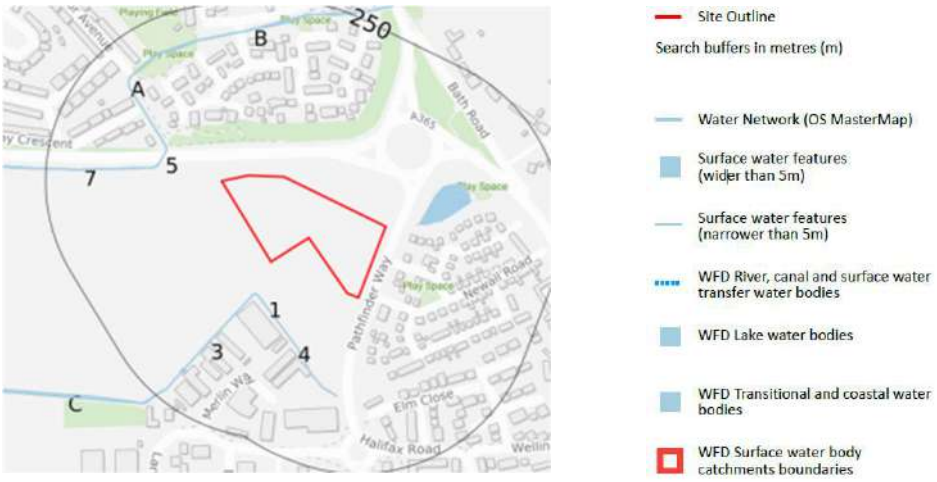

Figure 2.10: Water Network (OS Master Map)

2.7.2 Surface water abstractions and discharges

There is one active licenced surface water discharge within 500m of the site. It is listed in Table 2.7.

Table 2.7: Surface water discharges

Location Relative to Site	Purpose of Abstraction
356m south-west.	Trade discharges - site drainage. Receiving water: Berryfield Brook. Issue date: 31/03/1993

2.7.3 Surface water quality

Reference to the Environment Agency website shows the site is located within the catchment known as the Avon Bristol Rural Operational Catchment. The specific river water body being the Avon (Bristol) confluence River Marden to confluence of Seminfton Brook. The current (2019 cycle 3) overall status under the Water Framework Directive is described as 'Moderate'.

The reason for the water body currently having a 'Moderate' status is due to Mercury and its compounds, Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE) levels.

The objective for mercury and its compounds is for levels to be 'good' by 2040 and PBDEs to be good by 2063, to be achieved through natural conditions chemical status recovery time. The objective for PFOS is to be 'good' by 2039, however, it is stated as technically infeasible due to no known technical solution being available.

2.7.4 Surface water flooding

The desk study information indicates the proposed development is in Flood Zone 1 with a low probability of flooding from rivers or the sea

The highest surface water flood risk on site is 1 in 100-year chance with a flooding depth of between 0.1m and 0.30m.

No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regard to drainage and flooding.

2.8 Natural ground instability

Trees and hedges have been present around the wider site boundaries as seen in the historical aerial photographs. Cohesive deposits of the Oxford Clay Formation may be affected by potential for shrink-swell ground movements in clays as a result of changes in moisture content from removal or growth of trees.

Geological hazard	Risk on site given by Groundsure report	Reason
Shrink swell clays	Moderate	Ground conditions are predominantly of high plasticity.
Running sands	Negligible	Conditions unlikely whatever the position of the water table. No identified constraints on land use due to running sand conditions.

Geological hazard	Risk on site given by Groundsure report	Reason
Compressible deposits	Negligible	Compressible strata thought not to occur.
Collapsible strata	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Landslides	Very low	Slope instability problems are not likely to occur.
Ground dissolution of soluble rocks	Negligible	Soluble rocks are not thought to be present; or if present, not prone to dissolution.

2.9 Waste management

There are no current or historical waste management sites recorded within 250m of the site.

2.10 Regulatory Information

Information in the Groundsure Report (Appendix D), relating to various regulatory controls has been reviewed, with a summary presented below in Table 2.8.

Table 2.8: Regulatory information within 500m of the site

Regulatory Data	Distance from Site	Details	Potential Risk	Comment
Pollution incidents	129m north-west	Occurred 15/01/2003 Pollutant not identified. Category 4 for land, water and air impact.	No	Due to distance from site, being located down hydraulic gradient and its Category 4 classification.
Local Authority Pollution Prevention and Controls	309m south-west	Permitted Waste oil burners, less than 0.4MW net rated thermal input	No	Due to small volume of waste and distance from the site.
Historical Land uses	21m south	Unspecified depot dated 1986	Yes	Unknown what the depot was used for and it is up hydraulic gradient of the site.
	117m south-west	Unspecified works dated 1986	No	Due to distance from site and anticipated low permeability ground conditions.
	124m south	Garage	No	Due to distance from site and

Regulatory Data	Distance from Site	Details	Potential Risk	Comment
				anticipated low permeability ground conditions.
Trade Directory Entries	83m east	Active Electricity sub-station (not dated).	No	Due to its distance to the site. Any associated contamination is likely to be localised and anticipated impermeable ground conditions will inhibit migration on to site.
	88m north-west	Sewage pumping station.	No	No active surface water discharges are listed within 250m of the site. The pumping station is located down hydraulic gradient of the site.
	126m south-west	Graintec Ltd - lifting and handling equipment.	No	Due to distance from site.
	140m south-west	Metals manufacturers, fabricators and stockholders.	No	Due to distance from site.

2.11 Natural soil chemistry

Information contained within the environmental report (Appendix D) gives indicative (estimated) concentration values for the natural soils at the site for a selection of Contaminants of Potential Concern (CoPC). These have been reproduced in Table 2.9.

Table 2.9: Natural soil chemistry

Element	Arsenic	Cadmium	Chromium	Lead	Nickel
Concentration (mg/kg)	15 - 35	<1.8	60 - 12	100 - 200	15 - 45

The data in Table 2.9 is considered within the geo-environmental assessment.

Reference to the UK Soil Observatory Map (UKSO) show the site to lie within an area where:

» Lead concentrations are within the 50% percentile, with estimated concentrations of between 44 - 49 mg/kg. The UKSO gives an estimated concentration of 48.01 mg/kg for the site.

- Cadmium concentrations are shown to be 0.34 mg/kg for the site, which lies within the 60% percentile with concentrations between 0.33 and 0.38 mg/kg.
- Chromium concentrations are within the 60% percentile with concentrations between 67 - 73 mg/kg. The UKSO gives an estimated concentration of 72.99 mg/kg for the site. The site is shown to lie near an area within the 80% percentile with concentrations of between 79 - 85 mg/kg.
- Arsenic concentrations are within the 70% percentile with concentrations between 16.81 - 19.3 mg/kg. The UKSO gives an estimated concentration of 17.24 mg/kg for the site.
- Nickel concentrations are within the 60% percentile, with estimated concentrations of between 21.04 - 24.35 mg/kg. The UKSO gives an estimated concentration of 23.10 mg/kg for the site.

2.12 Radon

The radon risk is reported in the Groundsure report.

The guidance indicates that the site is not in a Radon Affected Area and no radon protection measures are required.

2.13 Unexploded ordnance (UXO)

2.13.1 Specialist UXO Desk Study Summary

A specialist UXO report was commissioned from 1st Line Defence by ISG Ltd and provided to Hydrock. A summary of the report is below:

- There is a Medium Risk from military ordnance. RAF Melksham lay 60m south of the site during WWII and was used to train airmen in aircraft maintenance, armaments, electrics and equipment use.
- RAF Melksham was the headquarters of the 4th Division Home Guard, and a considerable amount of training would have taken place at the facility.
- Training exercises involving live and dummy ammunition may not have been limited to the base and earthworks and features have been noted within immediate and surrounding areas of the base from WWII era imagery.
- The Home Guard commonly buried Ordnance at strategic positions to be recovered in the event of an invasion, which were frequently lost or forgotten about. A crate of Home Guard grenades was discovered south-east of the site.
- Given the high concentration of Home Guard located in the area there is considered to be an increased risk of encountering Home Guard related ordnance
- The risk from German aerial delivered UXO is assessed as Low Risk.

A site-specific plan is required to manage the risk of UXO. All operatives on site need to be briefed on the risk of UXO and basic identification. A UXO specialist should be present on site to visually inspect open excavations. Further guidance should be sought from the 1st Line Defence report Ref: DA4478a-00. A copy of the UXO desk study is included in Appendix D.

3. Initial Conceptual Site Model

3.1 Introduction

The initial CSM incorporates evidence from the site walkover, the Desk Study and previous investigations carried out at the site. The formulation of an initial Conceptual Site Model is a key component of the LCRM methodology. The initial CSM incorporates a ground model of the site physical conditions and an exposure model of the possible contaminant linkages; it forms the basis for Generic Quantitative Risk Assessment (GQRA) in accordance with current guidelines.

3.2 Ground model

The preliminary ground model presented in Section 3.2 provides an understanding of the ground conditions and is the basis for preparing the preliminary geotechnical hazard assessment (Section 3.3) and the preliminary geo-environmental exposure model (Section 3.4)

3.3 Geotechnical hazard identification

3.3.1 Context

The preliminary geotechnical hazard identification has been undertaken in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622.

The following section sets out the identified geotechnical hazards and the development elements potentially affected (see Table J.1 in Appendix J for further information).

3.3.2 Plausible geotechnical hazards

Plausible geotechnical hazards identified at the site are:

- Uncontrolled Made Ground (variable strength and compressibility).
- Soft / loose compressible ground (low strength and high settlement potential).
- Shrink swell of the clay fraction of soils under the influence of vegetation.
- Variable lateral and vertical changes in ground conditions.
- High sulfates present in the soils.
- Obstructions as a result of storage of construction waste from surrounding sites.
- Shallow groundwater.
- Earthworks – settlement (fill on soft/loose ground).
- Earthworks – poor bearing capacity of new fill.
- Earthworks – unsuitability of site won material to be reused as fill.

3.3.3 Potential development elements affected

Development elements potentially affected by geotechnical hazards are:

- Buildings – foundations.
- Buildings – floor slabs.
- Roads and pavements.
- Services.
- Construction staff, vehicles and plant operators.
- Concrete below ground.
- Earthworks – settlement (due to placement of fill on soft / loose ground).

- Earthworks – poor bearing capacity of new fill.
- Earthworks control, inability to place and compact fill.

The above plausible geotechnical hazards and development elements affected have been carried forward for investigation and assessment. The investigation is presented in Section 5 and the assessment is presented in Section 6.

3.4 Geo-environmental exposure model

3.4.1 Context

The preliminary exposure model is used to identify geo-environmental hazards and to establish potential contaminant linkages, based on the source-pathway-receptor (SPR) approach.

A viable contaminant linkage requires all the components of an SPR to be present. If only one or two are present, there is no linkage and no further assessment is required.

3.4.2 Potential contaminants

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

3.4.2.1 Potential on-site sources of contamination

- Made Ground, associated with historical construction activities and imported fill, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials, PAH and petroleum hydrocarbons (S01).
- Ground gases (carbon dioxide and methane) from organic materials in the Made Ground / natural soils (S02).

3.4.2.2 Potential off-site sources of contamination

- Ground gases (carbon dioxide and methane) from organic materials in the Made Ground (S03).

3.4.3 Potential receptors

The following potential receptors in relation to the proposed land use have been identified.

- People (neighbours, site end users) (R01).
- Development end use (buildings, utilities and landscaping) (R02).
- Surface water: features off-site (R03).
- Flora and fauna (R04)

Groundwater has been discounted as a possible receptor due to no superficial deposits being present on site, no recorded abstraction points within 1km of the site and the classification of the bedrock as an unproductive stratum.

3.4.4 Potential pathways

The following potential pathways have been identified.

- Direct contact: ingestion, skin contact, inhalation of dust and outdoor air by people (P01).
- Migration and build-up of ground gas and vapours via permeable soils and/or construction gaps (P02).
- Migration of contaminant via leachate migration to the unsaturated zones (P03)
- Uptake and consumption by flora and fauna (P04).

Health and safety risks to site development contractors and maintenance workers have not been assessed as part of this study and will need to be considered separately.

The above sources, pathways and receptors have been considered as part of the Preliminary Risk Assessment in accordance with LCRM (2021), are considered to be plausible in the context of this site and have been carried forward for investigation and assessment. The investigation is presented in Section 5 and the assessment is presented in Section 7 An assessment of the Source – Pathway – Receptor linkages is undertaken following the assessment (Section 7) and is presented in Appendix K (Table K.1).

A summary of the plausible linkages is presented on the initial CSM provided in Appendix A. (Hydrock Drawing 27203-HYD-XX-XX-DR-GE-1002).

3.4.5 *Potential implications of climate change*

Climate change has the potential to change the risk profile for conceptual site models and associated contaminant linkages. The impact of climate change on the CSM is site-specific, and a qualitative assessment of the potential impact of climate change on the CSM for this site is summarised below. The assessment has primarily utilised the guidance in Environment Agency (2010)[3] and SoBRA (2022)[4] which set out the UK context to climate change and land contamination. Both guidance documents advocate a "what if" scenario approach in the context of changes in ambient temperatures, an increase in the frequency of extreme rainfall/storm events and heatwaves/droughts, and long-term changes in groundwater and sea levels.

Those "what if" scenarios that are relevant to this CSM are:

- Increased frequency and/or magnitude of extreme rainfall events leading to short-term surface flooding, surface water run-off, groundwater flooding, and/or land-based erosion.
- Increased frequency and/or magnitude of storm events leading to short-term drops in barometric pressure and/or high winds.
- Occurrence of extreme cold and hot weather events leading to changes in ground conditions such as soil temperature, evapo(trans)piration, and soil moisture (for example freeze-thaw effects and desiccation), decreased infiltration and fall in groundwater and surface water levels.
- Long-term decrease in rainfall leading to lower infiltration and fall in groundwater and surface water levels.

[3] *Environment Agency, 2010. Guiding Principles for Land Contamination. Part 2. FAQs, technical information, detailed advice and references, March 2010.*

[4] *SoBRA, 2022. Guidance on Assessing Risk to Controlled Waters from UK Land Contamination Under Conditions of Future Climate Change, Society of Brownfield Risk Assessment, August 2022.*

4. Ground investigations

4.1 Site works

The ground investigation works, including the rationale which was based on the findings of the preliminary risk assessment is summarised in Section 4.

The fieldwork took place between 23 and 26 May 2023. The ground investigation locations were surveyed in using a hand-held GPS and are shown on the Exploratory Hole Location Plan (Hydrock Drawing 27203-HYD-XX-XX-DR-GE-1003) in Appendix A.

The logs, including details of ground conditions, soil sampling, in situ testing and any installations, are also presented in Appendix E.

The weather conditions during the Hydrock fieldwork and for the previous week were dry and sunny.

Table 4.1: Summary of site works

Activity	Method	No.	Name	Depth/ Range (m bgl)	In situ tests	Rationale
Boreholes	Windowless sampler	7	WS01-WS07	3.0 - 6.45	SPT HSV	To investigate the strength profile of the Made Ground and Oxford Clay Formation, install gas and groundwater monitoring wells and enable the collection of geotechnical and geo-environmental samples.
	Rotary open hole	1	BH01	10.50	SPT	To understand the deeper ground conditions of the site and to collect geotechnical and geo-environmental samples.
Trial pits	Machine (JCB 3CX)	11	TP1 - TP11	2.50 - 3.70	HSV	To investigate shallow ground conditions and collect samples for geotechnical and geo-environmental testing. Due to no definitive red line site boundary supplied by the client at the time of the site investigation, TP01 - TP03 are located outside of the site boundary.
Probes	Dynamic probe	1	WS3	6.0		To gain a strength profile through the Made Ground and Oxford Clay Formation.
Trial pits	Machine (JCB 3CX)	2	TP1 &TP11	2.50 - 3.70		To undertake soakaway testing.

Notes:
SPT= Standard Penetration Test
HSV= Hand Shear Vane

Wells for monitoring groundwater levels and ground gas concentrations, were installed in a number of the windowless sampler boreholes and the rotary cored borehole. A summary of the monitoring well installations is presented in Table 4.2.

Table 4.2: Summary of monitoring installations

Location	Ground level (m OD)	Standpipe / piezometer diameter	Screen top and base depth (m bgl)	Screen top and base elevation (m OD)	Strata targeted
BH01	41.32	50	0.5 to 1.50	40.82 to 39.82	Made Ground
WS04	41.60	50	0.3 to 1.30	40.30 to 41.30	Made Ground
WS05	41.30	50	0.30 - 1.60	41.00 to 39.70	Made Ground
WS07	40.47	50	1.00 - 6.00	39.47 to 34.47	Oxford Clay Formation

4.2 Geo-environmental testing

4.2.1 Sampling strategy and protocols

Exploratory hole positions were determined by reference to the site conditions and uncertainties identified in the initial CSM.

No specific features were identified during the desk study as requiring targeted investigation and a reasonably even spacing was used. No specific sampling statistics or grid were utilised in this instance.

Samples were taken, stored and transported in general accordance with BS 10175:2011+A2:2017.

4.2.2 Geo-environmental monitoring

Gas monitoring boreholes have been monitored on 3 occasions of a programmed 6 visits. The results are presented in Appendix G. Monitoring is ongoing and this report will be updated on completion of the monitoring.

4.2.3 Geo-environmental laboratory analyses

The chemical test certificates for testing undertaken as part of Hydrock's investigation are provided in Appendix H and summarised in the table below. Wherever possible, UKAS and MCERTS accredited procedures have been used.

The geo-environmental analyses undertaken on soils are summarised in Table 4.3.

Table 4.3: Geo-environmental analyses of soils

Determinand Suite	Made Ground	Made Ground Placed Topsoil	Relict Topsoil	Residual Oxford Clay Formation
Hydrock minimum suite of determinands for solids*	4	3	1	1

*Hydrock minimum soil suite comprises: As, B (water soluble), Be, Cd, Cr (total), Cr (VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulfide, pH, asbestos fibres, speciated polynuclear aromatic hydrocarbons (PAH, by GC-FID), total phenols and fraction of organic carbon

Due to the absence of any obvious signs of petroleum hydrocarbon contamination, testing for total petroleum hydrocarbon (TPH) Hydrock Level 2 suite was not undertaken.

The soils chemical test data are interpreted and assessed in Sections 7.3 and 7.4.

The geo-environmental analyses undertaken as part of Hydrock's investigation on leachates are summarised in Table 4.4.

Table 4.4: Geo-environmental analyses of leachates.

Determinand Suite	Made Ground
Hydrock default leachate suite	2

The groundwater chemical test data is interpreted and assessed in Section 7.5.

4.3 Geotechnical testing

4.3.1 Geotechnical laboratory testing

The geotechnical tests undertaken by Hydrock are summarised in Table 4.5 and the test certificates are provided in Appendix F. Wherever possible, UKAS accredited procedures have been used.

Table 4.5: Summary of sample numbers for geotechnical tests

Test	Made Ground	Relict Topsoil	Residual Oxford Clay Formation
Natural moisture content	2	2	2
Atterberg limits	2	2	2
Sulfate and aggressive chemical environment classification for buried concrete classification (full BRE SD1 suite)	4	1	-

The geotechnical test data are summarised in Section 5.4 and interpreted in Section 6.

4.4 Constraints

The centre of the site could not be investigated due to the presence of topsoil stockpiles. This topsoil was being spread across the northern part of the site throughout the ground investigation.

5. Ground investigation records and data

5.1 Physical ground conditions

5.1.1 Summary of strata encountered

The following presents a summary of the properties of the ground and groundwater conditions encountered, based on field observations, interpretation of the field data and laboratory test results, taking into account drilling, excavation and sampling methods, transport, handling and specimen preparation.

All relevant data from the Hydrock investigation discussed in Section 4 are used from this point forward.

Details of the Hydrock ground investigation works are provided in the logs in Appendix E, previous data are provided in Appendix D , a summary of the ground model is presented in Table 5.1 and the individual strata are described in the sections below. Relevant contour plans are presented in Appendix A

Table 5.1: Strata encountered

Stratum	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m) (range)	Thickness (m) (average)
Placed Topsoil	0 0	0.10- 0.50	0.10 - 0.50	0.26
'General' Made Ground	0.0 - 0.20	0.5 - 1.70	0.5 - 1.70	1.07
Topsoil (TP5 only)	0	0.40	0.4	0.4
Relict Topsoil	0.70 - 1.63	1.10 - 1.70	0.07 - 1.10	0.31
Residual Oxford Clay Formation	0.40 - 1.70	1.90 - 3.0	0.20 - 1.50	0.71
Oxford Clay Formation	1.90 - 3.00	>10.95	>9.30	Not proven

5.1.2 Surface covering

The following surface cover was identified during the field reconnaissance and the fieldworks:

- Made Ground consisting of a slightly sandy / sandy, slightly gravelly / gravelly CLAY covering approximately 40% of the site.
- Placed topsoil covering approximately 40% of the site.
- Vegetation (scrub and grass over Made Ground), covering approximately 20% of the site.

5.1.3 Made Ground

Below the surface covering, Made Ground was recorded across the entire site, except for at the location of TP5.

In general, there are two main types of Made Ground:

- 'General' Made Ground, was encountered from between 0.0m and 0.20m, to depths of between 0.50 - 1.70m bgl, with an average thickness of 1.07m. It generally comprised firm to stiff sandy / slightly sandy, gravelly / slightly gravelly silty CLAY, with fragments of brick limestone, asphalt, and concrete.

» Placed Topsoil was encountered in the north-east quadrant of the site and during the ground investigation, was being spread from a stockpile located within the north-east of the site (see HYD-XX-XX-DR-GE-1001 In Appendix A for the location of the stockpile). The Placed Topsoil was encountered from ground level to depths of between 0.10m and 0.20m bgl, and had an average thickness of 0.16m. It comprised slightly sandy slightly gravelly silty CLAY.

Figure 11: Contour map of depth of Made Ground across site.

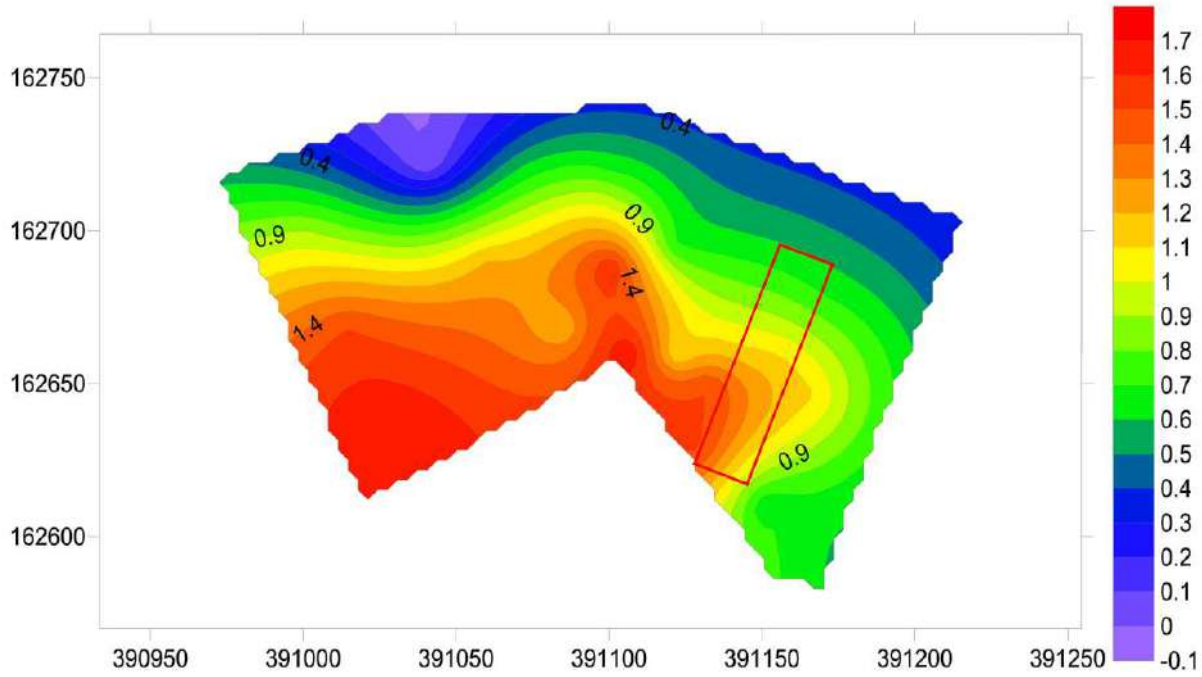

Figure 10 plots the depth of the Made Ground below the site. Made Ground was found to be deepest in the south and south-west site area and shallows towards the north. The proposed school building is indicated by the red rectangle. A full-size drawing is shown in Appendix A (Ref: 27203-HYD-XX-XX-DR-GE-1004)

5.1.4 *Topsoil*

Natural topsoil was encountered at TP5 only.

The Topsoil was approximately 0.40m thick. The topsoil comprised firm brown slightly sandy silty CLAY with a medium organic matter content.

For the purposes of this report, topsoil is defined as the upper layer of an in-situ soil profile, usually darker in colour and more fertile than the layer below (subsoil), which is a product of natural chemical, physical, biological and environmental processes, but does not imply compliance with BS 3882:2015. Reuse of topsoil as a growing medium at the site should be determined by the landscape architect or the landscape Contractors.

5.1.5 *Made Ground Placed Topsoil*

Topsoil was being spread out across the eastern half of the site from a stockpile. This topsoil was up to 0.5m in thickness and was uncompacted. This material was a soft brown slightly sandy slightly gravelly clay.

5.1.6 *Relict Topsoil*

A relict topsoil layer was observed to be underlying the Made Ground at WS04, WS05, TP3, TP10 and SA02. It generally comprised a dark brown to brown slightly sandy SILT with a high organic matter content. The relict Topsoil was encountered at depths of between 0.70m and 1.63m bgl with an average thickness of 0,31m proven.

For the purposes of this report, topsoil is defined as the upper layer of an in-situ soil profile, usually darker in colour and more fertile than the layer below (subsoil), which is a product of natural chemical, physical, biological and environmental processes, but does not imply compliance with BS 3882:2015. Reuse of topsoil as a growing medium at the site should be determined by the landscape architect or the landscape Contractors.

5.1.7 *Residual Oxford Clay Formation*

Residual (weathered) soils of the Oxford Clay Formation were encountered at depths of between 0.40m and 1.70m bgl and generally comprised firm to very stiff slightly sandy slightly gravelly silty CLAY and brown slightly sandy clayey SILT (encountered in SA02 only). The gravel fraction comprised subangular fine to medium gravels of siltstone. It was proven to depths of between 1.90m and 3.00m bgl and to have an average thickness of 0.71m.

5.1.8 *Oxford Clay Formation*

The Oxford Clay Formation was encountered underlying the Made Ground and/or topsoil across the entirety of the site. It was encountered at depths of between 1.50m and 3.00m bgl to a maximum recorded depth of 10.95m bgl. The base was not proven.

The Oxford Clay Formation comprised a very stiff very high strength greyish brown becoming grey slightly sandy CLAY. Rare to occasional fossilised rootlets were also observed within the stratum.

The strata was observed between 2.90m - 7.10m bgl to be thinly laminated, with frequent (possible gypsum) crystals and with rare nodules of pyrite from 5.00m - 7.10m bgl.

From 8.70m bgl, the Oxford Clay Formation graded into an extremely weak thinly laminated dark grey silty mudstone. Bedding fractures were very closely to closely spaced, sub-horizontal planar smooth, tight and clean.

5.2 Groundwater

5.2.1 *Groundwater observations and levels*

Groundwater encountered during the investigation is listed in Table 5.2. A groundwater observation represents the depth at which groundwater was first observed and is likely to be deeper than the actual water table level at that location.

Table 5.2: Groundwater occurrence

Stratum	Date	Location	Fieldwork	Comment
			Groundwater observation (m bgl)	
Made Ground	25/05/23	WS02	0.60	Slow seepage.
Oxford Clay Formation	23/05/23	TP2 TP5 TP6	2.80 2.10 1.90	Slow seepage.

Groundwater levels recorded during post-fieldwork monitoring are summarised in Table 5.3.

Table 5.3: Groundwater level data summary

Stratum	Date range	Location	Post-fieldwork monitoring	
			Depth to groundwater (range) (m bgl)	Groundwater elevation (range) (m OD)
Made Ground	12/06/23	WS04	1.03	40.57
		WS05	1.04	40.26
Oxford Clay Formation	12/06/23	WS07	0.80	39.67

5.2.2 *Infiltration tests*

The results of the infiltration testing undertaken are summarised in Table 5.4. The results sheets are presented in Appendix E.

Table 5.4: Infiltration test results

Stratum	Location	Depth to base of pit (m bgl)	Infiltration rate (m/s)	
			Run 1	Range
Oxford Clay Formation	SA01	1.86	Failed	N/A
Residual Oxford Clay Formation	SA02	2.19	Failed	N/A

Within the Residual Oxford Clay Formation and Oxford Clay Formation, soakaway testing produced no recorded infiltration rates. It was not possible to calculate infiltration rate due to insufficient drop in water level. Groundwater noted in the base of both soakaway pits prior to testing.

5.2.3 *Groundwater summary*

In general, shallow groundwater was encountered within the Made Ground and Oxford Clay Formation. Within WS03, groundwater was encountered as a slow seepage at a depth of 0.60m bgl, at the boundary between Made Ground and the Oxford Clay Formation.

The post-fieldwork monitoring indicated a perched water table in the Made Ground sitting on top of the relatively lower permeability Oxford Clay Formation, and a separate water table within the clays of the Oxford Clay Formation at a depth of 1.08m. This water level is unusually high, and it is suspected that it is due to a fault in the casing.

While groundwater may be encountered at founding level it is anticipated that due to the cohesive nature of the natural soils that groundwater infiltration would be adequately controlled by sump pumping. A higher inflow of groundwater may occur from a perched groundwater but this is likely to be influenced by the time of year the construction is undertaken and the head of perched water.

5.3 Ground gases (carbon dioxide and methane)

Records from the gas monitoring boreholes are presented in Appendix G and summarised in Table 5.5.

To date 3 monitoring visits have been undertaken, with a further 3 visits to be undertaken as part of the current commission. The data are assessed in Section 7.6.

Table 5.5: Range of ground gas data

Stratum	Methane (%)	Carbon dioxide (%)	Oxygen (%)	Steady flow rate (l/hr)	Comment
'General' Made Ground	0.10-9.80	0.10-3.00	13.60-20.30	0.00-0.30	WS04: Three out of three methane readings were 0.10%. WS05: Two out of three methane readings were 0.10%, with one outlier of 9.80%.
'Oxford Clay Formation'	0.00	0.00-0.20	19.10-20.20	0.00-0.30	Three out of three methane readings were 0.00%.

5.4 Geotechnical data

5.4.1 Introduction

Laboratory test results are contained in Appendix F with *in situ* test results shown on the relevant exploratory hole log or datasheet in Appendix E. The following sections summarise the main findings and provide interpretation where appropriate.

5.4.2 Plasticity

The volume change potentials in terms of BRE Digest 298 with respect to building near trees have been determined from the results of plasticity index tests on samples of soil. These are summarised in Table 5.6.

Table 5.6: Volume change potential

Stratum	No. of tests	Plasticity Index			Modified Plasticity Index			Plasticity designation	Volume Change Potential
		Min.	Max.	Av.	Min.	Max.	Av.		
Made Ground	2	30	32	31	21.9	23.3	22.6	Medium	Medium
Relict Topsoil	2	25	26	25.5	25	26	25.5	Medium	Medium

Residual Oxford Clay Formation	2	24	31	26.5	24	31	26.3	Medium	Medium

5.4.3 Soil strength

Table 5.7 summarises information pertaining to the shear strength of the soils according to geological stratum. Factual results are summarised for laboratory tests, field tests (e.g. hand shear vane) and uncorrected Standard Penetration Tests (SPT). Where the SPT is used to infer shear strength by published correlation, this is also tabulated. A shear strength versus depth profile is summarised in **Error! Reference source not found.**,and plots are presented in Appendix F.

Table 5.7: Soil strength results and derived values

Stratum	No. of tests	SPT (N-value) (range)	Undrained Shear Strength (kPa)	Method
Oxford Clay Formation	36	0 - 43	0 - 193.5	SPT – Rotary cored SPT Windowless sampler boreholes
	89	-	34 - >260	Hand shear vane Rotary cored and windowless sampler boreholes Trial pits

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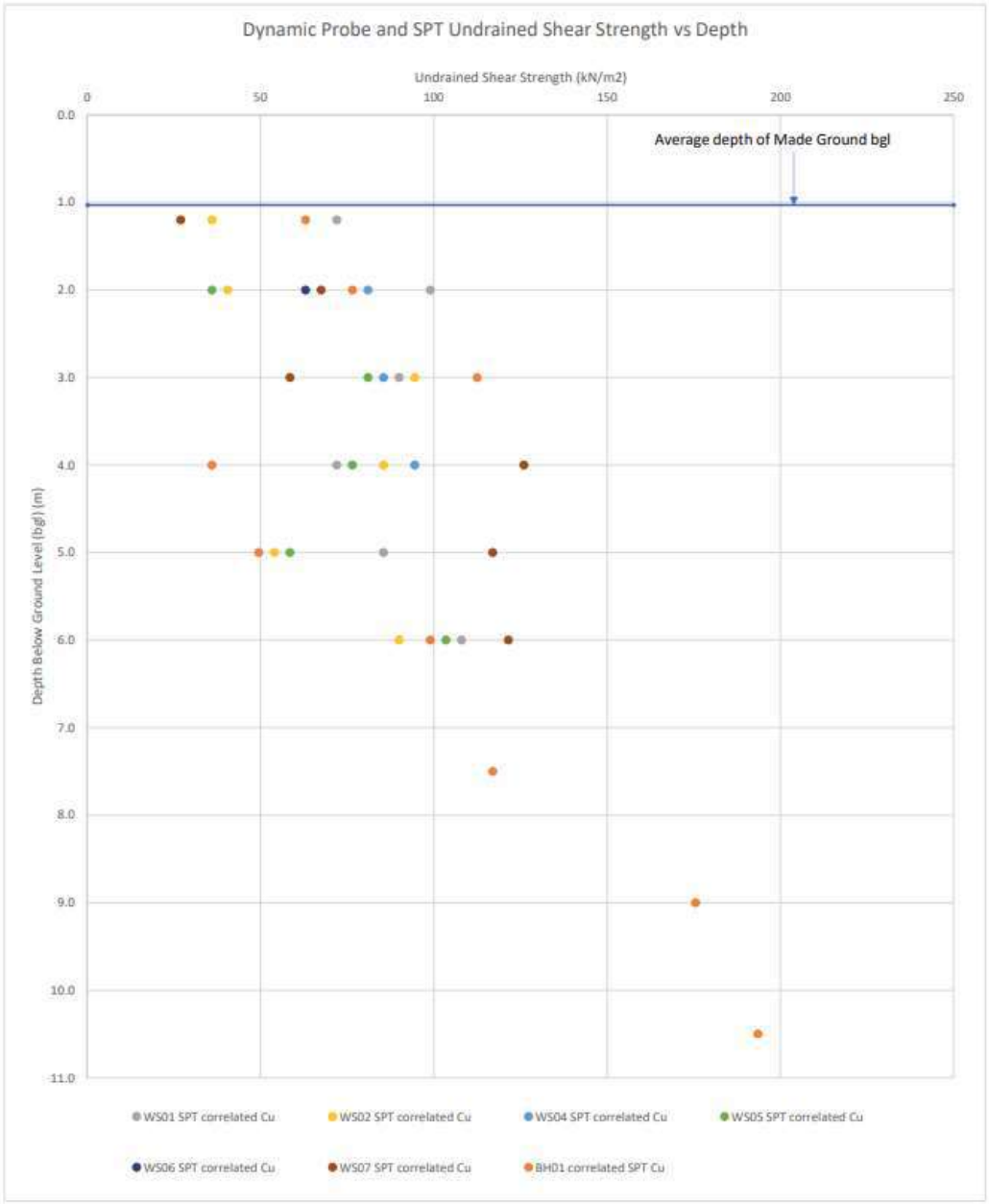

As shown by Figure 5.11, the strength profile of the Oxford Clay Formation indicates an overall increase in strength with depth.

5.4.4 *Sulfate content*

In accordance with BRE (Special Digest 1), the Design Sulfate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in Table 5.8. The assessment summary sheets are presented in Appendix F.

Table 5.8: Aggressive chemical environment concrete classification

Stratum	No. tests	DS	ACEC
Made Ground	4	DS-2	AC-2
Relict Topsoil	1	DS-1	AC-1

Residual Oxford Clay Formation	4	Awaiting lab results. Table will be updated upon receipt of results.	Awaiting lab results. Table will be updated upon receipt of results
Oxford Clay Formation	4	Awaiting lab results. Table will be updated upon receipt of results	Awaiting lab results. Table will be updated upon receipt of results

6. Geotechnical assessment

6.1 Geotechnical categorization of the proposed development

Eurocode 7, Section 2 advocates the use of geotechnical categorization of the proposed structures to establish the design requirements.

The proposed development is to comprise a low-rise school building with associated areas of Public Open Space (POS), hardstanding for parking and associated infrastructure.

Based on the above, for the purposes of this investigation, the proposed structures have been classed as Geotechnical Category 1.

Following ground investigation and as part of the assessment provided in the following section, the preliminary geotechnical hazard identification undertaken in Section 3.3 has been updated.

Assessment has been undertaken in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622. The preliminary Geotechnical Risk Register following investigation is provided in Appendix J (Table J.3) and will need to be updated during future design works.

6.2 Groundwork

6.2.1 Site preparation

The site is previously undeveloped and no buried man-made obstructions were encountered by this investigation. However, it is noted that fill activities have taken place previous to the ground ingestion in order to level the site. It is noted that buried services run parallel to the north, east and west site boundary as shown on the drawing Solum Surveying Ltd. 19.05.23. Melksham Primary School Pathfinder Way, Melksham SN12 6YP PAS128 Utility Survey. Project No.: 10446. Revision 0.

6.2.2 Groundworks

Excavation of shallow soils should be readily undertaken by conventional plant and equipment.

Trial pit faces were noted to remain generally vertical without collapse. The faces of shallow, near vertically sided excavations put down at the site are likely to remain stable for short periods of time. However, in large excavations the Residual Oxford Clay Formation maybe more prone to collapse fissures and planes of weakness within the clay can lead to collapse.

Temporary trench support, or battering of excavation sides, is recommended for all excavations that are to be left open for any length of time and will definitely be required where man entry is required.

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015); Construction Information Sheet 47: Inspections and Reports (2005) and HSG47: Avoiding Danger from Underground Services.

To ensure no loads are imposed on the sides of the excavation, spoil should not be placed immediately adjacent to the excavation. Spoil should be placed a suitable distance from the side of the excavation (as assessed by a competent person).

Based on site observations, the rate of water ingress to the proposed excavations is likely to be slow. In these circumstances, groundwater control by sump pumping is likely to be sufficient.

However, it should be recognised that groundwater levels may vary from those at the time of the investigation, for example in response to seasonal fluctuations and the timing of construction may dictate the extent of groundwater control required.

Any water pumped from excavations may need to be passed via settlement tanks (to reduce suspended solids) before being discharged

6.2.3 Earthworks/reuse of site-won materials

Historical earthworks activities have been identified on site through aerial imagery and during the Phase 2 Ground Investigation Made Ground was encountered to depths of between 0.50 and 1.70m bgl. Hydrock are not aware of any testing undertaken during the placement of the existing fill/Made Ground and in addition this material has been placed over topsoil which is prone to biodegradation and consolidation over time, which will likely culminate in settlement of the existing ground surface. Where soft landscaping is proposed this is unlikely to be a significant issue; however, in areas of hard surfacing, this may lead to cracking to the detriment of road pavement and playgrounds etc.

It is recommended that the fill in the affected area be excavated (to allow removal of the topsoil) and be replaced in line with a site-specific earthwork's specification. This is will ensure that the placement of the fill is controlled limiting differential and total settlement.

Made Ground was deepest in the south and south-west of the site and was found to shallow towards the north as shown on drawing 27203-HYD-XX-XX-DR-GE-1004.

Should earthworks be required, supplementary earthworks testing and an earthworks Specification will be necessary to ensure the appropriate management and reuse of the existing soils.

If significant earthworks are required, the works may be Category 2 in accordance with BS EN ISO 1997-1 (EC 7) and further geotechnical design may be necessary.

Once site proposals have been further defined more specific consideration will need to be given to the reuse of materials and reference should be made back to this office.

6.3 Foundation Recommendations

In accordance with EC7, BS EN 1997-1+A1 (2013), the proposed structure is considered to be Geotechnical Category 1.

The safe bearing pressures for foundations quoted for Category 1 structures in this report take into consideration traditional factors of safety against the risk of shear failure of the ground and should prevent undue or excessive total and differential settlement from the anticipated structural loadings.

6.3.1 Foundation Type

The Made Ground is considered unsuitable in its present condition for use as founding soils on the basis of its unpredictable nature and likely deposition in an uncontrolled manner and should be fully penetrated by all new foundations.

On the basis of the ground conditions indicated from the current ground investigation, the foundations will likely comprise:

» Strip foundations, or

» Pad foundations.

6.3.2 Strip Foundations

Strip foundations are considered suitable for the proposed building on the site.

All foundations should fully penetrate any Made Ground and be founded at least 0.90m into the undisturbed natural strata, which generally comprise firm to very stiff residual clay of the Oxford Clay Formation.

A safe net bearing pressure of 100kN/m^2 is considered appropriate for footings founded within the stiff to very stiff residual clays of the Oxford Clay Formation.

Based on the medium volume change potential residual clay soils of the Oxford Clay Formation, the minimum founding depth for strip foundations is 0.9m below the original ground level.

Made Ground across the site ranged between depths of 0.50m and 1.70m bgl as shown in Figure 11. All foundations should fully penetrate the Made Ground and be founded at least 0.9m into the natural firm to very stiff residual clays of the Oxford Clay Formation. Foundations should therefore be founded at between 1.40m and 2.60m below existing ground level. Further assessment is required for foundations within the influence of removed or proposed trees when the finished levels have been confirmed.

6.3.3 Pad Foundations

Pad foundations are considered suitable for the proposed building on the site.

A safe net bearing pressure of 100kN/m^2 is also considered appropriate for pad foundations up to 2.5m by 2.5m founding on the firm to very stiff residual clays of the Oxford Clay Formation.

Based on the medium volume change potential residual clay soils of the Oxford Clay Formation, the minimum founding depth for pad foundations is 0.90m bgl.

Made Ground across the site ranged in depths of between 0.50m and 1.70m bgl as shown in Figure 11. All foundations should fully penetrate the Made Ground and be founded at least 0.9m into the natural firm to very stiff residual clays of the Oxford Clay Formation. Foundations should therefore be founded at between 1.40m and 2.60m below existing ground level. Further assessment is required for foundations within the influence of removed or proposed trees when the finished levels have been confirmed.

Foundation formations should be inspected by a geotechnical engineer or other suitably competent person to ensure the founding conditions are suitable and as indicated in this report. Any formation materials deemed as unsuitable should be excavated and replaced with lean mix concrete or deepened to suitable strata.

Foundation excavations should be protected from rain and snow and inflow of surface water, frost and freezing conditions. They should also be protected from drying out in hot dry weather.

Any water that collects at the base of the foundation excavations should be removed by pumping from a sump in the base.

6.3.4 Ground floor slabs

Due to the presence of Made Ground up to 1.70m bgl and medium volume change potential clays beneath the site, it is recommended that suspended floor slabs with a void be adopted.

6.3.5 Roads and Pavements

Based on the geotechnical laboratory testing and considering the nature of the Made Ground, it is considered likely that an equilibrium CBR of 2.5% will be achievable over the majority of the site. However, Made Ground is inherently variable and soft spots should be anticipated

6.4 Drainage

Indicative infiltration rates for the ground investigation were not able to be calculated due to slow infiltration, as shown in Appendix F and are summarised in Table 5.4.

Conventional soakaways are considered unsuitable for the site based on the low permeability of the Oxford Clay Formation.

6.5 Buried concrete

Based on guidelines provided in BRE Special Digest 1 (BRE 2005) and the information presented in Section 5.4.4 (Table 5.8):

- The Made Ground can be classified as Design Sulfate Class DS-2 and ACEC Class AC-2.
- The shallow soils of the Relict Topsoil are classified as Design Sulfate Class DS-1 and ACEC Class AC-1.

At the time of writing there are further samples outstanding for the Residual Oxford Clay and Oxford Clay Formation and upon receipt of the results this report will be updated to reflect them.

The designer should check and confirm the classification of concrete using the information presented in Appendix E and Appendix F during the design.

7. Geo-environmental assessment

7.1 Updated Conceptual Site Model

7.1.1 Updated ground model

The initial conceptual site model developed from the desk study and field reconnaissance survey Section 3 has been updated using the findings of the ground investigation and is presented in Section 5. This CSM is the basis for the geo-environmental assessment presented in this section.

7.1.2 Updated exposure model

Following the ground investigation, the plausible contaminant sources, receptors and pathways identified in the preliminary geo-environmental exposure model Section 3 have been updated or confirmed as follows.

7.1.2.1 Sources

No potential sources have been removed from, or added to, the exposure model.

7.1.2.2 Receptors

No potential receptors have been removed from, or added to, the exposure model.

7.1.2.3 Pathways

No pathways have been removed from, or added to, the exposure model.

Using the updated ground model and updated exposure model, generic risk assessment is undertaken as presented below.

7.2 Risk assessment approach

Using the updated CSM, a Tier 2 generic quantitative risk assessment (GQRA) for identified receptors based on all media sampled has been undertaken in accordance with the principles of LCRM.

Firstly, the risks associated with the identified potential contaminant linkages have been estimated using standardised methods (typically involving comparison of site data with published 'screening values'). Secondly, where screening values are exceeded, the result has been evaluated in an authoritative review of the findings with other pertinent information to determine whether or not the exceedance is or is not acceptable in the site-specific circumstances.

The data sets used in the assessment comprise the analytical results obtained by Hydrock as listed in Section 5.

In cases where potentially unacceptable risks are indicated and/or the land is potentially unsuitable for its intended use, actions such as more advanced stages of risk assessment (Tier 3, detailed quantitative risk assessment (DQRA)).

7.3 Human health risk assessment

7.3.1 Soils Assessment

7.3.1.1 Generic Assessment Criteria

The soil screening values used are generic assessment criteria (GAC) (i.e. derived in accordance with EA CLEA guidance (2009) using the updated exposure model detailed in Defra SP1010 (2014), with the exception of published C4SLs. The term 'GAC' used in this report is inclusive of all generic soil screening values.

Based on the proposed development (a primary school), generic assessment criteria (GAC) based on a conservative residential with homegrown produce CLEA land use scenario have been adopted.

GAC are selected based on the following hierarchy:

» Category 4 Screening Levels (C4SL), where available.
» SoBRA Acute GAC for free cyanide, as acute dose toxicity is the primary risk driver.
» Hydrock GAC, derived by Hydrock as detailed in Appendix H.

The results of the assessment are presented in Appendix H.

7.3.1.2 Data sets

The data sets used in this report is based on the CSM and the proposed development, and is taken to be the entire area of the site, with the data separated into Placed Topsoil, Made Ground, Relict Topsoil and Residual Oxford Clay Formation. Assessment sheets are presented in Appendix H.

7.3.1.3 Assessment Results

Results indicate that all chemicals of potential concern (CoPC) are below the relevant GAC, therefore the contaminant linkage is incomplete.

No significant risk to human health has been identified and no further consideration is required.

7.4 Phytotoxicity risk assessment

7.4.1 Risk estimation

Priority phytotoxic chemical concentrations have been screened against published values to determine the likely risk to plant growth (phytotoxic GAC). Phytotoxic GAC based on a pH of >7% have been adopted for all soils based on laboratory results.

As with human health, individual sample test results are compared directly with the phytotoxic GAC.

Results indicate that all CoPC are below the relevant phytotoxic GAC, therefore the contaminant linkage is incomplete.

No significant risk to plant life has been identified and no further consideration is required.

7.5 Pollution of controlled waters risk assessment

7.5.1 Risk estimation

The risks to groundwater and surface water from contaminants on site have been assessed in accordance with the Environment Agency (2006) Remedial Targets Methodology (RTM).

Site contaminant loadings are compared with relevant screening values (Water Quality Targets (WQTs), which are linked to the CSM.

Acceptable WQT are defined for protection of human health (based on Drinking Water Standards (DWS)) and for protection of aquatic ecosystems (Environmental Quality Standards (EQS)).

As related specifically to this site, the data are compared with criteria selected in accordance with the methodology presented in Appendix H. This methodology involves selecting which of several alternative risk scenarios apply in this case. The assessment is presented in Table 7.1 below, with the justification for the scenarios selected explained in the following text:

- The soils beneath the site consist of low permeability Oxford Clay which will act as a barrier to downward transmission of contaminants. The Oxford Clay formation aquifer is designated to be unproductive. As a result, there is no viable pathway to groundwater beneath the site.
- The nearest surface water is located approximately 50m to the north-west of the site.
- There are no SPZ in the vicinity of the site.
- There are no active licensed surface water or groundwater abstractions within 500m of the site.
- No visual or olfactory evidence of contamination was noted on site and significantly elevated concentrations of contaminants were not recorded in laboratory tests.

Table 7.1: Summary of water quality risk assessment protocol

Hydrock scenario	Water body receptors	Secondary receptors	Example contaminant linkages	RTM level and data used	Water quality targets
D	Groundwater Surface water.	Human health (abstraction). Aquatic ecosystem.	Contaminants from site leach or seep into a groundwater body that feeds inland surface water by base flow. The surface water may be used for human consumption and is an aquatic ecosystem.	RTM Level 1	DWS

Notes:

Some EQS are water hardness dependent. This is measured either in the receiving surface water or in groundwater (if it is part of the pathway), or is estimated from national maps.

This table and the results of the assessment are considered as a first screening for potential risks of pollution of Controlled Waters. More specific requirements may be stipulated by the relevant Agency.

The results of the screening assessment are presented in Appendix H and are summarised in Table 7.2.

In some instances, the reporting limit (or detection limit) quoted by the laboratory may be greater than the WQT that it is being assessed against. As the current exercise is an initial screening assessment, further assessment of these elements has not been undertaken.

Table 7.2: CoPC which require further assessment (controlled waters)

CoPC	WQT (µg/l)	Basis for WQT	No. samples	No. samples above LoD	Min. (µg/l)	Max. (µg/l)	No. samples exceeding WQT and above LoD
Soil Leachate Data							
Manganese	50	DWS	1	1	63	63	1

7.5.2 *Risk evaluation*

The DWS for manganese are exceeded.

Whilst there are exceedances of the water quality targets, the exceedance is considered not to represent a significant risk of pollution of Controlled Waters from an on-site source as there is no evidence of artificial accumulations of these substances on the site. It is considered likely that they emanate from natural geology.

Furthermore, the inland waters EQSs for manganese are based on the bioavailable fraction and because bioavailability has not been calculated for these metals the assessment is conservative as it assumes 100% bioavailability.

It would be technically challenging and probably disproportionately costly to remove these natural contaminants from the water or to prevent further infiltration.

Hydrock believes that the risks to Controlled Waters do not need further consideration.

7.6 Ground gases risk assessment

CL:AIRE RB17 (Card et al 2012) states that where there are natural soils with low organic content and 1m to 5m of Made Ground (average <3m) that comprises general infill and car park construction materials TOC less than 1%, no gas protection is required as this represents CS1. As such, no ground gas protection is required. However, the typical TOC recorded for the Made Ground is 4% therefore there is an elevated potential for ground gas generation that needs to be assessed with ground gas monitoring data

It is judged from the available evidence that the gas generation potential at the site is low and that the sensitivity of the development is moderate (due to the end use being a school site). Consequently, and in accordance with CIRIA C665 (Table 5.5a and 5.5b), an appropriate minimum monitoring regime is six readings over two months, provided other monitoring requirements are also met, such as prevailing atmospheric pressure conditions (for example, BS 8485:2015 +A1:2019 suggests monitoring should include a period of falling atmospheric pressure).

7.6.1 *Assessment*

The risks associated with the ground gases methane (CH_4) and carbon dioxide (CO_2) have been assessed using BS 8485:2015 +A1:2019, which cites the guidelines published by CIRIA (C655, 2007) (known as Situation A).

The assessment guidelines set out in Table 2 of BS 8485 are based on interpretation of the gas concentrations and the gas flow rates. The quantitative assessment has been carried out by comparing the individual gas concentrations and gas screening values (GSV[5]) in Appendix D with the published CS thresholds (BS 8485 Table 2), in addition to a worst-case GSV assessment in accordance with section 6.3.7 of BS 8485. The assessment is summarised in Table 7.3 and the full assessment is presented in Appendix G.

Table 7.3: Ground gas risk assessment

	Min	Max	Typical [(i)]	Comment
Steady Flow Rate (l/hr)	0.0	-0.3	<0.01	-

	Min	Max	Typical [i]	Comment
Methane (%)	0.0	9.8	<1	There is one occasion where methane exceeded 1.0% (9.8%) during the first monitoring visit. . All other values for methane were ≤0.1%.
Carbon Dioxide (%)	0.0	3.0	<1	Similarly, there is one occasion where carbon dioxide exceeded 1.0% (3.0%). This was also during the first visit,
Carbon Monoxide (ppm)	1.0	3.0	1.0	-

[i] Hydrock assume that values are considered to be atypical if 95% or more of the remaining data are less than the value under consideration

For the purposes of the calculation, where the recorded gas flow rate is below the manufacturer's limit of detection for the instrument used, the detection limit has been adopted for the gas flow rate.

As indicated in Table 7.3, methane and carbon dioxide at concentrations are 'typically' below 1%. As such, the site is provisionally classified as Characteristic Situation 1 (Situation A).

The ground gas conditions will be full assessed on completion of the ground gas monitoring and the above recommendations are preliminary.

Based on the data to date no mitigation measures are required.

7.7 Construction materials risk assessment

7.7.1 Water pipelines

A formal water pipe investigation and risk assessment is beyond the scope of this report. However, the findings of this investigation have been compared to the threshold values in Water UK HBF (2014), Table 1 as far as is practicable.

The site is previously undeveloped and the preliminary risk assessment and investigation has indicated no plausible contaminant sources. No contaminants of potential concern were identified within the Made Ground that was placed as fill across the site.

It is envisaged that standard pipework will be suitable for the site. However, confirmation should be sought from the water supply company at the earliest opportunity.

7.7.2 Other construction materials

Plastic pipes for drains and sewers are manufactured from unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) or polyethylene (PE). These materials may be affected by the presence of organic compounds in the soil.

In accordance with the British Plastics Federation Guidance (August, 2018), as the concentrations of PAH, and BTEX are below 100mg/kg and the concentrations of petroleum hydrocarbons (TPH) are below 200 mg/kg, PVC-U, PP or PE pipework is considered suitable.

The implications for buried concrete are discussed in Section 6.5.

7.8 Findings of the generic contamination risk assessments

The potential sources, pathways and receptors identified in the desk study (Section 3) have been investigated Sections 5 and 6 and assessed (Sections 7.2 to 7.7). A Source-Pathway-Receptor linkage assessment has been undertaken and is presented in Appendix K (Table K.2).

The Final CSM is illustrated on Hydrock Drawing 27203-HYD-XX-XX-DR-GE-1005 in Appendix A.

There are no Source-Pathway-Receptor contaminant linkages which require mitigation.

8. Waste and materials management

8.1 Introduction

The Waste Framework Directive (WFD) (2009/98/EC) defines waste as '*any substance which the holder discards or intends to discard.*' In a geo-environmental context, the waste is most often 'soil' and the two main scenarios are offsite disposal of the material as a waste and/or reuse of the material on site. For cost and sustainability reasons, reuse is preferred to off-site disposal.

Section 8.2 below describes the key issues relating to off-site disposal to landfill and Section 8.3 considers requirements relating to reuse of soils and materials management.

8.2 Waste disposal

8.2.1 Principles

Based on the WFD, any material excavated on site may be classified as waste and it is the responsibility of the producer of a material to determine whether or not it is waste. Where off-site disposal is undertaken, the following guidance applies.

Classification is a staged process:

- A hazardous waste is defined under the WFD as one which possesses one or more of fifteen defined hazardous properties. If a waste is not defined as hazardous, then it is non-hazardous.
- Where the materials are soil, it is then be assigned using the 'List of Waste Codes', which classifies the material as either:
  - hazardous (17-05-03), which is defined as "*soil and stones containing hazardous substances*"; or
  - non-hazardous (17-05-04), which is defined as "*soil and stones other than those mentioned in 17-05-03*".
  - Hydrock utilise the proprietary assessment tool, HazWasteOnline™ to undertake this assessment.
- Waste Acceptance Criteria (WAC) testing is then undertaken if required, and are only applicable following classification of the waste, and only where the waste is destined for disposal to landfill. The WAC are both qualitative and quantitative. The WAC and the associated laboratory analyses (leaching tests) are not suitable for use in the determination of whether a waste is hazardous or non-hazardous.

It should be noted that some non-hazardous wastes may be suitable for disposal at an inert landfill as non-hazardous waste, subject to meeting the appropriate waste acceptance criteria.

It should be noted that classification must be undertaken on the waste produced, by the waste producer. Necessary sampling frequency to adequately characterise a soil population is defined within WM3.

Further discussion with regards to the characterisation process for different scenarios and waste types is provided below.

Topsoil and Peat

Topsoil and peat are biodegradable, therefore if they are surplus to requirements and cannot be re-used in accordance with a Materials Management Plan, they cannot be classified as inert. As such, topsoil and peat need to be classified by a staged assessment and sampling process and would either be classified as hazardous or non-hazardous, depending upon the results of the assessment.

Greenfield sites

Waste from completely greenfield sites may be accepted at a landfill as inert waste if it meets the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005) ('the Regulations') can be met. Paragraph 10 of the Regulations states, "*soils may be able to be classified as inert waste without testing, if:*

- *they are single stream waste of a single waste type;*
- *there is no suspicion of contamination and they do not contain other material or substances such as metals, asbestos, plastics, chemicals, etc…..*"

As such, where the site is greenfield and the waste producer is confident about the quality of a soil (i.e. naturally occurring and uncontaminated), further sampling and laboratory testing is not necessary for the Basic Characterisation and this can be undertaken on qualitative Waste Acceptance Criteria testing.

In this instance the waste producer can characterise the waste based on visual assessment and written description of the waste in addition to supporting evidence such as a desk study assessment of the greenfield status. However, it should be noted this characterisation is subject to agreement by the landfill operator who may require testing to be undertaken to confirm classification.

Contaminated or potentially contaminated sites

If the site is brownfield, contaminated or potentially contaminated, the waste must undergo an initial waste classification exercise using background information on the source and origin of the waste and assessment of chemical test data in accordance with Environment Agency Technical Guidance WM3.

If following the initial waste classification exercise, the soils are acceptable for disposal to a non-hazardous landfill, further qualitative Waste Acceptance Criteria (WAC) testing is not required.

However, if soils are potentially able to be disposed to an inert landfill as non-hazardous waste, or require testing to determine if they can be disposed of to a stable non-reactive hazardous or hazardous class of landfill, the next stage of assessment is to undertake qualitative WAC testing. This will determine the Basic Characterisation and the landfill category at which the soils can be accepted.

Hazardous material must be subjected to WAC testing to determine whether it requires treatment before it can be accepted at the hazardous landfill, while non-hazardous material can be tested to determine whether it may be suitable for placement in an inert landfill.

8.2.2 HazWasteOnline™ assessment

As the site is greenfield, HazWasteOnline™ assessment is not technically required. However, it has been undertaken for completeness during the site investigation. The output of the HazWasteOnline™ assessment is provided in Appendix I and a summary of the preliminary waste classification is provided below in Section 8.2.3.

8.2.3 Preliminary waste disposal options

The site is greenfield (as proven by the desk study assessment and a visual assessment of the soils). However, due to the recent Made Ground fill across the site, the HazWasteOnline™ assessment have been undertaken. As long as no unexpected contamination is encountered and if suitable segregation of different types of natural waste streams is put in place, for soils to be disposed of, it is considered that:

The HazWasteOnline™ classifies all of the sampled soils on site to be non-hazardous waste and suitable for disposal at an inert or non-hazardous landfill, subject to WAC testing.

No WAC Testing was undertaken as part of the ground investigation, however during the constructing phase any material that is to be disposed of from the site should be subject to WAC testing to confirm the receiving landfill site.

8.2.4 General waste comments

It should be noted that:

- It is the waste producer's responsibility to segregate the waste at source and waste producers must not mix waste materials/streams or dilute hazardous components, for example by mixing with less or non-hazardous waste on site to meet WAC limit values.
- The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigation, using the HazWasteOnline™ assessment. However, the formal classification of waste can only be undertaken on the material to be disposed of, and by the waste producer and the receiving landfill as license conditions vary from landfill to landfill.
- Basic Characterisation should be undertaken in accordance with Environment Agency guidance by the waste producer. Hydrock can assist if required and this report will assist the characterisation. However, Basic Characterisation does not form part of the current commission and would require further assessment and testing on the wastes actually to be disposed.
- Once the waste producer has undertaken an initial Basic Characterisation on each waste stream, they can manage the soils as part of the on-site processing programme (for example, stockpiling, treatment, screening and separation). The waste producer and landfill operator will then need to agree the suite of compliance testing for regularly generated waste to demonstrate compliance with the initial Basic Characterisation prior to disposal.
- At the time of disposal, additional testing on the excavated soils to be disposed of, will likely be necessary.
- Non-hazardous and hazardous soils require pre-treatment (separation, sorting and screening) prior to disposal.
- The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.
- In addition to disposal costs, landfill tax will be applicable. Non-hazardous and hazardous waste will generally be subject to the Standard Rate Landfill Tax. Inert or inactive waste will generally be subject to the Lower Rate Landfill Tax. The landfill tax value changes each April and can be found at https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013.
- Before a waste producer can move waste to a landfill site for disposal, they need to check the landfill site has the appropriate permit and must have completed the following[6]:
  - Duty of care transfer note / Hazardous Waste consignment note, including comment as to if pre-treatment has been undertaken; and
  - Basic Characterisation of the waste, to include: description of the waste; waste code (using list of wastes); composition of the waste (by testing, if necessary) and; WAC testing (if required).

[6] ENVIRONMENT AGENCY. November 2010. Guidance on waste acceptance procedures and criteria. Waste acceptance at landfills. The Environment Agency.

8.3 Materials management

8.3.1 Introduction

Soils that are to remain on site, should be managed and reused in accordance with a Materials Management Plan (MMP), prepared in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE), known as the DoWCoP. Where all aspects of the DoWCoP are followed the soils are considered not to be waste, because they were never discarded in the first place.

Version 2 of the DoWCoP clearly sets out the principles and an outline of the requirements of a MMP. The following compliance criteria must be seen to apply to the MMP for the site:

- Factor 1: Protection of human health and protection of the environment.
- Factor 2: Suitability for use, without further treatment.
- Factor 3: Certainty of Use.
- Factor 4: Fixed Quantity of Material.

The reuse of soils at sites should be considered during the planning and development design process so that compliance with issues such as fixed quantity and certainty of use clearly relate to agreed site levels. Suitability of Use is normally evident from the remediation strategy or the design statement, which form an integral part of a MMP. However, some soils may need to be tested post-excavation to prove they are suitable for use.

Once the MMP is finalised, it must be declared by a Qualified Person (QP). The Declaration is an on-line submission as part of which the QP is required to confirm that the declaration is being made before the relevant works have commenced (i.e. it is not a retrospective application).

Once all material movements have been completed in accordance with the MMP a verification report must be produced, kept for 2 years and provided to the EA on request.

It should be noted that failure to comply with the requirements of the DoWCoP when re-using materials has potentially significant consequences for the waste holder. The risk is that the reused materials are still regarded as a waste that has been illegally deposited. From 1 April 2018, the scope of Landfill Tax has been extended to sites operating without the appropriate environmental disposal permit, and operators of illegal waste sites will now be liable for Landfill Tax. Further information is available at: https://www.gov.uk/government/publications/landfill-tax-disposals-not-made-at-landfill-sites/landfill-tax-disposals-not-made-at-landfill-sites.

If soils are excavated and reused on sites (or moved to another site) without a MMP, exemption, or appropriate Permit in place, anyone who knowingly facilitates the disposal may be '*jointly and severally liable*' to any assessment of tax, fines or prosecution.

8.3.2 Materials management scenarios

The materials management scenarios present on site are discussed below.

It should be noted that more than one scenario may apply, dependent upon where the soils are proposed for reuse.

8.3.2.1 Clean, naturally occurring materials – reused on the site of origin

Where soils are naturally occurring, uncontaminated and are reused on the site they are excavated (i.e. greenfield site with documented site history, with no Made Ground), they will fall outside the Waste Framework Directive (WFD) (i.e. they will not be a waste when reused on the site of origin).

However, there needs to be certainty of that reuse, and evidence is necessary to support this strategy, for example through information provided during the planning process. The onus is on the developer to demonstrate that the materials are not a waste and will never become a waste. As such, a Materials Re-use Strategy is recommended to show certainty. Alternatively, if the volume of material is under 1,000 tonnes, then a U1 waste exemption may be applied for from the Environment Agency.

It may be noted that some 'clean naturally occurring materials' may still fail the 'suitable for use' test, for example, soils with a naturally high organic content may not be suitable for use because of their propensity to produce ground gases such as methane. Rules regarding other more unusual circumstances such as where natural soils contain an unacceptably high mineral content are described in the DoWCoP.

8.3.2.2 Clean, naturally occurring materials – transferred to other sites

Where soils are naturally occurring, uncontaminated and are transferred to other sites (i.e. direct transfer), they will not become waste as long as the transfer is undertaken in accordance with the DoWCoP. A MMP must be prepared for the receiving site and the materials movement must be noted in the MMP of the Donor site. This movement must have been declared to CL:AIRE prior to the works commencing.

8.3.2.3 Made Ground and other contaminated soils

On sites where Made Ground or contaminated soils are present, any soils excavated will be a waste as soon as they are excavated (even if they are clean, naturally occurring materials), unless they are subject to reuse in accordance with the DoWCoP. As such, for any brownfield site or a site where Made Ground is present and soils are being moved and reused, the materials could be deemed a waste, subject to either:

- a Materials Management Plan (MMP), to prevent the material being classified as a waste following reuse; or
- an exemption (for limited volumes); or
- an environmental permit, dependant on its status.

Other commonly occurring circumstances are:

If Made Ground is being moved between sites, it must be ensured that appropriate permits are in place to ensure the soils are not classified as a waste. Made Ground cannot be moved between sites under DoWCoP alone and would require relevant permits as part of the MMP documentation for the Hub site the material is being treated at.

8.3.2.4 Geotechnical improvement requirements

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties e.g. lime / cement modification, are not generally regarded as waste treatment operations and do not require a permit.

However, should processing be needed (such as screening, treatment or improvement), that would constitute a waste activity and require a mobile treatment permit. This may be as simple as removing oversize material with an excavator bucket, to using a riddle bucket to remove hardcore to full mechanical screening.

9. Uncertainties and limitations

9.1 Site-specific comments

The gas monitoring undertaken to date and included in this report is insufficient to fully characterise the site in accordance with CIRIA Report C665. Monitoring is ongoing and the conclusions of this report will be updated following completion of the scheduled monitoring.

9.2 General comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of ISG Ltd (the Client), by e-mail dated May 2023 under the terms of appointment for Hydrock, for the sole and specific use of the Client and parties commissioned by them to undertake work where reliance is placed on this report. Any third parties who use the information contained herein do so at their own risk. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared or for use of the report by any parties not defined in Hydrock's appointment.

This report details the findings of work carried out in May 2023. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

Hydrock has used reasonable skill, care and diligence in the design of the investigation of the site and in its interpretation of the information obtained. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred.

Groundwater data are only representative of the dates on which they were obtained and both levels and quality may vary.

Unless otherwise stated, the recommendations in this report assume that ground levels will remain as existing. If there is to be any re-profiling (e.g. to create development platforms or for flood alleviation) then the recommendations may not apply.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

Where the existing reports prepared by others have been provided by the Client, it is assumed that these have been either commissioned by the Client, or can be assigned to the Client, and can be relied upon by Hydrock. Should this not be the case Hydrock should be informed immediately as additional work may be required. Hydrock is not responsible for any factual errors or omissions in the supplied data, or for the opinions and recommendations of others. It is possible that the conditions described may have since changed through natural processes or later activities.

The work has been carried out in general accordance with recognised best practice. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The chemical analyses reported were scheduled for the purposes of risk assessment with respect to human health, plant life and controlled waters as discussed in the report. Whilst the results may be useful in applying the Hazardous Waste Assessment Methodology given in Environment Agency Technical Guidance WM3, they are not primarily intended for that purpose and additional analysis will be required at the time of disposal to fully classify waste. Discussion and comment

with regards to waste classification are preliminary and do not form the requirements of 'Basic Characterisation' as required.

Assessment and testing for the presence of coal tar has only been completed at the locations of exploratory holes undertaken for risk assessment purposes. This investigation is not designed to provide a definitive assessment of the risk from coal tar, nor the waste classification for bituminous bound pavement arisings at the site.

Unless otherwise stated, at the time of this investigation the future routes of water supply pipes had not been established. This investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling and chemical testing may be required at a later date once the routes of the supply pipes are known. In addition, it is recommended that the relevant water supply company be contacted at an early stage to confirm its requirements for assessment, which may not necessarily be the same as those recommended by UKWIR.

Whilst the preliminary risk assessment process has identified potential risks to construction workers, consideration of occupational health and safety issues is beyond the scope of this report.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential constraints and specialist advice should be sought.

Any site boundary line depicted on plans does not imply legal ownership of land.

10. Recommendations for further work

Following the ground investigation works undertaken to date, the following further works will be required:

- completion and reporting of the ongoing gas monitoring, hence the conclusions in this report are provisional, subject to the completion of monitoring;
- Updating this report with sulphate and gas monitoring results.
- Design foundations in line with building near trees when finished levels have been confirmed.
- Discussion and agreement with utility providers regarding the materials suitable for pipework;
- Further consideration regarding the desired performance of the existing earthworks and whether buried topsoil, encountered within a number of exploratory holes, requires removal. An earthworks specification maybe required if re-engineering of the fill is adopted.
- Discussions with regulatory bodies and the warranty provider regarding the conclusions of this report;
- Production of a Materials Management Plan (if required) relating to reuse of soils at the site and import of soils to the site.

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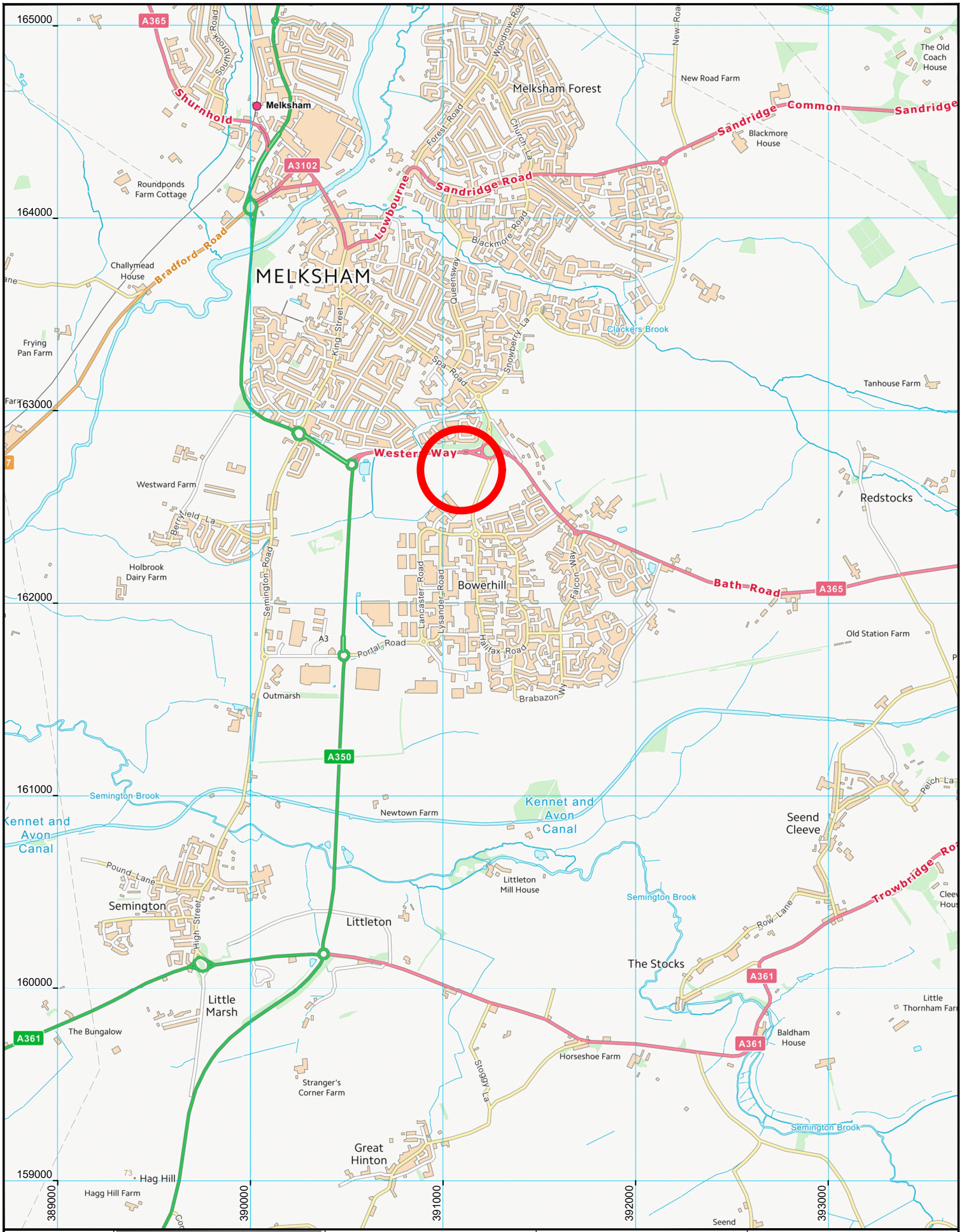
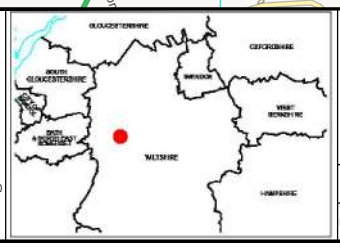
Appendix A Drawings



OS NORTH

Site Ref: ST96

0 500 Metres



REV.						
P1	FIRST ISSUE					
	EP	23/05/23	AT	23/05/23	TH	23/05/23
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT: ISG LTD

PROJECT: SCF, MELKSHAM

TITLE: SITE LOCATION PLAN

HYDROCK PROJECT NO.: C-27203-C

SCALE @ A4: 1:25,000

PURPOSE OF ISSUE: SUITABLE FOR INFORMATION

STATUS: S2

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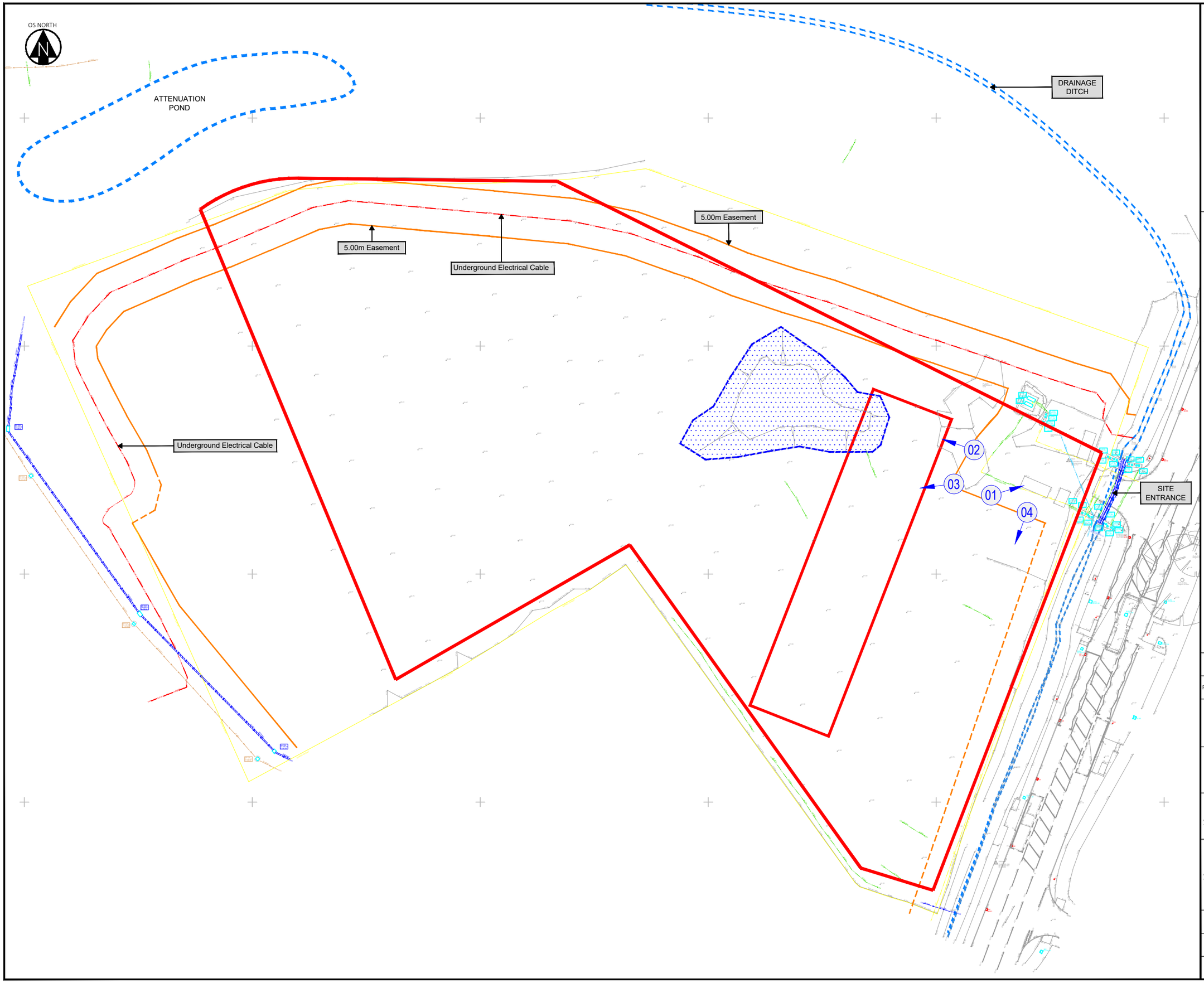
REVISION: P1



KEY

- Site Investigation Boundary
- 01 Walkover Location and Direction
- Proposed School Building
- Stockpile
- Drainage ditch
- Attenuation pond

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:MELKSHAM PRIMARY SCHOOL PATHFINDER WAY SN12 6YP_10446-TOPO_Rev.00_ Scale 1:200, Date: 18/05/23.

REV.	REVISION NOTES/COMMENTS					
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P1	FIRST ISSUE					
	TH	23/05/23	TH	23/05/23	TH	23/05/23

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CLIENT
ISG LIMITED

PROJECT
SCF MELKSHAM

TITLE
SITE FEATURES PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-27203-C	1:750

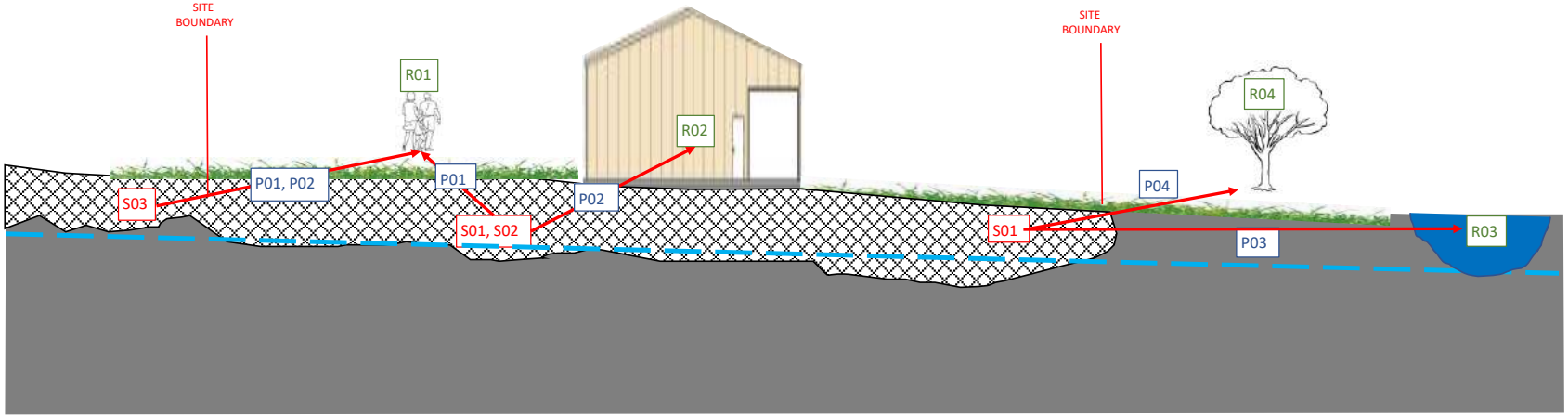
PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
27203-HYD-XX-XX-DR-GE-1001	P1

EAST

PROPOSED SCF MELKSHAM PRIMARY SCHOOL

WEST



SOURCES

S01. Made Ground, associated with historical construction activities and imported fill.

S02. Ground gases from organic materials in the Made Ground and natural soils.

S03. Ground gases generated from off-site organic materials in the Made Ground and natural soils.

PATHWAYS

P01. Ingestion, skin contact, inhalation of dust and outdoor air by people.

P02.Migration and build up of ground gas and vapours

P03. Migration of contaminant via leachate migration to

P04. Uptake and consumption by flora and fauna.

RECEPTORS

R01. People (neighbours, site end users).

R02. Development end use (buildings, utilities and

R03. Surface water

R04. Flora and Fauna

LEGEND:

- OXFORD CLAY FORMATION
- MADE GROUND- HISTORICAL
- GROUNDWATER LEVEL (INFERRED)
- PATHWAY

REV	NOTES / COMMENTS	DRAWN	CHECKED	APPROVED
P1	FIRST ISSUE 07/06/2023	AT 29/06/23	RSw 04/07/23	RSw 04/07/23

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CLIENT:
ISG Ltd

PROJECT:
SCF MELKSHAM

TITLE:
INITIAL CONCEPTUAL SITE MODEL

HYDROCK PROJECT: 27203

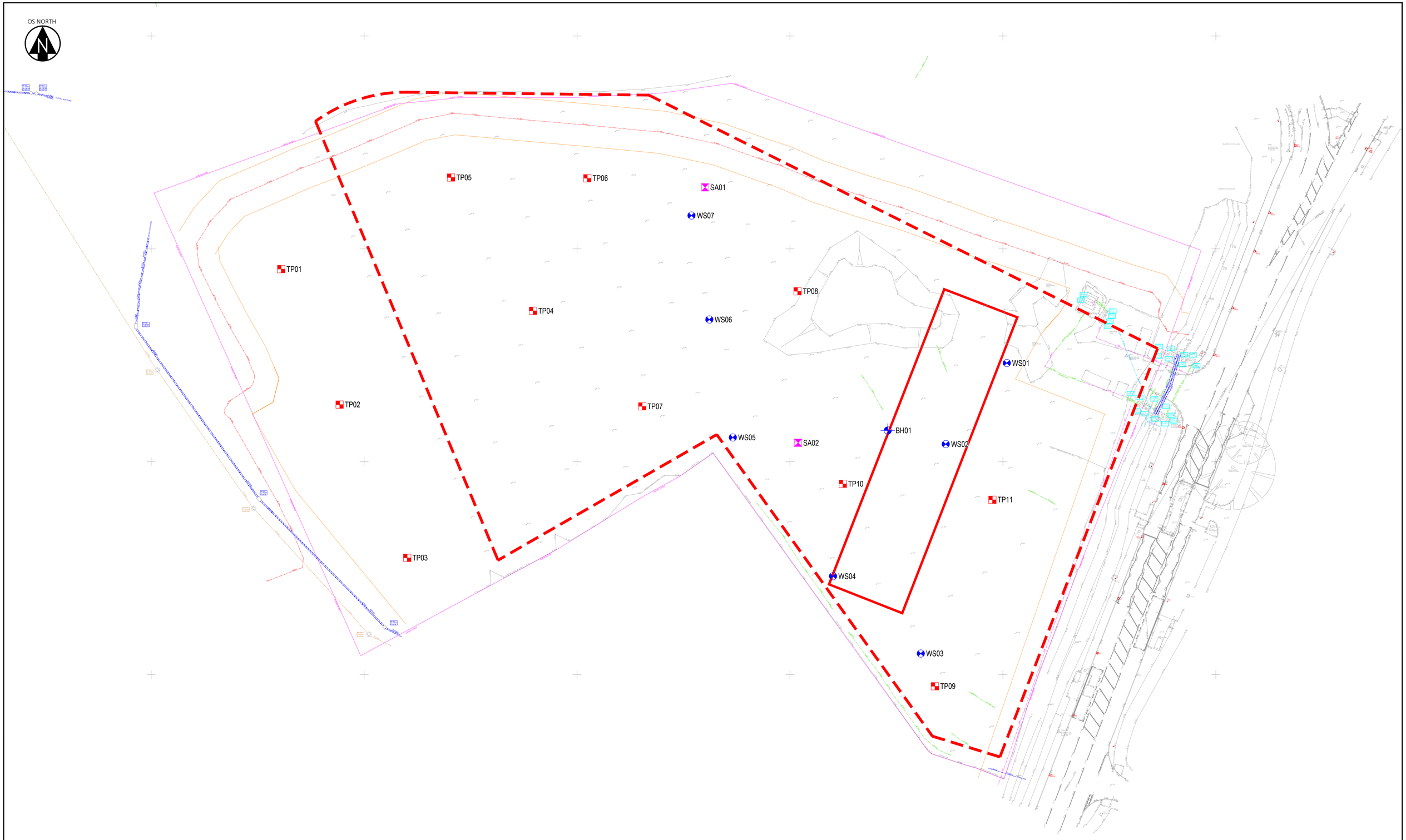
SCALE AT A3: NTS

PURPOSE OF ISSUE: SUITABLE FOR INFORMATION

STATUS: S2

DRAWING NO: 27203-HYD-XX-XX-DR-GE-1002

REV: P1



KEY

- Site Investigation Boundary
- Proposed School Building
- TPi Trial Pit
- BHi Borehole Location
- WSi Window Sample Location
- SAi Soakaway Test

NOTES

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3. This drawing has been based on the following drawings and information:
MELKSHAM PRIMARY SCHOOL PATHFINDER WAY SN12
6YP_10446-TOPO_Rev.00_Scale 1:200, Date: 18/05/23.

REV.	REVISION NOTES/COMMENTS	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
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CLIENT
ISG LIMITED

PROJECT
SCF, MELKSHAM

TITLE
EXPLORATORY HOLE LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	1:400

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

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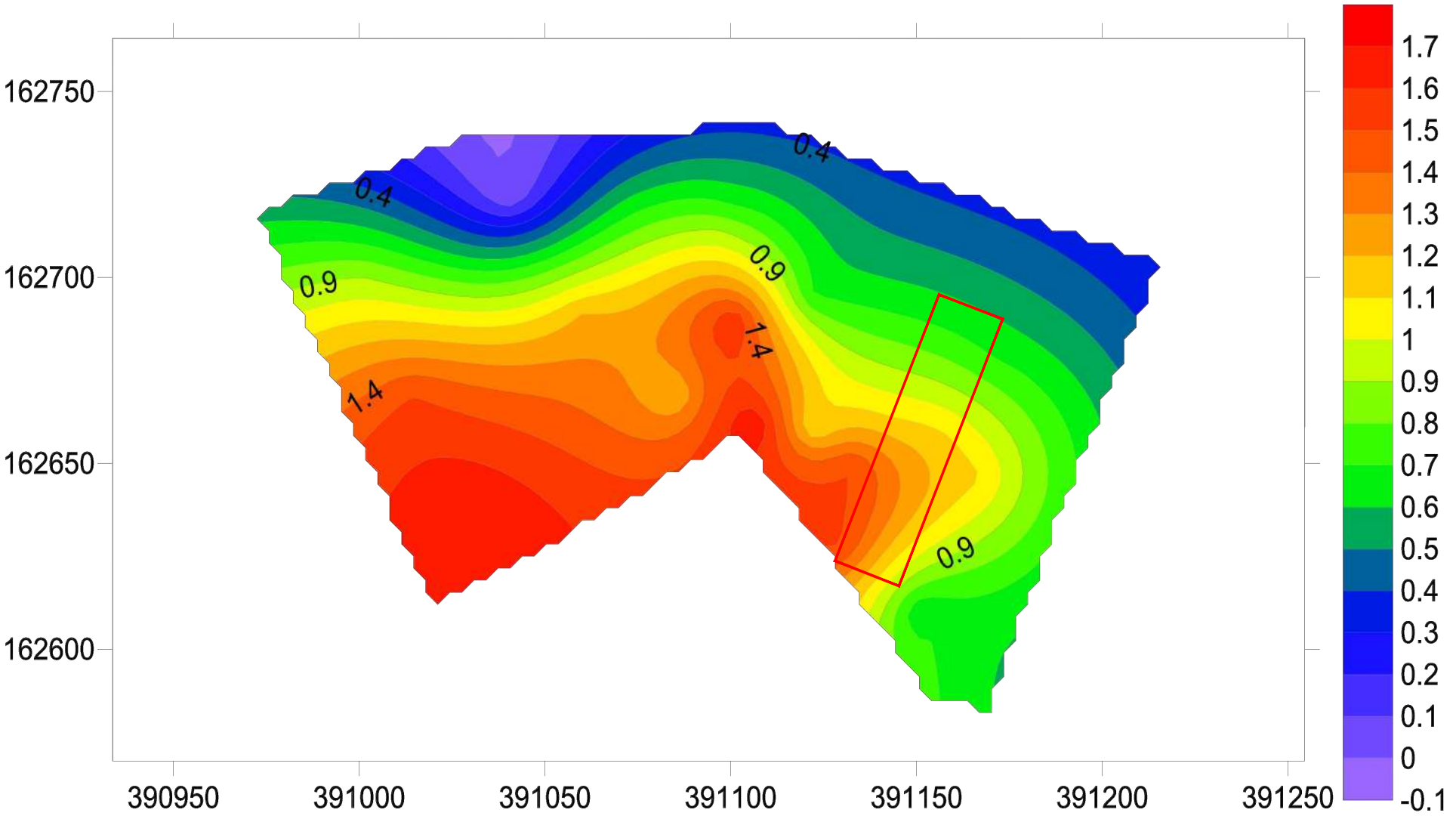

KEY

Proposed School Building

NOTES

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REV.	REVISION NOTES/COMMENTS	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
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CLIENT: ISG LIMITED

PROJECT: SCF MELKSHAM

TITLE: DEPTH OF MADE GROUND MAP

HYDROCK PROJECT NO.: C-27203-C

SCALE @ A4: NTS

PURPOSE OF ISSUE: SUITABLE FOR INFORMATION

STATUS: S2

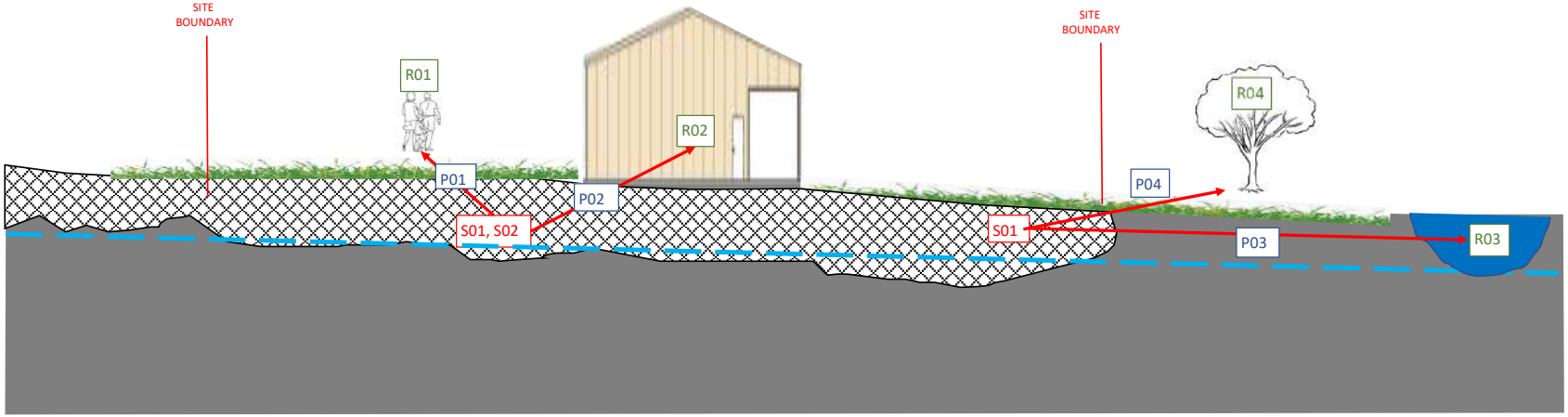
DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): 27203-HYD-XX-XX-DR-GE-1004

REVISION: P1

SOUTH

PROPOSED SCF MELKSHAM PRIMARY SCHOOL

NORTH



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S02. Ground gases from organic materials in the Made Ground and natural soils.

PATHWAYS

P01. Ingestion, skin contact, inhalation of dust and outdoor air by people.

P02.Migration and build up of ground gas and vapours via permeable soils and/or construction gaps

P03. Migration of contaminant via leachate migration to

P04. Uptake and consumption by flora and fauna.

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R01. People (neighbours, site end users).

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LEGEND:

- OXFORD CLAY FORMATION
- MADE GROUND- HISTORICAL
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- PATHWAY

REV	NOTES / COMMENTS	DRAWN	CHECKED	APPROVED
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CLIENT:
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SCF MELKSHAM

TITLE:
FINAL CONCEPTUAL SITE MODEL

HYDROCK PROJECT:
27203

SCALE AT A3:
NTS

PURPOSE OF ISSUE:
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STATUS:
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27203-HYD-XX-XX-DR-GE-1005

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P1



Notes

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AWW Site Plan Key

- SCHOOL SITE BOUNDARY
- OUTLINE PLANNING PERMISSION BOUNDARY

For illustrative purposes only, drawing not based on survey information.

Rev	Date	Notes	Drn	Chk'd
P01	22/05/23	Issued for review	KS	JF

2 0 2 4 6 8 10
SCALE 1: 200 m

Document Originator: AWW
Client: ISG

London 106 Weston Street, SE1 3QB 020 7160 6000
Plymouth East Quay House, PL4 0HX 01752 261 282
Bristol pivot + mark, 48-52 Baldwin Street, BS1 1QB 0117 923 2535

RIBA Chartered Practice www.aww-uk.com

Client: ISG

AWW Project Number: 4669
Project Stage: Stage 1

Project Title: Melksham 1FE School
Pathfinder Way, Bowerhill, Melksham

Title: Ground Floor Context Plan - Extension Flipped Option

Scale @ A1: As indicated
Document Status: For Information

Project	Origin.	Volume	Level	Type	Role	Number	Rev
4669	AWW	XX	XX	D	A	SK009	P01

Appendix B Field reconnaissance photographs

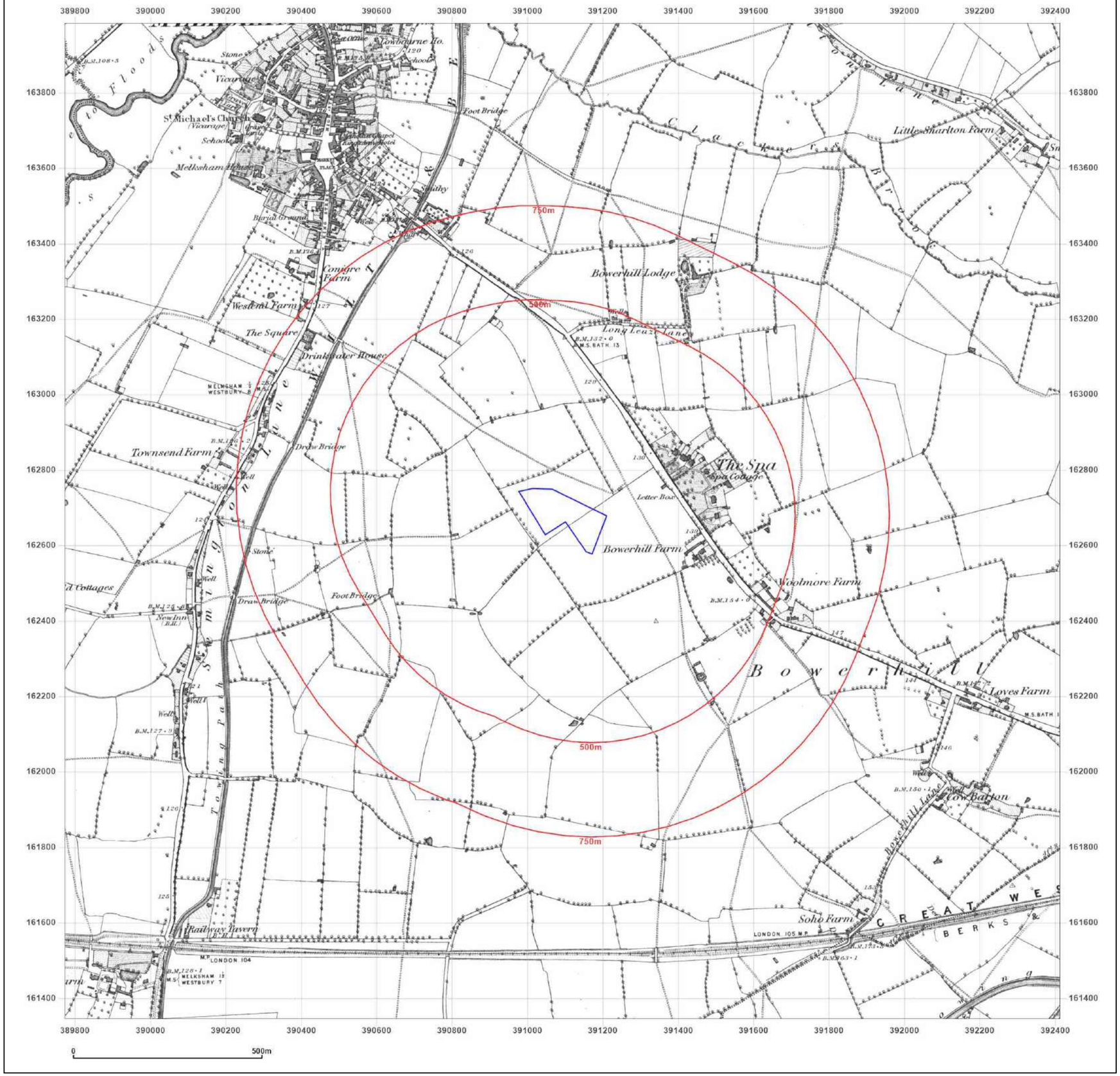
Desk Study Photograph 1	
Date: 18/05/23	
Direction Photograph Taken: North east	
Description: Site compound at the entrance to the site.	

Desk Study Photograph 1	
Date: 18/05/23	
Direction Photograph Taken: West.	
Description: Stockpile material in the centre of the site.	

Desk Study Photograph 2	
Date: 18/05/23	
Direction Photograph Taken: South west	
Description: Area of the site, Made Ground fill ground covering.	

Desk Study Photograph 3	
Date: 18/05/23	
Direction Photograph Taken: South.	
Description: Residential development to the south of the site.	

Appendix C Historical Ordnance Survey maps



Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1885**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1885
Revised 1885
Edition N/A
Copyright N/A
Levelled N/A

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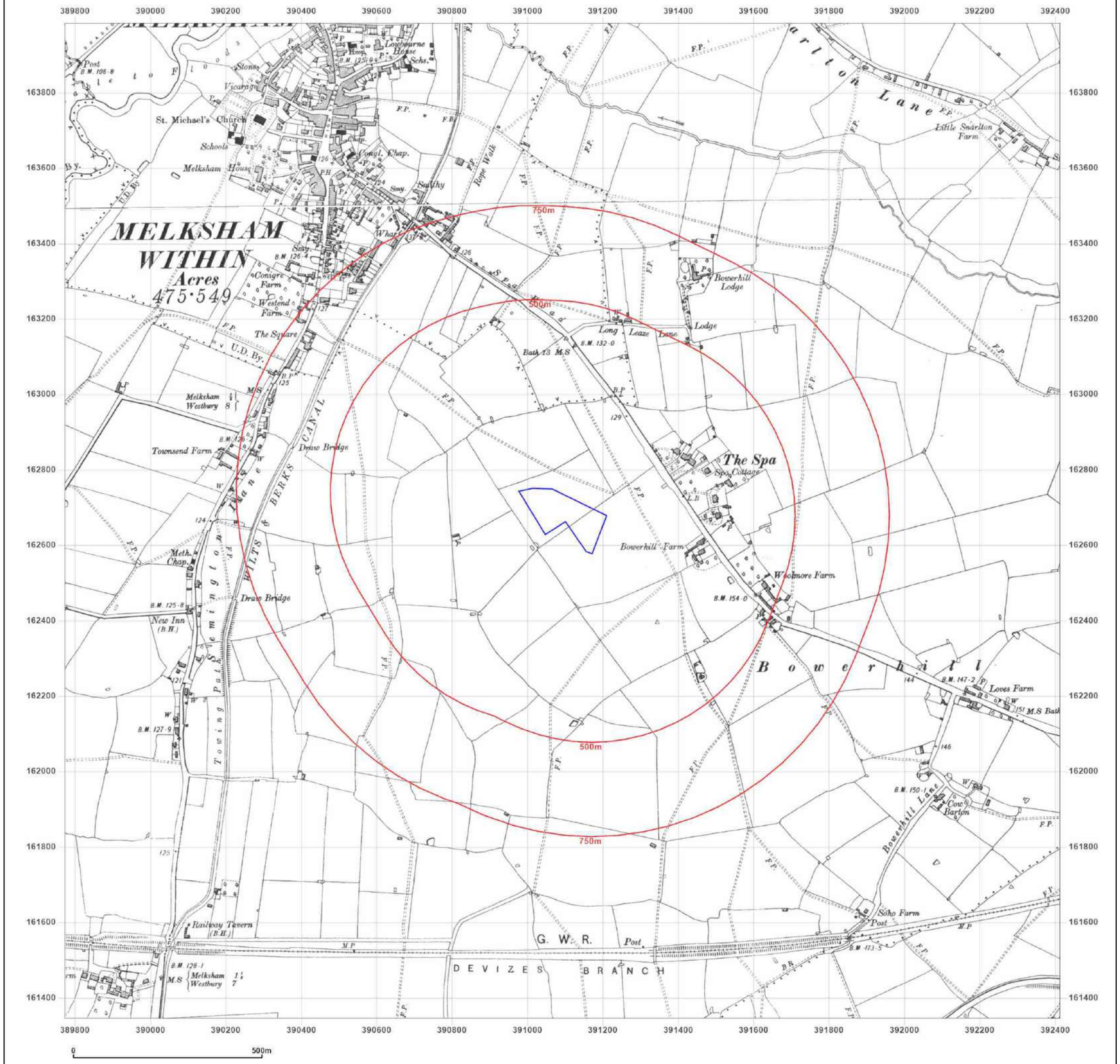

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1899**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1885
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1884
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

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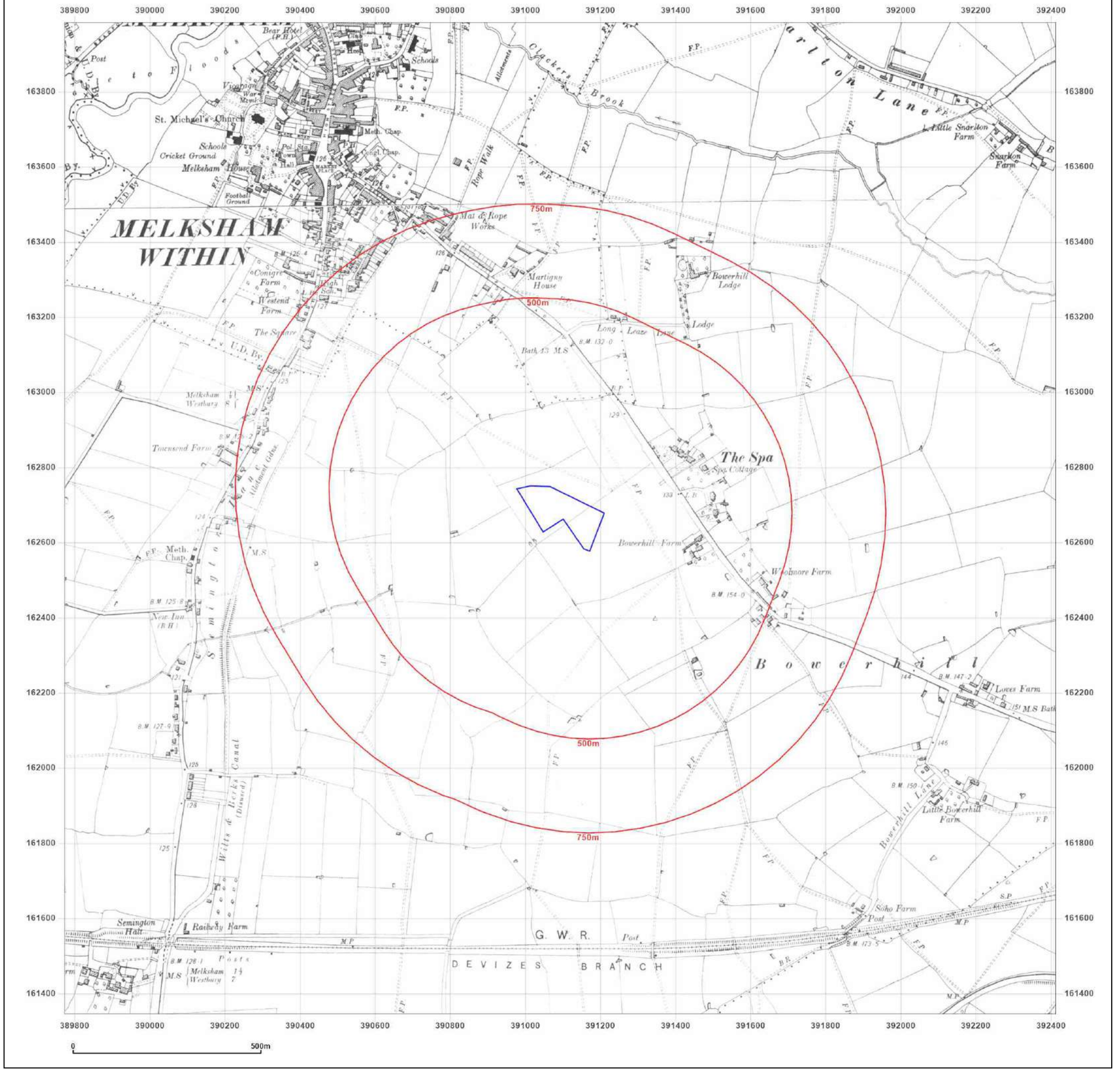

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1922**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1885
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1884
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

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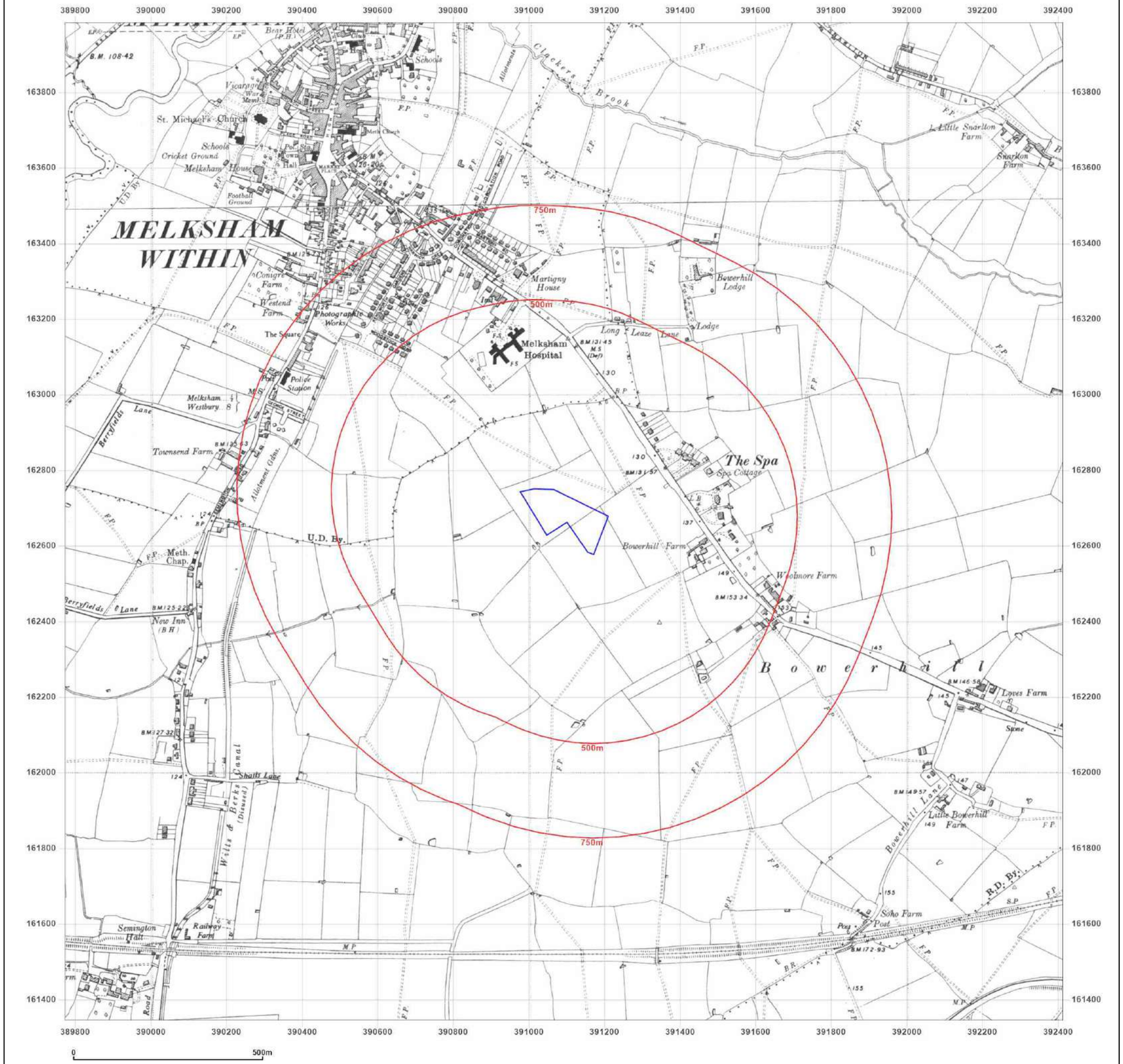

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1938-1942**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1885
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1884
Revised 1938
Edition N/A
Copyright N/A
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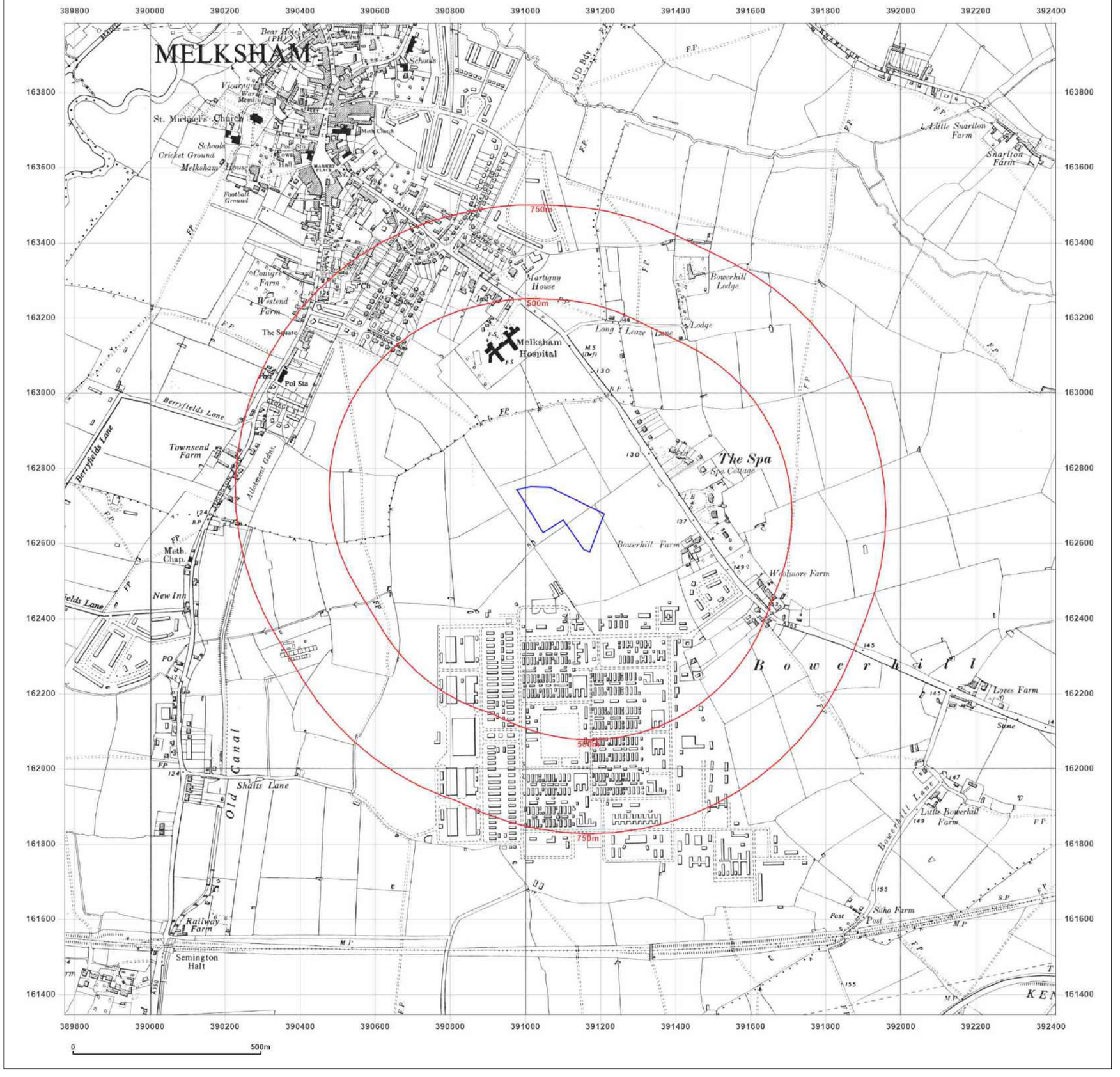

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: Provisional

Map date: **1956-1960**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed N/A
Revised 1960
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
Levelled N/A

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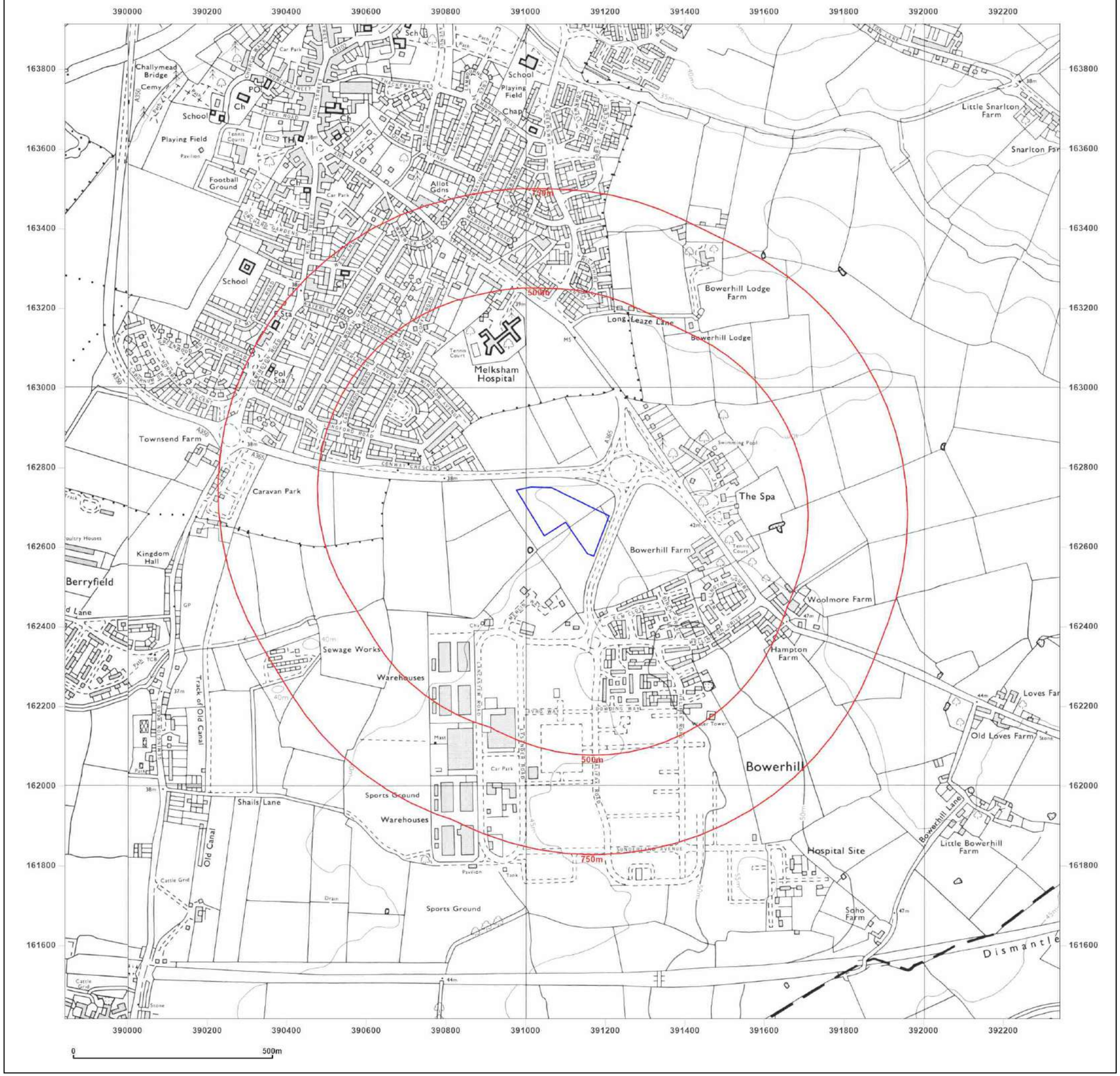

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1975-1976**

Scale: 1:10,000

Printed at: 1:10,000

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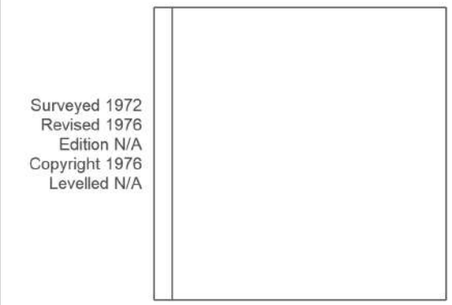

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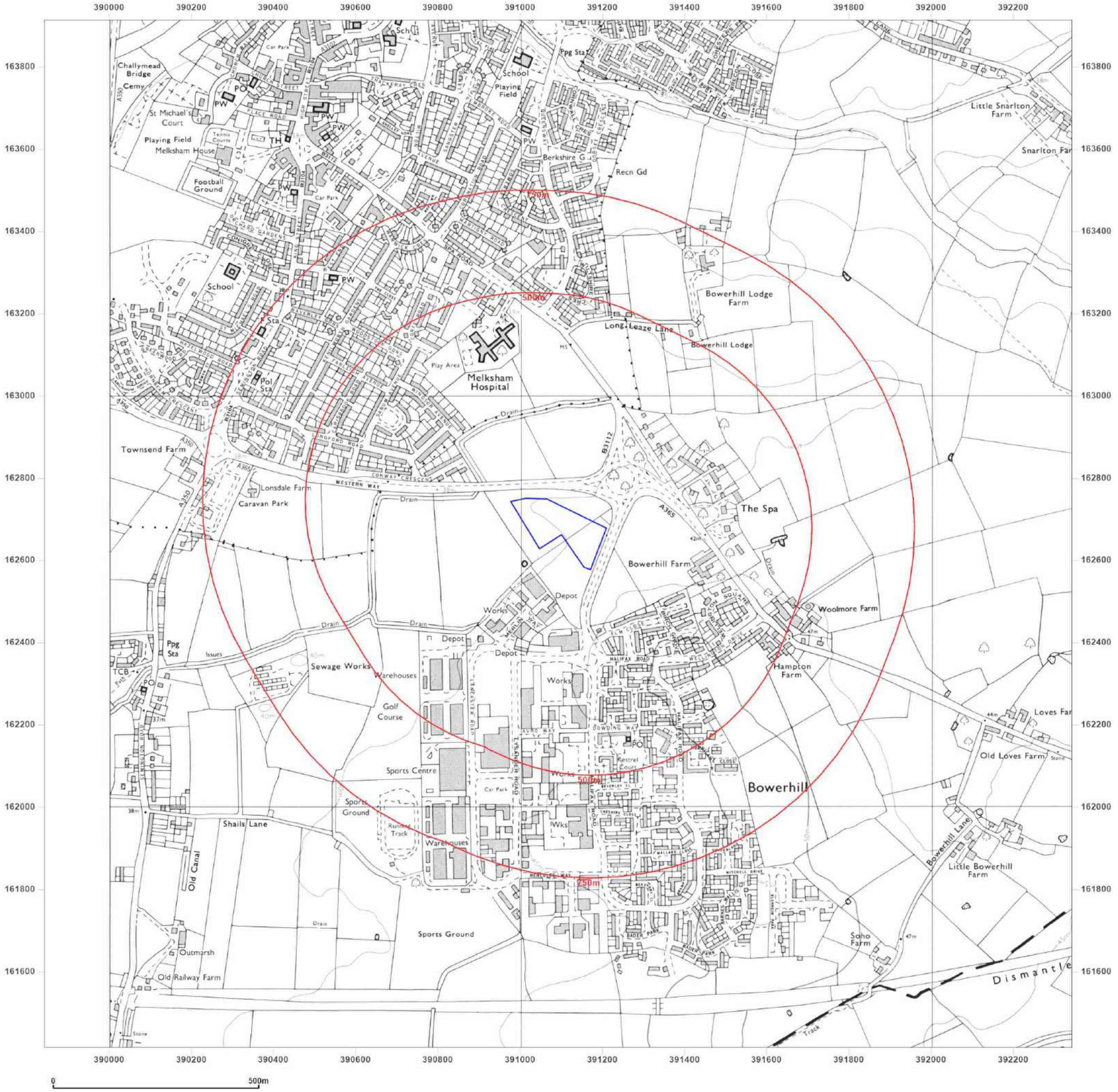

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1986**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1984
Revised 1986
Edition N/A
Copyright N/A
Levelled N/A

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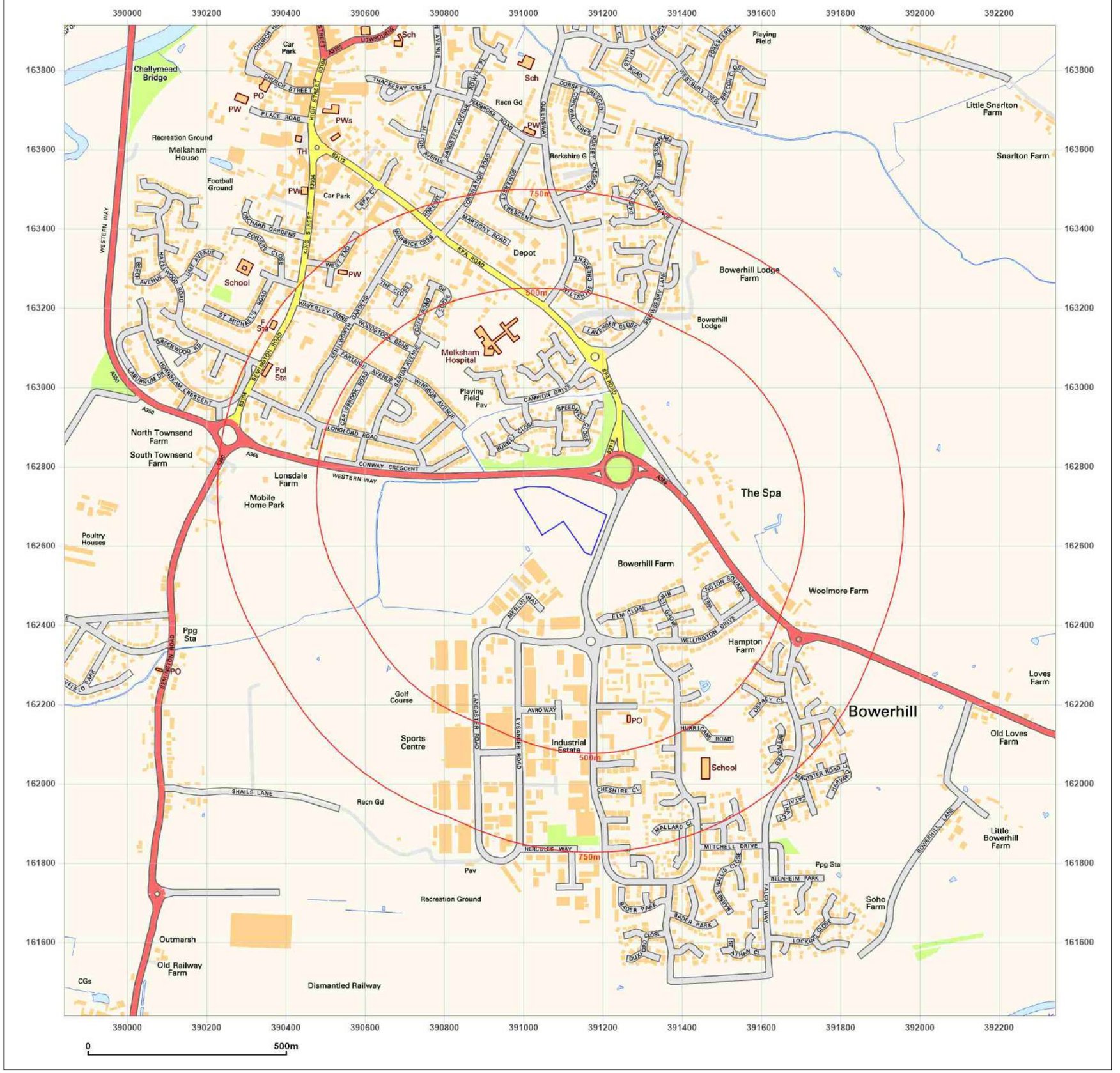

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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2001

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Site Details:

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Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N W E S

2010

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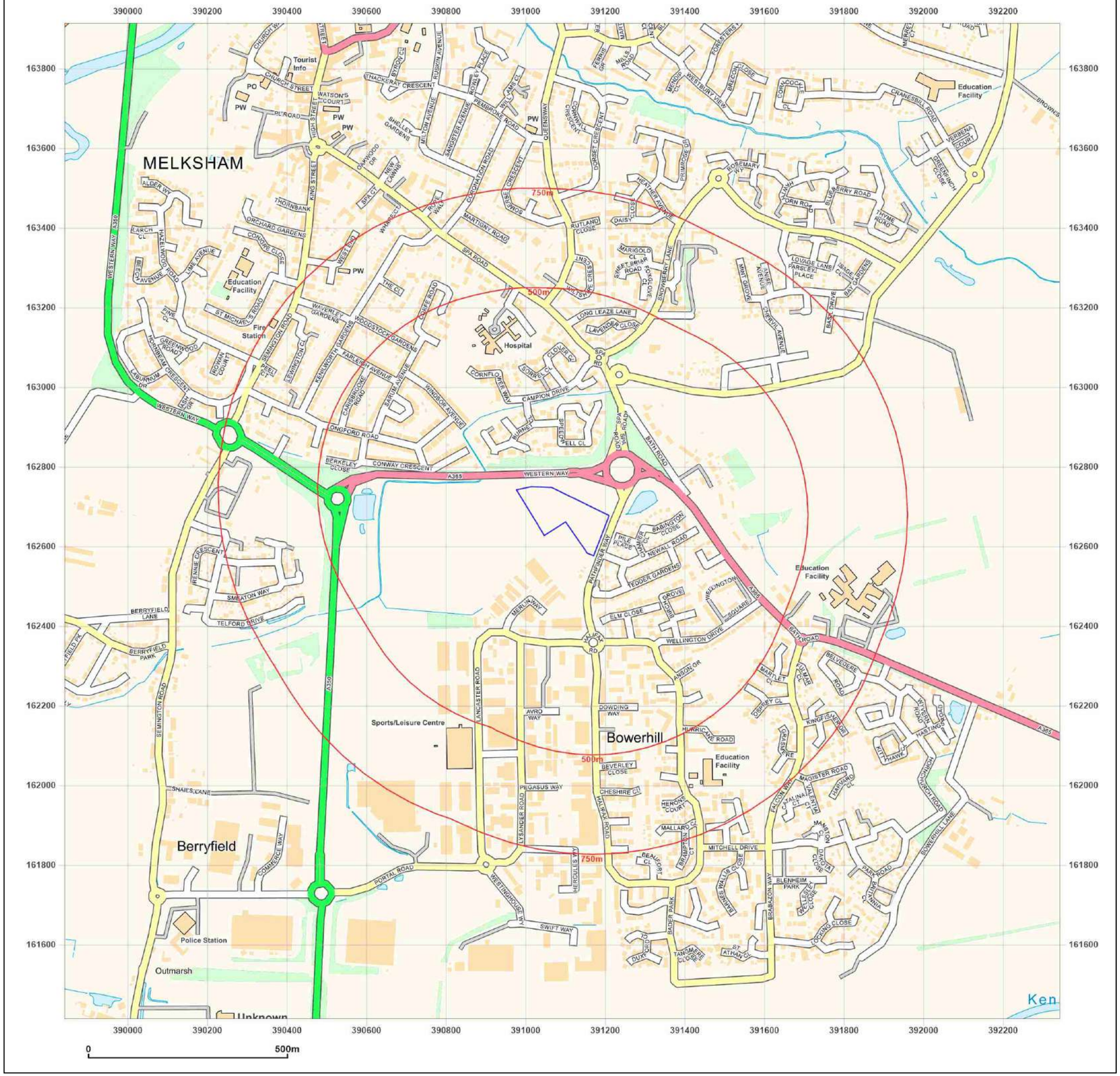

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **2023**

Scale: 1:10,000

Printed at: 1:10,000

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2023

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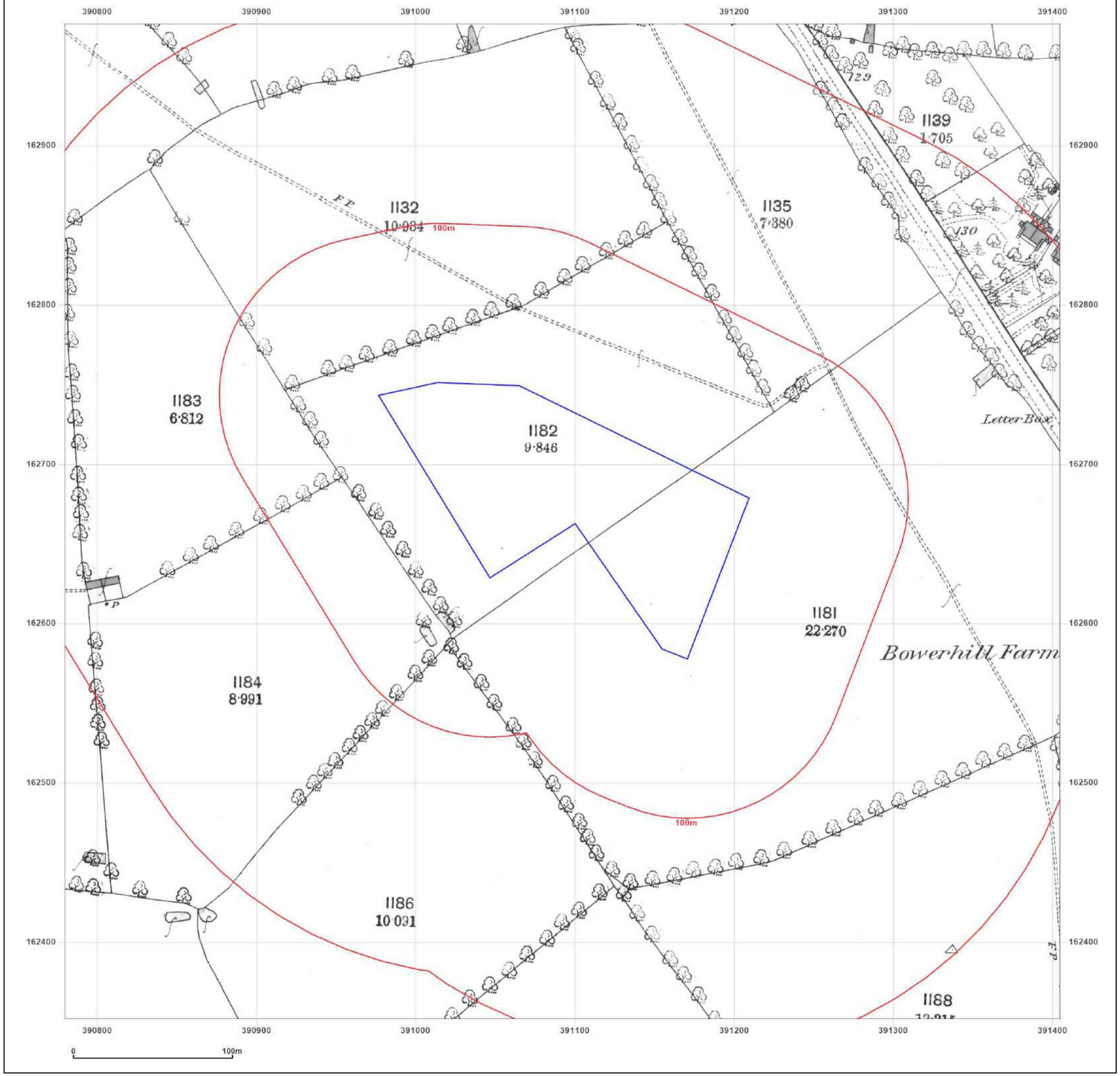

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1886**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1886
Revised 1886
Edition N/A
Copyright N/A
Levelled N/A

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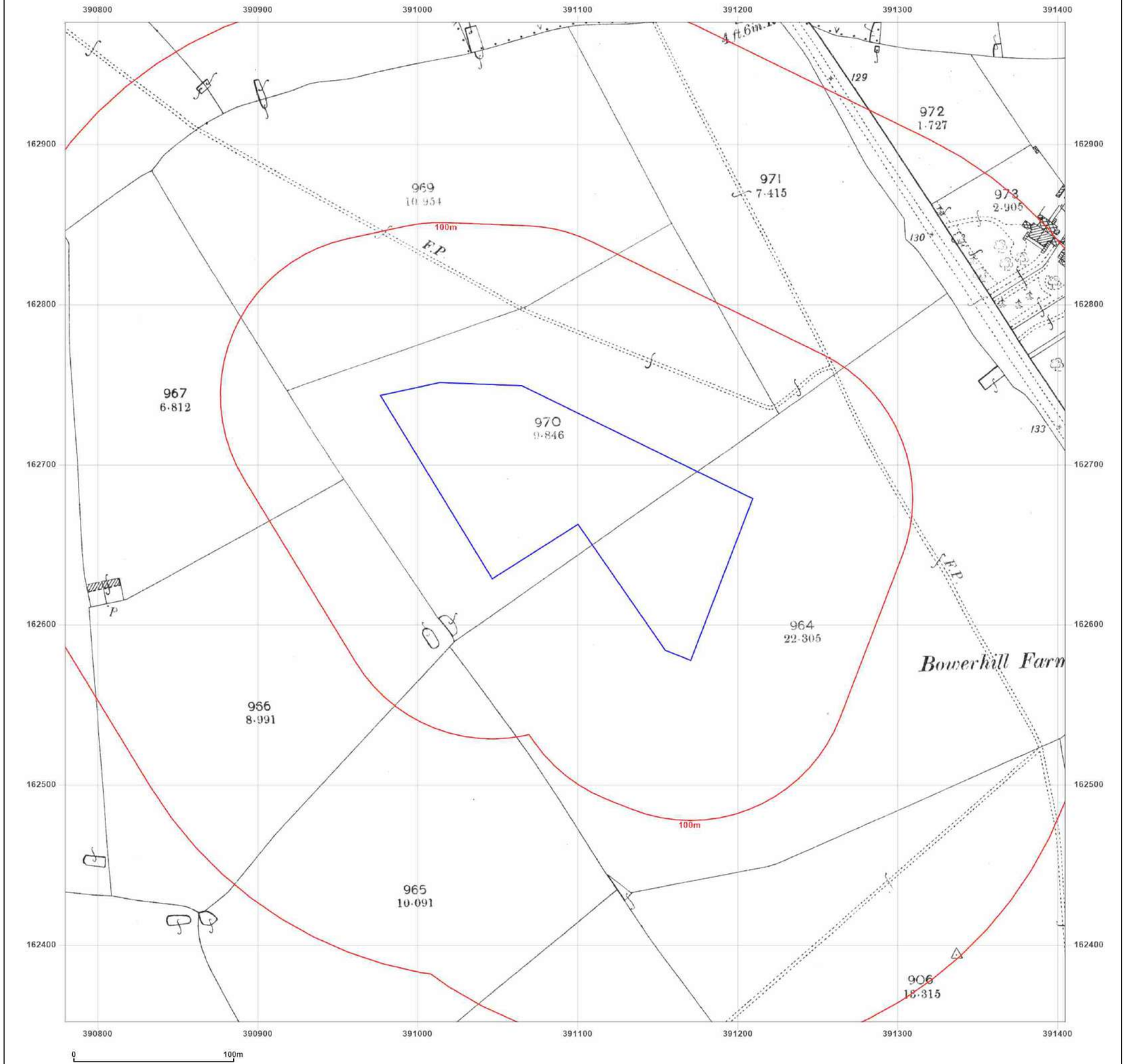

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1900
Revised 1900
Edition N/A
Copyright N/A
Levelled N/A

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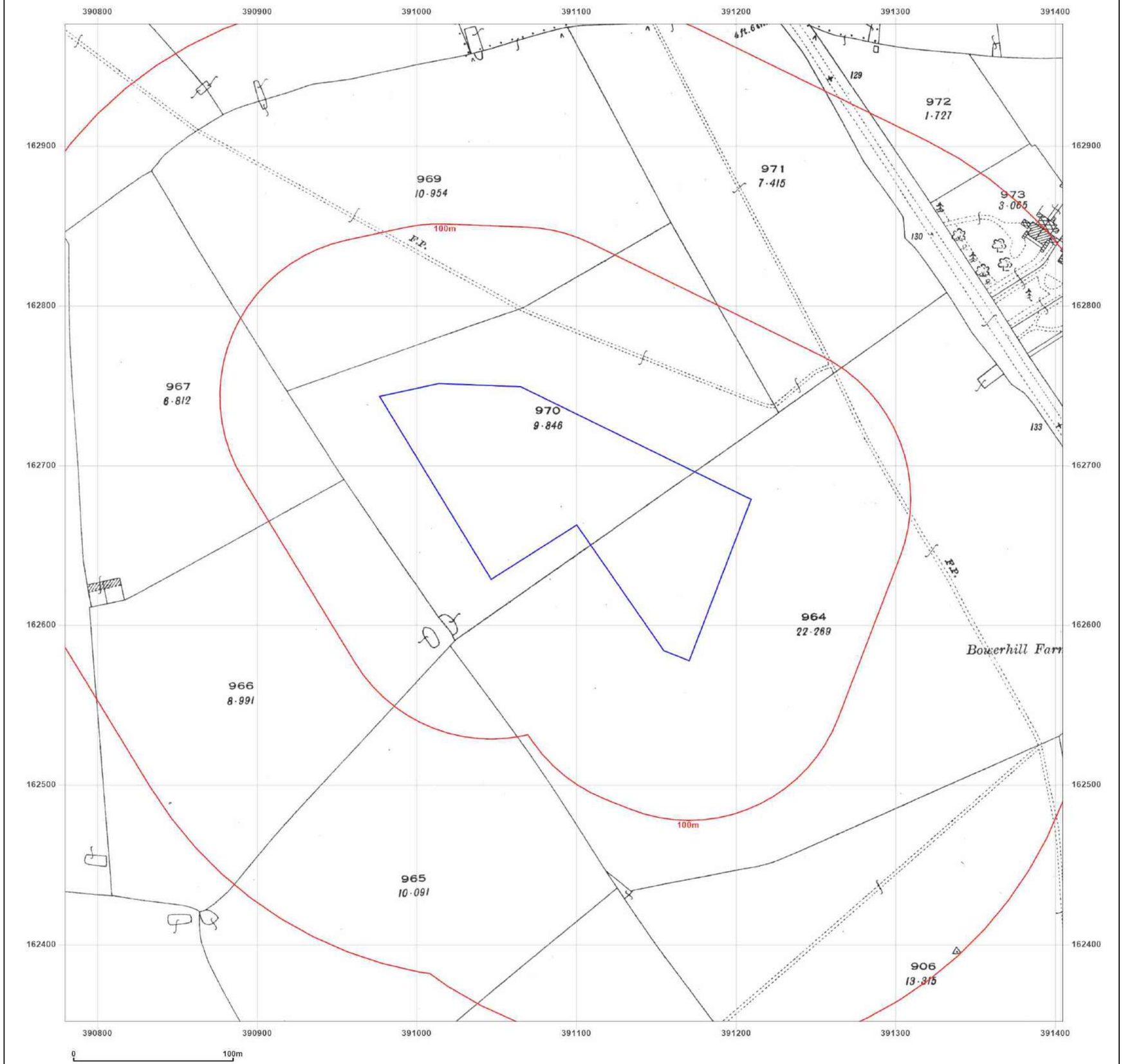

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1924**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

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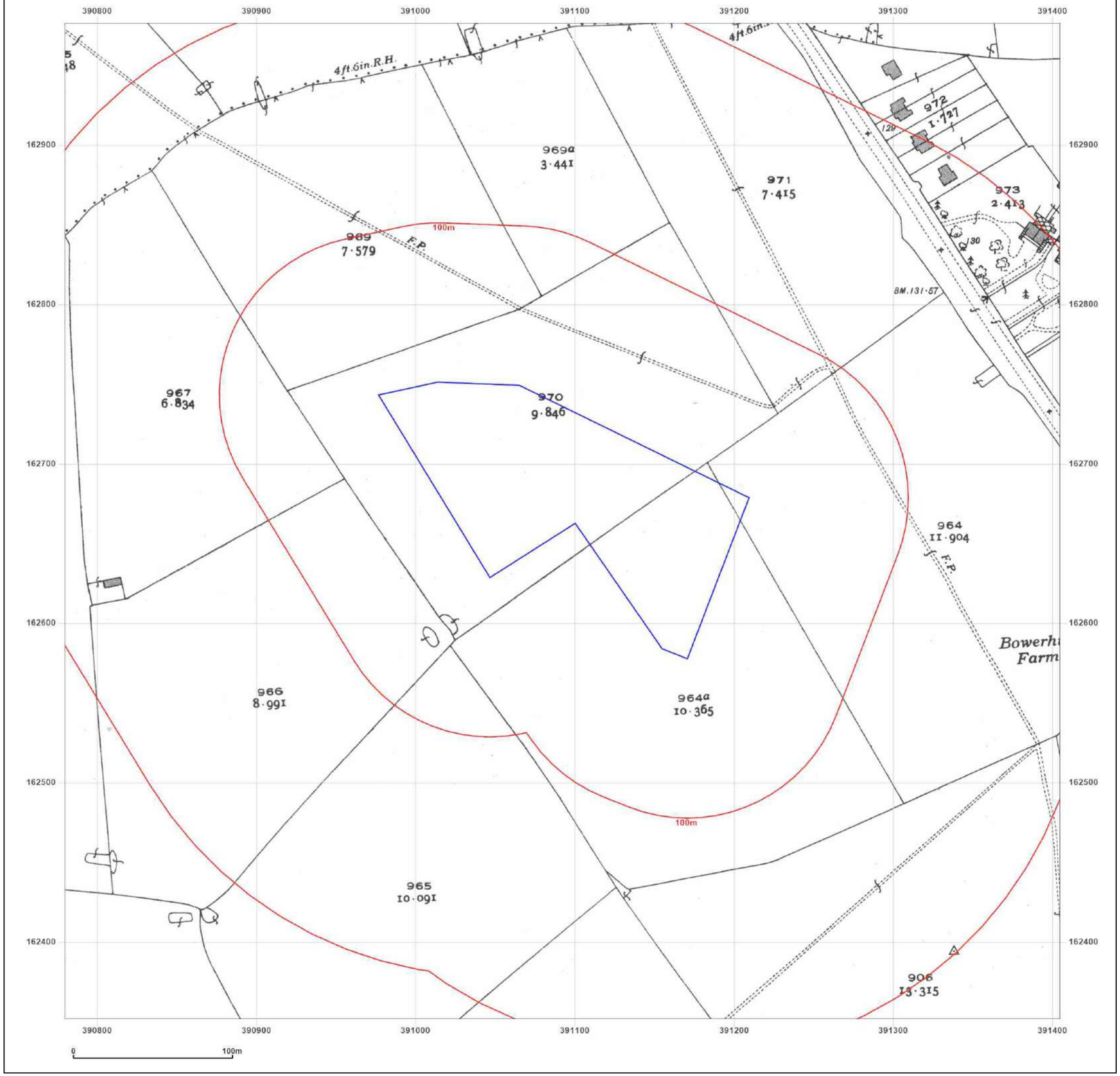

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: County Series

Map date: **1942**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1942
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1973**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1972
Revised 1972
Edition N/A
Copyright 1973
Levelled 1957

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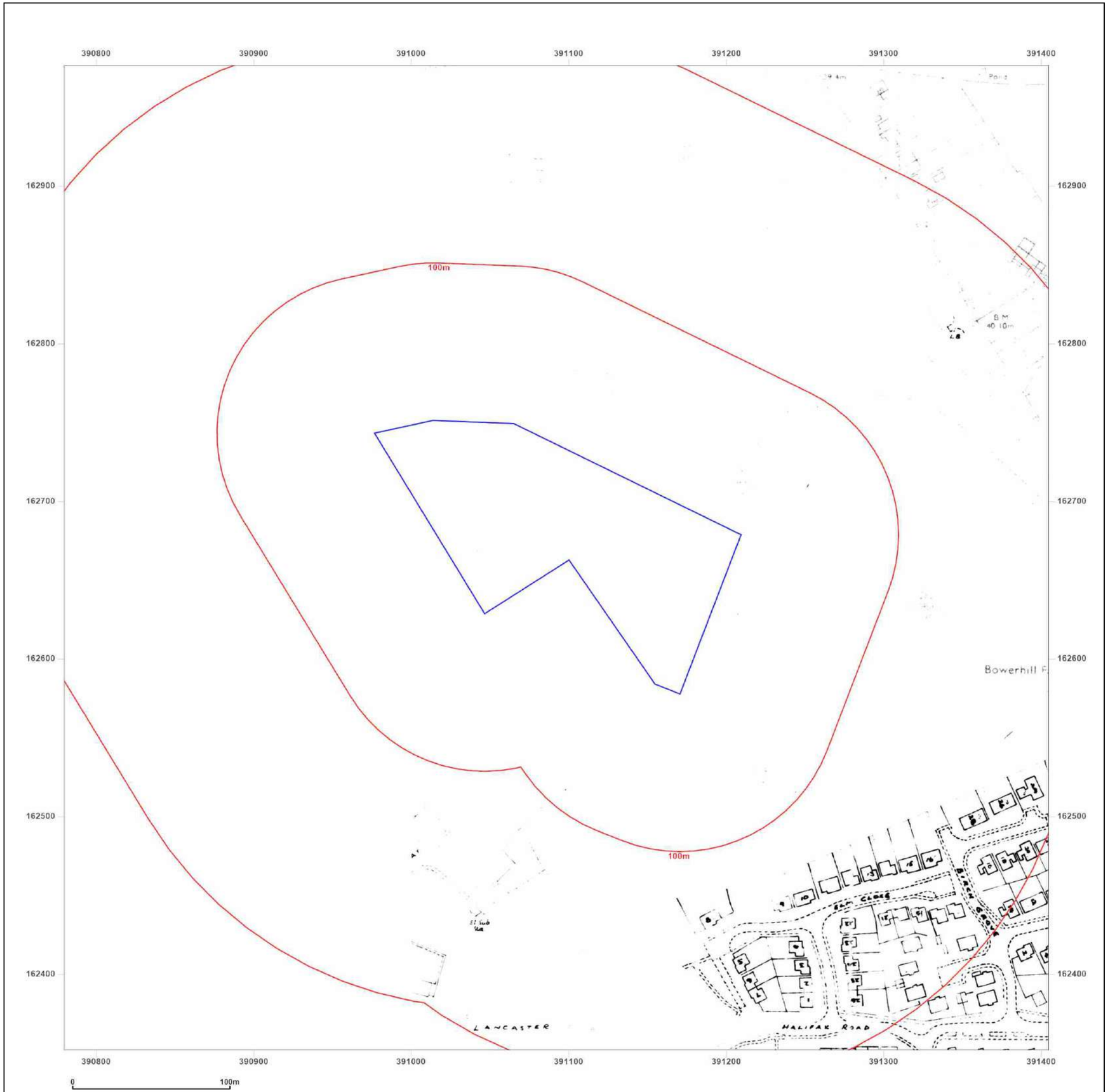

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1973**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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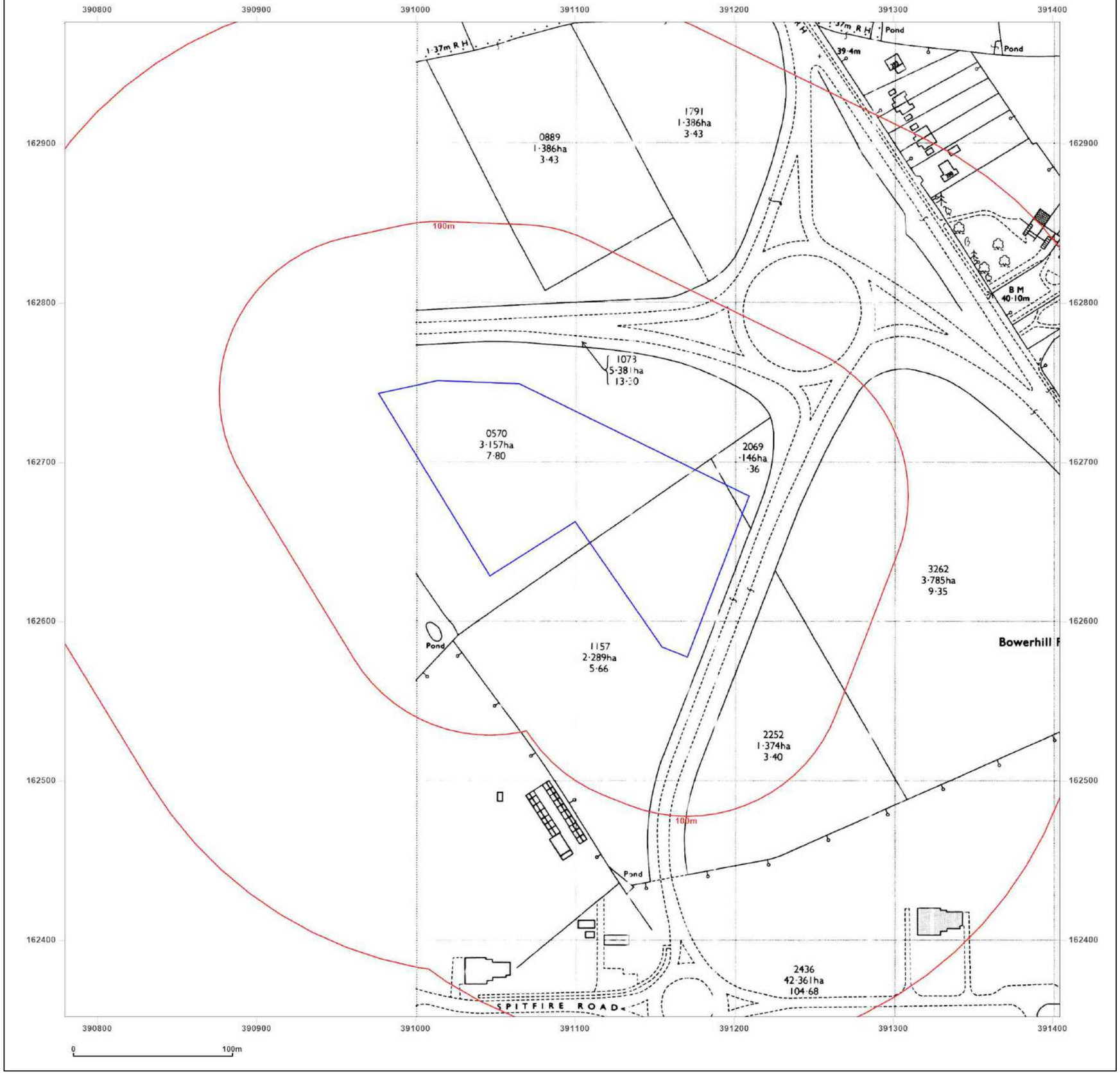

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1973**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1983**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1982
Revised 1982
Edition N/A
Copyright 1983
Levelled 1957

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Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1983**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1956
Revised 1983
Edition N/A
Copyright 1983
Levelled 1956

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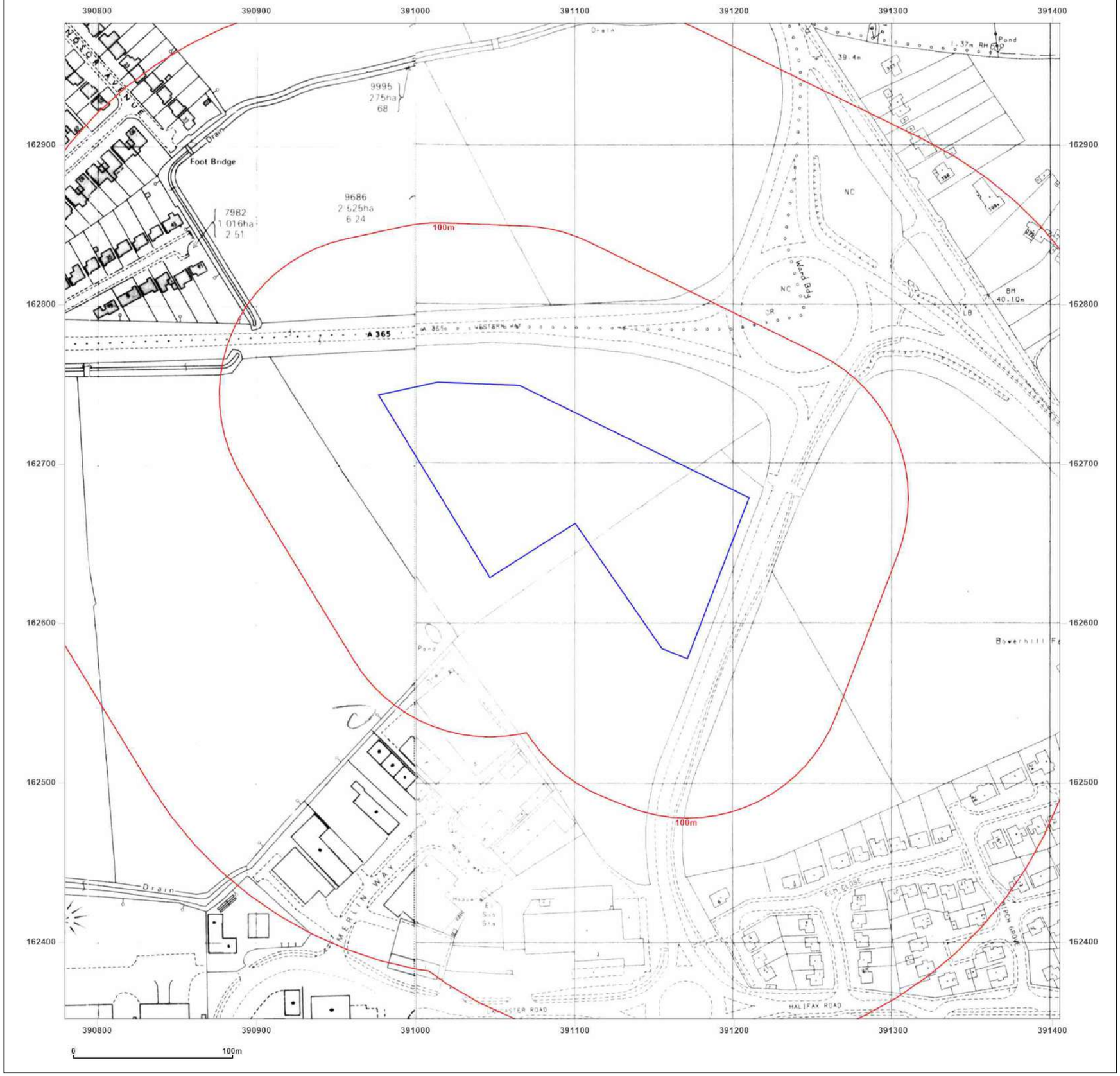

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1991-1992**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1957
Revised 1982
Edition N/A
Copyright 1991
Levelled 1957

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

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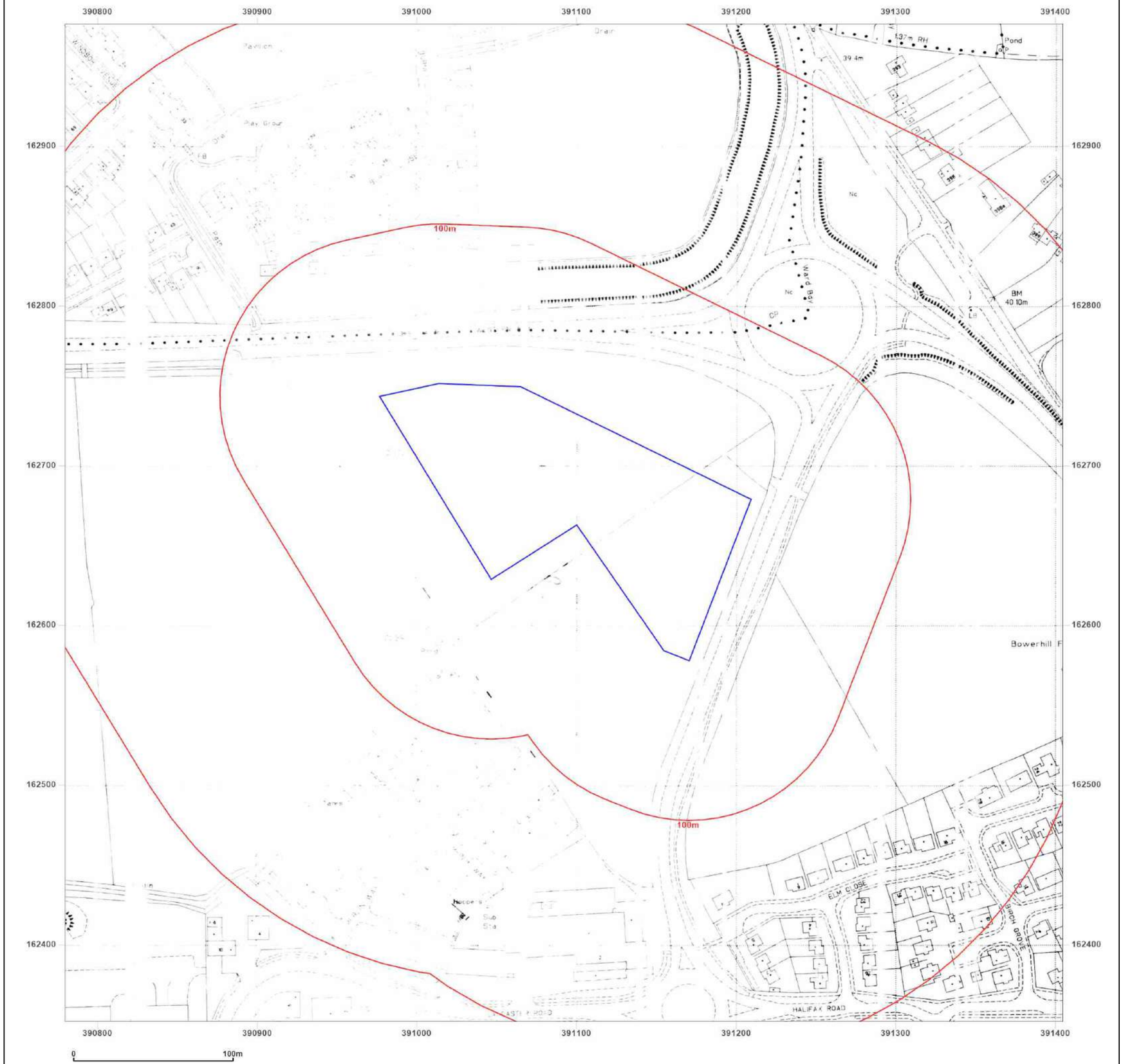

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

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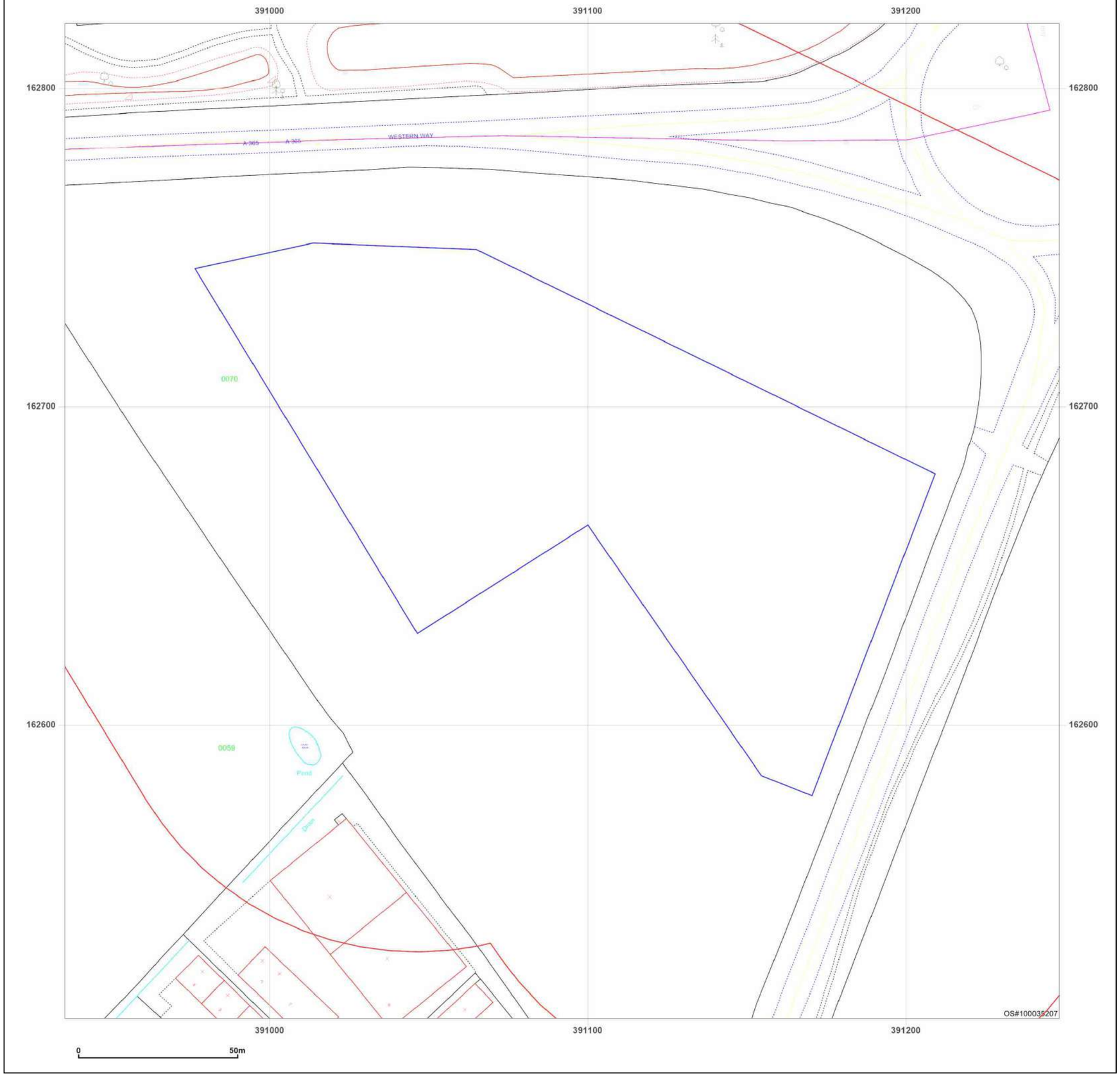

Groundsure INSIGHTS

Site Details:

391092 162684

Client Ref: 27203_SCF_Melksham
Report Ref: GS-24I-AKZ-EOL-KBY
Grid Ref: 391092, 162664

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

N
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2003

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www.groundsure.com/sites/default/files/groundsure_legend.pdf

Appendix D Desk study research information

Groundsure Enviro+Geo Insight

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

391092 162684,

Order Details

Date: 22/05/2023

Your ref: 27203_SCF_Melksham

Our Ref: GS-5IW-7NC-84W-AR1

Site Details

Location: 391108 162694

Area: 1.91 ha

Authority: Wiltshire Council ↗



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Summary of findings p. 2 >

OS MasterMap site plan p.13 >

Aerial image p. 8 >

groundsure.com/insightuserguide ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	1.1 >	Historical industrial land uses >	0	1	5	6	-
15 >	1.2 >	Historical tanks >	0	0	1	3	-
16 >	1.3 >	Historical energy features >	0	0	6	13	-
17 >	1.4 >	Historical petrol stations >	0	0	0	0	-
17 >	1.5 >	Historical garages >	0	0	2	0	-
17 >	1.6 >	Historical military land >	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
18 >	2.1 >	Historical industrial land uses >	0	1	5	7	-
19 >	2.2 >	Historical tanks >	0	0	3	5	-
20 >	2.3 >	Historical energy features >	0	0	13	34	-
22 >	2.4 >	Historical petrol stations >	0	0	0	0	-
22 >	2.5 >	Historical garages >	0	0	2	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
23 >	3.1 >	Active or recent landfill >	0	0	0	0	-
23 >	3.2 >	Historical landfill (BGS records) >	0	0	0	0	-
24 >	3.3 >	Historical landfill (LA/mapping records) >	0	0	0	0	-
24 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	0	-
24 >	3.5 >	Historical waste sites >	0	0	0	0	-
24 >	3.6 >	Licensed waste sites >	0	0	0	0	-
24 >	3.7 >	Waste exemptions >	0	0	0	8	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
26 >	4.1 >	Recent industrial land uses >	0	0	14	-	-
27 >	4.2 >	Current or recent petrol stations >	0	0	0	0	-
28 >	4.3 >	Electricity cables >	0	0	0	0	-
28 >	4.4 >	Gas pipelines >	0	0	0	0	-
28 >	4.5 >	Sites determined as Contaminated Land >	0	0	0	0	-

28 >	4.6 >	Control of Major Accident Hazards (COMAH) >	0	0	0	0	-
28 >	4.7 >	Regulated explosive sites >	0	0	0	0	-
29 >	4.8 >	Hazardous substance storage/usage >	0	0	0	0	-
29 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	0	0	-
29 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	0	0	-
29 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	0	3	-
30 >	4.12 >	Radioactive Substance Authorisations >	0	0	0	0	-
30 >	4.13 >	Licensed Discharges to controlled waters >	0	0	2	6	-
31 >	4.14 >	Pollutant release to surface waters (Red List) >	0	0	0	0	-
32 >	4.15 >	Pollutant release to public sewer >	0	0	0	0	-
32 >	4.16 >	List 1 Dangerous Substances >	0	0	0	0	-
32 >	4.17 >	List 2 Dangerous Substances >	0	0	0	0	-
32 >	4.18 >	Pollution Incidents (EA/NRW) >	0	0	1	0	-
33 >	4.19 >	Pollution inventory substances >	0	0	0	0	-
33 >	4.20 >	Pollution inventory waste transfers >	0	0	0	0	-
33 >	4.21 >	Pollution inventory radioactive waste >	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
34 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
36 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
37 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
38 >	5.4 >	Groundwater vulnerability- soluble rock risk >	None (within 0m)				
38 >	5.5 >	Groundwater vulnerability- local information >	None (within 0m)				
39 >	5.6 >	Groundwater abstractions >	0	0	0	0	4
40 >	5.7 >	Surface water abstractions >	0	0	0	0	4
42 >	5.8 >	Potable abstractions >	0	0	0	0	0
42 >	5.9 >	Source Protection Zones >	0	0	0	0	-
42 >	5.10 >	Source Protection Zones (confined aquifer) >	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
43 >	6.1 >	Water Network (OS MasterMap) >	0	0	10	-	-

44 >	6.2 >	Surface water features >	0	1	7	-	-
45 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
45 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
46 >	6.5 >	WFD Groundwater bodies >	0	-	-	-	-
Page	Section	**River and coastal flooding >**	On site	0-50m	50-250m	250-500m	500-2000m
47 >	7.1 >	Risk of flooding from rivers and the sea >	None (within 50m)				
47 >	7.2 >	Historical Flood Events >	0	0	0	-	-
47 >	7.3 >	Flood Defences >	0	0	0	-	-
48 >	7.4 >	Areas Benefiting from Flood Defences >	0	0	0	-	-
48 >	7.5 >	Flood Storage Areas >	0	0	0	-	-
49 >	7.6 >	Flood Zone 2 >	None (within 50m)				
49 >	7.7 >	Flood Zone 3 >	None (within 50m)				
Page	Section	**Surface water flooding >**					
50 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	**Groundwater flooding >**					
52 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	**Environmental designations >**	On site	0-50m	50-250m	250-500m	500-2000m
53 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	0
53 >	10.2 >	Conserved wetland sites (Ramsar sites) >	0	0	0	0	0
53 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	0
53 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	0	0
54 >	10.5 >	National Nature Reserves (NNR) >	0	0	0	0	0
54 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	0
54 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	0
54 >	10.8 >	Biosphere Reserves >	0	0	0	0	0
55 >	10.9 >	Forest Parks >	0	0	0	0	0
55 >	10.10 >	Marine Conservation Zones >	0	0	0	0	0
55 >	10.11 >	Green Belt >	0	0	0	0	0
55 >	10.12 >	Proposed Ramsar sites >	0	0	0	0	0

55 >	10.13 >	Possible Special Areas of Conservation (pSAC) >	0	0	0	0	0
56 >	10.14 >	Potential Special Protection Areas (pSPA) >	0	0	0	0	0
56 >	10.15 >	Nitrate Sensitive Areas >	0	0	0	0	0
56 >	10.16 >	Nitrate Vulnerable Zones >	0	0	0	0	1
57 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
58 >	10.18 >	SSSI Units >	0	0	0	0	0
Page	Section	**Visual and cultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
59 >	11.1 >	World Heritage Sites >	0	0	0	-	-
60 >	11.2 >	Area of Outstanding Natural Beauty >	0	0	0	-	-
60 >	11.3 >	National Parks >	0	0	0	-	-
60 >	11.4 >	Listed Buildings >	0	0	1	-	-
61 >	11.5 >	Conservation Areas >	0	0	0	-	-
61 >	11.6 >	Scheduled Ancient Monuments >	0	0	0	-	-
61 >	11.7 >	Registered Parks and Gardens >	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
62 >	12.1 >	Agricultural Land Classification >	Urban (within 250m)				
63 >	12.2 >	Open Access Land >	0	0	0	-	-
63 >	12.3 >	Tree Felling Licences >	0	0	0	-	-
63 >	12.4 >	Environmental Stewardship Schemes >	0	0	0	-	-
64 >	12.5 >	Countryside Stewardship Schemes >	0	0	0	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
65 >	13.1 >	Priority Habitat Inventory >	0	3	1	-	-
66 >	13.2 >	Habitat Networks >	0	0	0	-	-
66 >	13.3 >	Open Mosaic Habitat >	0	0	0	-	-
66 >	13.4 >	Limestone Pavement Orders >	0	0	0	-	-
Page	Section	**Geology 1:10,000 scale >**	On site	0-50m	50-250m	250-500m	500-2000m
67 >	14.1 >	10k Availability >	Identified (within 500m)				
68 >	14.2 >	Artificial and made ground (10k) >	0	0	0	0	-
69 >	14.3 >	Superficial geology (10k) >	0	0	2	1	-

70 >	14.4 >	Landslip (10k) >	0	0	0	0	-
71 >	14.5 >	Bedrock geology (10k) >	1	0	0	0	-
72 >	14.6 >	Bedrock faults and other linear features (10k) >	0	0	0	0	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
73 >	15.1 >	50k Availability >	Identified (within 500m)				
74 >	15.2 >	Artificial and made ground (50k) >	0	0	0	0	-
74 >	15.3 >	Artificial ground permeability (50k) >	0	0	-	-	-
75 >	15.4 >	Superficial geology (50k) >	0	0	2	2	-
76 >	15.5 >	Superficial permeability (50k) >	None (within 50m)				
76 >	15.6 >	Landslip (50k) >	0	0	0	0	-
76 >	15.7 >	Landslip permeability (50k) >	None (within 50m)				
77 >	15.8 >	Bedrock geology (50k) >	1	0	0	1	-
78 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
78 >	15.10 >	Bedrock faults and other linear features (50k) >	0	0	0	0	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
79 >	16.1 >	BGS Boreholes >	0	0	8	-	-
Page	Section	Natural ground subsidence >					
81 >	17.1 >	Shrink swell clays >	Moderate (within 50m)				
82 >	17.2 >	Running sands >	Negligible (within 50m)				
83 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
84 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
85 >	17.5 >	Landslides >	Very low (within 50m)				
86 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities >	On site	0-50m	50-250m	250-500m	500-2000m
88 >	18.1 >	Natural cavities >	0	0	0	0	-
88 >	18.2 >	BritPits >	0	0	0	0	-
88 >	18.3 >	Surface ground workings >	0	0	0	-	-
88 >	18.4 >	Underground workings >	0	0	0	0	0
89 >	18.5 >	Historical Mineral Planning Areas >	0	0	0	0	-

89 >	18.6 >	Non-coal mining >	0	0	0	0	0
89 >	18.7 >	Mining cavities >	0	0	0	0	0
89 >	18.8 >	JPB mining areas >	None (within 0m)				
89 >	18.9 >	Coal mining >	None (within 0m)				
90 >	18.10 >	Brine areas >	None (within 0m)				
90 >	18.11 >	Gypsum areas >	None (within 0m)				
90 >	18.12 >	Tin mining >	None (within 0m)				
90 >	18.13 >	Clay mining >	None (within 0m)				
Page	Section	**Radon** >					
91 >	19.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	**Soil chemistry** >	On site	0-50m	50-250m	250-500m	500-2000m
93 >	20.1 >	BGS Estimated Background Soil Chemistry >	2	0	-	-	-
93 >	20.2 >	BGS Estimated Urban Soil Chemistry >	0	0	-	-	-
93 >	20.3 >	BGS Measured Urban Soil Chemistry >	0	0	-	-	-
Page	Section	**Railway infrastructure and projects** >	On site	0-50m	50-250m	250-500m	500-2000m
94 >	21.1 >	Underground railways (London) >	0	0	0	-	-
94 >	21.2 >	Underground railways (Non-London) >	0	0	0	-	-
94 >	21.3 >	Railway tunnels >	0	0	0	-	-
94 >	21.4 >	Historical railway and tunnel features >	0	0	0	-	-
94 >	21.5 >	Royal Mail tunnels >	0	0	0	-	-
95 >	21.6 >	Historical railways >	0	0	0	-	-
95 >	21.7 >	Railways >	0	0	0	-	-
95 >	21.8 >	Crossrail 1 >	0	0	0	0	-
95 >	21.9 >	Crossrail 2 >	0	0	0	0	-
95 >	21.10 >	HS2 >	0	0	0	0	-

Recent aerial photograph



Capture Date: 12/05/2020

Site Area: 1.91ha

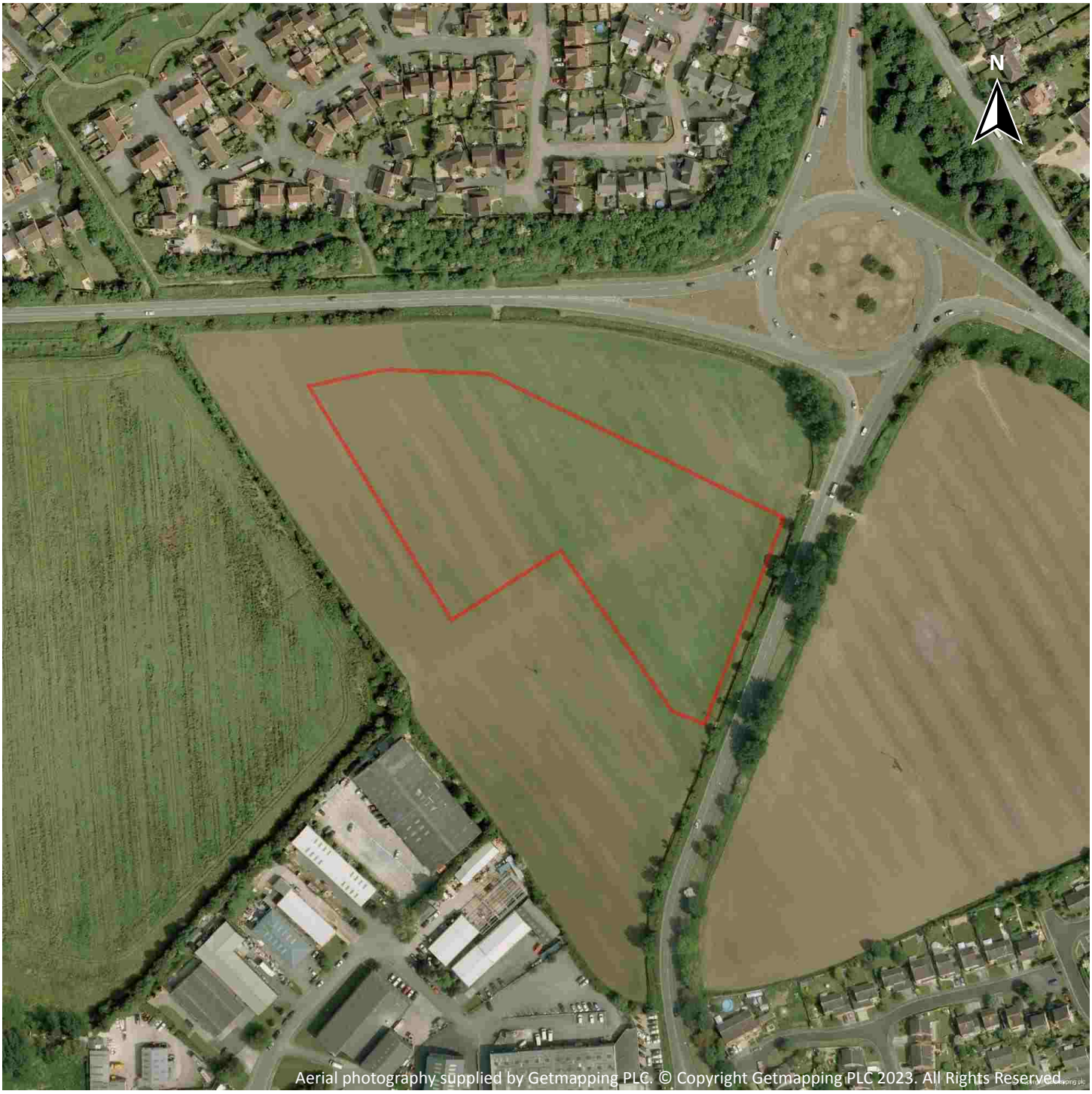
Recent site history - 2017 aerial photograph



Capture Date: 19/06/2017

Site Area: 1.91ha

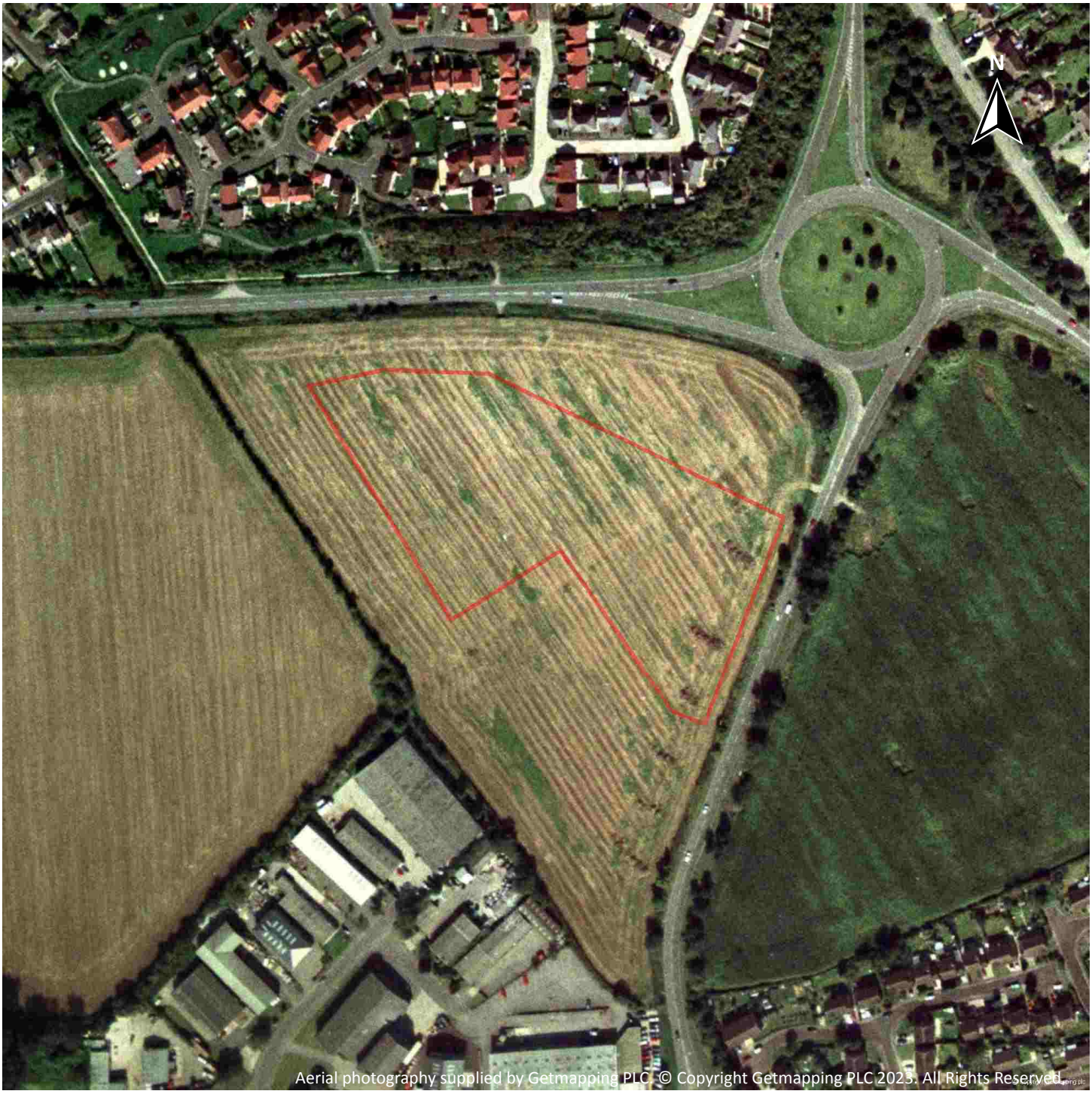
Recent site history - 2006 aerial photograph



Capture Date: 08/06/2006

Site Area: 1.91ha

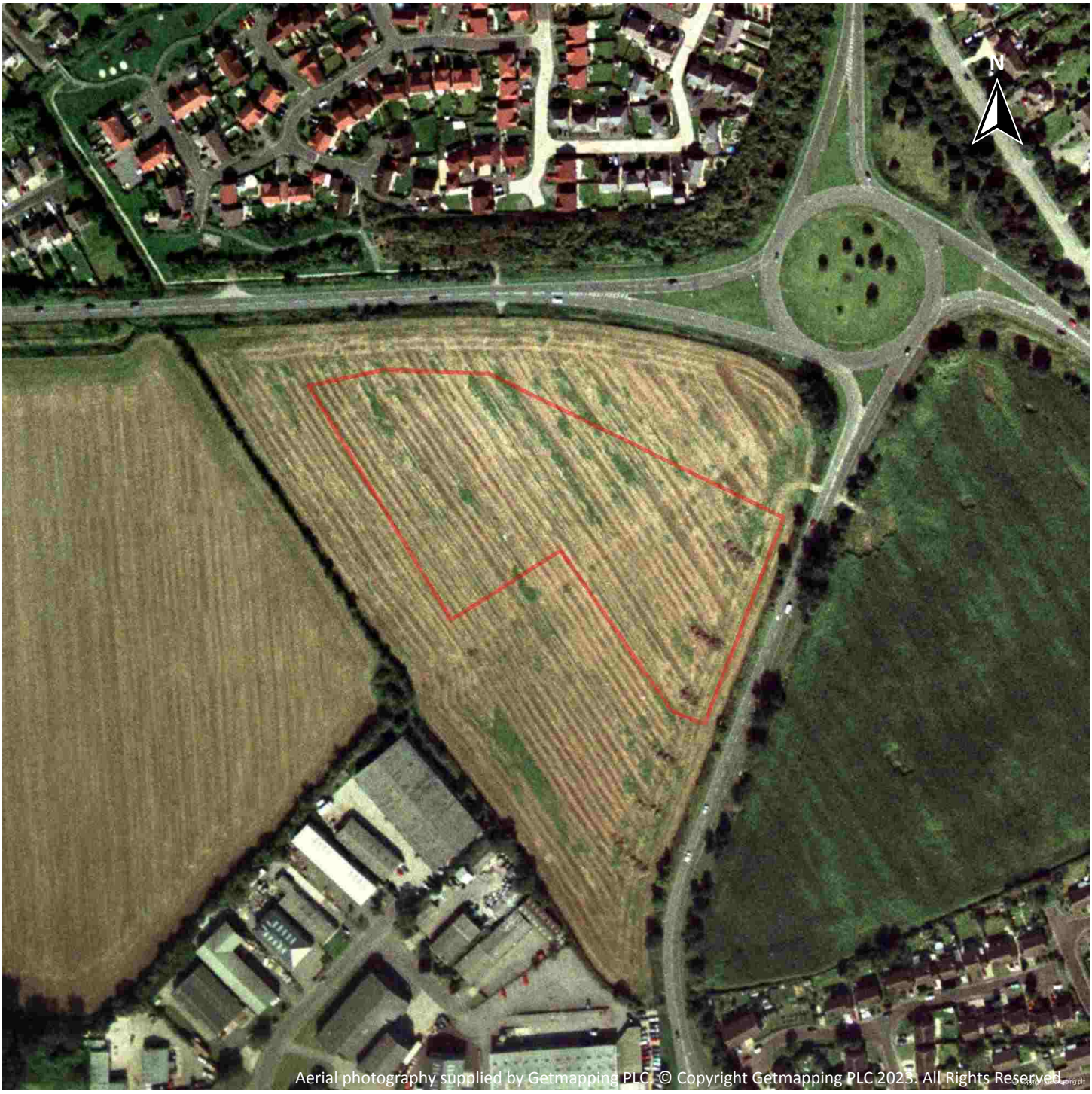
Recent site history - 2001 aerial photograph



Capture Date: 21/05/2001

Site Area: 1.91ha

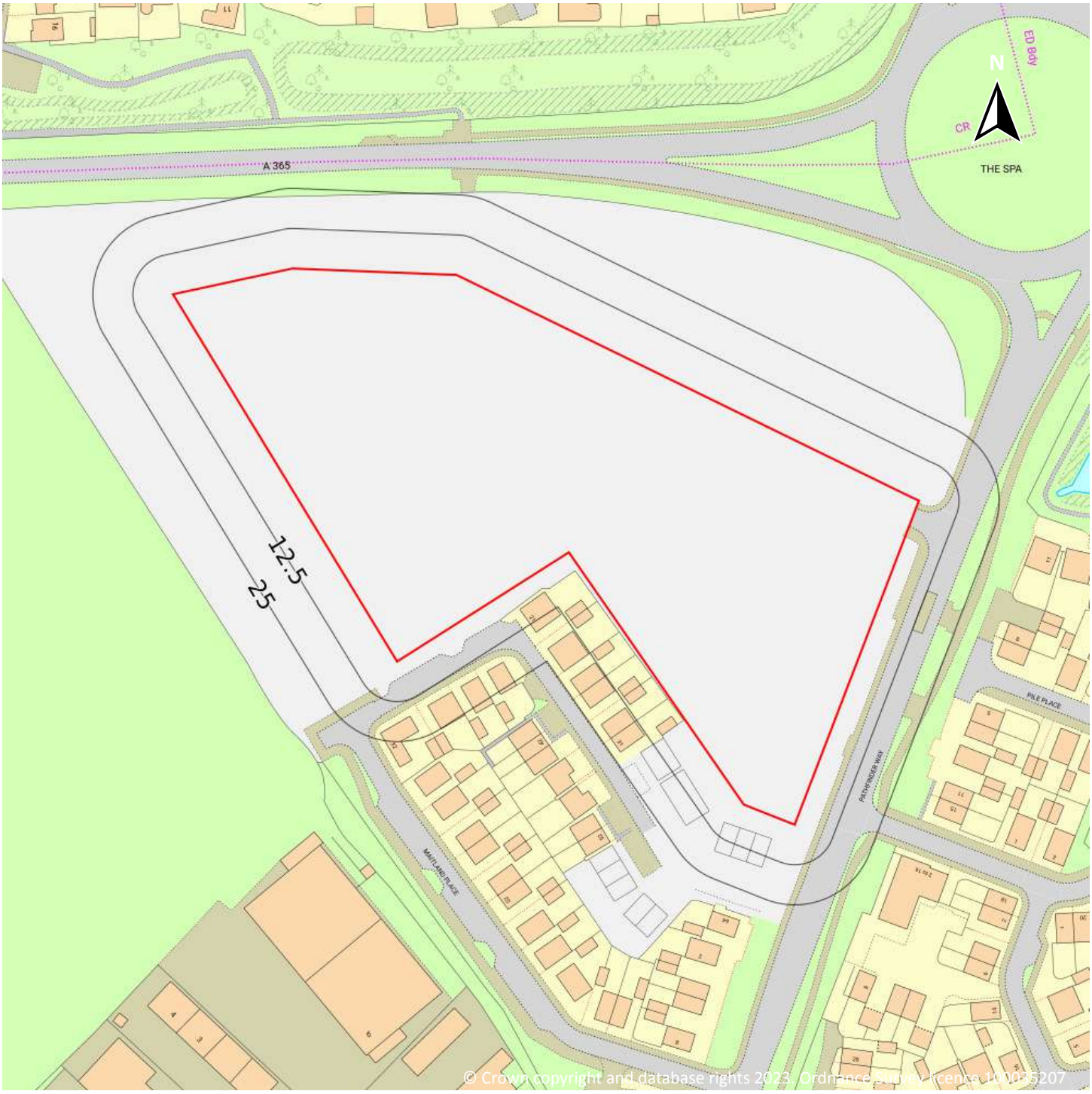
Recent site history - 1999 aerial photograph



Capture Date: 04/09/1999

Site Area: 1.91ha

OS MasterMap site plan



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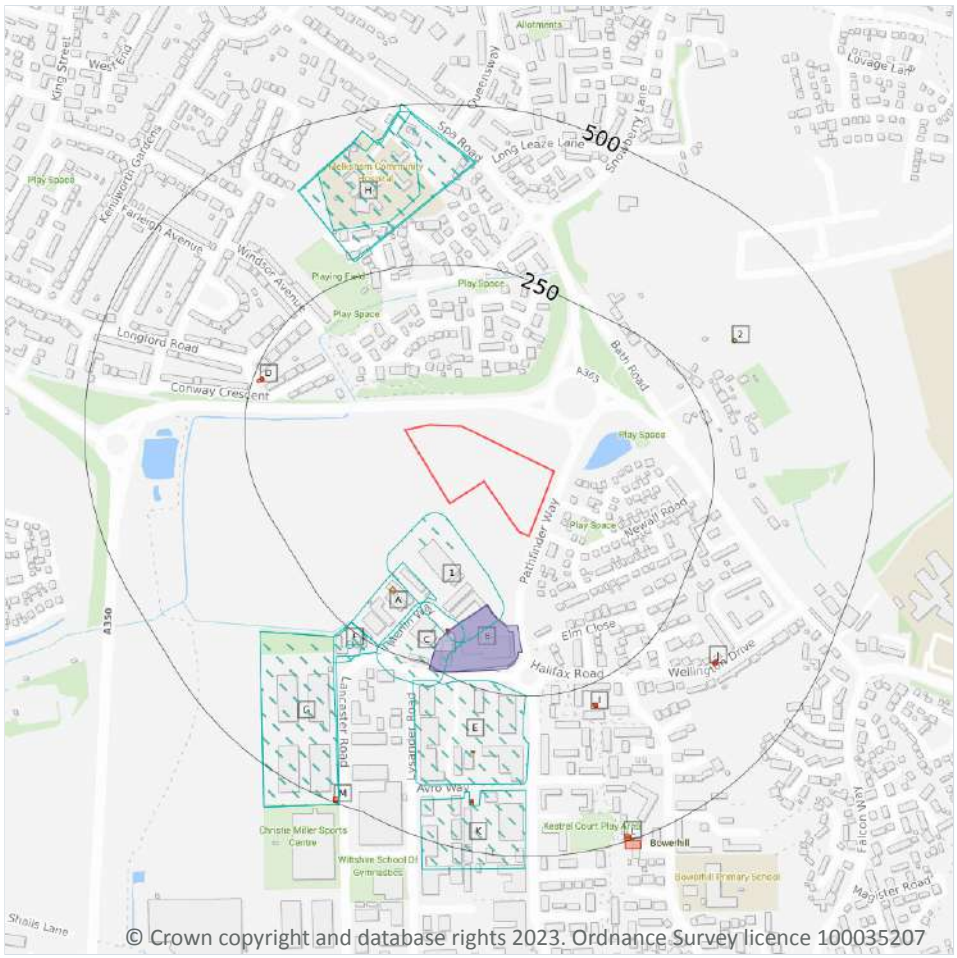
Site Area: 1.91ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	12

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
1	21m SW	Unspecified Depot	1986	1245969

ID	Location	Land use	Dates present	Group ID
A	117m SW	Unspecified Works	1986	1179125
C	158m S	Unspecified Depot	1986	1240708
E	235m S	Unspecified Works	1986	1179127
F	241m SW	Unspecified Depot	1986	1266334
G	241m SW	Unspecified Warehouses	1973	1232124
F	264m SW	Chimney	1973	1182829
H	274m NW	Hospital	1938	1190670
G	276m SW	Unspecified Warehouses	1986	1196505
H	278m NW	Hospital	1956 - 1973	1243276
H	322m N	Hospital	1986	1196403
K	397m S	Unspecified Works	1986	1179126

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**4**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
A	158m SW	Tanks	1991 - 1997	179812
2	345m NE	Unspecified Tank	1900 - 1942	189360
E	347m S	Tanks	1982	185658
E	347m S	Tanks	1983	180586

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	19

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
C	187m S	Electricity Substation	1982	101722
C	189m S	Electricity Substation	1983 - 1992	108249
C	190m S	Electricity Substation	1995 - 1997	110075
D	233m W	Electricity Substation	1982 - 1991	102562
D	234m NW	Electricity Substation	1995 - 1997	110848
D	234m NW	Electricity Substation	1972	102566
I	280m SE	Electricity Substation	1983 - 1997	102811
I	280m SE	Electricity Substation	1982	107920
J	347m SE	Electricity Substation	1983 - 1992	110536
J	349m SE	Electricity Substation	1982	109636
J	350m SE	Electricity Substation	1995 - 1997	104223
K	421m S	Electricity Substation	1982	113494
K	421m S	Electricity Substation	1983 - 1992	112017
K	425m S	Electricity Substation	1995 - 1997	104461
L	489m S	Electricity Substation	1982	103699
M	489m SW	Electricity Substation	1982 - 1997	106192
M	489m SW	Electricity Substation	1972	113383
L	492m S	Electricity Substation	1995 - 1997	105825
L	498m S	Electricity Substation	1983 - 1992	111892

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	2

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
B	124m S	Garage	1982	33923
B	124m S	Garage	1983	33644

This data is sourced from Ordnance Survey / Groundsure.

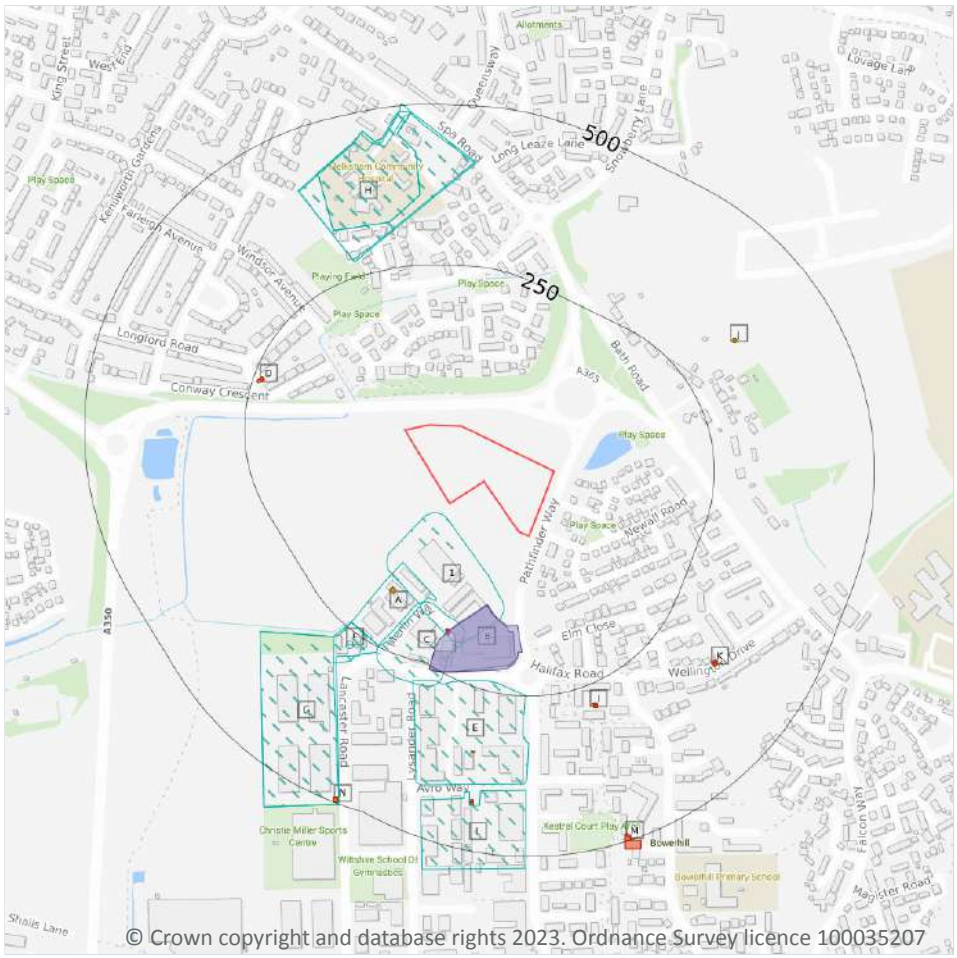
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	13

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
1	21m SW	Unspecified Depot	1986	1245969
A	117m SW	Unspecified Works	1986	1179125
C	158m S	Unspecified Depot	1986	1240708

ID	Location	Land Use	Date	Group ID
E	235m S	Unspecified Works	1986	1179127
F	241m SW	Unspecified Depot	1986	1266334
G	241m SW	Unspecified Warehouses	1973	1232124
F	264m SW	Chimney	1973	1182829
H	274m NW	Hospital	1938	1190670
G	276m SW	Unspecified Warehouses	1986	1196505
H	278m NW	Hospital	1956	1243276
H	322m N	Hospital	1986	1196403
H	322m N	Hospital	1973	1243276
L	397m S	Unspecified Works	1986	1179126

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**8**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
A	158m SW	Tanks	1991	179812
A	158m SW	Tanks	1997	179812
A	158m SW	Tanks	1995	179812
J	345m NE	Unspecified Tank	1900	189360
J	345m NE	Unspecified Tank	1924	189360
J	345m NE	Unspecified Tank	1942	189360
E	347m S	Tanks	1982	185658
E	347m S	Tanks	1983	180586

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	47

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
C	187m S	Electricity Substation	1982	101722
C	189m S	Electricity Substation	1983	108249
C	189m S	Electricity Substation	1992	108249
C	190m S	Electricity Substation	1996	110075
C	190m S	Electricity Substation	1996	110075
C	190m S	Electricity Substation	1997	110075
C	190m S	Electricity Substation	1995	110075
D	233m W	Electricity Substation	1991	102562
D	234m NW	Electricity Substation	1997	110848
D	234m NW	Electricity Substation	1995	110848
D	234m NW	Electricity Substation	1982	102562
D	234m NW	Electricity Substation	1972	102566
D	234m NW	Electricity Substation	1991	102562
I	280m SE	Electricity Substation	1983	102811
I	280m SE	Electricity Substation	1992	102811
I	280m SE	Electricity Substation	1982	107920
I	282m SE	Electricity Substation	1996	102811
I	282m SE	Electricity Substation	1996	102811
I	282m SE	Electricity Substation	1997	102811
I	282m SE	Electricity Substation	1995	102811
K	347m SE	Electricity Substation	1983	110536
K	347m SE	Electricity Substation	1992	110536
K	349m SE	Electricity Substation	1982	109636

ID	Location	Land Use	Date	Group ID
K	350m SE	Electricity Substation	1996	104223
K	350m SE	Electricity Substation	1996	104223
K	350m SE	Electricity Substation	1997	104223
K	350m SE	Electricity Substation	1995	104223
L	421m S	Electricity Substation	1982	113494
L	421m S	Electricity Substation	1983	112017
L	421m S	Electricity Substation	1992	112017
L	425m S	Electricity Substation	1996	104461
L	425m S	Electricity Substation	1996	104461
L	425m S	Electricity Substation	1997	104461
L	425m S	Electricity Substation	1995	104461
M	489m S	Electricity Substation	1982	103699
N	489m SW	Electricity Substation	1982	106192
N	489m SW	Electricity Substation	1972	113383
N	489m SW	Electricity Substation	1991	106192
N	490m SW	Electricity Substation	1991	106192
N	491m SW	Electricity Substation	1997	106192
N	491m SW	Electricity Substation	1995	106192
M	492m S	Electricity Substation	1996	105825
M	492m S	Electricity Substation	1996	105825
M	492m S	Electricity Substation	1997	105825
M	492m S	Electricity Substation	1995	105825
M	498m S	Electricity Substation	1983	111892
M	498m S	Electricity Substation	1992	111892

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	2

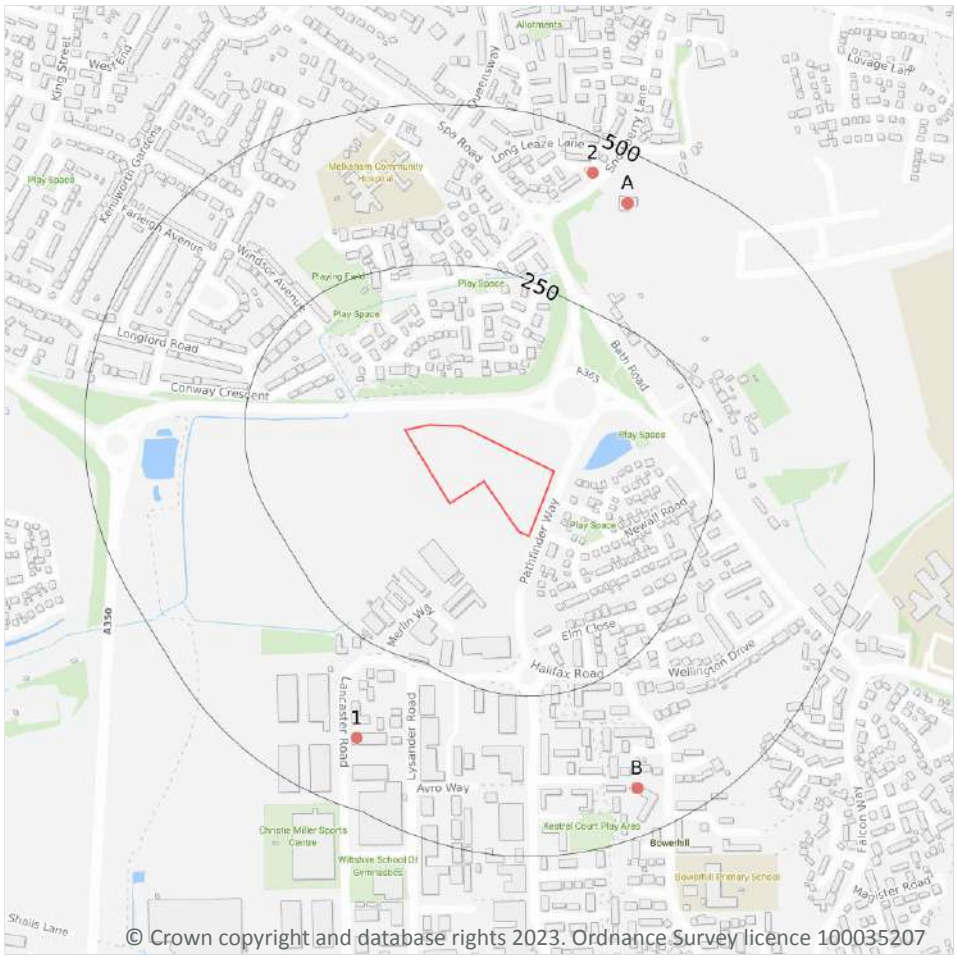
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
B	124m S	Garage	1982	33923
B	124m S	Garage	1983	33644

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	8

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

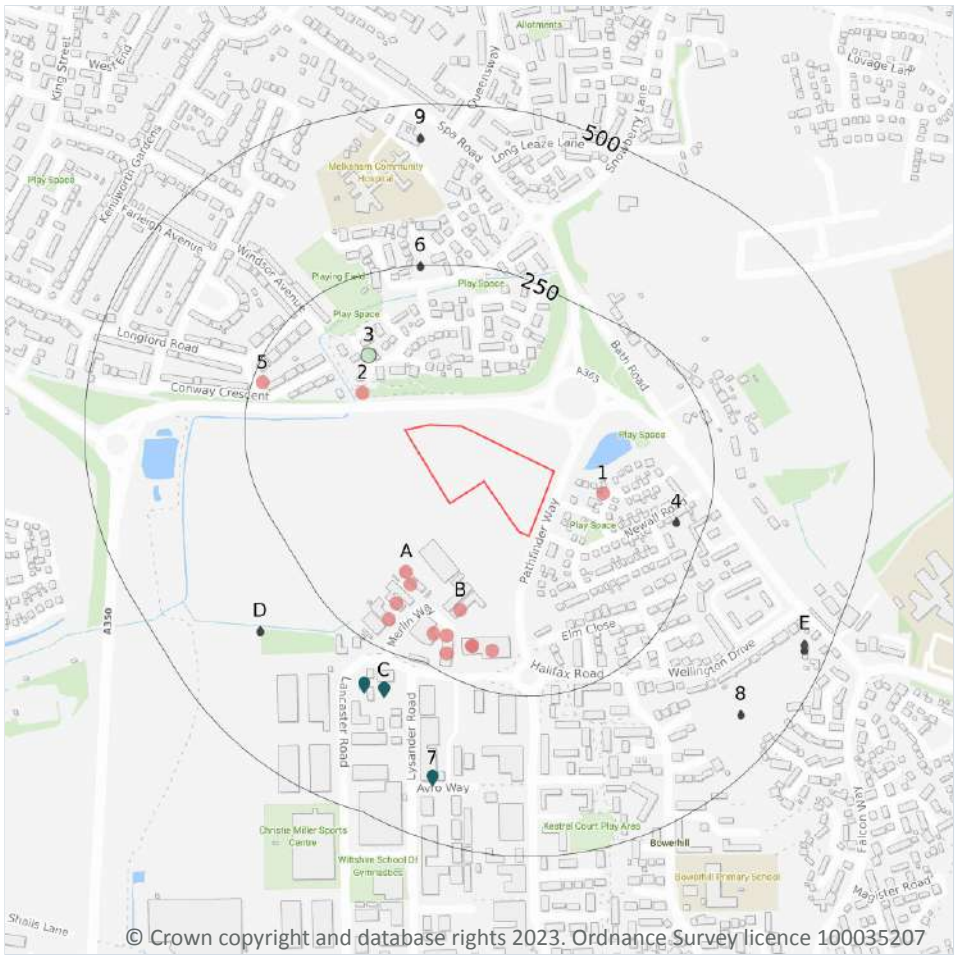
Features are displayed on the Waste and landfill map on **page 23 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	395m SW	Denmans Electrical Wholesalers Ltd Lancaster Road Melksham SN12 6SS	EPR/XF0434DL/A001	Treating waste exemption	Non-Agricultural Waste Only	Crushing waste fluorescent tubes

ID	Location	Site	Reference	Category	Sub-Category	Description
A	426m NE	SPA PHARMACY, SPA MEDICAL CENTRE, SNOWBERRY LANE, MELKSHAM, SN12 6UN	WEX312777	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
A	426m NE	SPA PHARMACY, SPA MEDICAL CENTRE, SNOWBERRY LANE, MELKSHAM, SN12 6UN	WEX274681	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	426m NE	SNOWBERRY LANE, MELKSHAM, SN12 6UN	WEX177673	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	426m NE	Gompels Pharmacy, SNOWBERRY LANE, MELKSHAM, SN12 6UN	WEX007878	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	428m SE	Ludlow-Hewitt Court Wiltshire SN12 6SX	EPR/DE5381LE/A001	Treating waste exemption	Non-Agricultural Waste Only	Aerobic composting and associated prior treatment
B	428m SE	Ludlow-Hewitt Court Wiltshire SN12 6SX	EPR/DE5381LE/A001	Using waste exemption	Non-Agricultural Waste Only	Spreading waste on non-agricultural land to confer benefit
2	444m N	1 Snowberry Lane MELKSHAM Wiltshire SN12 6FP	EPR/VF0209KF/A001	Using waste exemption	Both agricultural and non-agricultural waste	Use of mulch

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	14

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Company	Address	Activity	Category
1	83m E	Electricity Sub Station	Wiltshire, SN12	Electrical Features	Infrastructure and Facilities
2	88m NW	Sewage Pumping Station	Wiltshire, SN12	Waste Storage, Processing and Disposal	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
A	126m SW	Graintec Ltd	Unit 1-4 Harrier Court, Merlin Way, Bowerhill, Melksham, Wiltshire, SN12 6TJ	Lifting and Handling Equipment	Industrial Products
A	140m SW	D H F Engineering Ltd	Harrier Court, Merlin Way, Bowerhill, Wiltshire, SN12 6TJ	Metals Manufacturers, Fabricators and Stockholders	Industrial Products
B	153m S	Genesis	4, Merlin Way, Bowerhill, Wiltshire, SN12 6TJ	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
A	177m SW	Office Evolution	16, Merlin Way, Bowerhill, Wiltshire, SN12 6TJ	Office and Shop Equipment	Industrial Products
B	187m S	Tulip Wood Bespoke Ltd	2a, Lancaster Road, Bowerhill, Wiltshire, SN12 6SS	Furniture	Consumer Products
B	193m S	Melksham Motor Spares Ltd	7, Lancaster Road, Bowerhill, Wiltshire, SN12 6SS	Vehicle Parts and Accessories	Motoring
B	193m S	Road Runner Vehicle Repairs	7, Lancaster Road, Bowerhill, Wiltshire, SN12 6SS	Vehicle Repair, Testing and Servicing	Repair and Servicing
B	197m S	Electricity Sub Station	Wiltshire, SN12	Electrical Features	Infrastructure and Facilities
A	204m SW	F A W T Greenhouses	17, Merlin Way, Bowerhill, Wiltshire, SN12 6TJ	Metalworkers Including Blacksmiths	Construction Services
B	204m S	Hoppers	Wiltshire, SN12	Hoppers and Silos	Farming
B	220m S	Infiled E M International Ltd	6, Lancaster Road, Bowerhill, Wiltshire, SN12 6SS	Lampshades and Lighting	Consumer Products
5	234m W	Electricity Sub Station	Wiltshire, SN12	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**0**

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	3

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Address	Details	
C	309m SW	MOT Centre, Lysander Road, Bowerhill, SN12 6SP	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
C	314m SW	Keith Charles Lye, Lancaster Road, Bowerhill, Melksham, SN12 6SS	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

ID	Location	Address	Details	
7	407m S	Novacast Ltd, Old Station Yard Approach, Melksham, SN12 8DB	Process: Other Metal Processes Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	**0**

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	**8**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Address	Details	
4	206m E	BOWERHILL FARM(MELKSHAM), THE SPA, MELKSHAM, WILTS	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: 021137 Permit Version: 1 Receiving Water: TRIB OF RIVER BRISTOL AVON	Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: - Effective Date: 30/06/1965 Revocation Date: 27/04/2004
6	249m N	SCOUT AND GUIDE HQ, BATH ROAD, MELKSHAM	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 010968 Permit Version: 1 Receiving Water: CLACKERS BROOK	Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113) Issue date: - Effective Date: 12/09/1989 Revocation Date: 21/06/1999
D	356m SW	PROPOSED DEVELOPMENT SITE, SOUTH OF BOWERHILL TRADING EST, PHASE 1, MELKSHAM, WILTSHIRE	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: 012195 Permit Version: 1 Receiving Water: BERRYFIELD BROOK	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 31/03/1993 Effective Date: 26/03/1993 Revocation Date: -

ID	Location	Address	Details	
D	356m SW	PROPOSED DEVELOPMENT SITE, SOUTH OF BOWERHILL TRADING EST, PHASE 1, MELKSHAM, WILTSHIRE	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: 012195 Permit Version: 1 Receiving Water: BERRYFIELD BROOK	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 113 & SCHED 12) Issue date: 31/03/1993 Effective Date: 26/03/1993 Revocation Date: -
8	431m SE	BADER CLOSE, BOWER HILL, MELKSHAM	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 011484 Permit Version: 1 Receiving Water: BERRYFIELDS STREAM	Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113) Issue date: - Effective Date: 31/10/1989 Revocation Date: 09/06/1999
9	448m N	SPA ROAD, MELKSHAM	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 011491 Permit Version: 1 Receiving Water: CLACKERS BROOK	Status: TEMPORARY CONSENTS (WATER ACT 1989, SECTION 113) Issue date: - Effective Date: 31/10/1989 Revocation Date: 09/06/1999
E	461m SE	WOOLMORE FARM, BOWERHILL, MELKSHAM, WILTS	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 020157 Permit Version: 1 Receiving Water: TRIB OF RIVER BRISTOL AVON	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: - Effective Date: 31/05/1966 Revocation Date: 01/10/1996
E	464m SE	WOOLMORE FARM, BOWERHILL, MELKSHAM, WILTS	Effluent Type: AGRICULTURE - ARABLE FARMING Permit Number: 020156 Permit Version: 1 Receiving Water: TRIB OF RIVER BRISTOL AVON	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: - Effective Date: 31/05/1966 Revocation Date: 01/10/1996

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	1

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Details	
3	129m NW	Incident Date: 15/01/2003 Incident Identification: 131471 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

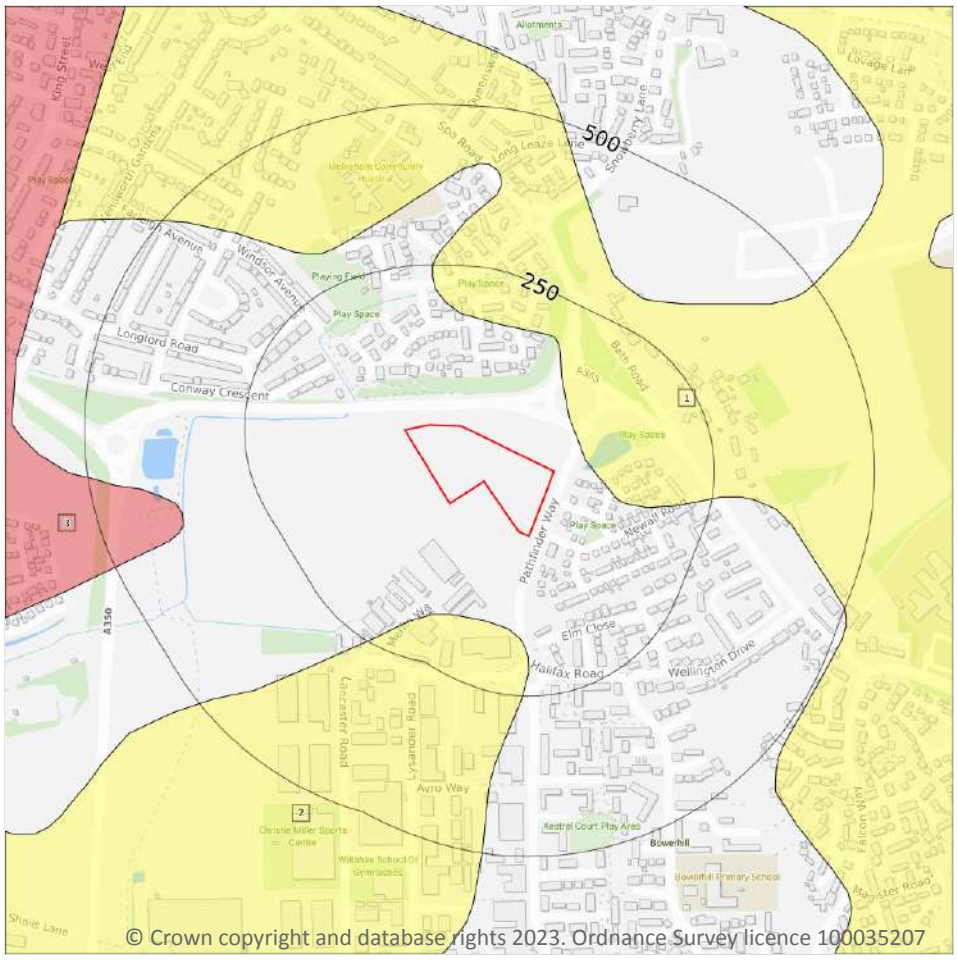
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m	3

Aquifer status of groundwater held within superficial geology.

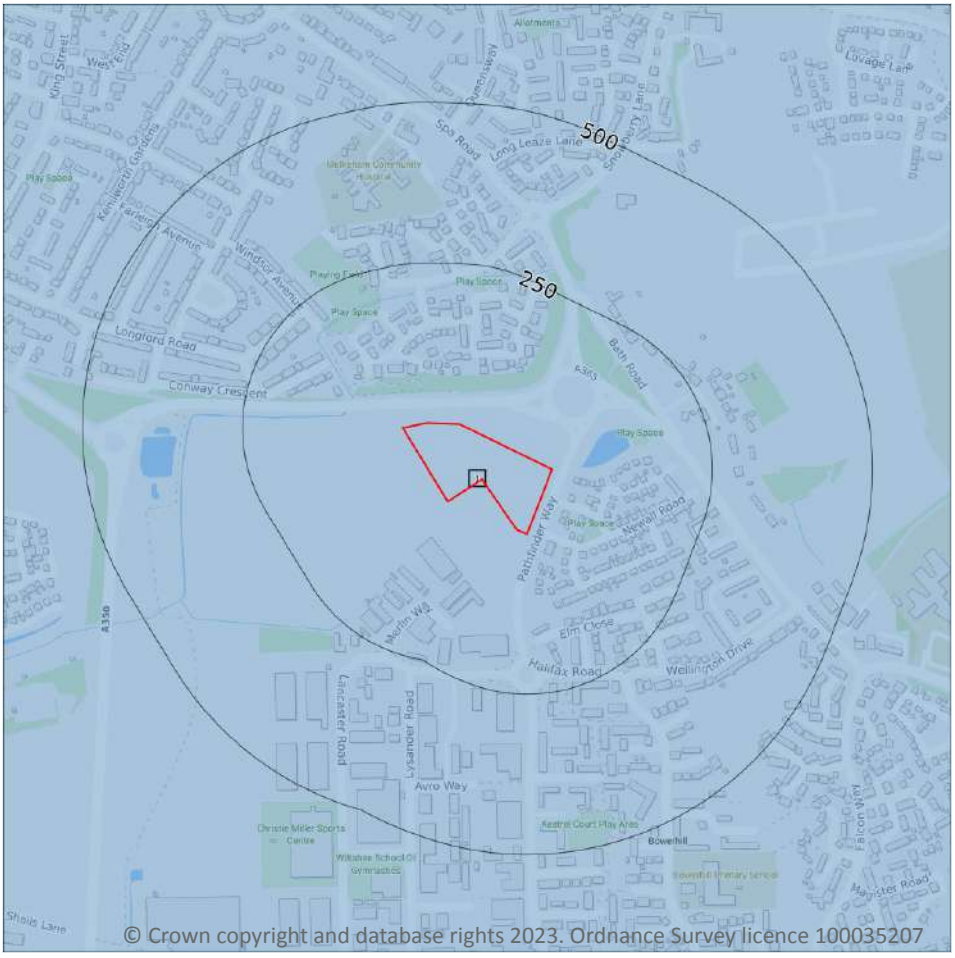
Features are displayed on the Hydrogeology map on **page 34 >**

ID	Location	Designation	Description
1	52m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	148m S	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Location	Designation	Description
3	371m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m	1

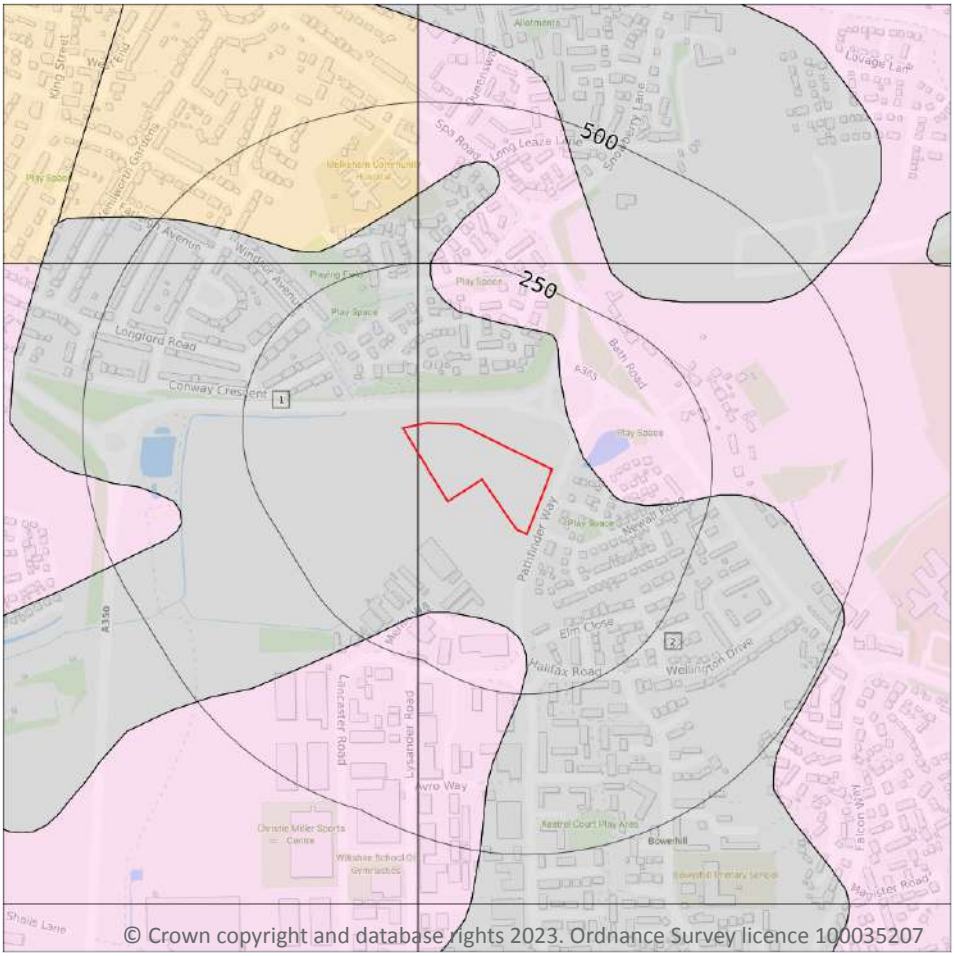
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 36 >**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



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5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 37 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures
2	On site	Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Low Infiltration value: 40-70% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



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5.6 Groundwater abstractions

Records within 2000m	4

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 39 >**

ID	Location	Details	
-	942m NW	Status: Historical Licence No: 17/53/001/G/241 Details: General Farming & Domestic Direct Source: Ground Water - Fresh Point: MELKSHAM Data Type: Point Name: Guley Easting: 390300 Northing: 163400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 25/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1966 Version End Date: -
-	1988m W	Status: Historical Licence No: 17/53/001/G/277 Details: General Farming & Domestic Direct Source: Ground Water - Fresh Point: WELL Data Type: Point Name: Pullen Easting: 389100 Northing: 163400	Annual Volume (m^3): 9955 Max Daily Volume (m^3): 27.276 Original Application No: - Original Start Date: 24/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 24/03/1966 Version End Date: -
-	1988m W	Status: Active Licence No: 17/53/001/G/277 Details: General Farming & Domestic Direct Source: Ground Water - Fresh Point: FRYING PAN FARM WELL NO 1 Data Type: Point Name: Cox Easting: 389100 Northing: 163400	Annual Volume (m^3): 9957 Max Daily Volume (m^3): 27.28 Original Application No: NPS/WR/032385 Original Start Date: 24/03/1966 Expiry Date: - Issue No: 102 Version Start Date: 01/10/2019 Version End Date: -
-	1988m W	Status: Active Licence No: 17/53/001/G/277 Details: General Farming & Domestic Direct Source: Ground Water - Fresh Point: FRYING PAN FARM WELL NO 2 Data Type: Point Name: Cox Easting: 389100 Northing: 163400	Annual Volume (m^3): 9957 Max Daily Volume (m^3): 27.28 Original Application No: NPS/WR/032385 Original Start Date: 24/03/1966 Expiry Date: - Issue No: 102 Version Start Date: 01/10/2019 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**4**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 39 >**

ID	Location	Details	
-	1749m N	Status: Active Licence No: 17/53/001/S/019 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Surface Water - Fresh Point: RIVER AVON MELKSHAM Data Type: Point Name: Cooper Tire & Rubber Company Europe Ltd Easting: 390590 Northing: 164450	Annual Volume (m^3): 12130000 Max Daily Volume (m^3): 42600 Original Application No: - Original Start Date: 10/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2007 Version End Date: -
-	1749m N	Status: Active Licence No: 17/53/001/S/019 Details: Process Water Direct Source: Surface Water - Fresh Point: RIVER AVON MELKSHAM Data Type: Point Name: Cooper Tire & Rubber Company Europe Ltd Easting: 390590 Northing: 164450	Annual Volume (m^3): 12130000 Max Daily Volume (m^3): 42600 Original Application No: - Original Start Date: 10/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2007 Version End Date: -
-	1749m N	Status: Active Licence No: 17/53/001/S/019 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Surface Water - Fresh Point: RIVER AVON MELKSHAM Data Type: Point Name: Cooper Tire & Rubber Company Europe Ltd Easting: 390590 Northing: 164450	Annual Volume (m^3): 12130000 Max Daily Volume (m^3): 42600 Original Application No: - Original Start Date: 10/03/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2007 Version End Date: -
-	1989m S	Status: Historical Licence No: 17/53/009/S/095 Details: Spray Irrigation - Direct Direct Source: Surface Water - Fresh Point: SEMINGTON BROOK Data Type: Line Name: Masters Easting: 390800 Northing: 160600	Annual Volume (m^3): 9092 Max Daily Volume (m^3): 151 Original Application No: - Original Start Date: 25/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1966 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

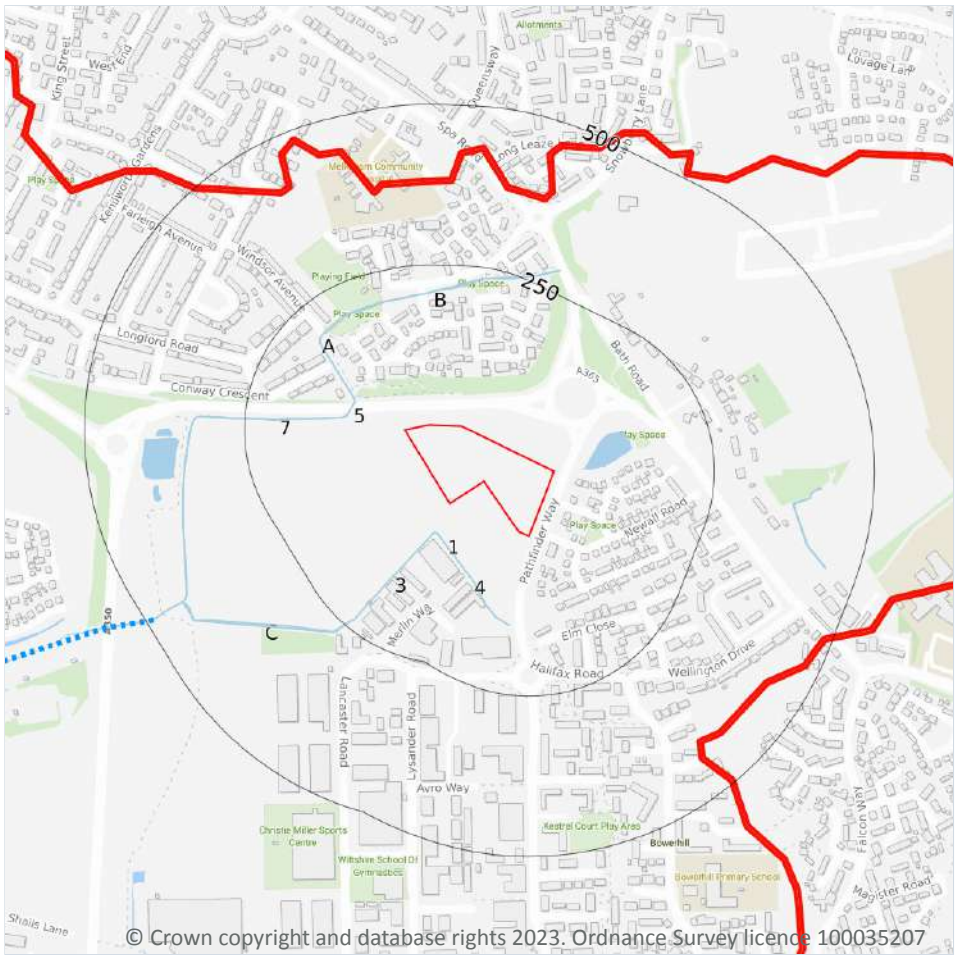
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	10

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 43 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
3	50m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
4	50m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	89m NW	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
A	89m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	91m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	201m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	231m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	231m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	233m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	239m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**8**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 43 >**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 43 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River**	**Avon (Brist) conf R Marden to conf Semington Bk**	**GB109053027440**	**Avon Bristol Rural**	**Avon Bristol and Somerset Nort**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 43 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
13	489m SW	River	Avon (Brist) conf R Marden to conf Semington Bk	GB109053027440 ↗	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	0

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

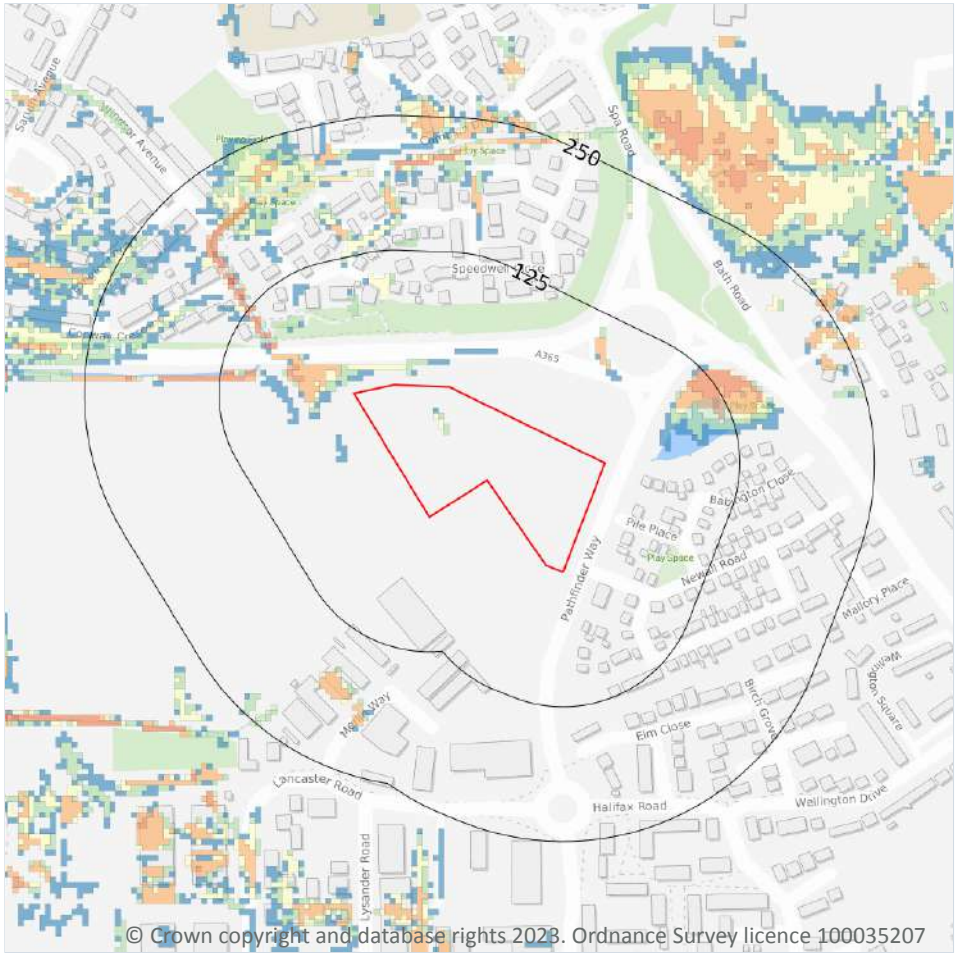
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 100 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 50 >**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 52 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

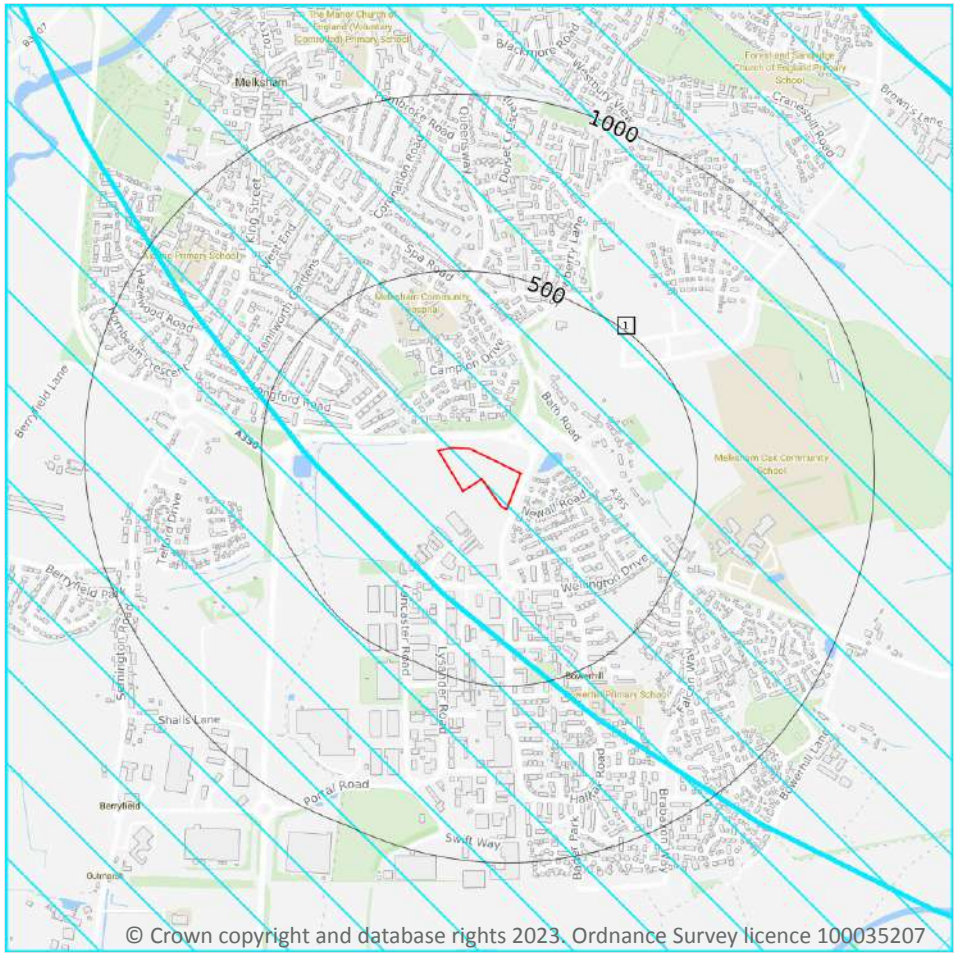
Records within 2000m	1

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
1513m NW	S Bk - source to conf R Avon (Brist) NVZ	Surface Water	559	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 57 >**

ID	Location	Type of developments requiring consultation
1	**On site**	**Infrastructure - Airports, helipads and other aviation proposals.** **Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t.**

This data is sourced from Natural England.

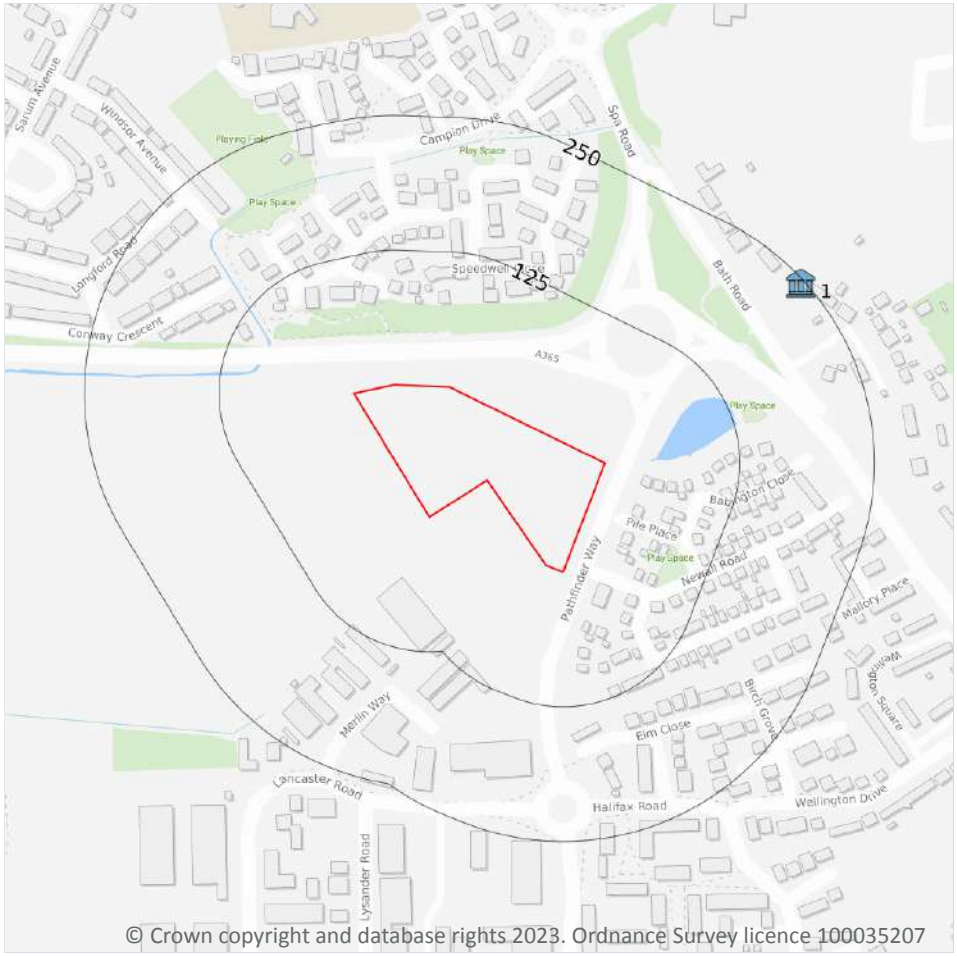
10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	1

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 59 >**

ID	Location	Name	Grade	Reference Number	Listed date
1	247m NE	399 And 400 The Spa	II	1194751	13/02/1985

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

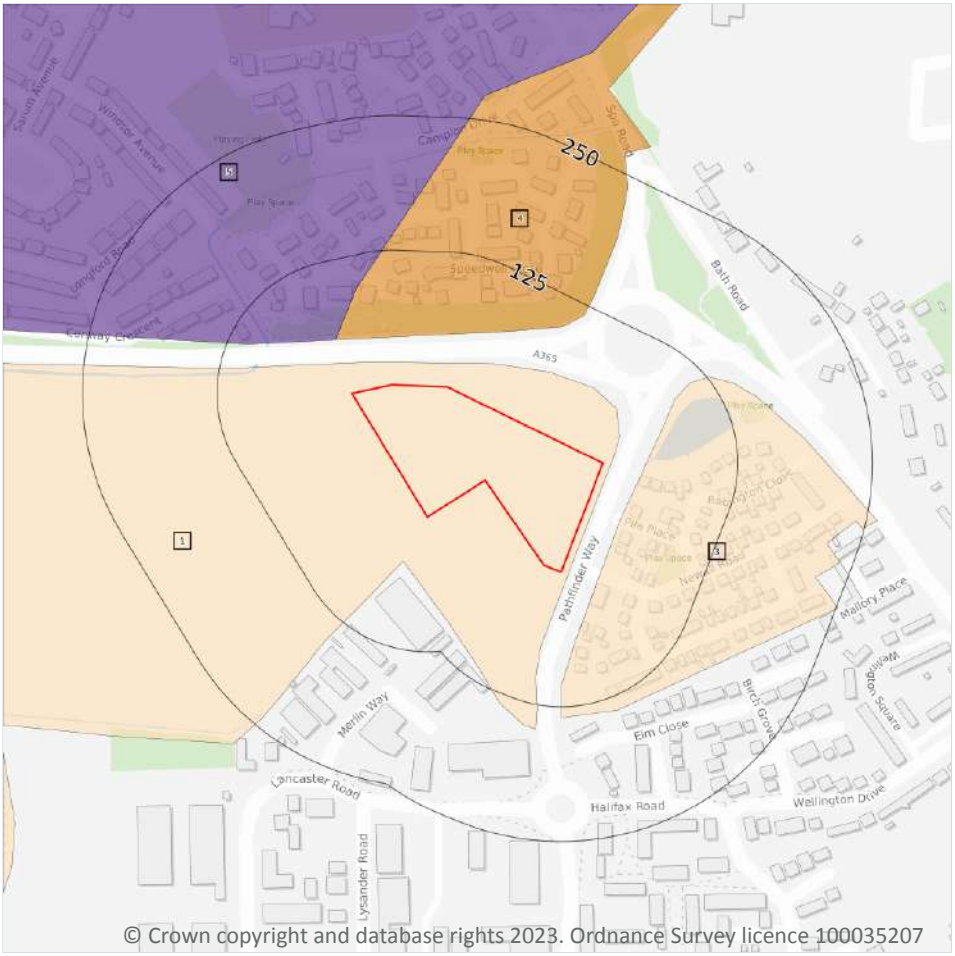
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	4

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 62 >**

ID	Location	Classification	Description
1	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**

ID	Location	Classification	Description
3	34m SE	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.
4	44m NW	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.
5	52m NW	Urban	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

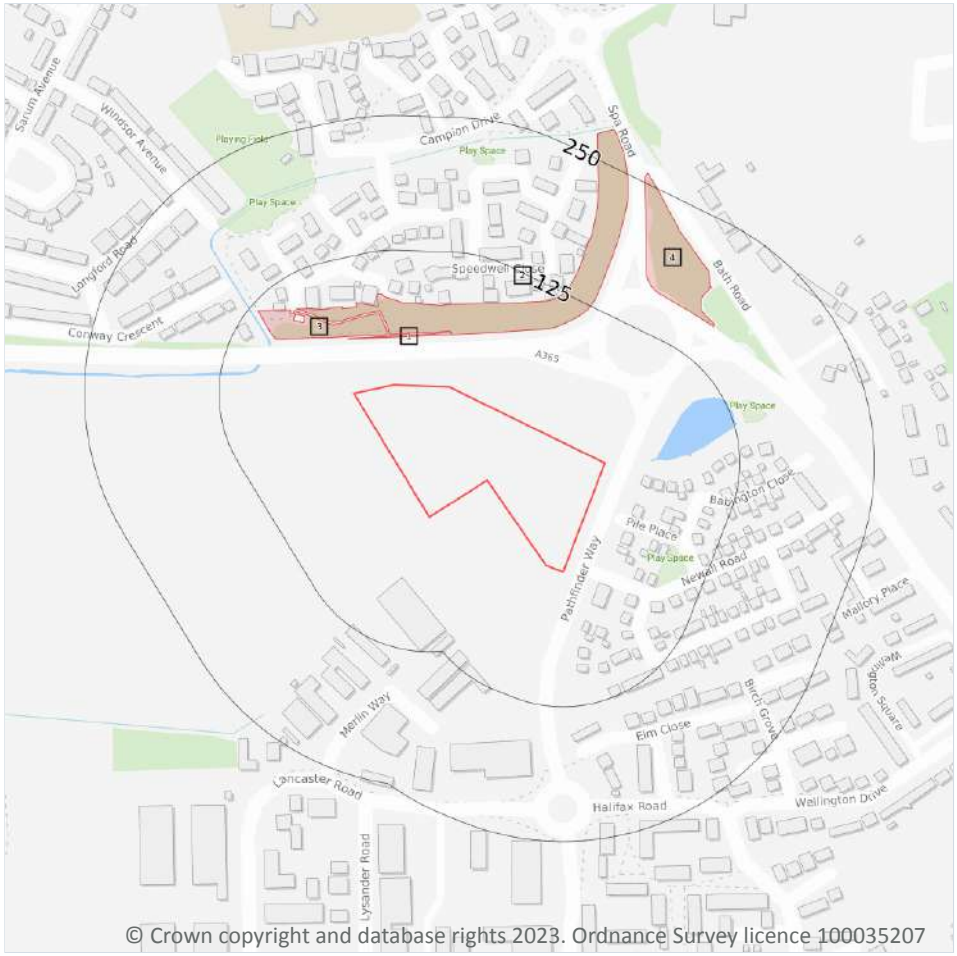
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	**4**

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 65 >**

ID	Location	Main Habitat	Other habitats
1	44m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	47m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	47m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	161m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 67 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**ST96SW**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

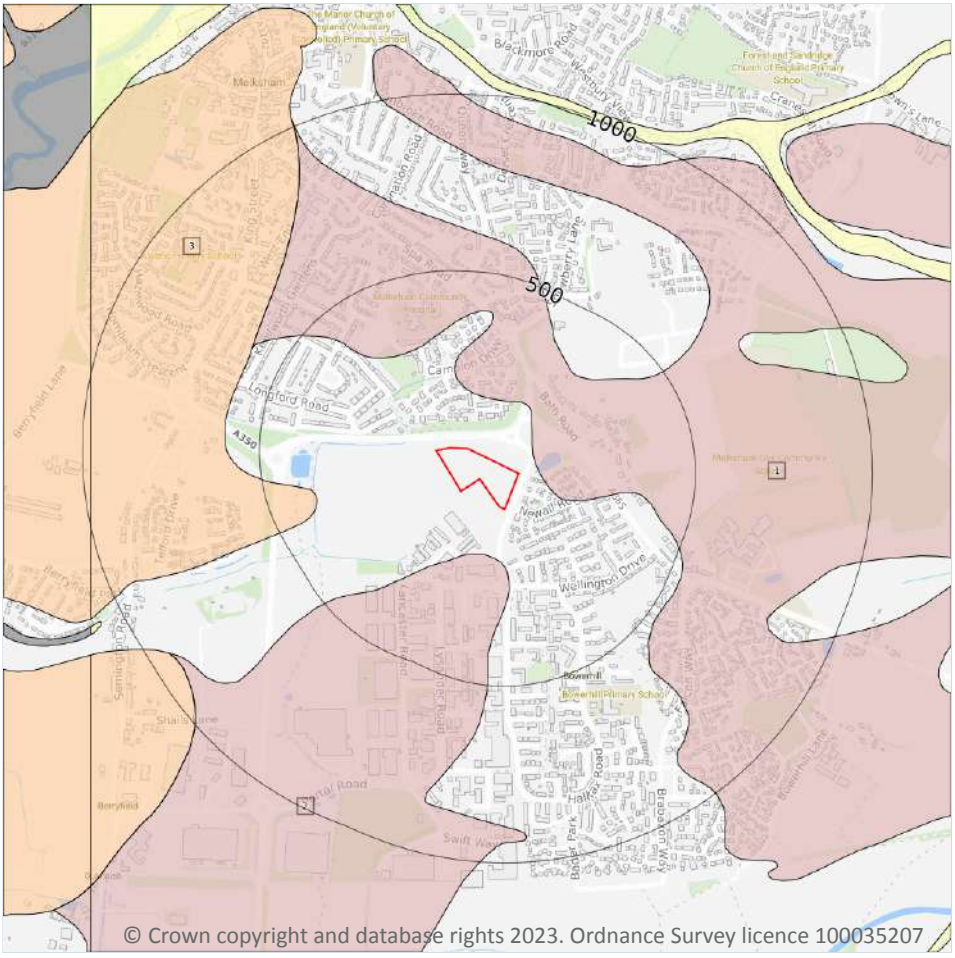
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **3**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 69 >**

ID	Location	LEX Code	Description	Rock description
1	55m E	HEAD-XCZSV	Head - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
2	140m S	HEAD-XCZSV	Head - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
3	363m W	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



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Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	1

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 71 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**OXC-MDST**	**Oxford Clay Formation - Mudstone**	**Oxfordian Age - Callovian Age**

This data is sourced from the British Geological Survey.

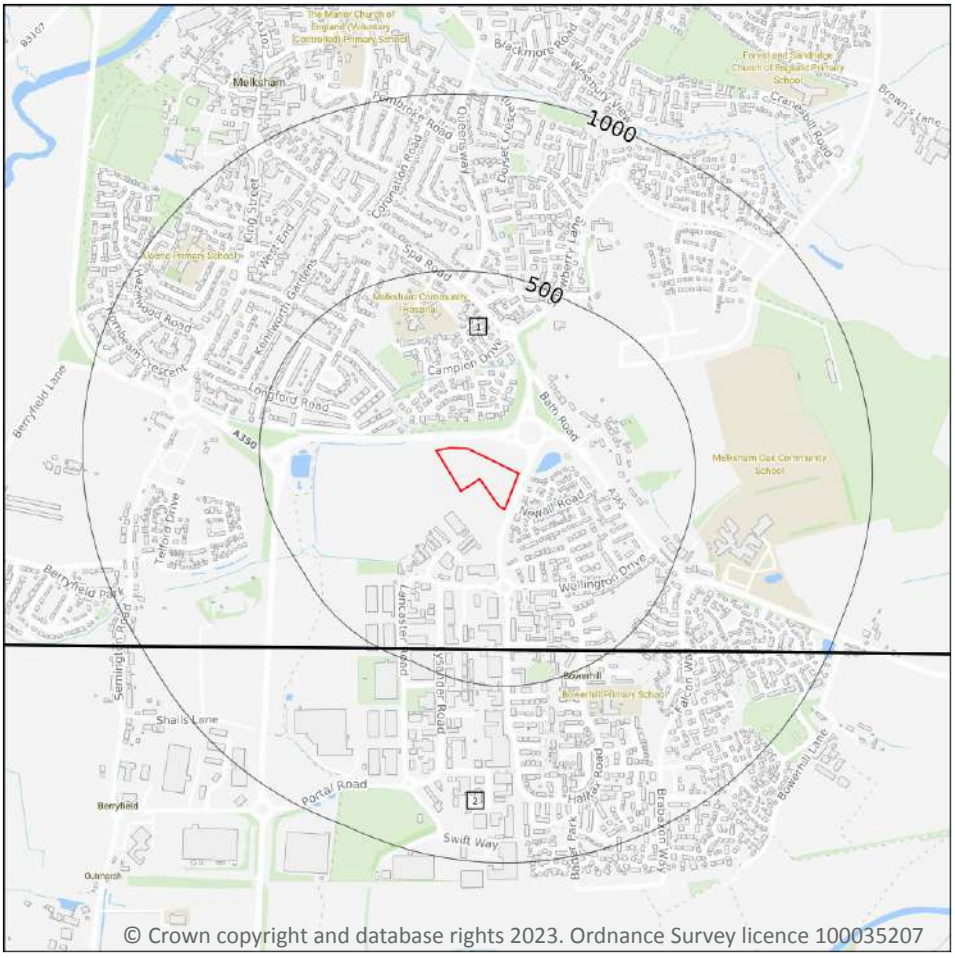
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



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Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	2

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 73 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**Full**	**EW265_bath_v4**
2	397m S	Full	Full	Full	Full	EW281_frome_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

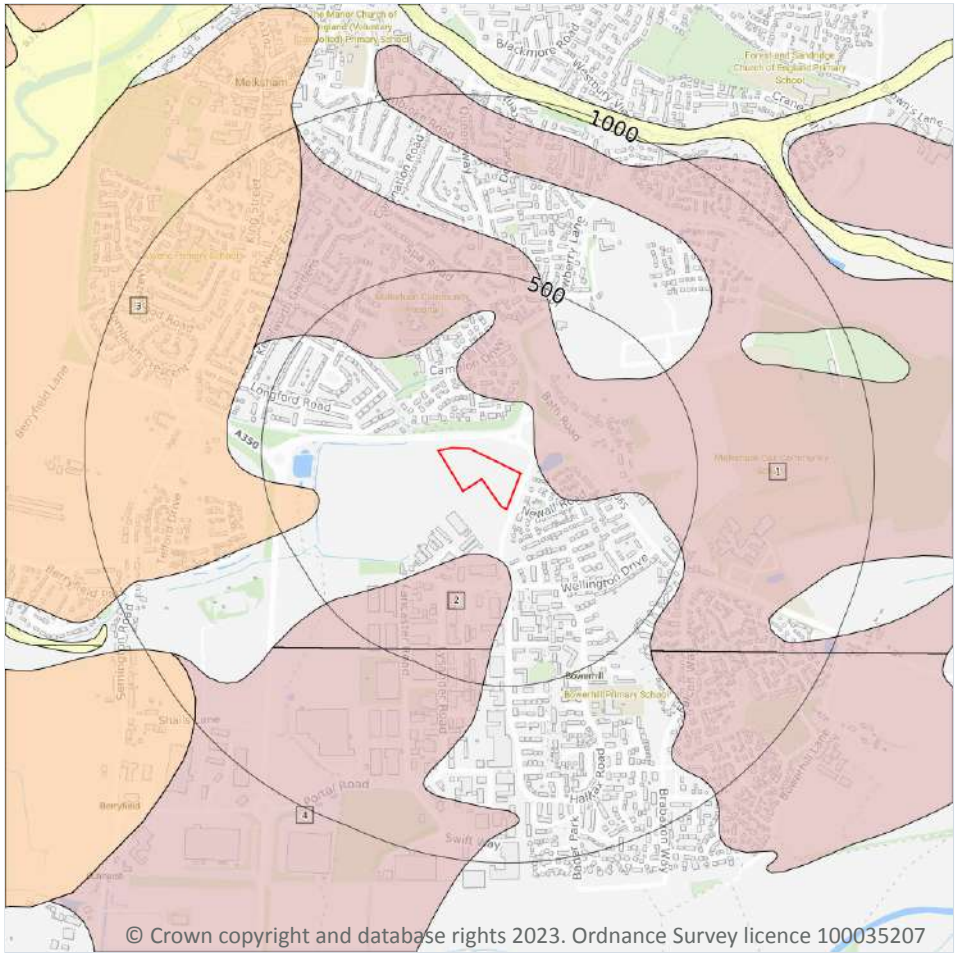
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **4**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 75 >**

ID	Location	LEX Code	Description	Rock description
1	55m E	HEAD-XCZ	HEAD	CLAY AND SILT
2	140m S	HEAD-XCZ	HEAD	CLAY AND SILT
3	362m W	RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
4	399m S	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **2**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 77 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**OXC-MDST**	**OXFORD CLAY FORMATION - MUDSTONE**	**CALLOVIAN**
2	397m S	OXC-MDST	OXFORD CLAY FORMATION - MUDSTONE	CALLOVIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Low**	**Very Low**

This data is sourced from the British Geological Survey.

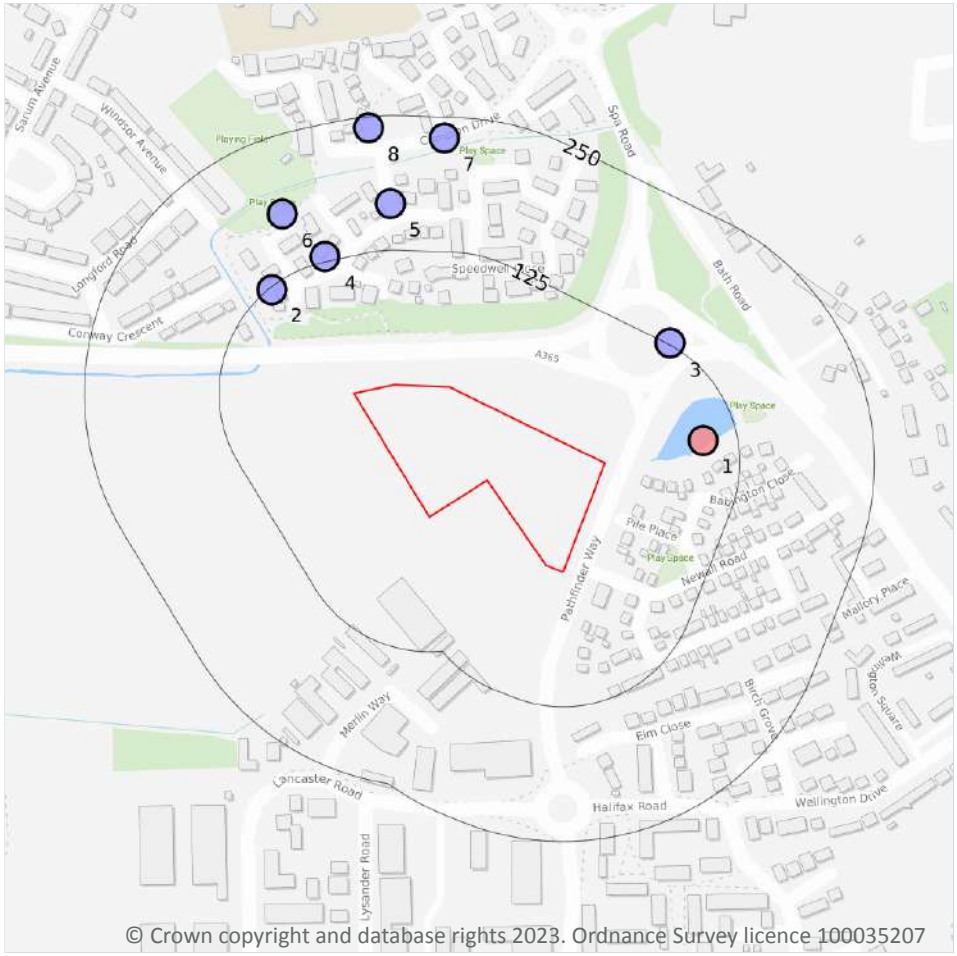
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



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16.1 BGS Boreholes

Records within 250m	8

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

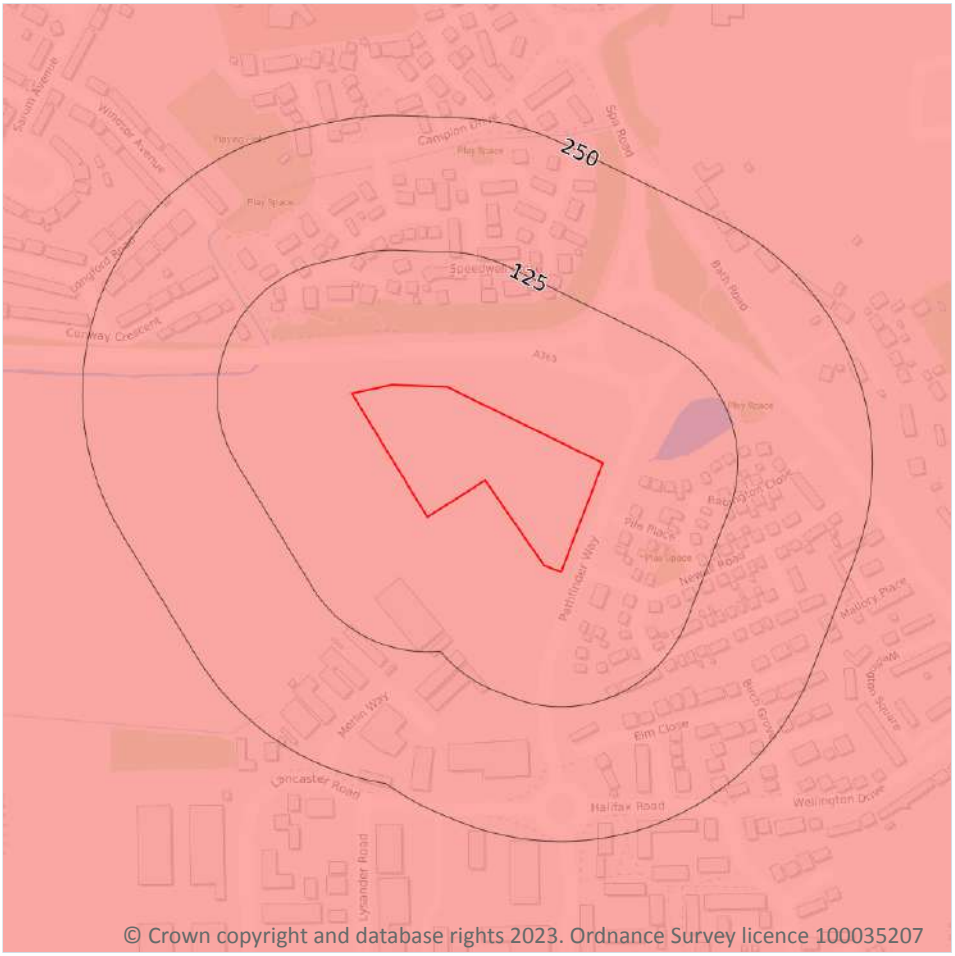
Features are displayed on the Boreholes map on **page 79 >**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	93m E	391300 162700	MELKSHAM SPA	107.13	N	397460 ↗
2	123m NW	390900 162840	MELKSHAM HOSPITAL TP 2	3.0	N	397471 ↗

ID	Location	Grid reference	Name	Length	Confidential	Web link
3	127m NE	391270 162790	MELKSHAM WESTERN RELIEF ROAD 1	1.52	N	397466 ↗
4	129m NW	390950 162870	MELKSHAM HOSPITAL TP 5	4.1	N	397474 ↗
5	169m N	391010 162920	MELKSHAM HOSPITAL TP 4	2.8	N	397473 ↗
6	179m NW	390910 162910	MELKSHAM HOSPITAL TP 3	3.5	N	397472 ↗
7	230m N	391060 162980	MELKSHAM HOSPITAL TP 12	3.0	N	397481 ↗
8	240m N	390990 162990	MELKSHAM HOSPITAL TP 11	2.5	N	397480 ↗

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

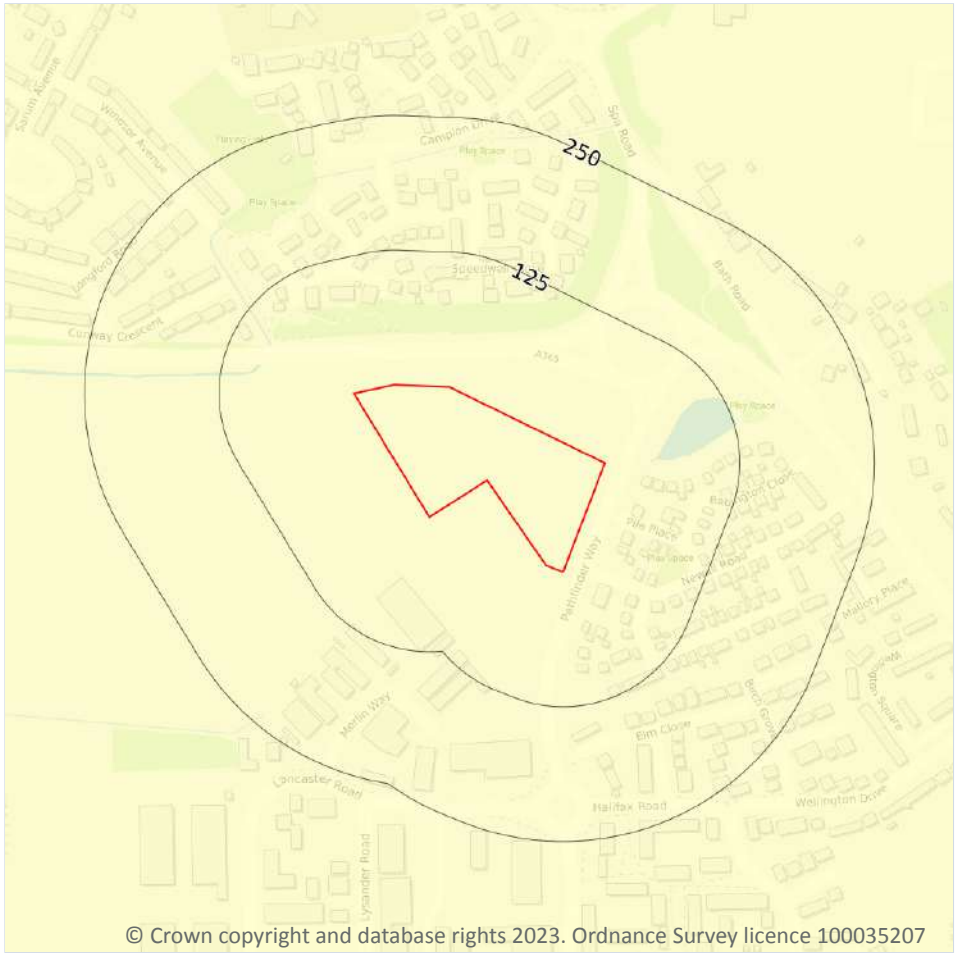
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 81 >**

Location	Hazard rating	Details
On site	**Moderate**	**Ground conditions predominantly high plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	1

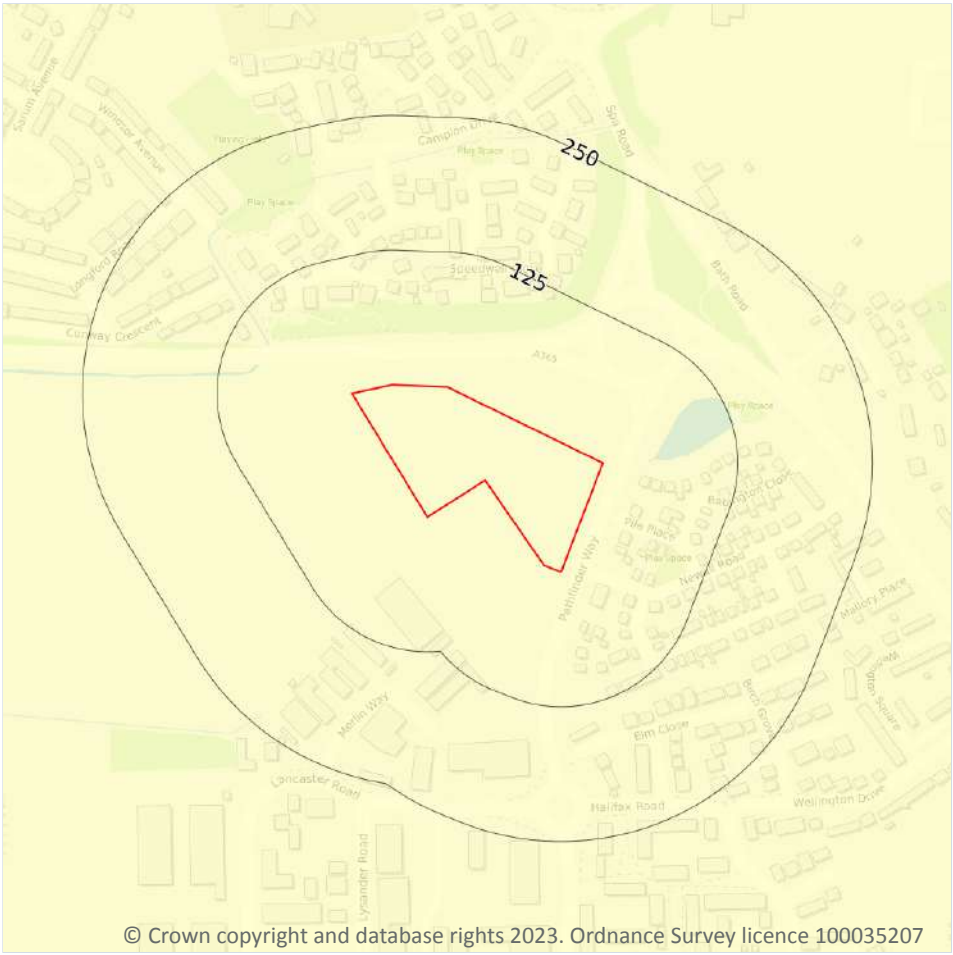
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 82 >**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	1

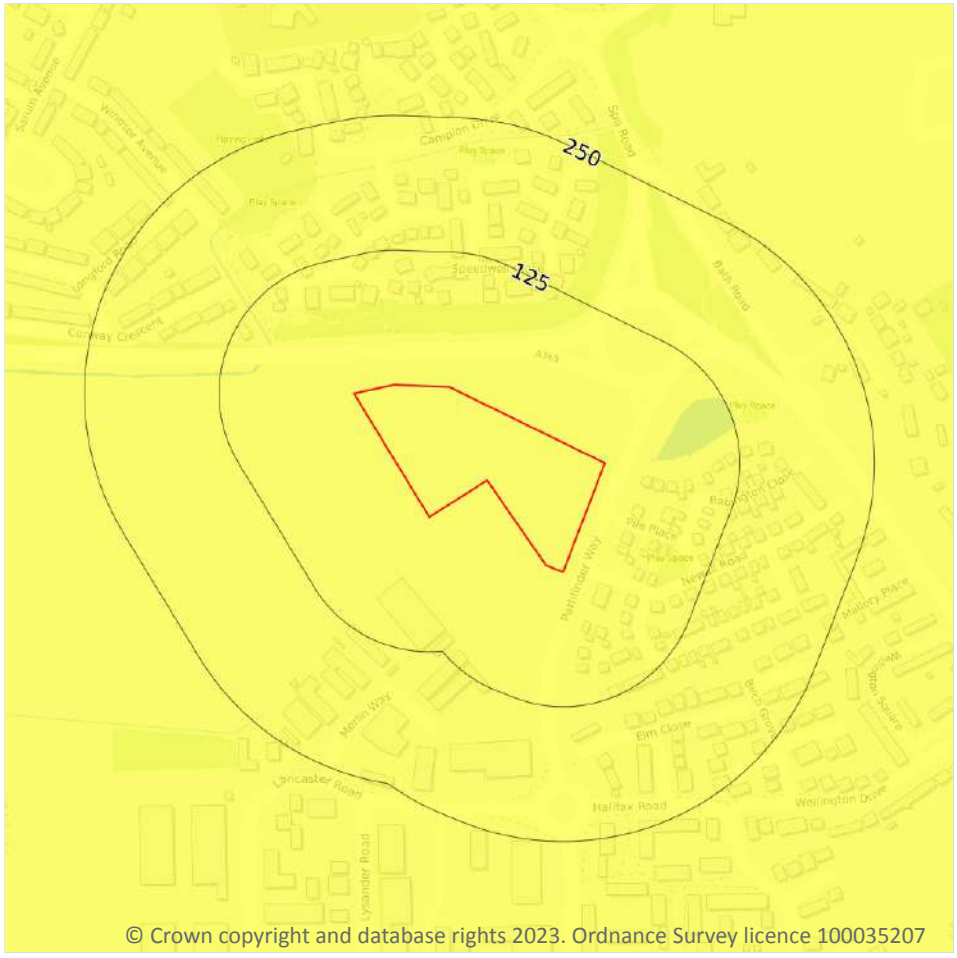
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 83 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

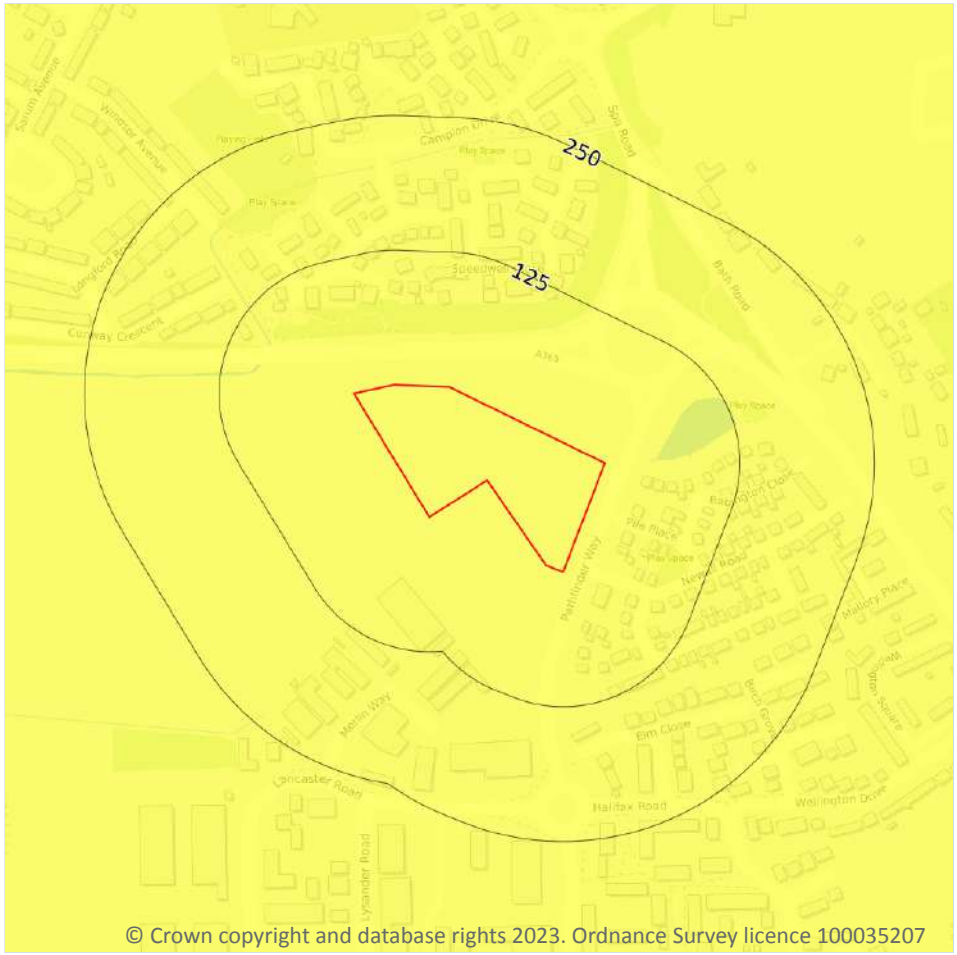
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 84 >**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

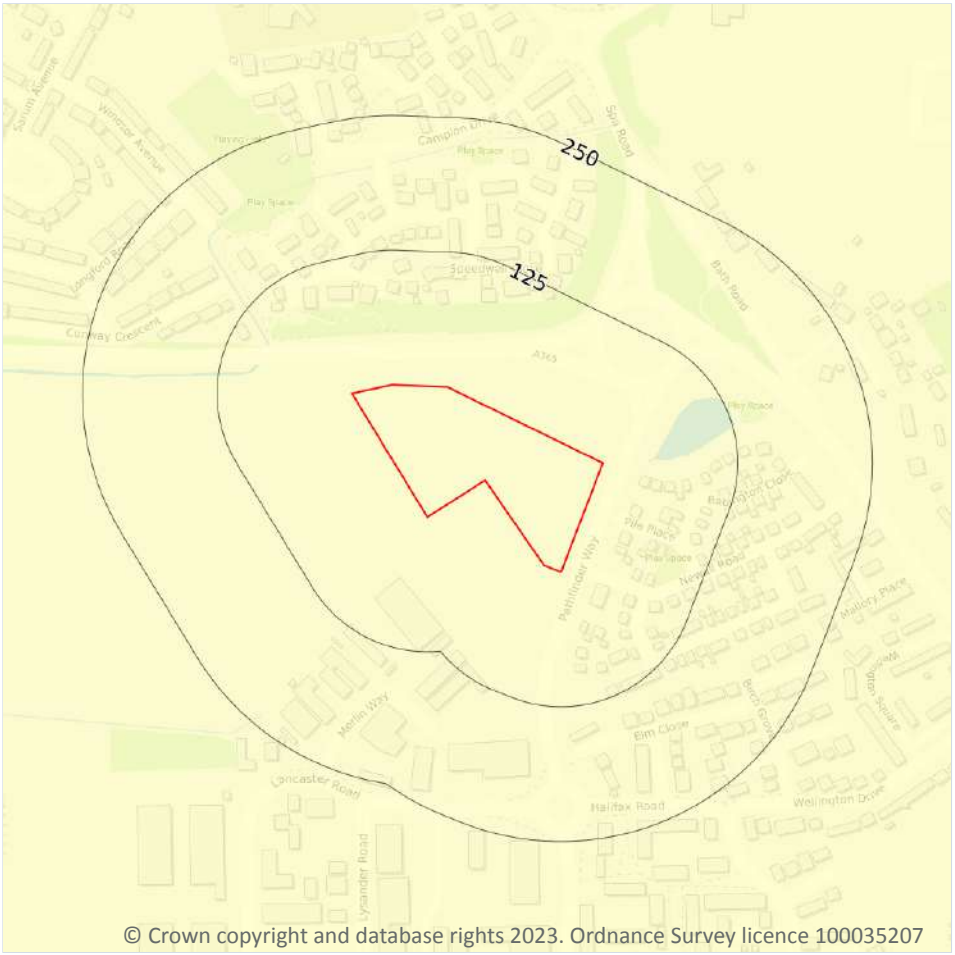
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 85 >**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 86 >**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	0

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

Greater than 30%

Between 10% and 30%

Between 5% and 10%

Between 3% and 5%

Between 1% and 3%

Less than 1%

19.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 91 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	2

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**25 - 35 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**30 - 45 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

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Specialist UXO desk top study



Detailed Unexploded Ordnance (UXO) Risk Assessment

Project Name	Melksham Primary School
Client	ISG Ltd
Site Address	Pathfinder Way, Bowerhill, Melksham
Report Reference	DA4478a-00
Date	19/05/2023
Authored by	WE / RS
Final Check	AT

Executive Summary

Site Location and Description

The site is situated in Bowerhill, Melksham.

According to recent aerial imagery, the site is occupied open ground and access way.

Open ground occupies the area surrounding the site as well as Pathfinder Way to the east and a relatively small structure to the south.

The site is approximately centred on the OS grid reference: **ST 91069 62698**.

Proposed Works

Scheduled intrusive works are understood to include eight boreholes (including dynamic sampler boreholes) and eight trial pits. Future works are understood to include the construction of a 235 house residential development.

Geology and Bomb Penetration Depth

The British Geological Survey (BGS) map shows the bedrock geology of the site to be underlain by the Oxford Clay Formation.

Site-specific geotechnical information was not available to 1st Line Defence at the time of the production of this report. An assessment of maximum bomb penetration depth can be made once such data becomes available, or by a UXO specialist during on-site support.

It should be noted that the maximum depth that a bomb could reach may vary across a site and will be largely dependent on the specific underlying geological strata and its density.

UXO Risk Assessment

1st Line Defence has assessed that there is a **Medium Risk** from items of military ordnance across the site. There is also an assessed **Low Risk** from items of German air delivered UXO.

The Risk from Military Ordnance

- The site lay in the general area of notable military activity during WWII with RAF Melksham approximately 60m to the south. RAF Melksham was used to train airmen in aircraft maintenance, armaments, electrics, and equipment use. Due to the lack of available sources, it has not been possible to determine the exact boundary of RAF Melksham or specific functions of the structures situated closest to the site. See **Annex H3** for an overlay of Allied features in the vicinity.
- RAF Melksham was not a conventional RAF base. It was not an airfield and subsequently did not contain features such as dispersal areas, bomb stores or a runway. 1948 imagery evidences aircraft within the hangars located in the west of the facility. It is understood that the aircraft were either constructed on site or else transported by land, but never flown to or from the facility. The aircraft were used solely for the purpose of ground crew training. Consequently, some of the typical sources of airfield contamination such as practice bombing are not relevant.
- However, RAF Melksham was the headquarters of the 4th Division Home Guard, and a considerable amount of training activity would have taken place at the facility. The base was used to garrison C Company consisting of 9 platoons totalling a maximum of 650 men. There is also evidence of a substantial military camp located to the west of the proposed site. The camp as used by forces preparing for the D-Day operations of 1944.
- Of concern to the proposed site, is that training exercises may not have been confined to the base itself. Unusual features and earthworks are noted in areas within and immediately adjacent to the site on WWI-era aerial imagery dated 1948, the purposes of which has not been possible to account for. Given the units present at Melksham, it is conceivable that exercises would have involved live and dummy ordnance ranging from small arms to land service ammunition. Much of the activity occurring at Melksham does not appear to have been documented and very few documents regarding day-to-day operations were found at the National Archives or the RAF archive at Hendon.
- The Home Guard commonly buried ordnance at strategic positions to be recovered in the event of a German invasion. The Home Guard frequently lost or never recovered these caches of weaponry. Locations of the weapons caches were rarely recorded. A crate of Home Guard issue self-igniting phosphorus grenades was discovered in Seend, south-east of the proposed site. Given the high concentration of Home Guard located in the area there is considered to be an increased risk of encountering Home Guard related ordnance.
- Due to the significant military presence within relative close proximity to the site and lack of available resources, there is a **Medium Risk** of encountering Allied items of UXO on site.

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UXO Risk Assessment

The Risk from German Aerial Delivered UXO

- During WWII, the site was situated within the Rural District of Bradford and Melksham, which sustained an overall very-low density of bombing with an average of 1.4 items dropped per 1,000 acres according to official Home Office bombing statistics. The very low density of bombing is likely to be attributed by the lack of any major industrial Luftwaffe targets in the district.
- No records of bombing were available for the district, however, anecdotal evidence references an isolated bombing incident near Woolmere Farm, approximately 500m east of the site area.
- No major signs of damage such as scattered earth or cratering were visible on or within proximity of the site within WWII-era aerial imagery dated 1948. Additionally, no distinct signs of damage such as scattered debris could be observed to the military camp situated approximately 200m south of the site.
- Given that the site and immediate surrounding area was occupied by open ground, it is anticipated that ground cover would not have been conducive to the detection of evidence of UXO. Bomb entry holes could be as small as 20cm in diameter and in such conditions, have easily gone unnoticed.
- Despite the open ground nature of the site and general area, it is still considered that access on site may have occurred throughout WWII due to the aforementioned camp to the south. Undeveloped areas adjacent to military sites were often used as ground for training and as such, there is an increased likelihood of monitoring of the site area for items of UXO.
- The conditions in which HAA or LAA projectiles may have fallen unnoticed within the site boundary are analogous to those regarding air delivered ordnance.
- Given the above factors, there is an assessed **Low Risk** of encountering items of German Aerial Delivered Ordnance on site.

Post-WWII Redevelopment

- According to recent aerial imagery, no development has occurred on site post WWII, however, residential houses have since been developed in the areas surrounding the east and southern section of the site.
- The risk of UXO remaining is considered to be mitigated at the location of and down to the depth of any post-war redevelopment on site. For example, the risk from deep buried UXO will only have been mitigated within the volumes of any post-war pile foundations or deep excavations for basement levels. The risk will however remain within virgin geology below and amongst these post-war works, down to the maximum bomb penetration depth.

Recommended Risk Mitigation Measures

The following risk mitigation measures are recommended to support the proposed works at Melksham Primary School:

All Works

- UXO Risk Management Plan
- Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.

Open Excavations (trial pits, service pits, bulk excavations, strip foundations etc.)

- UXO Specialist On-site Support

Note – proactive on-site UXO support/survey should not be necessary for any works taking place at the location of and down to the depths of significantly worked post-war made ground/post-war fill.

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Glossary

Abbreviation	Definition
AA	Anti-Aircraft
AFS	Auxiliary Fire Service
AP	Anti-Personnel
ARP	Air Raid Precautions
DA	Delay-action
EOC	Explosive Ordnance Clearance
EOD	Explosive Ordnance Disposal
FP	Fire Pot
GM	G Mine (Parachute mine)
HAA	Heavy Anti-Aircraft
HE	High Explosive
IB	Incendiary Bomb
JSEODOC	Joint Services Explosive Ordnance Disposal Operation Centre
LAA	Light Anti-Aircraft
LCC	London County Council
LRRB	Long Range Rocket Bomb (V-2)
LSA	Land Service Ammunition
NFF	National Filling Factory
OB	Oil Bomb
PAC	Pilotless Aircraft (V-1)
PB	Phosphorous Bomb
PM	Parachute Mine
POW	Prisoner Of War
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RFC	Royal Flying Corps
RNAS	Royal Naval Air Service
ROF	Royal Ordnance Factory
SA	Small Arms
SAA	Small Arms Ammunition
SD2	Anti-personnel “Butterfly Bomb”
SIP	Self-Igniting Phosphorous
U/C	Unclassified bomb
UP	Unrotated Projectile (rocket)
USAAF	United States Army Air Force
UX	Unexploded
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	Flying Bomb (Doodlebug)
V-2	Long Range Rocket
WAAF	Women’s Auxiliary Air Force
X	Exploded

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1st Line Defence Limited
Detailed Unexploded Ordnance (UXO) Risk Assessment

Site: Melksham Primary School
Client: ISG Ltd

1. Introduction

1.1. Background

1st Line Defence has been commissioned by ISG Ltd to conduct a Detailed Unexploded Ordnance (UXO) Risk Assessment for the works proposed at Melksham Primary School.

Buried UXO can present a significant risk to construction works and development projects. The discovery of a suspect device during works can cause considerable disruption to operations as well as cause unwanted delays and expense.

UXO in the UK can originate from three principal sources:

1. Munitions resulting from wartime activities including German bombing in WWI and WWII, long range shelling, and defensive activities.
2. Munitions deposited as a result of military training and exercises.
3. Munitions lost, burnt, buried or otherwise discarded either deliberately, accidentally, or ineffectively.

This report will assess the potential factors that may contribute to the risk of UXO contamination. If an elevated risk is identified at the site, this report will recommend appropriate mitigation measures, in order to reduce the risk to as low as is reasonably practicable. Detailed analysis and evidence will be provided to ensure an understanding of the basis for the assessed risk level and any recommendations.

This report complies with the guidelines outlined in *CIRIA C681*, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'

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2. Method Statement

2.1. Report Objectives

The aim of this report is to conduct a comprehensive assessment of the potential risk from UXO at Melksham Primary School. The report will also recommend appropriate site and work-specific risk mitigation measures to reduce the risk from explosive ordnance during the envisaged works to a level that is as low as reasonably practicable.

2.2. Risk Assessment Process

1st Line Defence has undertaken a five-step process for assessing the risk of UXO contamination:

1. The likelihood that the site was contaminated with UXO.
2. The likelihood that UXO remains on the site.
3. The likelihood that UXO may be encountered during the proposed works.
4. The likelihood that UXO may be initiated.
5. The consequences of initiating or encountering UXO.

In order to address the above, 1st Line Defence has taken into consideration the following factors:

- Evidence of WWI and WWII German air delivered bombing as well as the legacy of Allied occupation.
- The nature and conditions of the site during WWII.
- The extent of post-war development and UXO clearance operations on site.
- The scope and nature of the proposed works and the maximum assessed bomb penetration depth.
- The nature of ordnance that may have contaminated the proposed site area.

2.3. Sources of Information

Every reasonable effort has been made to ensure that relevant evidence has been consulted and presented in order to produce a thorough and comprehensible report for the client. To achieve this the following, which includes military records and archive material held in the public domain, have been accessed:

- The National Archives and the RAF Museum Hendon.
- Historical mapping datasets.
- Historic England National Monuments Record.
- Relevant information supplied by ISG Ltd.
- Available material from 33 Engineer Regiment (EOD) Archive (part of 29 Explosive Ordnance and Disposal and Search Group).
- 1st Line Defence's extensive historical archives, library and UXO geo-datasets.
- Open sources such as published books and internet resources.

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3. Background to Bombing Records

3.1. General Considerations of Historical Research

This desktop assessment is based largely upon analysis of historical evidence. Every reasonable effort has been made to locate and present significant and pertinent information. 1st Line Defence cannot be held accountable for any changes to the assessed risk level or risk mitigation measures, based on documentation or other data that may come to light at a later date, or which was not available to 1st Line Defence during the production of this report.

It is often problematic and sometimes impossible to verify the completeness and accuracy of WWII-era records. As a consequence, conclusions as to the exact location and nature of a UXO risk can rarely be quantified and are, to a degree, subjective. To counter this, a range of sources have been consulted, presented and analysed. The same methodology is applied to each report during the risk assessment process. 1st Line Defence cannot be held responsible for any inaccuracies or the incompleteness in available historical information.

3.2. German Bombing Records

During WWII, bombing records were generally gathered locally by the police, Air Raid Precaution (ARP) wardens and military personnel. These records typically contained information such as the date, the location, the amount of damage caused and the types of bombs that had fallen during an air raid. This information was made either through direct observation or post-raid surveys. The Ministry of Home Security Bomb Census Organisation would then receive this information, which was plotted onto maps, charts, and tracing sheets by regional technical officers. The collective record set (regional bomb census mapping and locally gathered incidents records) would then be processed and summarised into reports by the Ministry of Home Security Research and Experiments Branch. The latter were tasked with providing the government 'a complete picture of air raid patterns, types of weapons used and damage caused- in particular to strategic services and installations such as railways, shipyards, factories and public utilities.'[1]

The quality, detail and nature of record keeping could vary considerably between provincial towns, boroughs and cities. No two areas identically collated or recorded data. While some local authorities maintained records with a methodical approach, sources in certain areas can be considerably more vague, dispersed, and narrower in scope. In addition, the immediate priority was mostly focused on assisting casualties and minimising damage at the time. As a result, some records can be incomplete and contradictory. Furthermore, many records were even damaged or destroyed in subsequent air raids. Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are therefore not always reliable. Whereas records of attacks on military or strategic targets were often maintained separately and have not always survived.

3.3. Allied Records

During WWII, considerable areas of land were requisitioned by the War Office for the purpose of defence, training, munitions production and the construction of airfields. Records relating to military features vary and some may remain censored. Within urban environments datasets will be consulted detailing the location of munition production as well as wartime air and land defences. In rural locations it may be possible to obtain plans of military establishments, such as airfields, as well as training logs, record books, plans and personal memoirs. As with bombing records, every reasonable effort will be made to access records of, and ascertain any evidence of, military land use. However, there are occasions where such evidence is not available, as records may not be accessible, have been lost/destroyed, or simply were not kept in the first place.

[1] http://www.nationalarchives.gov.uk/help-with-your-research/research-guides/bomb-census-survey-records-1940-1945/.

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4. UK Regulatory Environment and Guidelines

4.1. General

There is no formal obligation requiring a UXO risk assessment to be undertaken for construction projects in the UK, nor is there any specific legislation stipulating the management or mitigation of UXO risk. However, it is implicit in the legislation outlined below that those responsible for intrusive works (archaeology, site investigation, drilling, piling, excavation etc.) should undertake a comprehensive and robust assessment of the potential risks to employees and that mitigation measures are implemented to address any identified hazards.

4.2. CDM Regulations 2015

The Construction (Design and Management) Regulations 2015 (CDM 2015) define the responsibilities of parties involved in the construction of temporary or permanent structures.

The CDM 2015 establishes a duty of care extending from clients, principle designers, and contractors to those working on, or affected by, a project. Those responsible for construction projects may therefore be accountable for the personal or proprietary loss of third parties, if correct health and safety procedure has not been applied.

Although the CDM does not specifically reference UXO, the risk presented by such items is both within the scope and purpose of the legislation. It is therefore implied that there is an obligation for parties to:

- Provide an appropriate assessment of potential UXO risks at the site (or ensure such an assessment is completed by others).
- Put in place appropriate risk mitigation measures if necessary.
- Supply all parties with information relevant to the risks presented by the project.
- Ensure the preparation of a suitably robust emergency response plan.

4.3. The 1974 Health and Safety at Work etc. Act

All employers have a responsibility under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, to ensure the health and safety of their employees and third parties, so far as is reasonably practicable and conduct suitable and sufficient risk assessments.

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4.4. CIRIA C681

In 2009, the Construction Industry Research and Information Association (CIRIA) produced a guide to the risk posed by UXO to the UK construction industry (CIRIA C681). CIRIA is a neutral, independent and not-for-profit body, linking organisations with common interests and facilitating a range of collaborative activities that help improve the industry.

The publication provides the UK construction industry with a defined process for the management of risks associated with UXO from WWI and WWII air bombardment. It is also broadly applicable to the risks from other forms of UXO that might be encountered. It focuses on construction professionals' needs, particularly if there is a suspected item of UXO on site, and covers issues such as what to expect from a UXO specialist. The guidance also helps clients to fulfil their legal duty under CDM 2015 to provide designers and contractors with project specific health and safety information needed to identify hazards and risks associated with the design and construction work. This report conforms to this CIRIA guidance and to the various recommendations for good practice referenced therein. It is recommended that this document is acquired and studied where possible to allow a better understanding of the background to both the risk assessment process and the UXO issue in the UK in general.

4.5. Additional Legislation

In the event of a casualty resulting from the failure of an employer/client to address the risks relating to UXO, the organisation may be criminally liable under the Corporate Manslaughter and Corporate Homicide Act 2007.

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5. The Role of Commercial UXO Contractors and The Authorities

5.1. Commercial UXO Specialists

The role of a UXO Specialist (often referred to as UXO Consultant or UXO Contractor) such as 1st Line Defence, is defined in CIRIA C681 as the provision of expert knowledge and guidance to the client on the most appropriate and cost-effective approach to UXO risk management at a site.

The principal role of UXO Specialists is to provide the client with an appropriate assessment of the risk posed by UXO for a specific project, and identify and carry out suitable methodology for the mitigation of any identified risks to reduce them to an acceptable level.

The requirement for a UXO Specialist should ideally be identified in the initial stages of a project, and it is recommended that this occur prior to the start of any detailed design. This will enable the client to budget for expenditure that may be required to address the risks from UXO, and may enable the project team to identify appropriate techniques to eliminate or reduce potential risks through considered design, without the need for UXO specific mitigation measures. The UXO Specialist should have suitable qualifications, levels of competency and insurances.

Please note 1st Line Defence has the capability to provide a complete range of required UXO risk mitigation services, in order to reduce a risk to as low as reasonably practicable. This can involve the provision of both ground investigation, and where appropriate, UXO clearance services.

5.2. The Authorities

The police have a responsibility to co-ordinate the emergency services in the event of an ordnance-related incident at a construction site. Upon inspection they may impose a safety cordon, order an evacuation, and call the military authorities Joint Services Explosive Ordnance Disposal Operation Centre (JSEODOC) to arrange for investigation and/or disposal. Within the Metropolitan Police Operational Area, SO15 EOD will be tasked to any discovery of suspected UXO. The request for Explosive Officer (Expo) support is well understood and practiced by all Metropolitan Boroughs. The requirement for any additional assets will then be coordinated by the Expo if required.

In the absence of a UXO specialist, police officers will usually employ such precautionary safety measures, thereby causing works to cease, and possibly requiring the evacuation of neighbouring businesses and properties.

The priority given to the police request will depend on the EOD teams' judgement of the nature of the UXO risk, the location, people and assets at risk, as well as the availability of resources. The speed of response varies; authorities may respond immediately or in some cases it may take several days for the item of ordnance to be dealt with. Depending on the on-site risk assessment the item of ordnance may be removed from the site and/or destroyed by a controlled explosion.

Following the removal of an item of UXO, the military authorities will only undertake further investigations or clearances in high-risk situations. If there are regular UXO finds on a site the JSEODOC may not treat each occurrence as an emergency and will recommend the construction company puts in place alternative procedures, such as the appointment of a commercial contractor to manage the situation.

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6. The Site

6.1. Site Location

The site is situated in Bowerhill, Melksham.

Open ground occupies the area surrounding the site as well as Pathfinder Way to the east and a relatively small structure to the south.

The site is approximately centred on the OS grid reference: **ST 91069 62698**.

Site location maps are presented in **Annex A**.

6.2. Site Description

According to recent aerial imagery, the site is occupied open ground and access way.

A recent aerial photograph and site plan are presented in **Annex B** and **Annex C** respectively.

7. Scope of the Proposed Works

7.1. General

Scheduled intrusive works are understood to include eight boreholes (including dynamic sampler boreholes) and eight trial pits. Future works are understood to include the construction of a 235 house residential development.

8. Ground Conditions

8.1. General Geology

The British Geological Survey (BGS) map shows the bedrock geology of the site to be underlain by the Oxford Clay Formation. No superficial deposits are recorded on site.

8.2. Site-Specific Geology

Site-specific geotechnical data was not provided by the client during the production of this report.

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9. Site History

9.1. Introduction

The purpose of this section is to identify the composition of the site pre and post-WWII. It is important to establish the historical use of the site, as this may indicate the site's relation to potential sources of UXO as well as help with determining factors such as the land use, groundcover, likely frequency of access and signs of bomb damage.

9.2. Summary of the Historical Background of the Site

RAF Melksham, situated south of the site, was an RAF training facility that fulfilled a number of military functions between 1940 and the early 1970s, before returning to civilian use. For a detailed analysis of the Allied military usage of the site see **section 13.2** of this report.

9.3. Ordnance Survey Historical Maps

Relevant historical maps were obtained for this report and are presented in **Annex D.** See below for a summary of the site history shown on acquired mapping.

Pre-WWII		
Date	**Scale**	**Description**
1922	1:10,560	This map indicates that the site and surrounding area is occupied by open ground. The closest development to the site is *Bath Road* approximately 180m east of the site.

Post-WWII		
Date	**Scale**	**Description**
1961	1:,10,000	This map does not indicate any developments to have taken place on or immediately surrounding the site when compared with previous OS mapping. Structures which are likely to be part of a military camp occupy the area approximately 200m south of the site.

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10. Introduction to German Air Delivered Ordnance

10.1. General

During WWI and WWII, the UK was subjected to bombing which often resulted in extensive damage to city centres, docks, rail infrastructure and industrial areas. The poor accuracy of WWII targeting technology and the nature of bombing techniques often resulted in neighbouring areas to targets sustaining collateral damage.

In addition to raids which concentrated on specific targets, indiscriminate bombing of large areas also took place. This occurred most prominently in the London 'Blitz', though affected many other towns and cities. As discussed in the following sections, a proportion of the bombs dropped on the UK did not detonate as designed. Although extensive efforts were made to locate and deal with these UXBs at the time, many still remain buried and can present a potential risk to construction projects.

The main focus of research for this section of the report will concern German air delivered ordnance dropped during WWII, although WWI bombing will also be considered.

10.2. Generic Types of WWII German Air Delivered Ordnance

To provide an informed assessment of the hazards posed by any items of unexploded ordnance that may remain in situ on site, the table below provides information on the types of German air delivered ordnance most commonly used by the Luftwaffe during WWII. Images and brief summaries of the characteristics of these items of ordnance are listed in **Appendices i-iii**.

Generic Types of WWII German Air Delivered Ordnance		
Type	**Frequency**	**Likelihood of detection**
High Explosive (HE) bombs	In terms of weight of ordnance dropped, HE bombs were the most frequently deployed by the Luftwaffe during WWII.	Although efforts were made to identify the presence of unexploded ordnance following an air raid, often the damage and destruction caused by detonated bombs made observation of UXB entry holes impossible. The entry hole of an unexploded bomb can be as little as 20cm in diameter and was easily overlooked in certain ground conditions (see **Annex E**). Furthermore, ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded smaller bomb. UXBs therefore present the greatest risk to present–day intrusive works.
1kg Incendiary bombs (IB)	In terms of the number of weapons dropped, small IBs were the most numerous. Millions of these were dropped throughout WWII.	IBs had very limited penetration capability and in urban areas would often have been located in post-raid surveys. If they failed to initiate and fell in water, on soft vegetated ground, or bombed rubble, they could easily go unnoticed.
Large Incendiary bombs (IB)	These were not as common as the 1kg IBs, although they were more frequently deployed than PMs and AP bomblets.	If large IBs did penetrate the ground, complete combustion did not always occur and in such cases they could remain a risk to intrusive works.
Aerial or Parachute mines (PM)	These were deployed less frequently than HE and IBs due to size, cost and the difficulty of deployment.	If functioning correctly, PMs would generally have had a slow rate of descent and were very unlikely to have penetrated the ground. Where the parachute failed, mines would have simply shattered on impact if the main charge failed to explode. There have been extreme cases when these items have been found unexploded. However, in these scenarios, the ground was either extremely soft or the munition fell into water.
Anti-personnel (AP) bomblets	These were not commonly used and are generally considered to pose a low risk to most works in the UK.	SD2 bomblets were packed into containers holding between 6 and 108 submunitions. They had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.

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10.3. Failure Rate of German Air Delivered Ordnance

It has been estimated that 10% of WWII German air delivered HE bombs failed to explode as designed. Reasons for why such weapons might have failed to function as designed include:

- Malfunction of the fuze or gain mechanism (manufacturing fault, sabotage by forced labour or faulty installation).
- Many were fitted with a clockwork mechanism that could become immobilised on impact.
- Failure of the bomber aircraft to arm the bombs due to human error or an equipment defect.
- Jettisoning the bomb before it was armed or from a very low altitude. This most likely occurred if the bomber aircraft was under attack or crashing.

From 1940 to 1945, bomb disposal teams reportedly dealt with a total of 50,000 explosive items of 50kg, over 7,000 anti-aircraft projectiles and 300,000 beach mines. Unexploded ordnance is still regularly encountered across the UK, see press articles in **Annex F**.

10.4. UXB Ground Penetration

An important consideration when assessing the risk from a UXB is the likely maximum depth of burial. There are several factors which determine the depth that an unexploded bomb will penetrate:

- Mass and shape of bomb.
- Height of release.
- Velocity and angle of bomb.
- Nature of the ground cover.
- Underlying geology.

Geology is perhaps the most important variable. If the ground is soft, there is a greater potential of deeper penetration. For example, peat and alluvium are easier to penetrate than gravel and sand, whereas layers of hard strata will significantly retard and may stop the trajectory of a UXB.

10.4.1. The J-Curve Effect Principle

J-curve is the term used to describe the characteristic curve commonly followed by an air delivered bomb dropped from height after it penetrates the ground. Typically, as the bomb is slowed by its passage through underlying soils, its trajectory curves towards the surface. Many UXBs are found with their nose cone pointing upwards as a result of this effect. More importantly, however, is the resulting horizontal offset from the point of entry. This is typically a distance of about one third of the bomb's penetration depth, but can be higher in certain conditions (see **Annex E**).

10.4.2. WWII UXB Ground Penetration Studies

During WWII the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by bomb disposal (BD) teams. Conclusions were drawn predicting the likely average and maximum depths of penetration of different sized bombs in different geological strata.

For example, the largest common German bomb (500kg) had a likely concluded penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1,000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

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10.4.3. Site Specific Bomb Penetration Considerations

When considering an assessment of the bomb penetration at the site of proposed works the following parameters should be used:

- WWII geology – Oxford Clay Formation.
- Impact angle and velocity – 10-15° from vertical and 270 metres per second.
- Bomb mass and configuration – The 500kg SC HE bomb, without retarder units or armour piercing nose (this was the largest of the common bombs used against Britain).

It has not been possible to determine maximum bomb penetration capabilities at this stage due to the limitations of site-specific geotechnical information provided for the purpose of this report. An assessment can be made once further information becomes available or by an UXO Specialist on-site.

10.5. V-Weapons

Hitler's 'V-weapon' campaign began from mid-1944. It used newly developed unmanned cruise missiles and rockets. The V-1, known as the *flying bomb* or *pilotless aircraft*, and the V-2, a long range rocket, were launched from bases in Germany and occupied Europe. A total of 9,251 V-1s and 1,115 V-2s were recorded in the United Kingdom.

Although these weapons caused considerable damage, their range was limited by their position of deployment across Europe and as a result the vast majority of V-weapon strikes were directed against targets in the south-east of England, predominantly in the London Boroughs and Home Counties. This limitation of capability meant targets in **Bowerhill** were generally too far to be considered for V-weapon strikes by the Luftwaffe. The risk from V-weapons is therefore considered negligible and will not be further addressed in this report.

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11. The Likelihood of Contamination from German Air Delivered UXBs

11.1. World War I

During WWI Britain was targeted and bombed by Zeppelin Airships as well as Gotha and Giant fixed-wing aircraft. The objective of these raids was to unnerve the British public, to destroy strategic targets and to ultimately attempt to coerce Britain's capitulation from the war. A WWI map of air raids and naval bombardments across the UK was consulted, see **Annex G**. The map does not account for any raids undertaken over Wiltshire. However no evidence of any significant WWI-era air raids could be found within the county.

WWI bombs were generally smaller and dropped from a lower altitude than those used in WWII. This resulted in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress. For these reasons there is a limited risk that UXBs passed undiscovered in the urban environment. When combined with the relative infrequency of attacks and an overall low bombing density, the risk from WWI UXBs is considered low and will not be further addressed in this report.

11.2. World War II Bombing of the Rural District of Melksham

The Luftwaffe's main objective for the attacks on Britain was to inhibit the country's economic and military capability. To achieve this they targeted airfields, depots, docks, warehouses, wharves, railway lines, factories, and power stations. As the war progressed the Luftwaffe bombing campaign expanded to include the indiscriminate bombing of civilian areas in an attempt to subvert public morale.

During WWII the site was located within the Rural District of Bradford and Melksham, which sustained an overall very low density of bombing, according to official Home Office bombing statistics. Very low densities of bombing were recorded across the county of Wiltshire, with an average of 4.2 items of ordnance dropped per 1,000 acres compared to the national average of 24.3 items dropped per 1,000 acres. This is most likely a result of the county containing few major industrial targets. Airfields in coastal counties such as Devon, Dorset, and Somerset would have been considerably easier for the Luftwaffe to reach without interception. It should be noted that the site is situated on the border of the Urban District of Melksham, which according to official Home Office bombing statistics, did not sustain any bombing during WWII.

Records of bombing incidents in the civilian areas of Rural District of Bradford and Melksham were typically collected by Air Raid Precautions wardens and collated by Civil Defence personnel. Some other organisations, such as port and railway authorities, maintained separate records. Records would be in the form of typed or hand written incident notes, maps and statistics. Bombing data was carefully analysed, not only due to the requirement to identify those parts of the country most needing assistance, but also in an attempt to find patterns in the Germans' bombing strategy in order to predict where future raids might take place.

Records of bombing incidents are presented in the following sections.

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11.3. WWII Home Office Bombing Statistics

The following table summarises the quantity of German air delivered bombs (excluding 1kg incendiaries and anti-personnel bombs) dropped on the Rural District of Bradford and Melksham between 1940 and 1945.

Record of German Ordnance Dropped on the Rural District of Bradford and Melksham		
Area Acreage		**26,881**
Weapons	High Explosive bombs (all types)	44
	Parachute mines	0
	Oil bombs	0
	Phosphorus bombs	0
	Fire pots	0
	Pilotless aircraft (V-1)	0
	Long range rockets (V-2)	0
Total		**44**
Number of Items per 1,000 acres		**1.6**

Record of German Ordnance Dropped on the Urban District of Melksham		
Area Acreage		**1,029**
Weapons	High Explosive Bombs (all types)	0
	Parachute Mines	0
	Oil Bombs	0
	Phosphorus Bombs	0
	Fire Pot	0
	Pilotless Aircraft (V1)	0
	Long Range Rockets (V2)	0
Total		**0**
Number of Items per 1,000 acres		**0**

Source: Home Office Statistics
This table does not include UXO found during or after WWII.

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. Although the risk relating to IBs is lesser than that relating to larger HE bombs, they were similarly designed to inflict damage and injury. Anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. Although Home Office statistics did not record these types of ordnance, both should not be overlooked when assessing the general risk to personnel and equipment.

11.4. Written Records

Civil Defence Region 7 written records and minutes documents concerning the operation of RAF Melksham were obtained from The National Archives. Both sets of the obtained written records contained no evidence of bombing within the proposed site area.

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11.5. Anecdotal Evidence of Bombing

Information from a local online newspaper article has been obtained to suggest that an isolated bomb incident was recorded within the surrounding area of the site.[2] This article, which is a tribute to the former activities of RAF Melksham, discusses plans for the original location of the facility. It states that "The decision proved to be a good one for RAF Melksham as the original site was later bombed, leaving the training school unscathed". The original plan for the site was on the other side of Bath Road, on land near Woolmore Farm, approximately 500m east of the site location.

1st Line Defence has found no evidence, from the available civil defence records and MOD records of RAF Melksham to substantiate this anecdotal account. Equally, it has not been possible to discount that such an incident may have occurred. It is considered likely that this raid was an isolated incident and the result of a single bomber, due to the very low bomb density recorded in the region. It is not anticipated to have significantly damaged or directly impacted the proposed site due to its location opposite Bath Road.

11.6. WWII-Era Aerial Photography

WWII-era aerial photography for the site area was obtained from the National Monuments Record Office (Historic England). This photography provides a record of the composition of the site immediately following the war (**see Annex H1**).

WWII-Era Aerial Photography	
Date	**Description**
3rd March 1948	This photograph confirms that the site was occupied and surrounded by open ground. The ground of the site appears to be well maintained with no distinct signs of damage such as cratering or scattered earth. Military huts can be seen approximately 200m south of the site, with ground disturbances approximately 100m south and 120m south-east of the site.

11.7. Abandoned Bombs

A post air-raid survey of buildings, facilities, and installations would have included a search for evidence of bomb entry holes. If evidence of an entry hole was encountered, Bomb Disposal Officer Teams would normally have been requested to attempt to locate, render safe, and dispose of the bomb. Occasionally, evidence of UXBs was discovered but due to a relatively benign position, access problems, or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an 'abandoned bomb'.

Given the inaccuracy of WWII records, and the fact that these bombs were 'abandoned', their locations cannot be considered definitive or the lists exhaustive. The MoD states that 'action to make the devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that were never recorded.

1st Line Defence holds no records of officially registered abandoned bombs at or near the site of the proposed works.

[2] *http://www.wiltshiretimes.co.uk/news/1397100.memorial_tribute_for_towns_raf_links/*

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11.8. Bomb Disposal Tasks

The information service from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (now part of 29 EOD & Search Group) no longer processes commercial requests for information. It has therefore not been possible to include any updated official information regarding bomb disposal/clearance tasks with regards to this site. A database of known disposal/clearance tasks has been referred to which does not make reference to such instances occurring within the site of proposed works. If any relevant information is received at a later date, ISG Ltd will be advised.

11.9. Evaluation of German Air Delivered UXO Records

Factors	Conclusion
Density of Bombing *It is important to consider the bombing density when assessing the possibility that UXBs remain in an area. High bombing density could allow for error in record keeping due to extreme damage caused to the area.*	During WWII, the site was situated within the Rural District of Bradford and Melksham, which according to official Home Office bombing statistics sustained an overall very low density of bombing; this comprised of 44 items of ordnance over 26,881 acres, with an average of 1.4 items per 1,000 acres. The very low density of bombing can likely be attributed to the lack of major industrial targets throughout the district. No records of bombing were available for the district, however, anecdotal evidence referenced an isolated bombing incident near Woolmere Farm, approximately 500m east of the site area. It is considered that any Luftwaffe activity in the area would have likely targeted the spitfire works in Trowbridge located 7km south-west of the site.
Damage	WWII-ere aerial imagery dated 1948 does not indicate any distinct signs of damage such as cratering or scattered debris on or within the vicinity of the site. Additionally, no signs of damage such as scattered debris to the structures within the wider vicinity of the site can be seen.
Ground Cover *The nature of the ground cover present during WWII would have a substantial influence on any visual indication that may indicate UXO being present.*	Given the open ground nature of the site and surrounding area, ground cover is anticipated to have been poor. Bomb entry holes could be as small as 20cm in diameter and easily hidden within areas of open ground or vegetation.
Access Frequency *UXO in locations where access was irregular would have a greater chance of passing unnoticed than at those that were regularly occupied.*	Whilst areas of open ground are typically considered to have had limited access, the site was situated within close proximity to RAF Melksham and its associated structures. As such, there is an increased likelihood that the area of the site would have been more frequently accessed and that any items of UXO would have been spotted.
Bomb Failure Rate	There is no evidence to suggest that the bomb failure rate in the locality of the site would have been dissimilar to the 10% normally used.
Abandoned Bombs	1st Line Defence holds no records of abandoned bombs at or within the site vicinity.
Bombing Decoy sites	1st Line Defence could find no evidence of bombing decoy sites within the site vicinity.
Bomb Disposal Tasks	1st Line Defence could find no evidence of bomb disposal tasks within the site boundary and immediate area.

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12. Introduction to Allied Ordnance

12.1. General

Many areas across the UK may be at risk from Allied UXO because of both wartime and peacetime military use. Typical military activities and uses that may have led to a legacy of military UXO at a site include former minefields, home guard positions, anti-aircraft emplacements, training and firing ranges, military camps, as well as weapons manufacture and storage areas.

Although land formerly used by the military was usually subject to clearance before returned to civilian use, items of UXO are sometimes discovered and can present a potential risk to construction projects.

This section of the report discusses the generic types of Allied ordnance typically encountered on areas associated with former military activity.

12.2. Land Service Ammunition

Items of LSA are being considered in this report due to the relative close proximity of RAF Melksham.

The term LSA covers items of ordnance that are propelled, placed, or thrown during land warfare. These items may be filled or charged with explosives, smoke, incendiary, or pyrotechnics and can be divided into five main groups:

Land Service Ammunition	
Item	**Description**
Mortar Rounds	A mortar round is normally nosed-fused and fitted with its own propelling charge. Its flight is stabilised by the use of a fin. They are usually tear-drop shaped (though older variants are parallel sided), with a finned 'spigot tube' screwed or welded to the rear end of the body which houses the propellant charge. Mortars are either High Explosive or Carrier (i.e. smoke, incendiary, or pyrotechnic).
Grenades	A grenade is a short range weapon designed to kill or injure people. It can be hand thrown or fired from a rifle or a grenade launcher. Grenades either contain high explosive or smoke producing pyrotechnic compounds. The common variants have a classic 'pineapple' shape.
Projectiles	A projectile (or shell) is propelled by force, normally from a gun, and continues in motion using its kinetic energy. The gun a projectile is fired from usually determines its size. A projectile contains a fuzing mechanism and a filling. Projectiles can be high explosive, carrier or Shot (a solid projectile).
Rockets	Rockets were commonly designed to destroy heavily armoured military vehicles (anti-tank weapon). The device contains an explosive head (warhead) that can be accelerated using internal propellants to an intended target. Anti-aircraft rocket batteries were also utilised as part of air defence measures.
Landmines	A landmine is designed to be laid on or just below the ground to be exploded by the proximity or contact of a person or vehicle. Landmines were often placed in defensive areas of the UK to obstruct potential invading adversaries.

In the UK unexploded or partially exploded mortars and grenades are the most common items of LSA encountered, as they could be transported and utilised anywhere. They are mostly encountered in areas used for military training and are often found discarded on or near historical military bases. Images of the most commonly found items of LSA are presented in **Appendices v - vii.**

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12.3. Small Arms Ammunition

The close proximity of RAF Melksham and the increased likelihood of training exercises near the site necessitates that items of SAA be considered in this report.

The most common type of ordnance encountered on land used by the military are items of Small Arms Ammunition (SAA). SAA refers to the complete round or cartridge designed to be discharged from varying sized hand-held weapons such as rifles, machine guns and pistols. SAA can include bullets, cartridge cases and primers/caps. Example images of the most SAA are presented in **Appendix viii.**

12.4. Defending the UK From Aerial Attack

During WWII the War Office employed a number of defence tactics against the Luftwaffe from bombing major towns, cities, manufacturing areas, ports and airfields. These can be divided into passive and active defences (examples are provided in the table below).

Active Defences	Passive Defences
• Anti-aircraft gun emplacements to engage enemy aircraft. • Fighter aircraft to act as interceptors. • Rockets and missiles were used later during WWII.	• Blackouts and camouflaging to hinder the identification of Luftwaffe targets. • Decoy sites were located away from targets and used dummy buildings and lighting to replicate urban, military, or industrial areas. • Barrage balloons forced enemy aircraft to greater altitudes. • Searchlights were often used to track and divert adversary bomber crews during night raids.

Active defences such as anti-aircraft artillery present a greater risk of UXO contamination than passive defences. Unexploded ordnance resulting from dogfights and fighter interceptors is rarely encountered and difficult to accurately qualify.

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12.4.1. Anti-Aircraft Artillery (AAA)

During WWII three main types of gun sites existed: heavy anti-aircraft (HAA), light anti-aircraft (LAA) and 'Z' batteries (ZAA). If the projectiles and rockets fired from these guns failed to explode or strike an aircraft they would descend back to land. The table below provides further information on the operation and ordnance associated with these type of weapons.

Anti-Aircraft Artillery				
Item	**Description**			
HAA	These large calibre guns such as the 3.7" QF (Quick Firing) were used to engage high flying enemy bombers. They often fired large HE projectiles, which were usually initiated by integral fuzes, triggered by impact, area, time delay or a combination of aforementioned mechanisms.			
LAA	These mobile guns were intended to engage fast, low flying aircraft. They were typically rotated between locations on the perimeters of towns and strategically important industrial works. As they could be moved to new positions with relative ease when required, records of their locations are limited. The most numerous of these were the 40mm Bofors gun which could fire up to 120 x 40mm HE projectiles per minute to over 1,800m.			
Variations in HAA and LAA Ammunition	**Gun type**	**Calibre**	**Shell Weight**	**Shell Dimensions**
	3.0 Inch	76mm	7.3kg	76mm x 356mm
	3.7 Inch	94mm	12.7kg	94mm x 438mm
	4.5 Inch	114mm	24.7kg	114mm x 578mm
	40mm	40mm	0.9kg	40mm x 311mm
Z-AA	The three inch unrotated rocket/projectile known as the UP-3 had initially been developed for the Royal Navy. The UP-3 was also used in ground-based single and 128-round launchers known as ''Z'' batteries. The rocket, containing a high explosive warhead was often propelled by cordite.			

The conditions in which anti-aircraft projectiles may have fallen unnoticed within a site area are analogous to those regarding air delivered ordnance. Unexploded anti-aircraft projectiles could essentially have fallen indiscriminately anywhere within range of the guns. The chance of such items being observed, reported and removed during the war depends on factors such as land use, ground cover, damage and frequency of access – the same factors that govern whether evidence of a UXB is likely to have been noted. More information about these factors with regards to this particular site can be found in the German Air Delivered Ordnance section of this report.

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at **Appendix iv**.

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13. The Likelihood of Contamination from Allied Ordnance

13.1. Introduction

When undertaking construction work within or immediately adjacent to a site with previous and/or current military use, it is often considered likely to contain an elevated risk of contamination from Allied UXO. This assumption of risk is based on the following reasoning:

- The clearance of ordnance from military camps, depots, storage facilities, ranges and training areas were not always effectively managed, or undertaken to equivalent degrees of certainty. In addition, search and detection equipment used over seventy years ago following WWII has proved ineffective both for certain types of UXO and at depths beyond capability.
- In the vast majority of cases, explosive ordnance would have been stored and available for use at military installations. Ordnance ranged from small arms and land service ammunition to weapons components and larger, air delivered items. During periods of heightened activity, ordnance was also frequently lost in transit, particularly between stores and assigned training locations.
- The military generally did not anticipate that their land would be later sold for civilian development, and consequently appropriate ordnance disposal procedure was not always adhered to. It was not uncommon for excess or unwanted ordnance to be buried or burnt within the perimeters of a military establishment as a means of disposal. Records of such practice were rarely kept.

There are several factors that may serve to either affirm, increase, or decrease the level of risk within a site with a history of military usage. Such factors are typically dependent upon the proximity of the proposed area of works to training activities, munition productions and storage, as well as its function across the years.

This section will examine the history of the proposed site and assess to what degree, if any, the site could have become contaminated as a result of the military use of the surrounding area.

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13.2. RAF Melksham

RAF Melksham was a RAF Camp without runways. The only recorded flight at the base was the use of a Tiger Moth Biplane that flew from the sports facility in the west of the site. It is believed that the base was used to train airmen in the theoretical side to flying, and ground crews in basic weapons and aircraft maintenance.

RAF Melksham was a significant WWII era training base. Melksham was opened in July 1940 and was occupied by the No 12 School of Technical Training (24 Jun 1940 – 26 Feb 1965), which included schools of armaments training, electrical training, instrument training, and maintenance training. In addition the base was also garrisoned by the WAAF NCO's School (23 Dec 1941 - 30 Jun 1943) and the WAAF NCO's Administrative School (23 Oct 1942 - 30 Jun 1943).

Anecdotal evidence suggests that a range of training activities were undertaken at the base. There is record of captured Luftwaffe aircraft being taken to the base for examination. The presence of Luftwaffe aircraft is a possible explanation for the unexploded German bomb found to the west of the camp (See **section 13.4** of this report below).

WWII-era photography evidences several fighter and four wellington bomber aircraft present within the camp. The aircraft are believed to have been constructed on site or else transported by land, as there is no runway. It is believed that the aircraft were used for training purposes. Trainee airmen would then use any nearby airfields such as RAF Keevil for practical gunnery training.

According to the RAF Melksham site plan (see **Annex I**), the site is situated approximately 60m south of the boundary of the RAF base. Several MG posts are indicated to have been located within relative close proximity of the site, with the closest approximately 110m south of the site.

13.3. RAF Melksham Site Plan

A plan of RAF Melksham was obtained from the RAF Museum, Hendon. The plan identifies the buildings of the airfield and explains what they were used for. The site plan for the airfield is presented in **Annex I.**

RAF Melksham Site Plan	
Date	**Description**
Unknown	This plan indicates that the site is situated approximately 60m south of the boundary of the RAF base. The main structural facilities are located as close as 200m south of the site. Several MG posts are indicated to have been located within relative close proximity of the site, with the closest approximately 110m south of the site.

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13.4. The A350 Bomb

In 2014 a large item of unexploded ordnance was discovered to the east of the A350, approximately 0.8km south-west of the proposed site. The item was incorrectly identified in the local media as a WWI allied shell. The shape of the shell, and the size of the item indicate that the item was a 50kg WWII era German aerially delivered bomb. However, as identified in the sections above it is considered unlikely that the item was deployed on site. In addition the shell filling had been removed indicated that it had been disposed of.

It is possible that the item was deployed anywhere in the surrounding region and brought to the camp for the purposes of disposal or training. If the item was brought to the camp for disposal then it cannot be ruled out that further items of ordnance were buried in the vicinity of the proposed site.

Alternatively it may be possible that the shell was brought to the camp for the purposes of investigation. Anecdotal evidence suggests that the camp was used as a house captured Luftwaffe aircraft, and it may also have been used to examine capture unexploded ordnance.

Consequently for the purposes of this report items such as the A350 unexploded bomb, while likely German in origin, are likely to be buried at shallow depths. Although they may have had their explosive content removed, there would be no means of confirming this upon their encounter.

13.5. The Home Guard

RAF bases were generally used extensively by the Home Guard. The Home Guard would commonly bury items of ordnance such as SIPS and McNaughton tubes to be recovered in the event of an enemy invasion. Many of these items were forgotten, lost, or else abandoned after the receded threat of German invasion after 1940.

The Battalion Headquarters for the 4th Battalion Home Guard, Trowbridge and Devises, were based at RAF Melksham. C Company were garrisoned at the camp. C Company comprised 9 platoons. The strength of C Company varied between 530 and 650 men.

Given the extent of the Home Guard presence located within the camp it is considered likely that the land adjoining the camp was used for training. In 2012 a crate of buried SIPS (Self Igniting Phosphorus) grenades were discovered in the back garden of a residential property in Seend approximately 3km south-east of the proposed site.

13.6. Training at RAF Melksham

The MOD favoured the use of airfields and adjoining land for the purposes of military training. All airmen were subject to some degree of arms training. In addition many airfields were used extensively in the preparations for the D-day campaign. During training exercises it was common for a range of LSA and SAA to be dispersed, much of which would not be collected or disposed of.

There is record of a large military camp situated to the west of the proposed site. The camp is visible in post war aerial photography. The location of the camp has been highlighted in **Annex H3**.

13.7. Military Presence in the Rural District Bradford and Melksham

There was a high number of military facilities in the general site area. A GCHQ defence line was located approximately 1.6km to the south of the site. The defence line featured numerous pillboxes, anti-tank guns, ditches, and tank traps. In addition a headquarters of Supreme Allied Commander Eisenhower was located 2.7km north-east of the proposed site.

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13.8. WWII-Era Aerial Photography

WWII-era aerial photography for the site area was obtained from the National Monuments Record Office (Historic England). This photography provides a record of the composition of the site immediately following the war (**see Annex H2**).

WWII-Era Aerial Photography	
Date	**Description**
13th June 1945	This photograph shows the activity of RAF Melksham, the structures of which were situated approximately 200m south of the site. Multiple aircraft are indicated to be stored at the RAF base, approximately as close as 450m south-west of the site. What appears to be some minor ground disturbances and small structures can be seen immediately east and approximately 130m south-west of the site. The camp to the south features various huts and storage structures, some of which are camouflaged as well as multiple access ways.

13.9. Evaluation of Contamination Risk from Allied UXO

1st Line Defence has considered the following potential sources of Allied ordnance contamination:

Sources of Allied UXO Contamination	Conclusion
Military Camps *Military camps present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training.*	The site is located approximately 200m north of a large home guard camp, military training facility, and to the east of a separate army camp. There is therefore a high chance that the proposed site was used for training. WWII-era photography indicates several ground disturbances in close proximity to the site which may have been features utilised for LSA or SAA training.
Anti-Aircraft Defences *Anti-Aircraft defences were employed across the country. Proximity to anti-aircraft defences increases the chance of encountering AA projectiles.*	1st Line Defence could find no evidence of Anti-Aircraft defences such as a HAA or LAA gun emplacement occupying or bordering the site. The closest HAA was located approximately 14.9km west of the site, in the vicinity of Widcombe. Despite this distance the maximum effective range of an AA projectile can be up to 15km. The conditions in which HAA or LAA projectiles may have fallen unnoticed within a site footprint are generally analogous to those regarding German air delivered ordnance.
Home Guard Activity *The Home Guard regularly undertook training and ordnance practice in open areas, as well as burying ordnance as part of anti-invasion defences.*	The Battalion Headquarters for the 4th Battalion Home Guard, Trowbridge and Devises, were based at RAF Melksham. C Company were garrisoned at the camp and comprised 9 platoons, between 530 and 650 men strong. Whilst no evidence could be found to suggest that this battalion occupied or used the site area, open ground areas near camps were often used for training purposes and as such there is an increased risk that items of SAA were used on site.
Defensive Positions *Defensive positions suggest the presence of military activity, which is often indicative of ordnance storage, usage or disposal.*	The proposed site is located approximately 1.6km to the north of the GCHQ defence line however, no defence positions are recorded directly within the site area.

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Training or firing ranges *Areas of ordnance training saw historical ordnance usage in large numbers, often with inadequate disposal of expended and live items. The presence of these ranges significantly impact on the risk of encountering items of ordnance in their vicinity.*	Whilst no evidence of training or firing ranges could be found on site, given the strong military presence within close proximity, there is an increased likelihood that the site and surrounding area was used for various LSA and SAA training purposes.
Defensive Minefields *Minefields were placed in strategic areas to defend the country in the event of a German invasion. Minefields were not always cleared with an appropriate level of vigilance.*	There is no evidence of defensive minefields affecting the site.
Ordnance Manufacture *Ordnance manufacture indicates an increased chance that items of ordnance were stored, or disposed of, within a location.*	No information of ordnance being stored, produced, or disposed of within the proposed site could be found.
Military Related Airfields *Military airfields present an elevated risk from ordnance simply due to the large military presence and likelihood of associated live ordnance training or bombing practice.*	The site was situated north of RAF Melksham and was primarily utilised as a technical training base. Additionally, WWII-era aerial imagery also indicates several fighter and four wellington bomber aircraft present within the camp. These aircraft were likely used for training purposes and transported to nearby airfields such as RAF Keevil for practical gunnery training.

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14. The Likelihood of UXO Contamination Summary

The following table assesses the likelihood that the site was contaminated by items of German air delivered and Allied ordnance. Factors such as the risk of UXO initiation, remaining, and encountering will be discussed later in the report.

UXO Contamination Summary	
Quality of the Historical Record	The research has evaluated pre- and post-WWII Ordnance Survey maps, Luftwaffe reconnaissance imagery, WWII-era RAF aerial imagery, Civil Defence Group 7 Bomb Census reports, as well as various online and literary records. The record set is of generally poor quality due to the lack of available site plans for RAF Melksham and records for the district. As such, corroboration between different data sets has been limited.
Military Ordnance	• The site lay in the general area of notable military activity during WWII with RAF Melksham approximately 60m to the south. RAF Melksham was used to train airmen in aircraft maintenance, armaments, electrics, and equipment use. Due to the lack of available sources, it has not been possible to determine the exact boundary of RAF Melksham or specific functions of the structures situated closest to the site. See **Annex H3** for an overlay of Allied features in the vicinity. • RAF Melksham was not a conventional RAF base. It was not an airfield and subsequently did not contain features such as dispersal areas, bomb stores or a runway. 1948 imagery evidences aircraft within the hangars located in the west of the facility. It is understood that the aircraft were either constructed on site or else transported by land, but never flown to or from the facility. The aircraft were used solely for the purpose of ground crew training. Consequently, some of the typical sources of airfield contamination such as practice bombing are not relevant. • However, RAF Melksham was the headquarters of the 4th Division Home Guard, and a considerable amount of training activity would have taken place at the facility. The base was used to garrison C Company consisting of 9 platoons totalling a maximum of 650 men. There is also evidence of a substantial military camp located to the west of the proposed site. The camp as used by forces preparing for the D-Day operations of 1944. • Of concern to the proposed site, is that training exercises may not have been confined to the base itself. Unusual features and earthworks are noted in areas within and immediately adjacent to the site on WWI-era aerial imagery dated 1948, the purposes of which has not been possible to account for. Given the units present at Melksham, it is conceivable that exercises would have involved live and dummy ordnance ranging from small arms to land service ammunition. Much of the activity occurring at Melksham does not appear to have been documented and very few documents regarding day-to-day operations were found at the National Archives or the RAF archive at Hendon. • The Home Guard commonly buried ordnance at strategic positions to be recovered in the event of a German invasion. The Home Guard frequently lost or never recovered these caches of weaponry. Locations of the weapons caches were rarely recorded. A crate of Home Guard issue self-igniting phosphorus grenades was discovered in Seend, south-east of the proposed site. Given the high concentration of Home Guard located in the area there is considered to be an increased risk of encountering Home Guard related ordnance. • Due to the significant military presence within relative close proximity to the site and lack of available resources, there is a **Medium Risk** of encountering Allied items of UXO on site.

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German Air Delivered Ordnance	• During WWII, the site was situated within the Rural District of Bradford and Melksham, which sustained an overall very-low density of bombing with an average of 1.4 items dropped per 1,000 acres according to official Home Office bombing statistics. The very low density of bombing is likely to be attributed by the lack of any major industrial Luftwaffe targets in the district. • No records of bombing were available for the district, however, anecdotal evidence references an isolated bombing incident near Woolmere Farm, approximately 500m east of the site area. • No major signs of damage such as scattered earth or cratering were visible on or within proximity of the site within WWII-era aerial imagery dated 1948. Additionally, no distinct signs of damage such as scattered debris could be observed to the military camp situated approximately 200m south of the site. • Given that the site and immediate surrounding area was occupied by open ground, it is anticipated that ground cover would not have been conducive to the detection of evidence of UXO. Bomb entry holes could be as small as 20cm in diameter and in such conditions, have easily gone unnoticed. • Despite the open ground nature of the site and general area, it is still considered that access on site may have occurred throughout WWII due to the aforementioned camp to the south. Undeveloped areas adjacent to military sites were often used as ground for training and as such, there is an increased likelihood of monitoring of the site area for items of UXO. • The conditions in which HAA or LAA projectiles may have fallen unnoticed within the site boundary are analogous to those regarding air delivered ordnance. • Given the above factors, there is an assessed **Low Risk** of encountering items of German Aerial Delivered Ordnance on site.

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15. The Likelihood that UXO Remains

15.1. Introduction

It is important to consider the extent to which any explosive ordnance clearance (EOC) activities or extensive ground works have occurred on site. This may indicate previous ordnance contamination or reduce the risk that ordnance remains undiscovered.

15.2. UXO Clearance

Former military sites (or at least certain areas within their footprint) are often subject to clearance before they are returned to civilian use by the MoD. If a site is retained by the military, it is possible that no clearance operations have ever been undertaken. However, UXO is sometimes still discovered even on sites where clearance operations are known to have been undertaken. The detail and level of survey and targeted investigation undertaken by the military will depend on the former use of the site and purpose of the clearance (i.e. disposal, redevelopment, return to agriculture, etc.).[3] The level of clearance will also depend on the available technology, resources and practices of the day.

It therefore cannot be assumed that the risk of UXO remaining has been completely mitigated, even though EOC tasks have been undertaken at a former military site.

1st Line Defence has found no evidence in the public domain or within internal records that any official ordnance clearance operations have taken place on site. Note however that we have not received confirmation of this fact from the 33 EOD Regiment Archive (now part of 29 EOD & Search Group). It should also be noted that in addition to 29 EOD & Search Group archival information, 1st Line Defence also do not currently have access to data that may be relevant including 5131(BD)SQN Archive, SD Training Technical Advisory Section (TAS) and MACA Records (bomb disposal callouts).

If such information is available at a later date, it is recommended that it be reviewed as it will assist with understanding both levels and types of contamination likely to be present, and may indicate risk reduction in certain areas.

15.3. Post-War Redevelopment

According to recent aerial imagery, no development has occurred on site post WWII, however, residential houses have since been developed in the areas surrounding the east and southern section of the site.

The risk of UXO remaining is considered to be mitigated at the location of and down to the depth of any post-war redevelopment on site. For example, the risk from deep buried UXO will only have been mitigated within the volumes of any post-war pile foundations or deep excavations for basement levels. The risk will however remain within virgin geology below and amongst these post-war works, down to the maximum bomb penetration depth.

[3] *CIRIA C681*

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16. The Likelihood of UXO Encounter

16.1. Introduction

For UXO to pose a risk at a site, there should be a means by which any potential UXO might be encountered on that site.

The likelihood of encountering UXO on the site of proposed works would depend on various factors, such as the type of UXO that might be present and the intrusive works planned on site. In most cases, UXO is more likely to be present below surface (buried) than on surface.

In general, the greater the extent and depth of intrusive works, the greater the risk of encountering. The most likely scenarios under which items of UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

Generally speaking, the risk of encountering any type of UXO will be minimal for any works planned within the footprint and down to the depth of post-war foundations and excavations.

16.2. Encountering Air Delivered Ordnance

Since an air delivered bomb may come to rest at any depth between just below ground level and its maximum penetration depth, there is a chance that such an item (if present) could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level as well as at depth.

16.3. Land Service/Small Arms Ammunition Encounter

Items of LSA and SAA are mostly encountered in areas previously used for military training. Such items could have been lost, burnt, buried or discarded during being in use by the military. Due to this, LSA are most likely to be encountered at relatively shallow depths – generally in the top 1m below ground level. Therefore, such items are most likely to be encountered during open excavation works. In some cases, there is the potential that LSA or SAA may be present on the surface of the ground – especially in areas with active military use or were recently in use by the MoD.

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17. The Likelihood of UXO Initiation

17.1. Introduction

UXO does not spontaneously explode. Older UXO devices will require an external event/energy to create the conditions for detonation to occur. The likelihood that a device will function can depend on a number of factors including the type of weaponry, its age and the amount of energy it is struck with.

17.2. Initiating Air Delivered Ordnance

Unexploded bombs do not spontaneously explode. All high explosive filling requires significant energy to create the conditions for detonation to occur.

In recent decades, there have been a number of incidents in Europe where Allied UXBs have detonated, and incidents where fatalities have resulted. There have been several hypotheses as to the reason why the issue is more prevalent in mainland Europe – reasons could include the significantly greater number of bombs dropped by the Allied forces on occupied Europe, the preferred use by the Allies of mechanical rather than electrical fuzes, and perhaps just good fortune. The risk from UXO in the UK is also being treated very seriously in many sectors of the construction industry, and proactive risk mitigation efforts will also have affected the lack of detonations in the UK.

There are certain construction activities which make initiation more likely, and several potential initiation mechanisms must be considered:

UXB Initiation	
Direct Impact	Unless the fuze or fuze pocket is struck, there needs to be a significant impact e.g. from piling or large and violent mechanical excavation, onto the main body of the weapon to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
Re- starting the Clock	A small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion would have taken place within the fuze mechanism over the last 70+ years that would prevent clockwork mechanisms from functioning. Nevertheless, it was reported that the clockwork fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-start.
Friction Impact	The most likely scenario resulting in the detonation of a UXB is friction impact initiating the shock-sensitive fuze explosive. The combined effects of seasonal changes in temperature and general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive which could detonate the main charge.

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17.3. Land Service /Small Arms Ammunition Initiation

Items of LSA generally do not become inert or lose their effectiveness with age. Time can cause items to become more sensitive and less stable. This applies equally to items submerged in water or embedded in silts, clays, or similar materials. The greatest risk occurs when an item of ordnance is struck or interfered with. This is likely to occur when mechanical equipment is used or when unqualified personnel pick up munitions.

If left alone, an item of LSA will pose little/no risk of initiation. Therefore, if it is not planned to undertake construction/intrusive works at the site, the risk of initiation of any LSA that may be present would be negligible. Similarly, those accessing a contaminated area would be at minimal risk if they do not interfere with any UXO present on the ground. Clearly for many end uses, however, the presence of UXO anywhere on a site would not be acceptable as it could not be guaranteed that the items will not be handled, struck or otherwise affected, increasing the likelihood of initiation.

Items of SAA are much less likely to detonate than LSA or UXBs, but can be accidentally initiated by striking the casing, coming into contact with fire, or being tampered with/dismantled. It is likely that the detonation of an item of SAA would result in a small explosion, as the pressure would not be contained within a barrel. Detonation would only result in local overpressure and very minor fragmentation from the cartridge case.

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18. Consequences of Initiation/Encounter

18.1. Introduction

The repercussions of the inadvertent detonation of UXO during intrusive ground works, or if an item or ordnance is interfered with or disturbed, are potentially profound, both in terms of human and financial cost. A serious risk to life and limb, damage to plant and total site shutdown during follow-up investigations are potential outcomes. However, if appropriate risk mitigation measures are put in place, the chances of initiating an item of UXO during ground works is comparatively low.

The consequences of encountering UXO can be particularly notable in the case of high-profile sites (such as airports and train stations) where it is necessary to evacuate the public from the surrounding area. A site may be closed for anything from a few hours to a week with potentially significant cost in lost time. It should be noted that even the discovery of suspected or possible item of UXO during intrusive works (if handled solely through the authorities), may also involve significant loss of production.

18.2. Consequences of Detonation

When considering the potential consequences of a detonation, it is necessary to identify the significant receptors that may be affected. The receptors that may potentially be at risk from a UXO detonation on a construction site will vary depending on the site specific conditions but can be summarised as follows:

- People – site workers, local residents and general public.
- Plant and equipment – construction plant on site.
- Services – subsurface gas, electricity, telecommunications.
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and the weakening of support structures.
- Environment – introduction of potentially contaminating materials.

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19. 1st Line Defence Risk Assessment

19.1. Risk Assessment Stages

Taking into account the quality of the historical evidence, the assessment of the overall risk from unexploded ordnance is based on the following five considerations:

1. That the site was contaminated with unexploded ordnance.
2. That unexploded ordnance remains on site.
3. That such items will be encountered during the proposed works.
4. That ordnance may be initiated by the works operations.
5. The consequences of encountering or initiating ordnance.

19.2. Assessed Risk Level

1st Line Defence has assessed that there is an overall **Low Risk** from German and anti-aircraft unexploded ordnance at the site of proposed works. There is also an assessed **Medium Risk** from Allied unexploded ordnance.

Ordnance Type	Risk Level			
	Negligible	Low	Medium	High
German Unexploded HE Bombs		✓		
German 1kg Incendiary Bombs		✓		
Anti-Aircraft Artillery Projectiles		✓		
Allied Land Service and Small Arms Ammunition			✓	

Please note – although the risk from unexploded ordnance on this site has been assessed as 'Low', this does not mean there is 'no' risk of encountering UXO. This report has been undertaken with due diligence, and all reasonable care has been taken to access and analyse relevant historical information. By necessity, when dealing historical evidence, and when making assessments of UXO risk, various assumptions have to be made which we have discussed and justified throughout this report. Our reports take a common-sense and practical approach to the assessment of risk, and we strive to be reasonable and pragmatic in our conclusions.

It should however be stressed that if any suspect items are encountered during the proposed works, 1st Line Defence should be contacted for advice/assistance, and to re-assess the risk where necessary. The mitigation measures outlined in the next section are recommended as a minimum precaution to alert ground personnel to the history of the site, what to look out for, and what measures to take in the event that a suspect item is encountered. It should also be noted that the conclusions of this report are based on the scope of works outlined in the 'Proposed Works' section of this report. Should the scope of works change or additional works be proposed, 1st Line Defence should be contacted to re-evaluate the risk.

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20. Proposed Risk Mitigation Methodology

20.1. General

The following risk mitigation measures are recommended to support the proposed works at Melksham Primary School:

Type of Work	Recommended Mitigation Measure
All Works	• **UXO Risk Management Plan** It is recommended that a site-specific plan for the management of UXO risk be written for this site. This plan should be kept on site and be referred to in the event that a suspect item of UXO is encountered at any stage of the project. It should detail the steps to be taken in the event of such a discovery, considering elements such as communication, raising the alarm, nominated responsible persons etc. Contact 1st Line Defence for help/more information. • **Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.** As a minimum precaution, all personnel working on the site should be briefed on the basic identification of UXO and what to do in the event of encountering a suspect item. This should in the first instance be undertaken by a UXO Specialist. Posters and information on the risk of UXO can be held in the site office for reference.
Shallow Intrusive Works/Open Excavations	• **Unexploded Ordnance (UXO) Specialist Presence on Site to support open excavations** When on site the role of the UXO Specialist would include: • Monitoring works using visual recognition and instrumentation, including immediate response to reports of suspicious objects or suspected items of ordnance that have been recovered by the ground workers on site. • Providing UXO awareness briefings to any uninformed staff and advise staff of the need to modify working practices to take account of the ordnance risk. • To aid incident management which would involve liaison with the local authorities and police should ordnance be identified and present an explosive hazard.

In making this assessment and recommending these risk mitigation measures, if known, the works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

1st Line Defence Limited **19/05/2023**

This Report has been produced in compliance with the Construction Industry Research and Information Association (CIRIA) C681 guidelines for the writing of Detailed UXO Risk Assessments.

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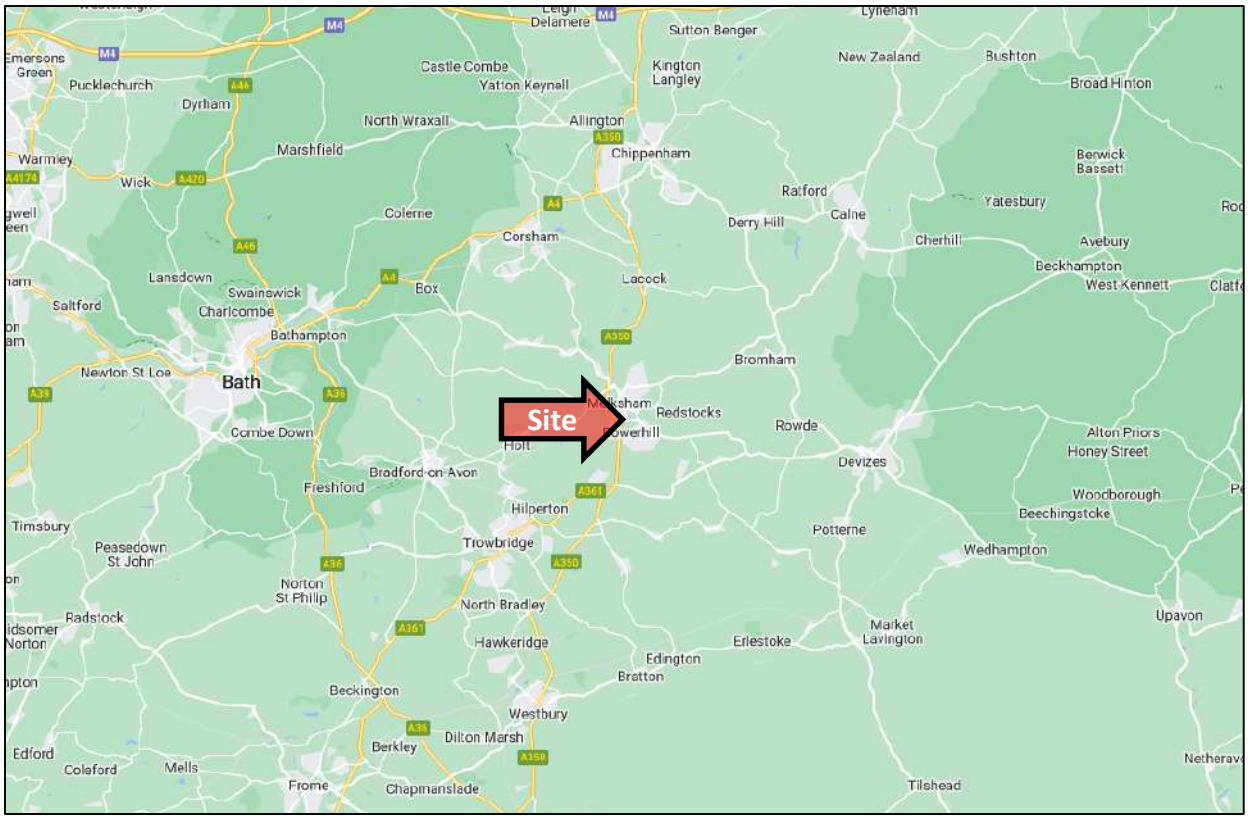
Site Location Maps

Annex: **A**





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Client: **ISG Ltd**

Approximate site boundary

N

Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: Google Maps

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Recent Aerial Photography

Annex: **B**



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Source: Google Earth ™ Mapping Services

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Client Provided Site Plan

Annex: C



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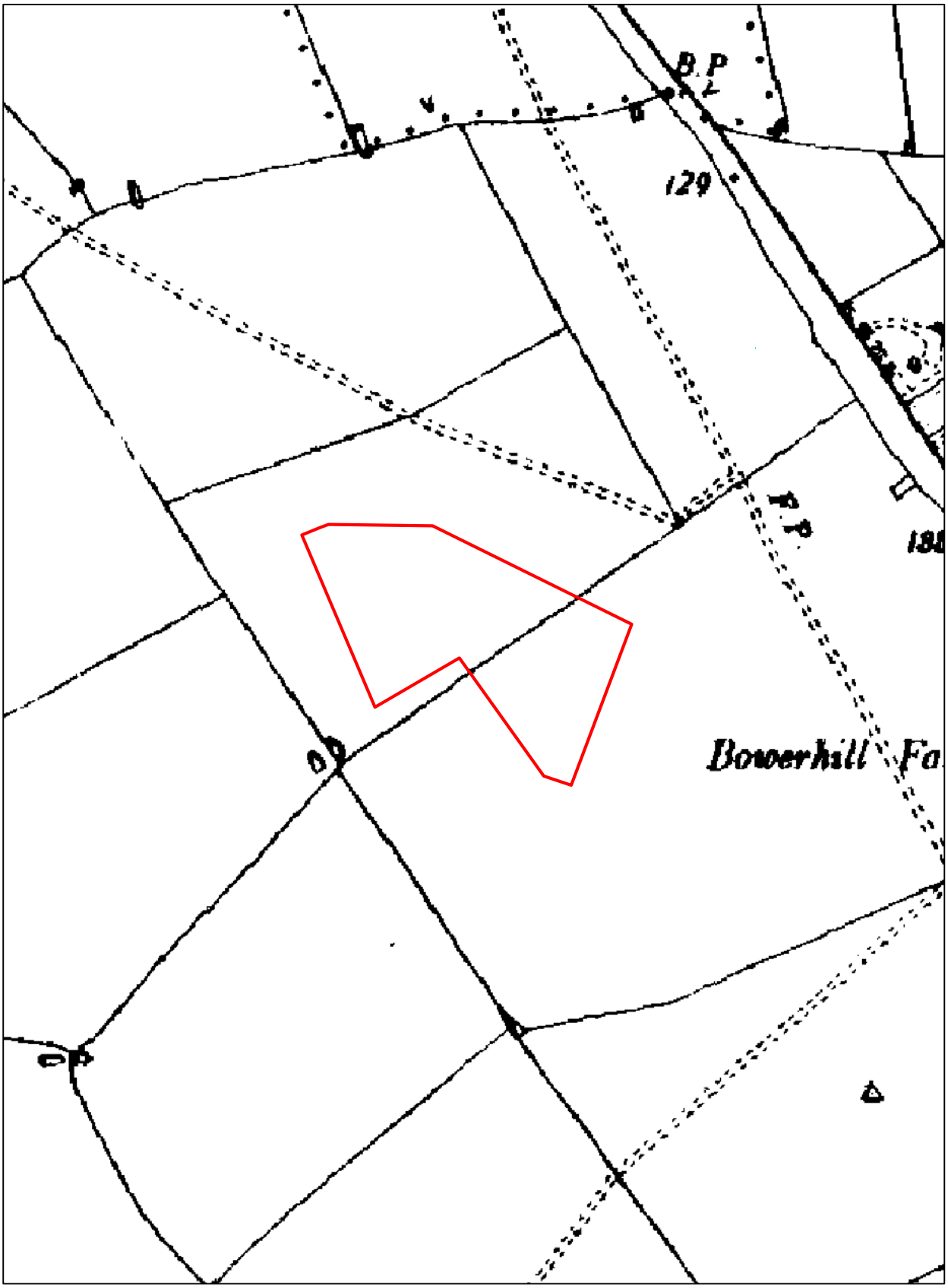
Pre-WWII Historical Map 1922 (1:10,560)

Annex: D1



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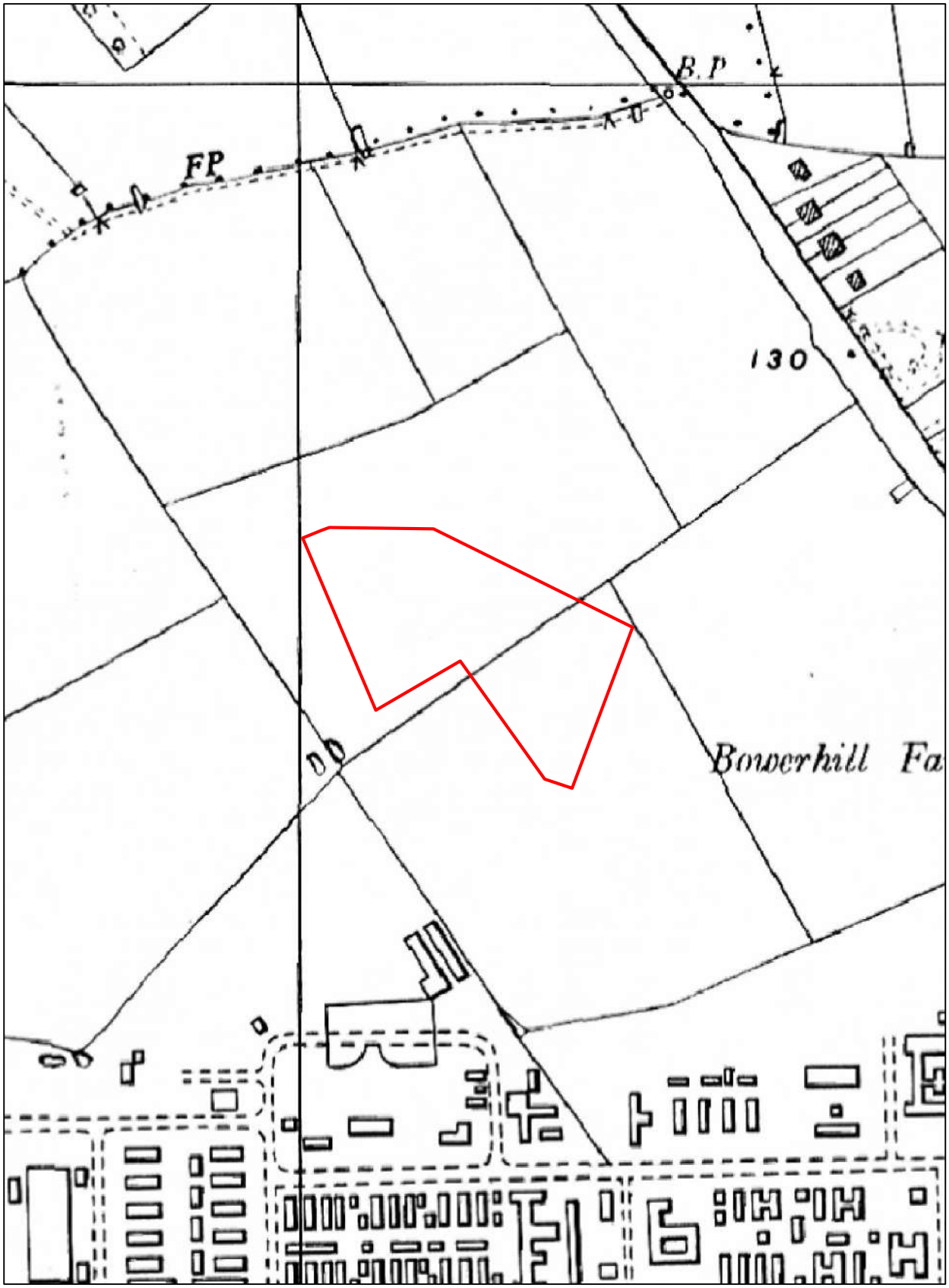
Post-WWII Historical Map 1961 (1:10,560)

Annex: D2



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Source: Landmark Maps

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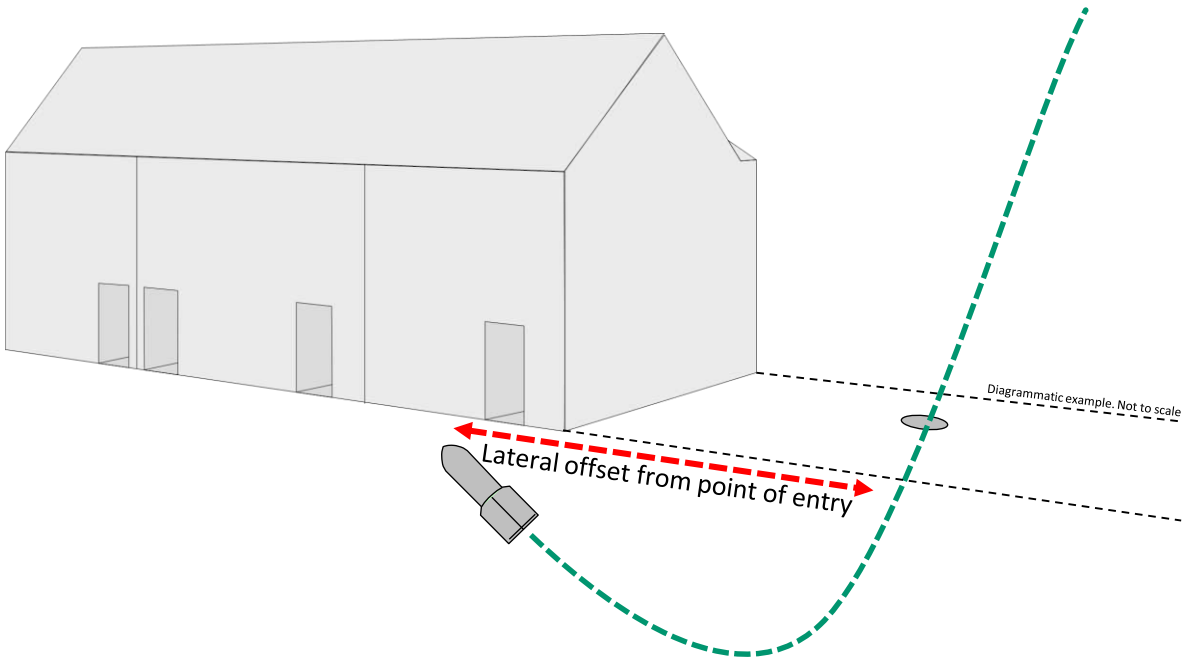
Example of UXO Entry Hole / The 'J-curve' Effect Principle

Annex: **E**









Top: J-curve Effect - Due to angle of entry, unexploded bombs would often end their trajectory at a lateral offset from point of entry, often ending up beneath adjacent extant structures/sites. The photograph above shows a 250kg unexploded bomb found in Bermondsey in 2015, pointing upwards, demonstrating 'J-curve'.

One of the most common scenarios for UXO going unnoticed was when a UXB fell into a 'bomb site' (such as the area shown **Top Left**), the entry hole of the bomb obscured by any debris and rubble present. Note that the entry hole of a 50kg UXB could be as little as 20cm in diameter (**Left**).

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Source: Various sources

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BBC NEWS

Bermondsey bomb: World War Two device safely removed



An unexploded World War Two bomb found in south London has been driven away safely under police and Army escort.

The 500lb (250kg) device was found on a building site in Grange Walk, Bermondsey on Monday.

Two primary schools were closed and hundreds of homes were evacuated as a precaution.

A cordon and 656ft (200m) exclusion zone was lifted at about 18:15 GMT as the bomb was removed to a quarry in Kent to be detonated, police said.

The Metropolitan Police force said the device was a 'SA' 250kg WWII German air-dropped bomb, known to the Army's Royal Logistic Corps bomb disposal experts.

250kg German HE Bomb, March 2015

BBC NEWS

WW2 bomb found near London City Airport blown up



An unexploded World War Two bomb found near London City Airport has been detonated.

The 500kg device was discovered at the King George V Dock on Sunday during planned work at the airport.

It was closed and all flights were cancelled on Monday after an exclusion zone was put in place.

The detonation, which took take place off Shoeburyness, Essex, was postponed on Tuesday because of high winds and dangerous conditions for divers.

The 1.5m-long German bomb - which was found in a bed of silt, 15m underwater - was carefully removed from the Thames and placed in a secure location a mile away from the coast of Essex.

500kg German HE Bomb, February 2018

BBC NEWS



Exeter WW2 bomb is detonated after homes evacuated

More than 2,600 households and 12 university halls of residence were cleared before the 2,200lb (1,000kg) device **was destroyed** on Saturday.

Police said the blast left a crater about the size of a double-decker bus.

Police have reported large pieces of metal debris hitting buildings and said some properties in the 100m (330ft) exclusion zone had sustained "structural damage".



1000kg German HE bomb, February 2021

BBC NEWS



Great Yarmouth: Huge blast after unplanned WW2 bomb detonation

A World War Two bomb found in Great Yarmouth has detonated while work was being done to defuse it, causing a huge blast that was heard for miles.

Army specialists were attempting to disarm it when there was an unplanned detonation at about 17:00 GMT.

People on social media said they heard a loud bang and felt buildings shake 15 miles (24km) away.

There have been no reports of injuries among the Army, emergency services or the public, Norfolk Police said.

Cordons were put in place when the bomb was first discovered close to two gas pipes on Tuesday, and work began to make it safe.

250kg German HE Bomb, February 2023

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Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: BBC News

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Examples of Unexpected Detonation of WWII Bombs in Europe

Annex: **F2**

BASF has confirmed that an explosive device, most likely a World War II-era bomb, caused the blast that left one person injured Tuesday at a plant construction site in Germany.

The explosion was reported at BASF's Ludwigshafen toluene diisocyanate (TDI) plant, which recently broke ground for a 300,000 metric tons per year TDI production plant and other construction to expand its facilities.



BASF Provides Some Details

Responding to a request from *PaintSquare News* for more information on Wednesday (Feb. 27), BASF's manager of media relations and corporate communications Europe, Ursula von Stetten, wrote in an email, "So here [are] the facts: The detonation took place at 10:00 a.m. One person was injured; the injury is not serious. He will be kept in the hospital for some days.

"Cause of the detonation was an explosive device, presumably a bomb deriving from the Second World War. The device detonated when grounding work was done. No details on [a] delay [are] available. At the moment, the exact circumstances of the incident are [being] evaluated."

1st March 2013

SPIEGEL ONLINE

Blast Kills One

World War II Bomb Explodes on German Motorway

A highway construction worker in Germany accidentally struck an unexploded World War II bomb, causing an explosion which killed him and wrecked several passing cars.



A World War II bomb has exploded during construction work on a German highway, killing one worker and injuring several motorists who were driving past, police said.

The worker had been cutting through the road surface near the south-western town of Aschaffenburg when his machine struck the bomb and triggered it. Police said they weren't sure yet what type of bomb it was. "The explosion seems to have been too small for it to have been an aircraft bomb," a police spokesman said.

23rd October 2006

WWII bomb injures 17 at Hattingen construction site



Seventeen people were injured on Friday when a construction crew unwittingly detonated a buried World War II-era bomb in Hattingen.

An excavator apparently drove over a 250-kilogramme (550 pound) American bomb, damaging surrounding buildings. Most of the injured suffered auditory trauma from the blast, and the excavator operator suffered injuries to his hands, police in the German state of North Rhine-Westphalia said.

"The hole was astoundingly small for such a large bomb full of so many explosives," Armin Gebhard, head of the Arnsberg department for military ordnance removal, told The Local. "But of course it damaged all the surrounding buildings too. We are really happy it wasn't worse."

19th September 2013

BBC NEWS

World War II bomb kills three in Germany



A special commission is investigating the causes of the explosion, while prosecutors are considering whether the team leader should face charges of manslaughter through culpable negligence, the BBC's Oana Lungescu reports from Berlin.

The blast happened an hour before the defusing operation was due to start.

Officials said the three men who died were experienced sappers, or combat engineers, who over 20 years had defused up to 700 bombs.

More than 7,000 people were immediately evacuated when the 500kg bomb was found. Several schools, a kindergarten and local companies remain closed.

2nd June 2010



June 2006

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Unexploded Second World War bomb discovered under Somerset footpath

By Western Daily Press | Posted: January 21, 2014

The unexploded bomb was found in Somerset.

Comments (0)

An unexploded bomb dropped in Britain during the Second World War has finally been discovered – underneath a popular footpath in Somerset.



Unexploded WW2 bomb found at Kenfig Pool, Bridgend

Dean Smith believes the shell was made in Germany

Bomb experts have been called to a south Wales nature reserve after an unexploded World War Two shell was discovered by a walker in Bridgend.

Dean Smith, 38, of Pyle, was walking near Kenfig Pool on Saturday when he saw a fin sticking out of the sand.

He reached down to pick it up, but ending up falling and landed with the 2ft-long (0.6m) bomb on top of him.

The site has been cordoned off by police and the Royal Logistics Corps will carry out a controlled explosion.

Related Stories

'Panic' as dog nearly thrown grenade

WW2 bomb found at wind farm exploded

WWII bomb found in kitchen cupboard



Mortar thought to be from WWII found on Oshawa's Camp-X grounds

August 24, 2018 | 5:42 am

What is believed to be a World War II mortar has been discovered in south Oshawa. A man out in Intrepid Park, the site of the Camp-X Second World War training grounds, discovered the round with his metal detector on Tuesday evening. Durham police are held the scene overnight awaiting military officials from Trenton to come and properly detonate the mortar.



Unexploded bomb found in farmer's field

17 May 2016

A live Second World War mortar shell was blown up by Army experts after a farmer found it in his field.

The discovery was made in the field alongside the A20 between Folkestone and Dover.

The mortar shell, which was around a foot long and 3in in diameter, was around 50ft from the main road.

The farmer alerted police and PC Trevor Moody and PCSO Michelle Brady went to the field.

PC Moody contacted the Army who sent in a bomb disposal unit.

An Army officer confirmed the live shell was from the Second World War and was packed with high explosives.

They moved it a safe distance away from the A20 and carried out a controlled explosion.

PC Moody said: "Given that we live in an area that saw much action during the Second World War, it is not uncommon for us to be alerted about unexploded bombs."

The incident was on Thursday.

• Click here for more news from Kent.



Royal Navy bomb disposal experts remove a World War Two shell discovered in a nature reserve

- A World War Two bomb was discovered in a Plymouth nature reserve
- Amateur metal detector found the shell and partially dug it up
- Royal Navy experts carried the explosive away before disposing of it

By VALERIE EDWARDS FOR MAILONLINE

PUBLISHED: 01:29, 13 January 2016 | UPDATED: 09:58, 13 January 2016

Share 338 shares 10 View comments

A World War Two bomb was reportedly found at Efford Nature Reserve in Plymouth after a member of the public was metal detecting and partially dug it up.

The Royal Navy Bomb Disposal team was called in to remove the bomb and police have closed off Military Lane, with the possibility of Military Road also being closed.

Police were called at around 1.30pm yesterday after what appeared to be a shell was discovered and partially dug up near Military Lane, Efford.



Holiday beach cordoned off after landslip sends more than a THOUSAND Second World War bombs and rockets tumbling onto the sands

- Bad weather led to ground movement which exposed the huge arsenal at Mappleton, East Riding
- A dog walker stumbled across the deadly find on Saturday and 15 controlled explosions were carried out
- Rockets, mortar bombs and 25-pounder bombs were recovered after they were fired into the cliffs by RAF aircraft during the war
- Most of the devices were dummy rounds used for bombing practice but contain enough explosives to cause terrible injuries

© Jonathan Pow

Bomb Beach Alley: Rockets were found after a landslide on Mappleton beach in 2012



Army bomb disposal team called to Blacksole Bridge in Herne Bay

by Aidan Barlow aidanbarlow@thekentgroup.co.uk 08 July 2015

It was like a scene from Dad's Army when Army bomb disposal experts found wartime explosives made by the Home Guard in makeshift bottles.

A team was called to the Blacksole Bridge in Herne Bay after the wartime bombs were found.

The team from the Royal Logistics Corps set up a 50 metre exclusion zone for pedestrians around the railway embankment after the suspected homemade phosphorous bombs were found.

The scene at Blacksole Bridge after wartime explosives were found in the railway cutting



Unexploded bomb found in Axminster

Update: The bomb disposal unit has made the device safe and the road has re-opened.

Six homes have been evacuated today after the discovery of an unexploded device in Axminster.

A Royal Navy bomb disposal team have been called to the scene after a "historic German device" was discovered in a garden.

Police have set up a 220m cordon around the garden in Alexandra Road and evacuated homes in the surrounding area as a precaution.



Storms and floods unearth unexploded wartime bombs

By Claire Marshall

BBC environment correspondent

There has been a dramatic increase in the number of wartime bombs unearthed because of the winter storms and flooding.

Bomb disposal teams in the South West have dealt with double the number of unexploded ordnance than in the same period last year.

Since mid-December, the Royal Navy's Southern Dive Unit has recovered or disposed of 244 items of ordnance.

During the same period last year, they dealt with just 108 items.

The storms have uncovered a lethal past

Almost 70 years after the end of WWII, one legacy of that conflict continues to turn up on beaches and harbours around Britain.

Unexploded shells, bombs and mines continue to be discovered every year, and the Royal Navy's Southern Dive Unit is tasked with making these devices safe.

Its area of responsibility stretches for some 2,250km (1,400 miles). It begins from the highwater mark in Hull and proceeds seaward to the territorial limit, and then runs clockwise around the British Isles - including the Isle of Wight, Channel Islands, and Isles of Scilly - to finish in Liverpool.

Related Stories

Ancient trees revealed by storms

Land Service Ammunition (LSA) resulting from historic military activity is commonly encountered across the UK by the public and construction industry alike. Such finds are much more common in rural areas than in urban environments, and can often be anticipated in areas such as former RAF stations or ranges. However, such items are also encountered entirely by surprise where the landowner or developer has no knowledge of any previous military use of the land.

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A350 reopened after wartime bomb in Melksham declared safe



Police sealed off the A350 after receiving reports of a suspected bomb in Portal Road, Melksham, where building work is taking place at the old running track behind the Christie Miller Sports Centre.

A bomb disposal unit arrived just before 3.30pm to examine the device, which is thought to be about three feet long and date from the First World War.

Roads were closed around Bowerhill and the main A350 near the Semington roundabout but have now been reopened.

PCSO Matt MacLaughlan said it was believed that what had been found was much bigger than the old RAF shell which was found on Thursday, October 2, and a wide cordon had been put in place as a precaution.

A worker at the site of the new Herman Miller factory found the suspected bomb and alerted site manager Josh Butler, who called the police.

It was X-rayed by a bomb disposal unit and police said the 200lb shell did not contain any explosives.

On October 2, digger driver Alan McConnell, who made the previous discovery, said: “I was digging holes and as I pulled a load of muck up, it was in the bucket.

"I thought it was a piece of cast iron, so I shook it about to get the muck off and realised 'ooh it’s got a rounded head on it, that’s a bomb'.”

David Merrills, Collins Earthworks project manager, called to the police to report the previous finding.

He said then: “We are all aware that we are working on what used to be an RAF base and there could be possible bombs."

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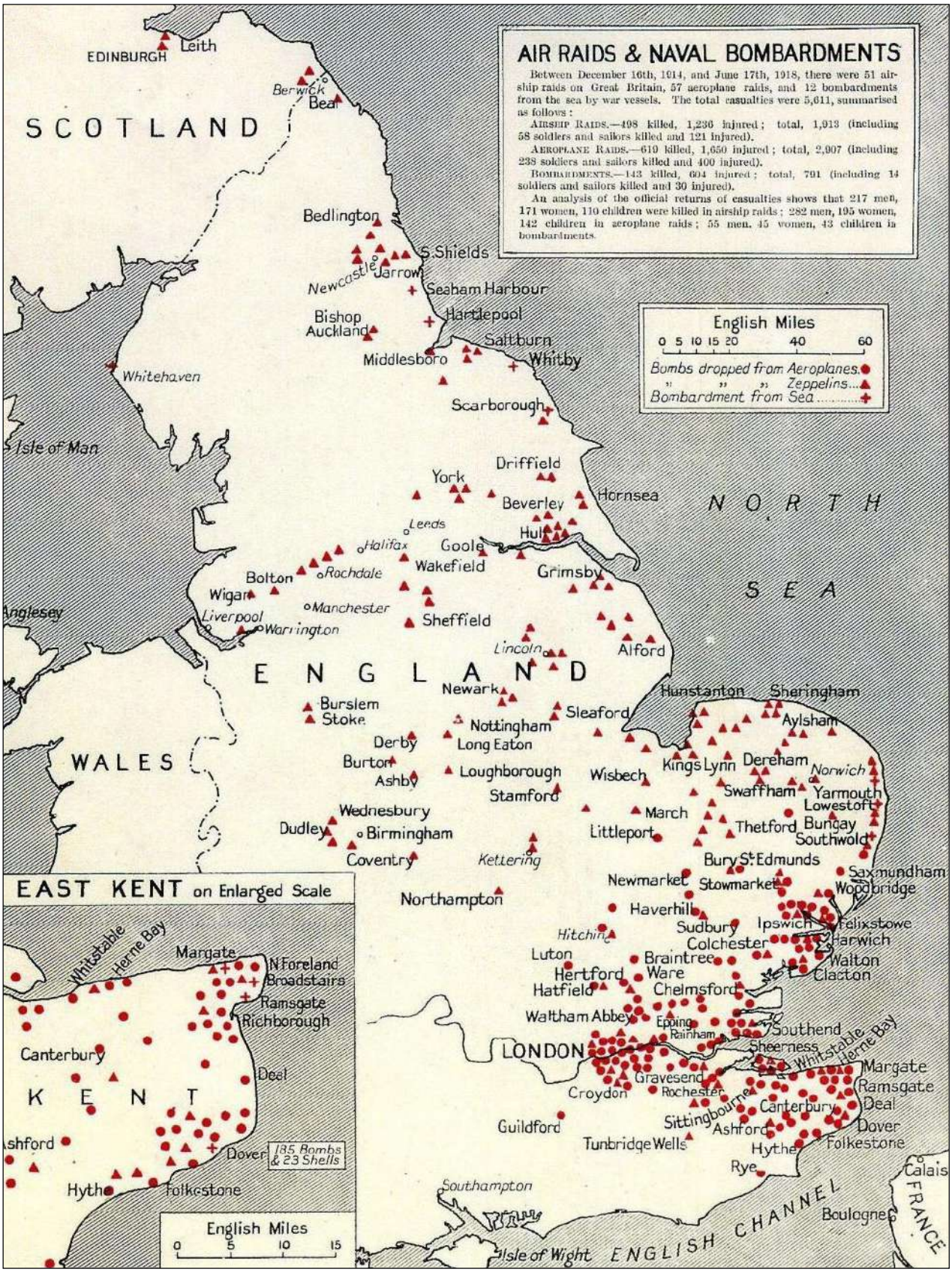
WWI Map of Air Raids and Naval Bombardments

Annex: **G**



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Source: J. Morris, *German Air Raids on Britain*

N

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RAF Aerial Photography 3rd March 1948

Annex: **H1**



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Approximate site boundary

N

Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: National Monuments Record Office (Historic England)

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RAF Aerial Photography 13th June 1945

Annex: **H2**



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Approximate site boundary

Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: National Monuments Record Office (Historic England)

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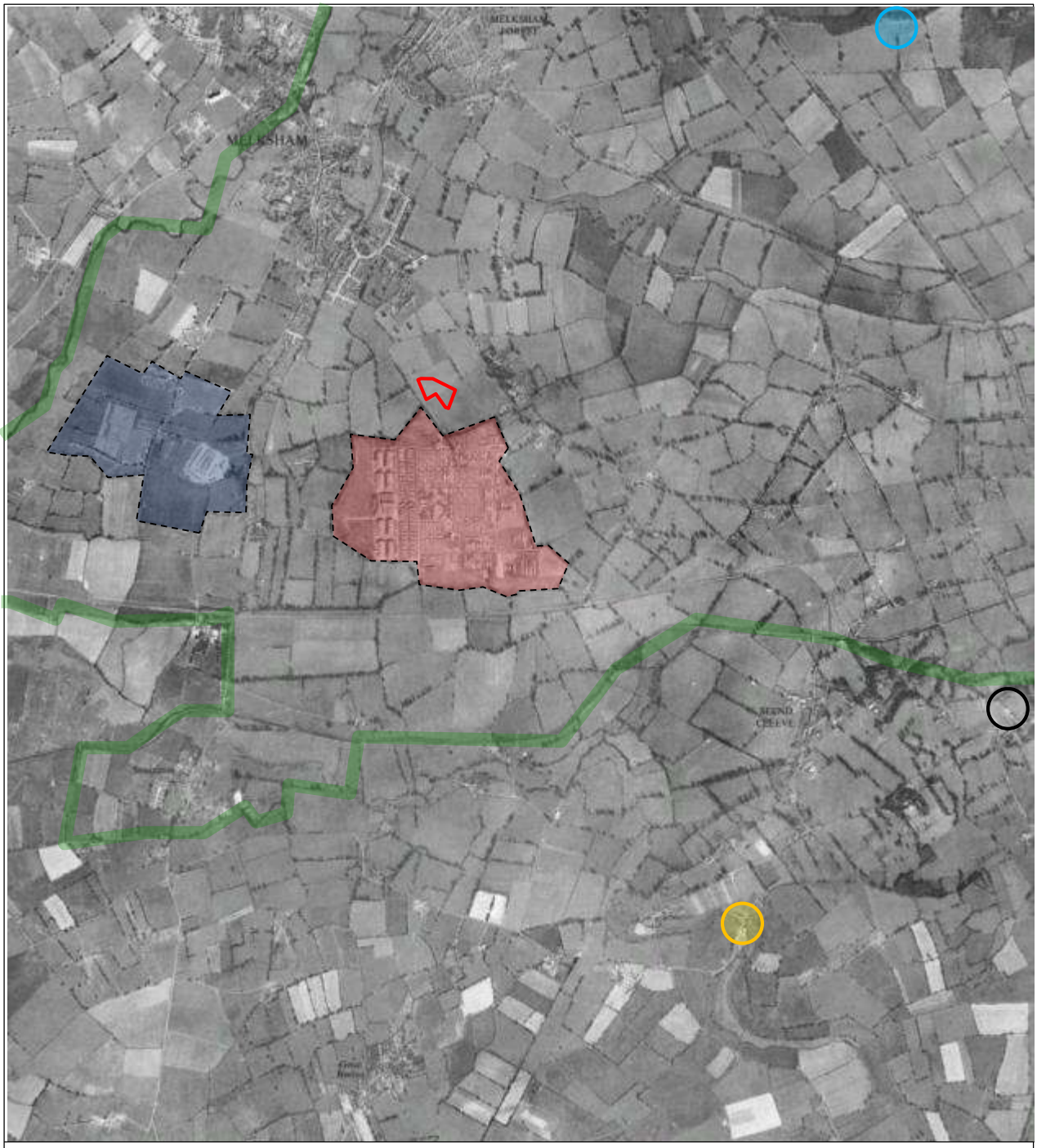
1945 Google Earth Layer - Allied Positions Overlay

Annex: **H3**



KEY

- RAF Melksham
- Military Camp
- Eisenhower's HQ
- Abandoned Bomb (Approximate location)
- GCHQ Defence Line
- Seend Home Guard Bomb (Approximate location)

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Approximate site boundary

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Project: **Melksham Primary School**

Ref: **DA4478a-00**

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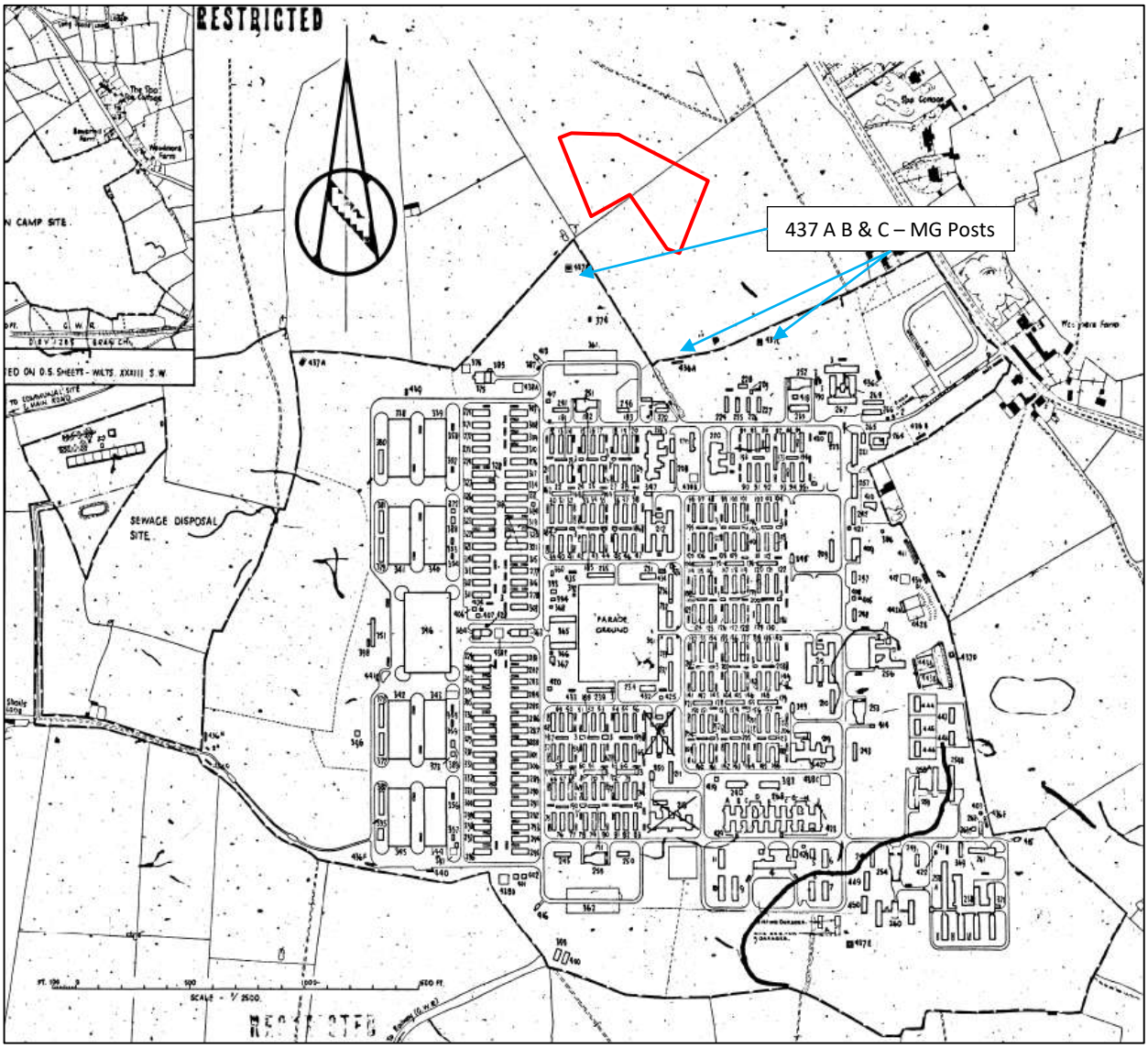
RAF Melksham Site Plan

Annex: I



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Approximate site boundary

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Source: RAF Musuem, Hendon

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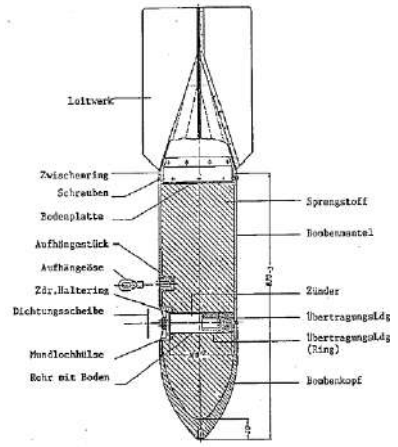
Examples of German Aerial-Delivered Ordnance

SC 50kg High Explosive Bomb

Bomb Weight	40-54kg (88-119lb)
Explosive Weight	25kg (55lb)
Fuze Type	Impact fuze/electro-mechanical time delay fuze
Bomb Dimensions	1,090 x 280mm (42.9 x 11.0in)
Body Diameter	200mm (7.87in)
Use	Against lightly damageable materials, hangars, railway rolling stock, ammunition depots, light bridges and buildings up to three stories.
Remarks	The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.

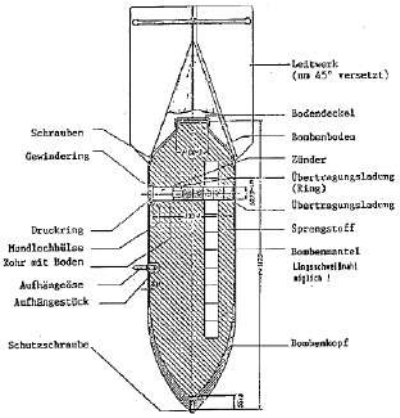






SC 250kg High Explosive Bomb

Bomb Weight	245-256kg (540-564lb)
Explosive Weight	125-130kg (276-287lb)
Fuze Type	Electrical impact/mechanical time delay fuze
Bomb Dimensions	1640 x 512mm (64.57 x 20.16in)
Body Diameter	368mm (14.5in)
Use	Against railway installations, embankments, flyovers, underpasses, large buildings and below-ground installations.
Remarks	It could be carried by almost all German bomber aircraft and was used to notable effect by the Junkers Ju-87 Stuka (*Sturzkampfflugzeug*, or dive-bomber).

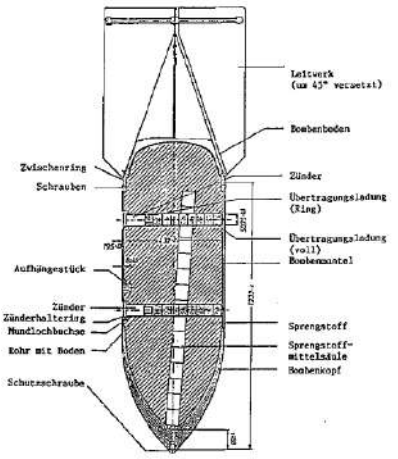



SC250 bomb being loaded onto German bomber

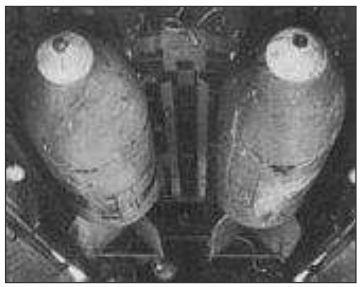


SC 500kg High Explosive Bomb

Bomb Weight	480-520kg (1,058-1,146lb)
Explosive Weight	250-260kg (551-573lb)
Fuze Type	Electrical impact/mechanical time delay fuze
Bomb Dimensions	1957 x 640mm (77 x 25.2in)
Body Diameter	470mm (18.5in)
Use	Against fixed airfield installations, hangars, assembly halls, flyovers, underpasses, high-rise buildings and below-ground installations.
Remarks	40/60 or 50/50 Amatol TNT, Trialene. Bombs recovered with Trialen filling have cylindrical paper-wrapped pellets, 1-15/16in. in length and diameter.







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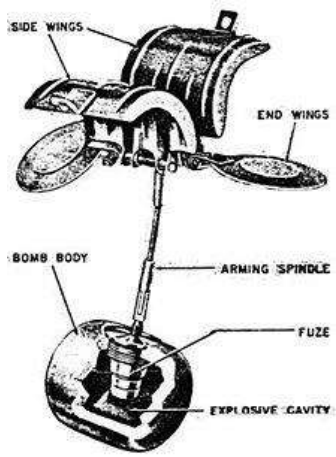
Examples of German Aerial-Delivered Ordnance

SD2 Anti-Personnel 'Butterfly Bomb'

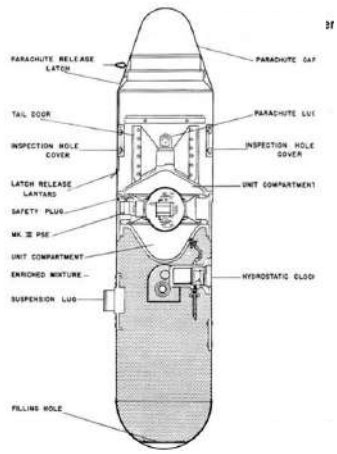
Bomb Weight	Approx. 2kg (4.41lb)
Explosive Weight	Approx. 7.5oz (225 grams) of Amatol surrounded by a layer of bituminous composition.
Fuze Type	41 fuze (time) , 67 fuze (clockwork time delay) or 70 fuse (anti-handling device)
Body Diameter	3in (7.62 cm) diameter, 3.1in (7.874) long
Use	Designed as an anti-personnel/fragmentation weapon. They were delivered by air, being dropped in containers of 23-144 sub-munitions that opened at a predetermined height, thus scattering the bombs.
Remarks	Quite rare. First used against Ipswich in 1940, but were also dropped on Kingston upon Hull, Grimsby and Cleethorpes in June 1943, amongst various other targets in UK. As the bombs fell the outer case flicked open via springs which caused four light metal drogues with a protruding 5 inch steel cable to deploy in the form of a parachute & wind vane, which armed the device as it span.





Parachute Mine (Luftmine B / LMB)

Bomb Weight	Approx. 990kg (2176lb)
Explosive Weight	Approx. 705kg (1,554lb)
Fuze Type	Impact/time delay/hydrostatic pressure fuze
Dimensions	2.64m x 0.64m (3.04m with parachute housing)
Use	Against civilian, military and industrial targets. Used as blast bombs and designed to detonate above ground level to maximise damage to a wider area.
Remarks	Deployed a parachute when dropped in order to control its descent. Had the potential to cause extensive damage within a 100m radius.



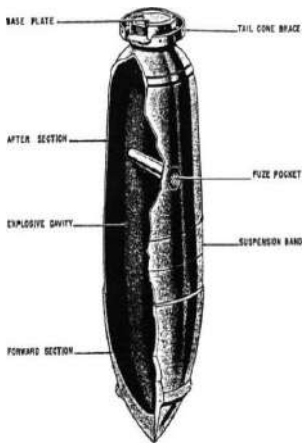






SC 1000kg

Bomb Weight	Approx. 993-1027kg (2,189-2,264lb)
Explosive Weight	Approx. 530-620kg (1168-1367lb)
Fuze Type	Electrical impact/mechanical time delay fuze.
Filling	Mixture of 40% amatol and 60% TNT, but when used as an anti-shipping bomb it was filled with Trialen 105, a mixture of 15% RDX, 70% TNT and 15% aluminium powder.
Bomb Dimensions	2800 x 654mm (110 x 25.8in)
Body Diameter	654mm (18.5in)
Use	SC-type bombs were General Purpose Bombs used primarily for general demolition work. Constructed of parallel walls with comparatively heavy noses, they are usually of three-piece welded construction.





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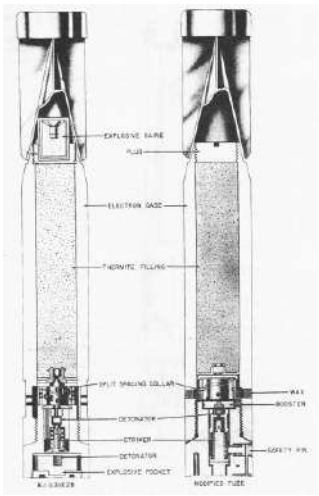
Examples of German Incendiary Bombs

1kg Incendiary Bomb

Bomb Weight	Approx. 1.0 - 1.3kg (2.2 and 2.9lb)
Explosive Weight	Approx. 680g (1.5lb) Thermite 8-15gm Explosive Nitropenta
Fuze Type	Impact fuze
Bomb Dimensions	350 x 50mm (13.8 x 1.97in)
Body Diameter	50mm (1.97in)
Use	As incendiary – dropped in clusters on towns and industrial complexes.
Remarks	Magnesium alloy case. Sometimes fitted with high explosive charge. The body is a cylindrical alloy casting threaded internally at the nose to receive the fuze holder and fuze.

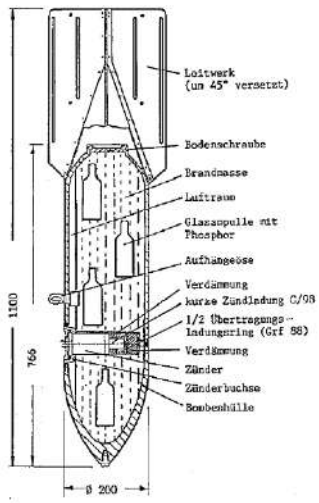


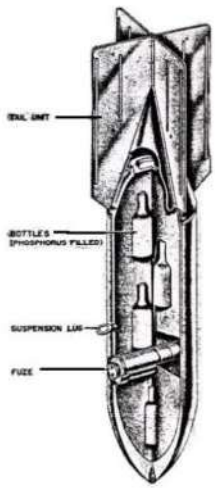




C50 A Incendiary Bomb

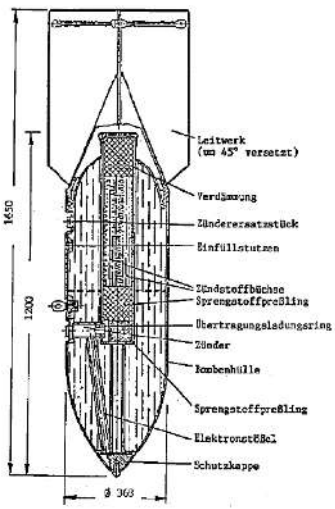
Bomb Weight	Approx. 41kg (90.4lb)
Explosive Weight	Approx. 0.03kg (0.066lb)
Incendiary Filling	12kg (25.5lb) liquid filling with phosphor igniters in glass phials. Benzine 85%; Phosphorus 4%; Pure Rubber 10%
Fuze Type	Electrical impact fuze
Bomb Dimensions	1,100 x 280mm (43.2 x 8in)
Use	Against any targets where an incendiary effect is required.
Remarks	Early fill was a phosphorous/carbon disulphide incendiary mixture.





Flam C-250 Oil Bomb

Bomb Weight	Approx. 125kg (276lb)
Explosive Weight	Approx. 1kg (2.2lb)
Fuze Type	Super-fast electrical impact fuze
Filling	Mixture of 30% petrol and 70% crude oil
Bomb Dimensions	1,650 x 512.2mm (65 x 20.2in)
Body Diameter	368mm (14.5in)
Use	Often used for surprise attacks on ground troops, against troop barracks and industrial installations. Thin casing – not designed for ground penetration.





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Ref: **DA4478a-00**

Source: Various sources

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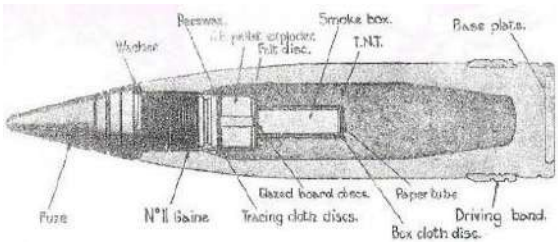
Examples of Anti-Aircraft Projectiles

3.7 Inch QF Anti-Aircraft Projectile

Projectile Weight	28lb (12.6 kg)
Explosive Weight	2.52lbs
Fuze Type	Mechanical Time Fuze
Dimensions	3.7in x 14.7in (94mm x 360mm)
Rate of Fire	10 to 20 rounds per minute
Use	The 3.7in AA Mks 1-3 were the standard Heavy Anti-Aircraft guns of the British Army and were commonly used on the Home Front.
Ceiling	30,000ft to 59,000ft





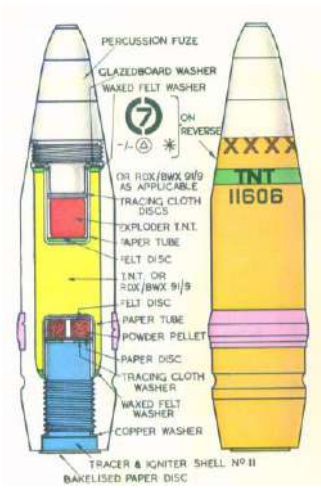


40mm Bofors Projectile

Projectile Weight	1.96lb (0.86kg)
Explosive Weight	300g (0.6lb)
Fuze Type	Impact Fuze
Rate of Fire	120 rounds per minute
Projectile Dimensions	40 x 180mm
Ceiling	23,000ft (7000m)
Remarks	Light quick fire high explosive anti-aircraft projectile. Each projectile fitted with small tracer element. If no target hit, shell would explode when tracer burnt out. Designed to engage aircraft flying below 2,000ft.



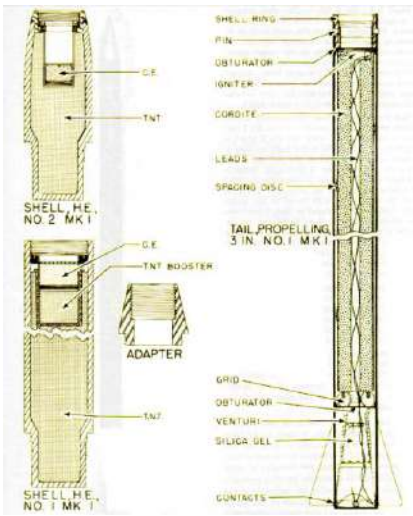




3in Unrotated Projectile (UP) Anti-Aircraft Rocket ("Z" Battery)

HE Projectile Weight	3.4kg (7.6lb)
Explosive Weight	0.96kg (2.13lb)
Filling	High Explosive – TNT. Fitted with aerial burst fuzing
Dimensions of projectile	236 x 83mm (9.29 x 3.25in)
Remarks	As a short range rocket-firing anti-aircraft weapon developed for the Royal Navy. It was used extensively by British ships during the early days of World War II. The UP was also used in ground-based single and 128-round launchers known as Z Batteries. Shell consists of a steel cylinder reduced in diameter at the base and threaded externally to screw into the shell ring of the rocket motor.





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Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: Various sources

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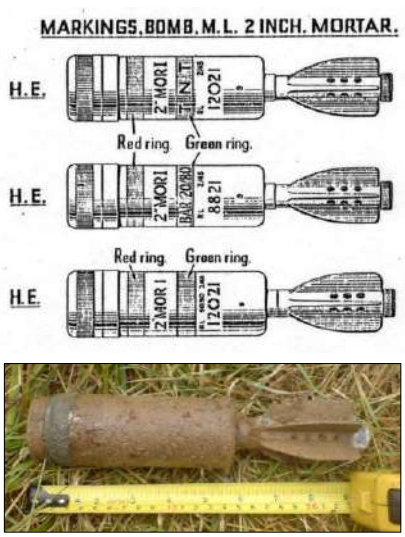
Examples of Land Service Ammunition – Mortars

2 inch Mortar High Explosive

Weight	Approx. 1.02kg (2.25lb)
Maximum Range	460m (500yards)
Filling	200g RDX/TNT
Dimensions	51 x 290mm (2in x 11.4 in)
Fuze Type	An impact fuze which detonates the fuze booster charge and in turn the high explosive charge.
Use	It had greater range and firepower over hand and rifle grenades, and was used to attack targets behind cover with high explosive rounds.
Identification	HE has a rounded edge to a flat back. Can either be a black body colour with red and yellow band or dark green with yellow band. Brass cap on top. Practice will have hole all the way through the top.





2 inch Mortar Smoke

Weight	Approx. 910g (2lb)
Maximum Range	460m (500yards)
Filling	White phosphorus and smoke fill
Dimensions	51 x 290mm (2in x 11.4 in)
Fuze Type	An impact fuze which initiates a bursting charge. This ruptures the mortar bomb's body and disperses the phosphorus filler.
Identification	Smoke mortars have a recess and emission holes. May still see light green body paint. Look for stained ground around munition.
Use	As a screening device for unit movement or to impair enemy field of vision.

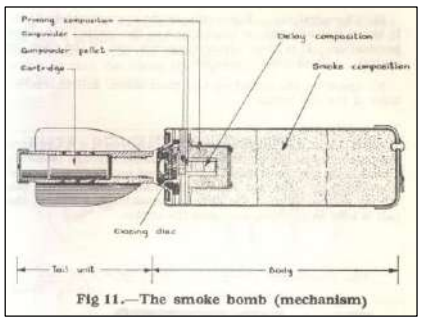
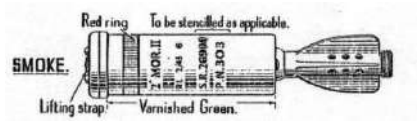


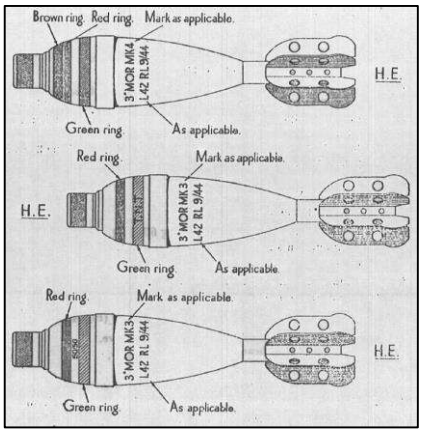
Fig 11.—The smoke bomb (mechanism)



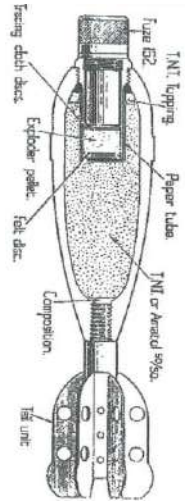


3 inch Mortar High Explosive

Weight	Approx. 4.5kg (10lb)
Maximum Range	1,460 (Mk1) – 2,560m (Mk2) (1,600 – 2,800yds)
Dimensions	81mm (3in)
Filling	Amatol
Firing Mechanism	Drop, fixed striker
Remarks	Fin-stabilised bomb fired by means of a charge consisting of a primary cartridge in the tail and four secondary cartridges.
Identification	An old style mortar. No way of telling if HE or practice, so treat as HE.







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Project: **Melksham Primary School**

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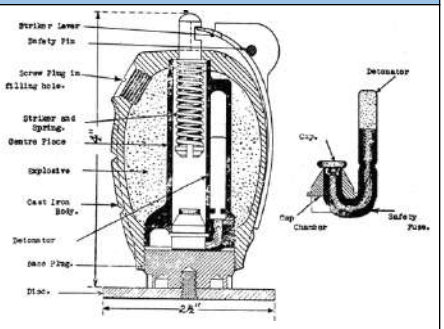
Examples of Land Service Ammunition – Grenades

No. 36 'Mills' Grenade

Weight	Approx. 765g filled (1lb 11.25oz)
Explosive Weight	71g (2oz) filling.
Fuze Type	4-7 second delay hand-throwing fuze. No. 6 Detonator
Dimensions	95 x 61mm (4 x 2.4in)
Use	Fragmentation explosive at approx. 30m range 100m range of damage.
Remarks	First introduced in 1915, its classic grooved, cast-iron 'pineapple' design was designed to provide uniform fragmentation. The detonator is inserted before use after removing the base plug.





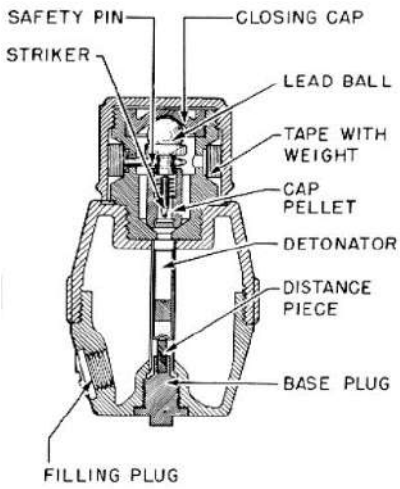


Left: baseplate and detonator removed

No. 69 Grenade

Weight	Approx. 383g (13.5oz)
Fill Weight	93g (3.25 oz) of either Amatol, Baratol or Lyddite
Fuze Type	'All-ways' fuze. Comprised of a safety cap, a weighted streamer attached to a steel ball bearing and a safety bolt designed to detonate from any point of impact.
Dimensions	115 x 60mm (4.5 x 2 .4 in)
Use	A blast grenade for use as an offensive weapon. Detonator was inserted before use.
Remarks	Introduced December 1940 and made from the plastic Bakelite as opposed to conventional metals. Detection is difficult due to this low metal content.

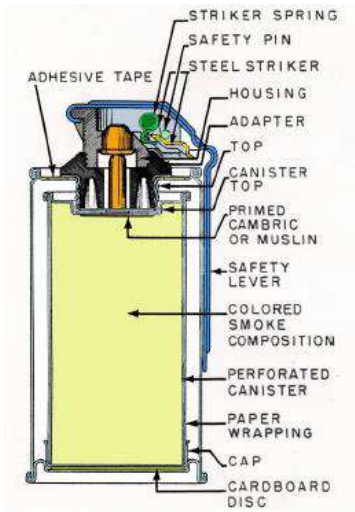




No. 83 Smoke Grenade

Weight	Approx. 680g (1.5lb)
Explosive Weight	Approx. 170-200g. (6-7 oz)
Fuze Type	Originally used a friction system using a match head composition. Later developed to a striker lever ignition system.
Dimensions	Approx. 62 x 140mm (2.44 x 5.5 in)
Use	Use as a target or landing zone marking device and as a screening method for troop / unit movement.
Remarks	This basic design stayed relatively unchanged up to the 1980's. The letters CCC were often etched into the body of the grenade in the colour of the smoke.





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Ref: **DA4478a-00** Source: Various sources

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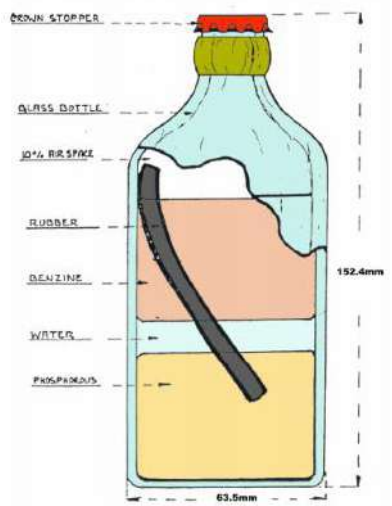
Examples of Land Service Ammunition – Home Guard

No. 76 Self Igniting Phosphorous (SIP) Grenade

Weight	Approx. 1lb 3oz
Filling	White Phosphorous and Benzene
Design	The filling was contained in a ½ pint sized glass bottle with water and a strip of rubber. Over time the rubber dissolved to create a sticky which would self ignite when the bottle broke.
Use	Originally intended as an anti-tank incendiary weapon deployed by hand. Designed to be produced cheaply without consuming materials needed to produce armaments on the front line.
Remarks	The Home Guard hid caches of these grenades during the war. Not all locations were officially recorded and some caches were lost and encountered post-war. In all cases, the grenades are still found to be dangerous.



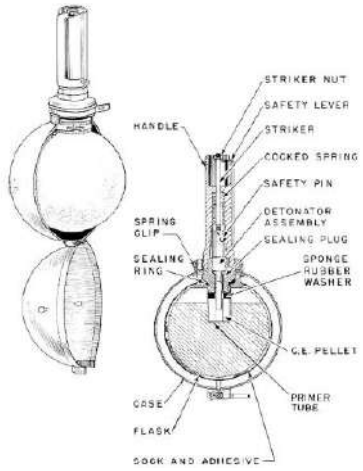


No. 74 Grenade ("Sticky Bomb") Mk1

Weight	Approx. 1.1kg (2.25lb)
Filling	Approx. 600g Nobel's No.283 (Nitro-glycerine) (1.33lb)
Design	A glass ball on the end of a Bakelite (plastic) handle. The inside of the ball would contain the explosive filling and the outside a very sticky adhesive coating.
Use	An anti-tank grenade primarily issued to the home guard. It required the user to come in very close proximity of the target and smash the glass explosive container against it.
Remarks	Timer fuze was located in the handle. This would explode after 3-6 secs.





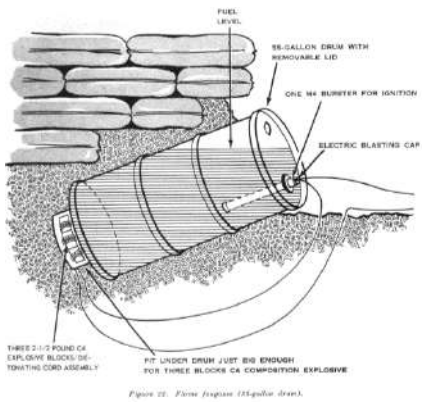


Flame Fougasse Bomb

Weight	Various
Filling	Initially a mixture of 40% petrol and 60% gas. Ammonal provided the propellant charge.
Design	Usually constructed from a 40-gallon drum dug into a roadside and camouflaged.
Use	As an improvised anti-tank bomb. When triggered the Fougasse could project a beam of burning sticky fuel in a fixed direction from up to 3m (10ft) wide and 27m (30yards) long.
Remarks	A highly unorthodox weapon designed by the Petroleum Warfare Department to address a critical lack of weapons in 1940. 50,000 are estimated to have been distributed around the UK.







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Project: **Melksham Primary School**

Ref: **DA4478a-00**

Source: Various sources

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Examples of Small Arms Ammunition

Cannon Ammunition



.303 British Rifle Ammunition

Bullet Diameter	7.92mm
Case length	56.44mm
Overall length	78.11mm
Type	Rifle Ammunition
Propellant	Originally black powder. Later Cordite followed by Nitrocellulose
Remarks	First produced in 1889 and still in use today, the .303inch cartridge has progressed through ten 'marks' which eventually extended to a total of around 26 variations.

Bullet Type	Colour of tip	Colour of Annulus
Armour Piercing	Green	Green
Ball	None	Purple
Incendiary	Blue	Blue
Observing	Black	Black
Proof	None	Yellow
Tracer Short Range	White	Red
Tracer Dark Ignition	Grey	Red
Tracer Long Range	Red	Red



Buried and Decayed Ammunition





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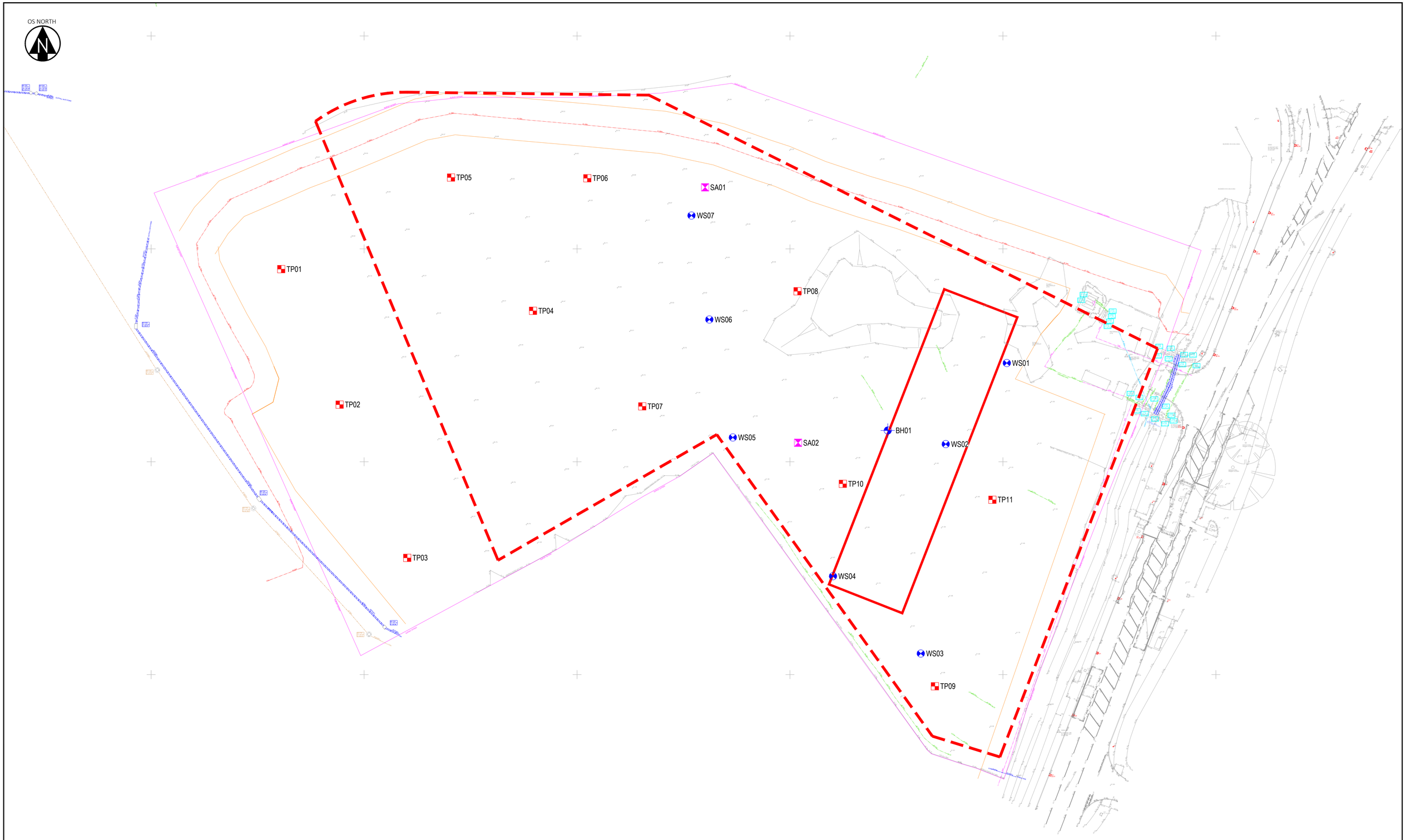
Appendix E Exploratory hole location plan, exploratory hole logs and photographs

Exploratory hole location plan



KEY

- Site Investigation Boundary
- Proposed School Building
- TPi Trial Pit
- BHi Borehole Location
- WSi Window Sample Location
- SAi Soakaway Test

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:
MELKSHAM PRIMARY SCHOOL PATHFINDER WAY SN12
6YP_10446-TOPO_Rev.00_Scale 1:200, Date: 18/05/23.

REV.	REVISION NOTES/COMMENTS	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P1	FIRST ISSUE	EP	15/06/23	RSw	04/07/23	RSw	04/07/23

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or visit www.hydrock.com

CLIENT
ISG LIMITED

PROJECT
SCF, MELKSHAM

TITLE
EXPLORATORY HOLE LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	1:400

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
27203-HYD-XX-XX-DR-GE-1003	P1

Exploratory hole logs

Hydrock

Project: Melksham SCF

Trialpit No
SA01
Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391100.07, 162719.44	Stability: Stable.	Dimensions: 1.80m x 0.50m
Hydrock Project No: C-27203		Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Friable brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick concrete and limestone. (MADE GROUND PLACED TOPSOIL)	0.20	(0.20)		
				Stiff brown to greyish brown slightly sandy slightly gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick concrete limestone. Cobbles are angular of brick. (MADE GROUND)	0.70	(0.50)		
1.00	HSV	100kPa		Stiff high strength yellowish brown mottled orange slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)	1.40	(0.70)		
1.50	HSV	179kPa		Very stiff very high strength thickly laminated grey and light grey mottled orange and off-white silty CLAY with frequent silt pockets. (OXFORD CLAY FORMATION)	1.80	(0.40)		
				Base of Excavation at 1.80m				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 1.80m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
SA02
Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391121.90, 162659.47	Stability: Stable.	Dimensions: 1.80m x 0.50m; Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 41.38m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Firm locally stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is angular to subangular fine to coarse of brick concrete and limestone. (MADE GROUND)	0.40	(0.40)	40.98	
				Firm medium strength greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of brick concrete limestone and asphalt. (MADE GROUND)	1.10	(0.70)	40.28	
				Firm dark brown slightly sandy SILT with a medium organic matter. Sand is fine. (RELICT TOPSOIL)	1.20	(0.10)	40.18	
1.50	HSV	39kPa		Firm brown becoming brownish grey slightly sandy SILT with a medium organic matter content and a mild organic odour. Sand is fine. (RESIDUAL OXFORD CLAY FORMATION)				
2.00	HSV	76kPa	▼	*... at 2.00m bgl: rare wood.*		(1.00)		
				Base of Excavation at 2.20m	2.20		39.18	

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 2.20m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP1
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391000.54, 162700.24	Stability: Stable.	Dimensions: 3.10m / 0.60m — Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 39.96m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Grass over firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular medium of brick limestone. (MADE GROUND)				
0.50	D					(0.90)		
0.50	ES							
0.50 - 0.90	B							
					0.90		39.06	
1.00	ES			Stiff high strength brown mottled orangish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of chert. (RESIDUAL OXFORD CLAY FORMATION)	1			
1.00	HSV	104kPa						
1.20 - 1.70	B							
1.50	D					(1.20)		
1.50	HSV	101kPa						
2.00	HSV	110kPa			2			
2.10 - 2.50	B				2.10		37.86	
2.30	D			Stiff high strength grey mottled orangish brown slightly sandy silty CLAY. Sand is fine to medium. (OXFORD CLAY FORMATION)		(0.40)		
2.50	HSV	130kPa			2.50		37.46	
3.00 - 3.50	B			Stiff high strength grey thinly laminated mottled orangish brown sandy silty CLAY with frequent pockets of grey silt occasional pockets of coarse sand sized gypsum occasional fossilised rootlets and a mild organic odour. Sand is fine to coarse. (OXFORD CLAY FORMATION)	3			
3.00	HSV	130kPa				(1.10)		
3.20	D							
3.50	HSV	130kPa						
					3.60		36.36	
				Base of Excavation at 3.60m				
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 3.60m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP10
Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391132.42, 162649.83	Stability: Stable.	Dimensions: 3.20m x 0.90m
Hydrock Project No: C-27203	Ground Level: 41.45m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Stiff dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick limestone concrete breeze block and asphalt. (MADE GROUND)				
				... at 0.40m bgl: greyish brown.				
0.50	D							
0.50	ES							
0.50 - 1.00	B					(1.50)		
1.00	D				1			
1.00	ES							
1.50 - 2.00	B				1.50		39.95	
1.50	HSV	203kPa		Very stiff very high strength locally thinly laminated greyish brown slightly sandy slightly gravelly silty CLAY with occasional pockets of silt. Sand is fine. Gravel is subrounded fine to medium of siltstone. (RESIDUAL OXFORD CLAY FORMATION)				
1.70	D							
2.00	HSV	133kPa			2			
2.40 - 2.80	B					(1.30)		
2.50	HSV	199kPa						
2.80	D				2.80		38.65	
2.80 - 3.10	B			Very stiff very high strength grey mottled brown and orangish brown slightly sandy silty CLAY with occasional fossilised rootlets. Sand is fine to coarse. (OXFORD CLAY FORMATION)				
3.00	D				3	(0.30)		
3.00	HSV	199kPa			3.10		38.35	
3.30	D			Very stiff very high strength thinly to thickly laminated slightly sandy silty CLAY with occasional fossilised rootlets. Sand is fine. (OXFORD CLAY FORMATION)		(0.40)		
3.50	HSV	210kPa			3.50		37.95	
				Base of Excavation at 3.50m				
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 3.50m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP11
Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391167.54, 162646.08	Stability: Stable.	Dimensions: 3.40m / 0.60m
Hydrock Project No: C-27203	Ground Level: 41.51m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick breeze block limestone and asphalt. (MADE GROUND)				
0.50	D							
0.50	ES					(1.10)		
1.00	ES				1.10		40.41	
1.20 - 1.50	B			Very stiff very high strength yellowish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subrounded fine of siltstone. (RESIDUAL OXFORD CLAY FORMATION)				
1.40	D							
1.50	HSV	183kPa				(0.70)		
2.00 - 2.50	B			Very stiff very high strength grey mottled orange slightly sandy silty CLAY. Sand is fine to medium. (OXFORD CLAY FORMATION)	1.80		39.71	
2.00	HSV	197kPa						
2.30	D					(0.80)		
2.50	HSV	200kPa						
2.70 - 3.00	B			Very stiff thinly laminated dark grey mottled yellowish brown slightly sandy silty CLAY with occasional fossilised rootlets. Sand is fine to medium. (OXFORD CLAY FORMATION)	2.60		38.91	
						(0.40)		
3.20 - 3.70	B			Very stiff dark grey mottled yellowish brown thinly to thickly laminated slightly sandy silty CLAY with occasional pockets of light grey silt. Sand is fine. (OXFORD CLAY FORMATION)	3.00		38.51	
3.30	D					(0.70)		
				Base of Excavation at 3.70m	3.70		37.81	

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 3.70m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP2
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391014.26, 162668.43	Stability: Stable.	Dimensions: 2.90m x 0.60m; Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 40.61m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20 0.20	D ES			Scrub over greyish brown firm locally stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick concrete clinker asphalt and limestone. (MADE GROUND)				
0.50	ES							
1.00 1.00	D ES				1	(1.50)		
					1.50		39.11	
1.70 1.70	D HSV	113kPa		Stiff high strength thinly laminated grey mottled brown and off white slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)		(0.50)		
2.00	HSV	130kPa			2			
					2.00		38.61	
2.50	D			Stiff high strength grey mottled off white and orangish brown sandy silty CLAY with frequent coarse sand to fine gravel sized possible gypsum and pockets of orange clayey coarse sand. Sand is fine to coarse. (OXFORD CLAY FORMATION)				
2.70	HSV	180kPa	▼	*... at 2.80m bgl: seepage.*		(1.70)		
3.00 3.00	D HSV	188kPa			3			
3.50 3.50	D HSV	185kPa						
				Base of Excavation at 3.70m	3.70		36.91	
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Groundwater seepage encountered at 2.80m bgl. 3. Trial pit terminated at 3.70m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP3
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391030.13, 162632.43	Stability: Stable.	Dimensions: 3.00m x 0.60m; Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 40.92m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Scrub over firm grey and greyish brown occasionally mottled black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick limestone asphalt and clinker. (MADE GROUND)				
0.50	D							
0.50	ES							
0.50 - 1.00	B							
1.00	ES				1	(1.60)		
1.50	D				1.60		39.32	
				Firm dark brown slightly sandy SILT. Sand is fine to medium. (RELICT TOPSOIL)	1.70	(0.10)	39.22	
2.00	D			Stiff very high strength brown and grey mottled off white slightly sandy CLAY with frequent coarse sand sized possible gypsum. Sand is fine to coarse. (RESIDUAL OXFORD CLAY FORMATION)				
2.00 - 2.50	B				2			
2.00	HSV	173kPa				(1.20)		
2.50	HSV	169kPa			2.90		38.02	
3.00	D			Stiff high strength thinly laminated grey occasionally mottled orange sandy silty CLAY with a rare fossilised rootlets and frequent possible gypsum. (OXFORD CLAY FORMATION)				
3.00 - 3.50	B				3			
3.00	HSV	145kPa				(0.70)		
3.50	D							
3.50	HSV	150kPa			3.60		37.32	
				Base of Excavation at 3.60m				
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 3.60m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP4
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391059.67, 162690.46	Stability: Stable.	Dimensions: 2.80m / 0.60m
Hydrock Project No: C-27203	Ground Level: 40.43m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Scrub over firm locally stiff slightly sandy gravelly CLAY with a medium organic matter content and a low cobble content. Sand is fine to coarse. Gravel is angular to to subrounded fine to coarse of brick cement asphalt and limestone. (MADE GROUND)				
0.50	ES					(1.20)		
1.00	D				1			
1.00	ES							
					1.20		39.23	
1.30 - 1.50	B			Stiff high strength orangish brown and brown slightly sandy silty CLAY with a low organic matter content. Sand is fine. (RESIDUAL OXFORD CLAY FORMATION)				
1.50	D					(0.50)		
1.50	HSV	129kPa						
					1.70		38.73	
				Very stiff very high strength grey mottled orange sandy CLAY with frequent fine gravel sized possible gypsum crystals. Sand is fine to coarse. (OXFORD CLAY FORMATION)				
2.00	HSV	155kPa			2			
						(0.80)		
2.50	D							
2.50	HSV	173kPa						
					2.50		37.93	
				Base of Excavation at 2.50m				
					3			
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 2.50m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP5
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391040.42, 162721.76	Stability: Stable.	Dimensions: 2.80m x 0.60m; Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 39.68m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Grass over firm brown slightly sandy silty CLAY with a medium organic matter content. Sand is fine to medium. (TOPSOIL)	0.40	(0.40)	39.28	
0.50	D			Stiff high strength yellowish brown slightly sandy slightly gravelly silty CLAY. Sand is fine. Gravel is angular to subangular fine to medium of chert. (RESIDUAL OXFORD CLAY FORMATION)				
0.50	ES							
0.70	HSV	97kPa				(0.80)		
1.50	D			Stiff high strength grey occasionally orangish brown mottled off-white slightly sandy silty CLAY with frequent pockets of off-white silt coarse sand to fine gravel sized gypsum and occasional fossilised rootlets. (OXFORD CLAY FORMATION)	1.20		38.48	
1.50	ES							
1.50	HSV	121kPa						
1.70	HSV	145kPa				(1.30)		
2.00	HSV	133kPa	▼	*... at 2.10m bgl: slow seepage.*				
2.50	D				2.50		37.18	
2.50	HSV	156kPa		Base of Excavation at 2.50m				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Trial pit machine dug with JCB 3CX. 3. Groundwater seepage encountered at 2.10m bgl. 4. Trial pit terminated at 2.50m bgl. 5. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP6
Page No. 1 of 1

Method: Trial Pit	Date(s): 23/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391072.43, 162721.59	Stability: Stable.	Dimensions: 3.20m x 0.60m / Scale: 1:25
Hydrock Project No: C-27203	Ground Level: 39.72m OD	Plant: JCB 3CX	

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	D			Grass over friable brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick concrete and limestone. (MADE GROUND PLACED TOPSOIL)	0.30	(0.30)	39.42	
0.20	ES							
0.20 - 0.50	B							
0.50	D			Firm brown slightly sandy slightly gravelly silty CLAY with a low organic matter content. Sand is fine to coarse. Gravel is subangular medium to coarse of chert and limestone. (MADE GROUND)	0.60	(0.30)	39.12	
0.50	ES							
0.50	HSV	103kPa						
0.60 - 1.00	B			Stiff high strength yellowish brown slightly sandy silty CLAY. Sand is fine. (RESIDUAL OXFORD CLAY FORMATION)				
0.80	D							
1.00	D				1	(0.60)		
1.00	ES							
1.00	HSV	113kPa			1.20		38.52	
				Very stiff very high strength light and dark grey slightly sandy slightly gravelly silty CLAY. Sand is fine. Gravel is subrangular to subrounded fine to coarse of siltstone. (OXFORD CLAY FORMATION)				
1.80	D							
1.80 - 2.50	B							
				... at 1.90m bgl: seepage.				
2.00	HSV	169kPa			2	(2.00)		
2.50	D							
2.50 - 3.00	B			*... from 2.50m bgl: frequent gypsum.*				
2.50	HSV	161kPa						
3.00	HSV	199kPa			3			
					3.20		36.52	
3.30	D			Very stiff very high strength dark grey silty CLAY with rare fossils. (OXFORD CLAY FORMATION)		(0.30)		
3.30 - 3.50	B							
3.50	HSV	251kPa			3.50		36.22	
				Base of Excavation at 3.50m				
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Groundwater seepage encountered at 1.90m bgl. 3. Trial pit terminated at 3.50m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Trialpit No TP7 Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391085.32, 162668.01	Stability: Stable.	Dimensions: 3.10m x 0.60m
Hydrock Project No: C-27203	Ground Level: 40.88m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Stiff brown to reddish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick, concrete and limestone. (MADE GROUND) *... between 0.30m - 0.70m bgl: reddish brown sandy angular to subangular fine to medium gravel of limestone in centre of west pit wall.*		(0.70)		
0.50	ES							
0.70	D				0.70		40.18	
1.00	D			Stiff yellowish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone siltstone and concrete. (MADE GROUND)		(0.50)		
1.00	ES				1			
1.10 - 1.50	B				1.20		39.68	
1.30	D			Stiff locally firm dark brown clayey SILT with a strong organic odour and high organic matter content. (RELICT TOPSOIL)		(0.30)		
					1.50		39.38	
1.70 - 2.00	B			Very stiff very high strength grey mottled orangish brown sandy slightly gravelly CLAY with frequent pockets of silt and coarse sand. Sand is fine to coarse. Gravel is subrounded fine to medium of siltstone. (RESIDUAL OXFORD CLAY FORMATION)				
1.80	D					(0.70)		
2.00	HSV	173kPa			2			
					2.20		38.68	
2.30	D			Very stiff very high strength grey mottled orangish brown sandy slightly gravelly CLAY with frequent pockets of silt and coarse sand. Sand is fine to coarse. Gravel is subrounded fine to medium of siltstone. (OXFORD CLAY FORMATION)				
2.30 - 2.60	B					(0.70)		
2.50	HSV	174kPa						
					2.90		37.98	
3.00	D			Very stiff very high strength thinly laminated dark bluish grey mottled orange sandy CLAY with frequent fossils and a occasional fossilised rootlets. Sand is fine to coarse. (OXFORD CLAY FORMATION)	3			
3.00 - 3.50	B					(0.60)		
3.00	HSV	180kPa						
3.50	HSV	171kPa			3.50		37.38	
				Base of Excavation at 3.50m				
					4			
					5			

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Trial pit machine dug with JCB 3CX. 3. No groundwater encountered. 4. Trial pit terminated at 3.50m bgl. 5. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Trialpit No
TP8
Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391121.78, 162695.04	Stability: Stable.	Dimensions: 2.90m / 0.60m
Hydrock Project No: C-27203	Ground Level: 40.80m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
				Friable brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick concrete and limestone. (MADE GROUND PLACED TOPSOIL)	0.15	(0.15)	40.65	
0.20 0.20	D ES			Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded of brick and concrete. (MADE GROUND)				
0.50 0.50	D ES					(0.55)		
					0.70		40.10	
0.80	HSV	34kPa		Soft locally firm low to medium strength dark brown slightly sandy silty CLAY with a medium organic matter content and mild organic odour. Sand is fine. (RELICT TOPSOIL)		(0.40)		
1.00 1.00	D ES				1.10		39.70	
1.20 1.20	D HSV	56kPa		Firm medium strength yellowish brown mottled orange slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)		(0.40)		
					1.50		39.30	
2.00 2.00	D HSV	212kPa		Very stiff very high strength grey mottled orangish brown slightly sandy silty CLAY. Sand is fine to medium. (OXFORD CLAY FORMATION)		(1.00)		
2.50	HSV	188kPa			2.50		38.30	
				Base of Excavation at 2.50m				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 2.50m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Trialpit No TP9 Page No. 1 of 1

Method: Trial Pit	Date(s): 24/05/2023	Logged By: AT	Checked By: RSw
Client: ISG Ltd	Co-ords: 391154.03, 162602.27	Stability: Stable.	Dimensions: 3.20m x 0.60m
Hydrock Project No: C-27203	Ground Level: 41.90m OD	Plant: JCB 3CX	Scale: 1:25

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Friable brown slightly sandy slighlty gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick limestone and concrete. (MADE GROUND)	0.30	(0.30)	41.60	
0.50 0.50	D ES			Firm locally stiff greyish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangulsr fine to coarse of brick asphalt concrete and limestone. (MADE GROUND)	0.70	(0.40)	41.20	
1.00 1.00 1.00 - 1.40 1.00	D ES B HSV	63kPa		Firm locally stiff medium to high strength yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)	1.40	(0.70)	40.50	
1.50 - 2.00 1.50 1.80 2.00	B HSV D HSV	160kPa 207kPa		Very stiff locally stiff high to very high strength light grey mottled orangish brown slightly sandy silty CLAY with occasional pockets of off-white silt. Sand is fine to medium. (OXFORD CLAY FORMATION)	2.30	(0.90)	39.60	
2.50 - 3.00 2.50 2.70 3.00	B HSV D HSV	167kPa 212kPa		Very stiff locally stiff very high strength thinly to thickly laminated dark grey mottled brown and dark yellowish brown slightly sandy locally sandy CLAY with rare fossilised rootlets and occasional gypsum. Sand is fine to coarse. (OXFORD CLAY FORMATION)	3.50	(1.20)	38.40	
3.50	D			Base of Excavation at 3.50m				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. No groundwater encountered. 3. Trial pit terminated at 3.50m bgl. 4. Trial pit backfilled with arisings.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
BH01
Page No. 1 of 2

Method: Dynamic Sampled & Rotary Cored	Date(s): 25/05/2023 - 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391142.96, 162662.34	Checked By: RSw	Flush: Water
Hydrock Project No: C-27203	Ground Level: 41.32m OD		Scale: 1:50

Sample/Core Run (m) Smpl. Ø (mm) Smpl. rec. %	Samples / Tests Depth (m)	Type	Results	Mechanical Log TCR	SCR	RQD	If: Min Mean Max	Water Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	0.20	ES							Soft locally firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of concrete brick breeze block and limestone. (MADE GROUND PLACED TOPSOIL)	0.40	(0.40)	40.92		
	0.50	D							Firm locally soft greyish brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick and sandstone. (MADE GROUND) 1	1.10	(0.70)	40.22		
	0.50	ES												
	1.00	D												
1.20 - 2.00 128mm 100% rec	1.00 1.20	ES SPT	N=14 (3,2,3,3,4,4)						Firm greyish brown occasionally mottled orange sandy CLAY. Sand is fine to coarse. (RESIDUAL OXFORD CLAY FORMATION)	1.60	(0.50)	39.72		
	1.80	D							Stiff high strength grey mottled orange and off-white slightly sandy slightly gravelly CLAY with a rare fossilised rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium of siltstone. (OXFORD CLAY FORMATION) 2					
2.00 - 3.00 128mm 100% rec	2.00	SPT	N=17 (2,3,4,3,5,5)								(1.30)			
	2.70	D							*... between 2.70m - 2.80m bgl: band of extremely weak mudstone.*	2.90		38.42		
3.00 - 4.00 113mm 92% rec	3.00	SPT	N=25 (2,5,8,6,5,6)						Very stiff locally stiff thinly laminated greyish brown occasionally mottled orangish brown slightly sandy silty CLAY with occasional lenses of fine to coarse sand and frequent possible gypsum. Sand is fine to coarse. (OXFORD CLAY FORMATION) 3					
	3.45	D									(1.10)			
	3.50 - 3.80	C								4.00		37.32		
4.00 - 5.00 113mm 100% rec	4.00	SPT	N=8 (1,2,2,2,2,2)						Soft thinly laminated greyish brown occasionally mottled orangish brown slightly sandy silty CLAY with occasional lenses of fine to coarse sand and frequent possible gypsum. Sand is fine to coarse. (OXFORD CLAY FORMATION) *... from 4.30m bgl: occasional subrounded fine to medium GRAVEL of siltstone.* *... between 4.82m - 4.92m bgl: dark grey and brown sandy SILT.* 4 5					
	4.60	D									(1.00)			
5.00 - 6.00 113mm 100% rec	5.00	SPT	N=11 (1,2,2,3,2,4)							5.00		36.32		
	5.50	D							Soft thinly laminated dark grey slightly sandy silty CLAY with rare nodules of pyrite. Sand is fine. (OXFORD CLAY FORMATION) 6					
											(1.00)			
6.00 - 7.50	6.00	SPT	N=22 (2,4,4,5,5,8)							6.00		35.32		
	6.60	D		75	75	75			Stiff thinly laminated dark grey slightly sandy silty CLAY withrare nodules of pyrite. Sand is fine. (OXFORD CLAY FORMATION) 7					
											(1.10)			
	7.20	D								7.10		34.22		
									Extremely weak thinly laminated dark grey silty MUDSTONE. (OXFORD CLAY FORMATION)	7.50	(0.40)	33.82		
7.50 - 9.00 113mm 100% rec 7.50 - 9.00	7.50	SPT	N=26 (3,3,4,6,7,9)						Very stiff high strength thinly laminated dark grey silty CLAY. (OXFORD CLAY FORMATION) 8					
	8.30	D		87	87	66					(1.20)			
	8.80	D								8.70		32.62		
9.00 - 10.50	9.00	SPT	N=39 (3,5,6,8,11,14)						Extremely weak thinly to thickly laminated dark grey silty MUDSTONE. Bedding fractures are very closely to closely spaced subhorizontal planar smooth tight clean. (OXFORD CLAY FORMATION) 9					
	9.40	D		50	50	12					(1.80)			
									Continued on Next Sheet 10					

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)
	25/05	0800	0.00					
P30.	25/05	1800	6.00	6.00		0.00	Water	
P30.	26/05	0800	6.00	6.00		0.00	Water	
	26/05	1600	0.00					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Borehole terminated at 10.95m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 0.5m - 1.50m bgl.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No BH01 Page No. 2 of 2

Method: Dynamic Sampled & Rotary Cored	Date(s): 25/05/2023 - 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391142.96, 162662.34	Checked By: RSw	Flush: Water
Hydrock Project No: C-27203	Ground Level: 41.32m OD		Scale: 1:50

Sample/Core Run (m) Smpl. Ø (mm) Smpl. rec. %	Samples / Tests			Mechanical Log				Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
	Depth (m)	Type	Results	TCR	SCR	RQD	If: Min Mean Max							
	10.50	SPT	N=43 (5,6,8,8,11,16)						Extremely weak thinly to thickly laminated dark grey silty MUDSTONE. Bedding fractures are very closely to closely spaced subhorizontal planar smooth tight clean. (OXFORD CLAY FORMATION)	10.50		30.82		
									End of Borehole at 10.95m					

11 12 13 14 15 16 17 18 19 20

Progress and Observations

Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Borehole terminated at 10.95m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 0.5m - 1.50m bgl.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS01
Page No. 1 of 2

Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391170.91, 162678.18	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 40.95m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			Firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to medium of brick concrete and limestone. (MADE GROUND)		(0.70)			
			0.30 - 0.50	B								
			0.50	D								
			0.50	ES				0.70		40.25		
			1.00	ES			Stiff light brown to yellowish brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of siltstone. (RESIDUAL OXFORD CLAY FORMATION)	1	(0.50)			
			1.00 - 1.20	B								
1.20 - 2.00	113mm	100%	1.00	HSV	130kPa			1.20		39.75		
			1.20	SPT	N=16 (1,1,4,3,5,4)		Firm high strength grey mottled brown thinly laminated slightly sandy silty CLAY with rare fossilised rootlets. Sand is fine to medium. (OXFORD CLAY FORMATION)					
			1.80	D								
2.00 - 3.00	113mm	100%	2.00	SPT	N=22 (2,4,4,4,6,8)			2				
							... from 2.30m bgl: occasional pockets of medium to coarse sand.					
			2.60	D								
3.00 - 4.00	101mm	100%	3.00	SPT	N=20 (2,3,4,4,5,7)			3	(3.50)			
			3.60	D								
							... at 3.70m bgl: pocket of dark brown silty fine to medium sand.					
4.00 - 5.00	86mm	100%	4.00	SPT	N=16 (1,2,3,4,4,5)			4				
								4.70		36.25		
			4.80	D			Stiff dark grey thinly laminated CLAY. (OXFORD CLAY FORMATION)					
5.00 - 6.00	66mm	100%	5.00	SPT	N=19 (2,2,4,4,5,6)			5				
			5.60	D					(1.75)			
								6				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No WS01 Page No. 2 of 2
Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT / Drilled By: GEL
Client: ISG Ltd	Co-ords: 391170.91, 162678.18	Checked By: RSw / Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 40.95m OD	Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			6.00	SPT	N=24 (2,3,4,5,7,8)		Stiff dark grey thinly laminated CLAY. (OXFORD CLAY FORMATION)					
								6.45		34.50		
							End of Borehole at 6.45m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS02
Page No. 1 of 2

Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391156.58, 162659.14	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.36m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	D			Firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to medium of brick concrete and limestone. (MADE GROUND PLACED TOPSOIL)		(0.50)			
			0.20	ES								
			0.50	ES				0.50		40.86		
			0.60	D			Soft becoming medium strength brown slightly sandy silty CLAY with a low organic matter content and a mild organic odour. Sand is fine. (MADE GROUND)					
			0.80	HSV	73kPa				(0.60)			
			1.00	D			1					
			1.00	ES				1.10		40.26		
1.20 - 2.00	113mm	100%	1.20	SPT	N=8 (1,1,2,2,2,2)		Soft becoming medium strength dark brown slightly sandy silty CLAY with a low organic matter content and a mild organic odour. Sand is fine. (RELICT TOPSOIL)		(0.20)			
			1.20	HSV	121kPa			1.30		40.06		
							Firm medium strength grey mottled orangish brown slightly sandy slightly gravelly silty CLAY with rare rootlets. Sand is fine to medium. Gravel is subangular fine of siltstone. (RESIDUAL OXFORD CLAY FORMATION)		(0.20)			
			1.70	D				1.50		39.86		
							Firm medium strength orangish brown slightly sandy slightly gravelly silty CLAY with rare rootlets. Sand is fine to medium. Gravel is subangular fine of siltstone. (OXFORD CLAY FORMATION)					
2.00 - 3.00	113mm	100%	2.00	SPT	N=9 (1,2,2,3,2,2)		2		(1.10)			
								2.60		38.76		
			2.70	D			Stiff thinly laminated dark grey silty CLAY with occasional pyrite nodules. (OXFORD CLAY FORMATION)					
3.00 - 4.00	101mm	90%	3.00	SPT	N=21 (3,3,4,4,6,7)		3					
							... from 3.20m bgl: thinly laminated.					
							... from 3.35m bgl: dark greyish brown.					
			3.60	D								
4.00 - 5.00	86mm	100%	4.00	SPT	N=19 (2,2,3,5,6,5)		4					
							... between 4.20m - 4.40m bgl: band of slightly sandy SILT.					
							... from 4.40m bgl: mottled brown and grey.		(3.85)			
			4.60	D								
5.00 - 6.00	76mm	85%	5.00	SPT	N=12 (3,2,2,3,3,4)		5 *... between 5.00m - 6.00m bgl: firm.*					
			5.70	D								
							6					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No WS02 Page No. 2 of 2
Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT / Drilled By: GEL
Client: ISG Ltd	Co-ords: 391156.58, 162659.14	Checked By: RSw / Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.36m OD	Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			6.00	SPT	N=20 (2,3,3,5,5,7)		Stiff thinly laminated dark grey silty CLAY with occasional pyrite nodules. (OXFORD CLAY FORMATION)					
								6.45		34.91		
							End of Borehole at 6.45m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS03
Page No. 1 of 1

Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391150.72, 162609.96	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.81m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20 0.20	D ES			Firm brown and greyish brown sandy slightly gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of asphalt limestone breeze block and brick. (MADE GROUND)	0.40	(0.40)	41.41		
			0.50 0.50	D ES			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of asphalt limestone and brick. (MADE GROUND)	0.60	(0.20)	41.21		
			1.00	ES			Stiff high strength brown slightly sandy clayey SILT with a medium organic matter content and a mild organic odour. Sand is fine. (RESIDUAL OXFORD CLAY FORMATION) *... at 0.60m bgl: seepage.*	1.00	(0.40)	40.81		
1.20 - 2.00	113mm	100%	1.20 1.20	HSV HSV	107kPa 129kPa		Very stiff high strength yellowish brown mottled orangish brown slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)	1.40	(0.40)	40.41		
			1.70	D			Firm grey and brown slightly sandy slightly gravelly silty CLAY with rare rootlets and brown infilled bioturbation. Sand is fine. Gravel is subrounded to rounded fine of siltstone. (OXFORD CLAY FORMATION)					
2.00 - 3.00	113mm	100%										
			2.60	D					(2.46)			
3.00 - 4.00	101mm	90%										
			3.60	D			*... from 3.40m bgl: occasional gypsum.*	3.86		37.95		
4.00 - 5.00	86mm	98%					Stiff high strength thinly laminated brown mottled grey slightly sandy silty CLAY with rare fossilised rootlets. Sand is fine to medium. (OXFORD CLAY FORMATION)	4.72	(0.86)	37.09		
5.00 - 5.95	76mm	65%					Very stiff high strength thinly laminated dark grey silty CLAY with rare pyritised amnmonites. (OXFORD CLAY FORMATION)					
			5.30	D			*... between 5.35m - 5.50m bgl: mudstone band.*		(1.23)			
			5.70	D			*... from 5.70m bgl: rare pyrite.*	5.95		35.86		
							End of Borehole at 5.95m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. Groundwater seepage encountered at 0.60m bgl. 4. Window sample terminated at 5.95m bgl upon barrel refusal . 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS04
Page No. 1 of 1

Method: Window Sampler	Date(s): 25/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391130.10, 162628.12	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.60m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20 0.20	D ES			Firm locally stiff brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone brick and concrete. (MADE GROUND)	0.30	(0.30)	41.30		
			0.50 0.50	D ES			Firm locally stiff slightly sandy slightly gravelly CLAY with rare plastic. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of siltstone brick andconcrete. (MADE GROUND)	1.40	(1.10)	40.20		
			1.00	ES								
1.20 - 2.00	113mm	80%	1.20	SPT	N=0 (0,0)							
			1.50	ES			Soft dark brown slightly sandy SILT. Sand is fine to medium. (RELICT TOPSOIL)	1.50	(0.10)	40.10		
			1.80	D			Firm brown mottled grey slightly sandy slightly gravelly CLAY with frequent rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium of siltstone. (RESIDUAL OXFORD CLAY FORMATION)	1.70	(0.20)	39.90		
2.00 - 3.00	101mm	100%	2.00	SPT	N=18 (2,3,3,5,4,6)		Stiff very high strength brown and grey slightly sandy slightly gravelly silty CLAY with frequent fossilised rootlets. Sand is fine to coarse. Gravel is subrounded fine to medium of siltstone. (OXFORD CLAY FORMATION) *... from 2.0m bgl: becoming grey mottled orangish brown.*		(1.40)			
			2.70	D								
3.00 - 4.00	86mm	100%	3.00	SPT	N=19 (2,2,3,4,6,6)			3.10		38.50		
			3.70	D			Stiff very high strength thinly laminated greyish brown slightly sandy silty CLAY with occasional gypsum and rare fossilised rootlets. Sand is fine to medium. (OXFORD CLAY FORMATION)		(1.35)			
			4.00	SPT	N=21 (3,5,5,5,4,7)			4.45		37.15		
							End of Borehole at 4.45m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 4.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 0.30m - 1.30m bgl.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS05
Page No. 1 of 2

Method: Window Sampler	Date(s): 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391106.58, 162660.70	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.30m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			Firm locally stiff brown and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of limestone quartz and brick. (MADE GROUND)	0.30	(0.30)	41.00		
			0.50 0.50	D ES			Stiff locally firm brown and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of brick concrete and limestone. (MADE GROUND) *... at 0.65m bgl: cobble of concrete.*					
			1.00	ES			*... from 0.90m bgl: becoming sandy.*	1	(1.33)			
1.20 - 2.00	113mm	100%	1.20	SPT	N=6 (1,1,2,1,2,1)			1.63		39.67		
			1.80	D			Firm dark brown slightly sandy SILT with a high organic matter content. Sand is fine to medium. (RELICT TOPSOIL)	1.70	(0.07)	39.60		
2.00 - 3.00	113mm	100%	2.00	SPT	N=8 (1,1,2,2,2,2)		Soft locally firm greyish brown becoming grey mottled brown slightly sandy slightly gravelly silty CLAY with occasional rootles. Sand is fine to coarse. Gravel is subrounded to rounded fine to medium of siltstone. (RESIDUAL OXFORD CLAY FORMATION) *... between 2.0m - 2.15m bgl: lenses of brown silt with a high organic matter content and a strong organic odour.*	2	(0.64)	39.03		
			2.70	D			Stiff high strength dark grey mottled orangish brown slightly sandy silty CLAY. Sand is fine. (OXFORD CLAY FORMATION)	2.27	(0.83)	38.20		
3.00 - 4.00	101mm	95%	3.00	SPT	N=18 (1,3,4,4,4,6)			3				
			3.60	D			Stiff high strength thinly laminated greyish brown and dark grey silty CLAY with a occasional fossilised rootlets and occasional coarse sand sized gypsum. (OXFORD CLAY FORMATION)	3.10				
4.00 - 5.00	86mm	95%	4.00	SPT	N=17 (10,5,4,3,5,5)		*... between 4.05m - 4.10m bgl: band of sandy silt.*	4	(3.35)			
			4.70	D								
5.00 - 6.00	76mm	95%	5.00	SPT	N=13 (2,2,2,3,4,4)			5				
			5.70	D				6				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 0.30m - 1.60m bgl.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No WS05 Page No. 2 of 2

Method: Window Sampler	Date(s): 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391106.58, 162660.70	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 41.30m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			6.00	SPT	N=23 (3,4,5,6,5,7)		Stiff high strength thinly laminated greyish brown and dark grey silty CLAY with a occasional fossilised rootlets and occasional coarse sand sized gypsum. (OXFORD CLAY FORMATION)					
								6.45		34.85		
							End of Borehole at 6.45m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 0.30m - 1.60m bgl.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No WS06 Page No. 1 of 1

Method: Window Sampler	Date(s): 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391101.07, 162688.41	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 40.84m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			Loose brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of brick concrete asphalt and breeze block. (MADE GROUND PLACED TOPSOIL)	0.18	(0.18)	40.66		
			0.50 0.50	D ES			Firm yellowish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of concrete brick limestone and quartz. (MADE GROUND)		(1.22)			
			1.00 1.00	D ES				1				
1.20 - 2.00	113mm	80%	1.20	SPT	N=8 (1,2,2,2,2,2)			1.40		39.44		
							Soft dark brown slightly sandy SILT. Sand is fine to medium. (RELICT TOPSOIL)	1.50	(0.10)	39.34		
			1.80	D			Soft high strength brown to orangish brown mottled grey slightly sandy silty CLAY. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)					
2.00 - 3.00	113mm	70%	2.00	SPT	N=14 (2,1,2,3,3,6)			2	(1.50)			
								3.00		37.84		
							End of Borehole at 3.00m	3				
								4				
								5				
								6				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 3.0m bgl due to loss of barrel shoe down the hole and its impact on UXO downhole clearance. 5. No visual or olfactory evidence of contamination. 7. Position backfilled with arisings upon completion.

Logged in general accordance with BS5930:2015

Hydrock

Project: Melksham SCF

Borehole No
WS07
Page No. 1 of 2

Method: Window Sampler	Date(s): 26/05/2023	Logged By: AT	Drilled By: GEL
Client: ISG Ltd	Co-ords: 391096.87, 162712.83	Checked By: RSw	Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 40.47m OD		Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			0.20	ES			Loose brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of concrete asphalt brick limestone and sandstone. (MADE GROUND PLACED TOPSOIL)	0.10	(0.10)	40.37		
			0.50 0.50	D ES			Firm locally firm greyish brown slightly sandy gravelly CLAY with rare plastic. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone brick and asphalt. (MADE GROUND) *... at 0.63m bgl: buried grass encountered.* *... between 0.65 - 0.90m bgl: yellowish brown.*	0.90	(0.80)	39.57		
			1.00 1.00	D ES			Stiff very high strength dark brown slightly sandy clayey SILT with a medium organic content. Sand is fine to medium. (RELICT TOPSOIL)	1	(0.45)			
1.20 - 2.00	113mm	80%	1.20 1.20	SPT HSV	N=6 (1,1,1,1,2,2) 202kPa			1.35		39.12		
			1.50	D			Firm yellowish brown slightly sandy silty CLAY with a low organic matter content. Sand is fine to medium. (RESIDUAL OXFORD CLAY FORMATION)	1.70	(0.35)	38.77		
2.00 - 3.00	113mm	100%	2.00	SPT	N=15 (1,2,2,3,4,6)		Stiff grey mottled orangish brown slightly sandy silty CLAY. Sand is fine to coarse. (OXFORD CLAY FORMATION)	2	(0.65)			
			2.60	D			Firm very high strength thinly laminated slightly sandy silty CLAY with occasional pockets of grey silt and medium to coarse sand. (OXFORD CLAY FORMATION)	2.35		38.12		
3.00 - 4.00	101mm	100%	3.00	SPT	N=13 (1,2,2,2,5,4)			3	(1.35)			
			3.70	D			Very stiff very high strength thinly laminated dark grey and brown slightly sandy silty CLAY with occasional pyrite and gypsum. (OXFORD CLAY FORMATION)	3.70		36.77		
4.00 - 5.00	86mm	100%	4.00	SPT	N=28 (1,3,5,6,7,10)		*... between 4.0m - 4.30m bgl: brown infilled bioturbation.*	4				
			4.70	D			*... between 4.43m - 4.62m bgl: pocket of orangish brown silty coarse sand to fine gravel sized gypsum.* *... from 4.70m bgl: frequent pyrite.*					
5.00 - 6.00	76mm	95%	5.00	SPT	N=29 (3,3,7,6,6,10)			5	(2.75)			
			5.70	D				6				

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 1.0m - 6.0m bgl.

Logged in general accordance with BS5930:2015

Hydrock	Project: Melksham SCF	Borehole No WS07 Page No. 2 of 2
Method: Window Sampler	Date(s): 26/05/2023	Logged By: AT / Drilled By: GEL
Client: ISG Ltd	Co-ords: 391096.87, 162712.83	Checked By: RSw / Rig: Dando Terrier
Hydrock Project No: C-27203	Ground Level: 40.47m OD	Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
			6.00	SPT	N=27 (2,2,5,6,7,9)		Very stiff very high strength thinly laminated dark grey and brown slightly sandy silty CLAY with occasional pyrite and gypsum. (OXFORD CLAY FORMATION)	6.45		34.02		
							End of Borehole at 6.45m					

General Remarks:
1. Position cleared with CAT & Genny prior to excavation. 2. Inspection pit hand dug to 1.20m bgl to check for buried services prior to drilling. 3. No groundwater encountered. 4. Window sample terminated at 6.45m bgl. 5. No visual or olfactory evidence of contamination. 7. Gas and groundwater monitoring well installed with a responze zone of between 1.0m - 6.0m bgl.

Logged in general accordance with BS5930:2015

Exploratory hole photographs

Site Investigation Photograph 1	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: BH01 inspection pit from 0.0m-1.20m bgl.	

Site Investigation Photograph 2	
Date: 31/05/23	
Direction Photograph Taken: n/a.	
Description: BH01 showing sample recovered from 1.20m-3.00m bgl.	

Site Investigation Photograph 3	
Date: 31/05/23	
Direction Photograph Taken: n/a.	
Description: BH01 showing the Oxford Clay Formation from 3.0m-4.0m bgl.	

Site Investigation Photograph 4	
Date: 31/05/23	
Direction Photograph Taken: n/a.	
Description: BH01 showing the Oxford Clay Formation from 4.0m-6.0m bgl.	

Site Investigation Photograph 5	
Date: 31/05/23	
Direction Photograph Taken: n/a.	
Description: BH01 rotary core runs showing the Oxford Clay Formation from 6.0m-9.0m bgl.	

Site Investigation Photograph 6	
Date: 31/05/23	
Direction Photograph Taken: n/a.	
Description: H01 rotary core runs showing the Oxford Clay Formation from 9.0m-10.50m bgl.	

Site Investigation Photograph 1	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP1 south pit wall.	

Site Investigation Photograph 2	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description: TP1 east pit wall.	

Site Investigation Photograph 3	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP1 west wall.	

Site Investigation Photograph 4	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description: TP1 spoil.	

Site Investigation Photograph 5	
Date: 23/05/23	
Direction Photograph Taken: South	
Description: TP2 north pit wall.	

Site Investigation Photograph 6	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP2 west pit wall.	

Site Investigation Photograph 7	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP2 west pit wall.	

Site Investigation Photograph 8	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP2 spoil.	

Site Investigation Photograph 9	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP3 north pit wall.	

Site Investigation Photograph 10	
Date: 23/05/23	
Direction Photograph Taken: north.	
Description: TP3 west pit wall.	

Site Investigation Photograph 11	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP3 east pit wall.	

Site Investigation Photograph 12	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description: TP3 spoil.	

Site Investigation Photograph 13	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP4 north pit wall.	

Site Investigation Photograph 14	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP4 west pit wall.	

Site Investigation Photograph 15	
Date: 23/05/23	
Direction Photograph Taken: North.	
Description: TP4 east pit wall.	

Site Investigation Photograph 16	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description:TP4 spoil.	

Site Investigation Photograph 17	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP5 south pit wall.	

Site Investigation Photograph 18	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP5 west pit wall.	

Site Investigation Photograph 19	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP5 east pit wall.	

Site Investigation Photograph 20	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description: TP5 spoil.	

Site Investigation Photograph 21	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP6 south pit wall.	

Site Investigation Photograph 22	
Date: 23/05/23	
Direction Photograph Taken: South	
Description: TP6 east pit wall.	

Site Investigation Photograph 23	
Date: 23/05/23	
Direction Photograph Taken: South.	
Description: TP6 west pit wall.	

Site Investigation Photograph 24	
Date: 23/05/23	
Direction Photograph Taken: n/a.	
Description: TP6 spoil.	

Site Investigation Photograph 25	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP7 north pit wall.	

Site Investigation Photograph 26	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP7 north pit wall in more detail.	

Site Investigation Photograph 27	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP7 west pit wall.	

Site Investigation Photograph 28	
Date: 24/05/23	
Direction Photograph Taken: North	
Description: TP7 east pit wall.	

Site Investigation Photograph 29	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP7 spoil.	

Site Investigation Photograph 30	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP8 west pit wall.	

Site Investigation Photograph 31	
Date: 24/05/23	
Direction Photograph Taken: East.	
Description: TP8 north pit wall.	

Site Investigation Photograph 32	
Date: 24/05/23	
Direction Photograph Taken: East.	
Description: TP8 south pit wall.	

Site Investigation Photograph 33	
Date: 24/05/23	
Direction Photograph Taken: n/a.	
Description: TP8 spoil.	

Site Investigation Photograph 34	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP9 west pit wall.	

Site Investigation Photograph 35	
Date: 24/05/23	
Direction Photograph Taken: South.	
Description: TP9 south pit wall.	

Site Investigation Photograph 36	
Date: 24/05/23	
Direction Photograph Taken: West	
Description: TP9 north pit wall.	

Site Investigation Photograph 37	
Date: 24/05/23	
Direction Photograph Taken: n/a.	
Description: TP9 spoil.	

Site Investigation Photograph 38	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP10 west pit wall.	

Site Investigation Photograph 39	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP10 north pit wall.	

Site Investigation Photograph 40	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP10 south pit wall.	

Site Investigation Photograph 41	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: TP10 spoil.	

Site Investigation Photograph 42	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP11 north pit wall.	

Site Investigation Photograph 43	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP11 west pit wall.	

Site Investigation Photograph 44	
Date: 24/05/23	
Direction Photograph Taken: North.	
Description: TP11 north pit wall.	

Site Investigation Photograph 45	
Date: 24/05/23	
Direction Photograph Taken: n/a.	
Description: TP11 spoil.	

Site Investigation Photograph 46	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: SA01 West wall.	

Site Investigation Photograph 47	
Date: 24/05/23	
Direction Photograph Taken: n/a.	
Description: SA02 east wall.	

Site Investigation Photograph 48	
Date: 24/05/23	
Direction Photograph Taken: West.	
Description: SA02 spoil.	

Site Investigation Photograph 1	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 inspection pit from 0.0m – 1.20m bgl.	

Site Investigation Photograph 2	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 showing 1.20m – 2.0m bgl.	

Site Investigation Photograph 3	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 showing the Oxford Clay Formation between 2.0m – 3.0m bgl.	

Site Investigation Photograph 4	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 showing the Oxford Clay Formation between 3.0m – 4.0m bgl.	

Site Investigation Photograph 5	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 showing the Oxford Clay Formation between 4.0m – 5.0m bgl.	

Site Investigation Photograph 6	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS01 showing the Oxford Clay Formation between 5.0m – 6.0m bgl.	

Site Investigation Photograph 7	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 inspection pit from 0.0m-1.20m bgl.	

Site Investigation Photograph 8	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 showing 1.20m – 2.0m bgl.	

Site Investigation Photograph 9	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 showing the Oxford Clay Formation between 2.0m – 3.0m bgl.	

Site Investigation Photograph 10	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 showing the Oxford Clay Formation between 3.0m – 4.0m bgl.	

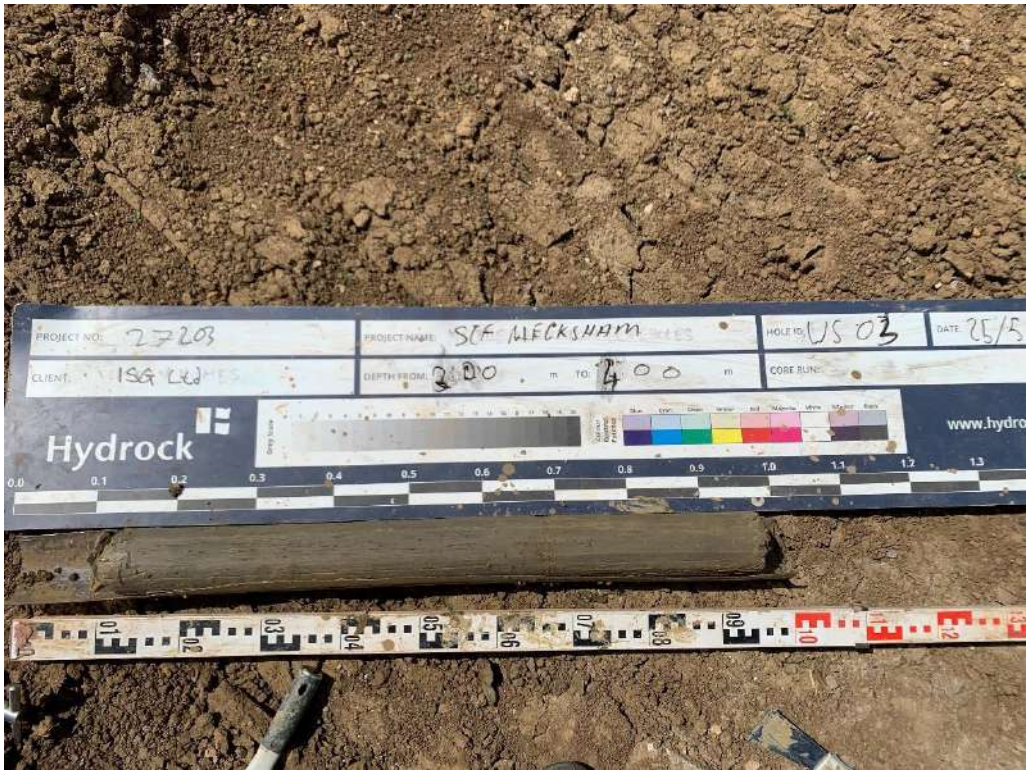
Site Investigation Photograph 11	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 showing the Oxford Clay Formation between 4.0m – 5.0m bgl.	

Site Investigation Photograph 12	
Date25/05/23	
Direction Photograph Taken: n/a.	
Description: WS02 showing the Oxford Clay Formation between 5.0m – 6.0m bgl.	

Site Investigation Photograph 13	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 inspection pit showing water at the base of the pit due to seepage.	

Site Investigation Photograph 14	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 showing sample recovered between 1.20m-2.00m bgl.	

Site Investigation Photograph 15	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 showing the Oxford Clay Formation between 2.0m – 3.0m bgl.	

Site Investigation Photograph 16	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 showing the Oxford Clay Formation between 3.0m – 4.0m bgl.	

Site Investigation Photograph 17	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 showing the Oxford Clay Formation between 4.0m – 5.0m bgl.	

Site Investigation Photograph 18	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS03 showing the Oxford Clay Formation between 5.0m – 5.95m bgl.	

Site Investigation Photograph 19	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS04 inspection pit from 0.0m-1.20m bgl.	

Site Investigation Photograph 20	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description:WS04 showing recovered sample from between 1.20m-2.0m bgl.	

Site Investigation Photograph 21	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS04 showing the Oxford Clay Formation from between 2.0m-3.0m bgl.	

Site Investigation Photograph 22	
Date: 25/05/23	
Direction Photograph Taken: n/a.	
Description: WS04 showing the Oxford Clay Formation from between 3.0m-4.0m bgl.	

Site Investigation Photograph 23	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 inspection pit from 0.0m-1.20m bgl.	

Site Investigation Photograph 24	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing recovered sample from between 1.20m-2.0m bgl.	

Site Investigation Photograph 25	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing the Oxford Clay Formation from between 2.0m-3.0m bgl.	

Site Investigation Photograph 26	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing the Oxford Clay Formation from between 3.0m-4.0m bgl.	

Site Investigation Photograph 27	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing the Oxford Clay Formation from between 4.0m-5.0m bgl.	

Site Investigation Photograph 28	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing the Oxford Clay Formation from between 5.0m-6.0m bgl.	

Site Investigation Photograph 29	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS06 inspection pit.	

Site Investigation Photograph 30	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS06 showing recovered sample from between 1.20m-2.0m bgl.	

Site Investigation Photograph 31	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS05 showing recovered sample from between 2.0m-3.0m bgl after the window sample barrel shoe was lost down hole.	

Site Investigation Photograph 32	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 inspection pit.	

Site Investigation Photograph 33	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 showing recovered sample from between 1.20m-2.0m bgl.	

Site Investigation Photograph 34	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 showing the Oxford Clay Formation from between 2.0m-3.0m bgl.	

Site Investigation Photograph 35	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 showing the Oxford Clay Formation from between 3.0m-4.0m bgl.	

Site Investigation Photograph 36	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 showing the Oxford Clay Formation from between 4.0m-5.0m bgl.	

Site Investigation Photograph 37	
Date: 26/05/23	
Direction Photograph Taken: n/a.	
Description: WS07 showing the Oxford Clay Formation from between 5.0m-6.0m bgl.	

Appendix F Geotechnical test results and geotechnical plots

Geotechnical laboratory test results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

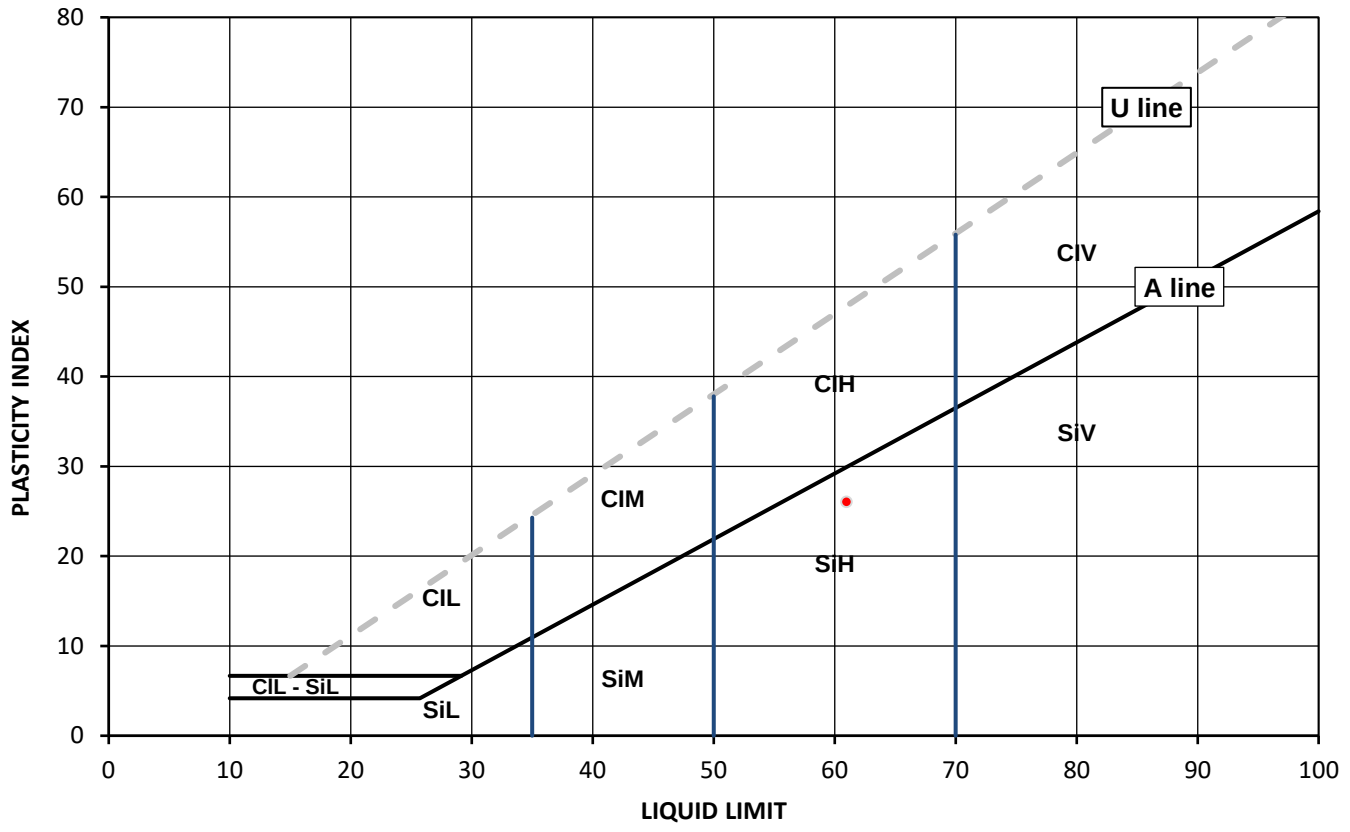
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	24/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704280	Depth Top [m]:	1.00
Hole No.:	TP8	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly clayey SILT		
Sample Preparation:	Tested after >425 µm removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
38	61	35	26	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

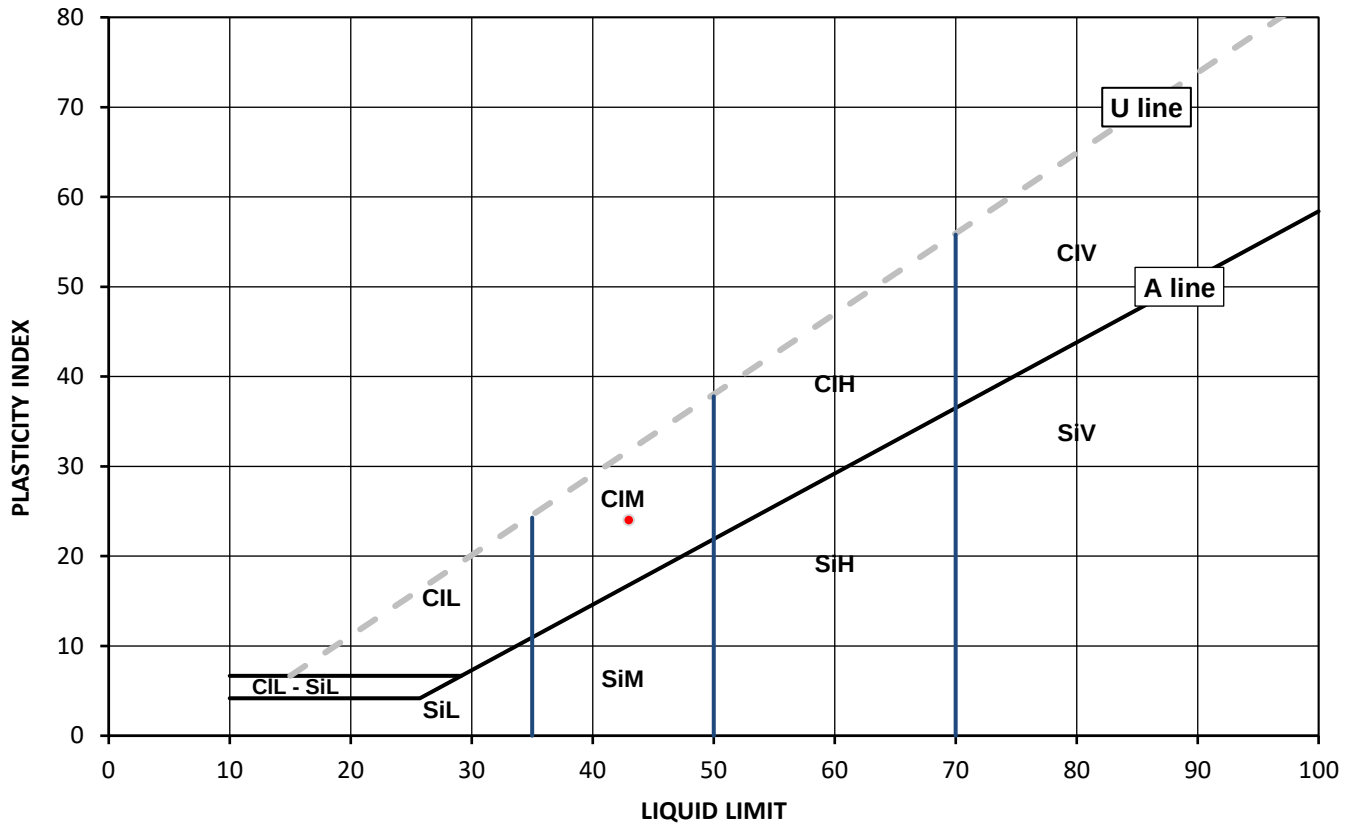
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	24/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704281	Depth Top [m]:	1.80
Hole No.:	TP10	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	43	19	24	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

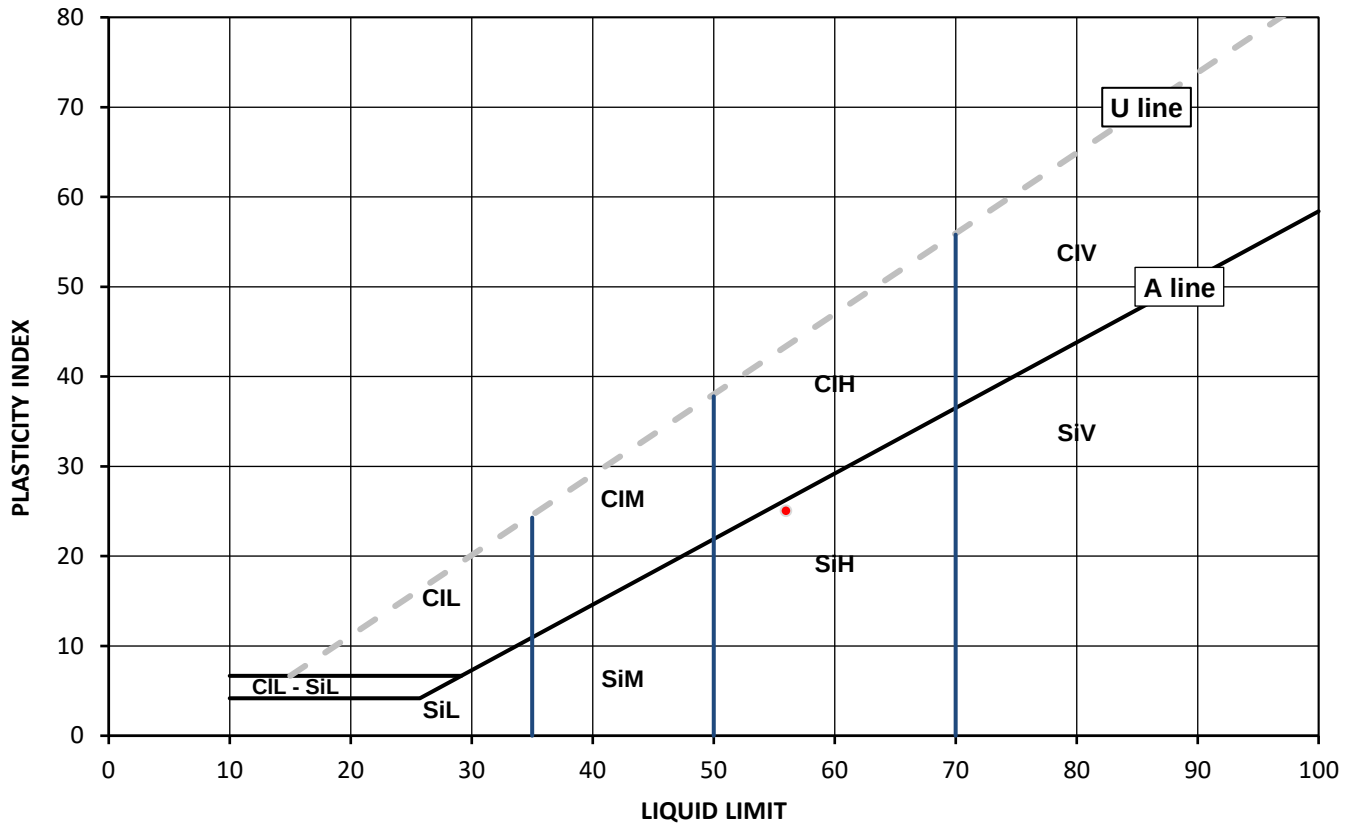
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	26/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704282	Depth Top [m]:	1.00
Hole No.:	WS07	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly slightly sandy silty CLAY		
Sample Preparation:	Tested after >425 µm removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
29	56	31	25	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

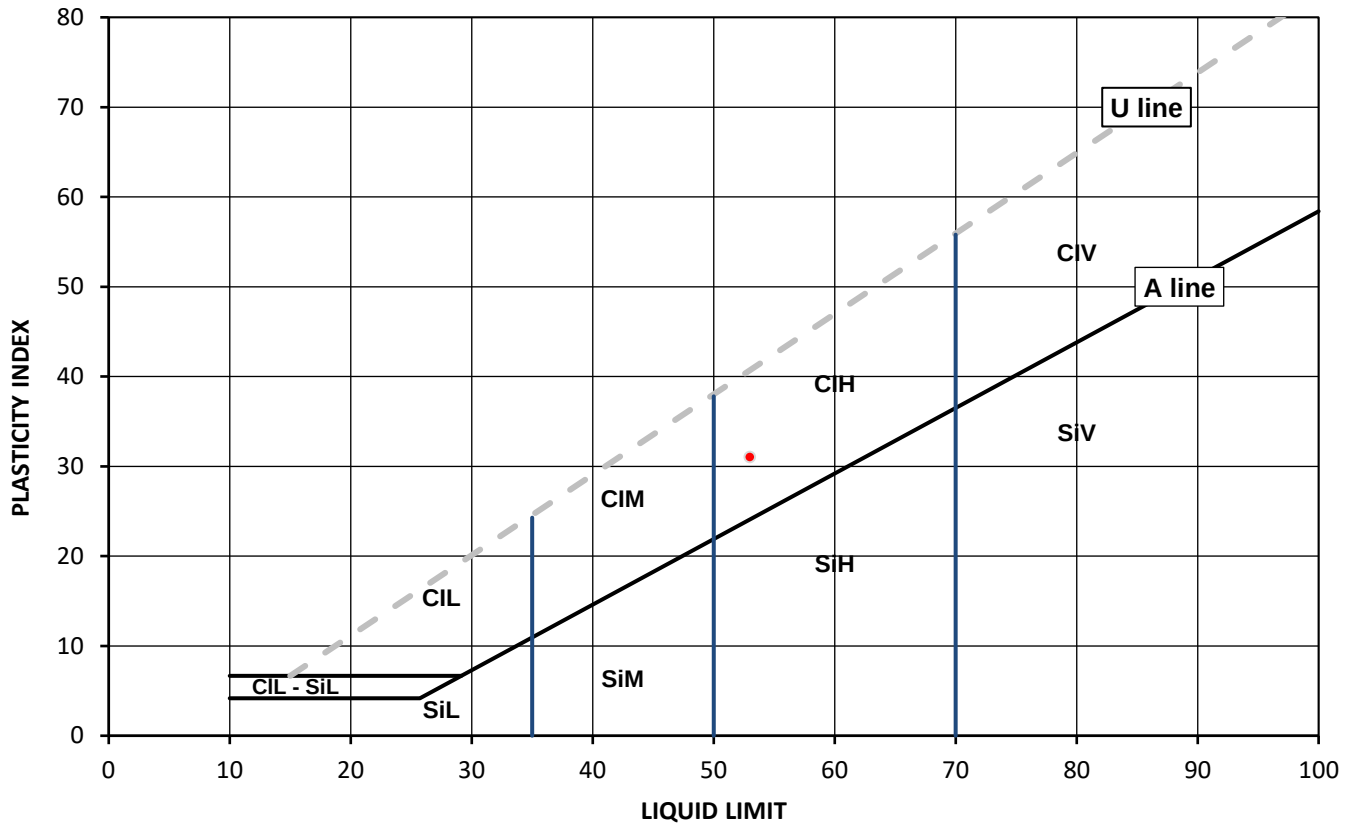
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	25/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704283	Depth Top [m]:	1.70
Hole No.:	WS02	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Light grey slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	53	22	31	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

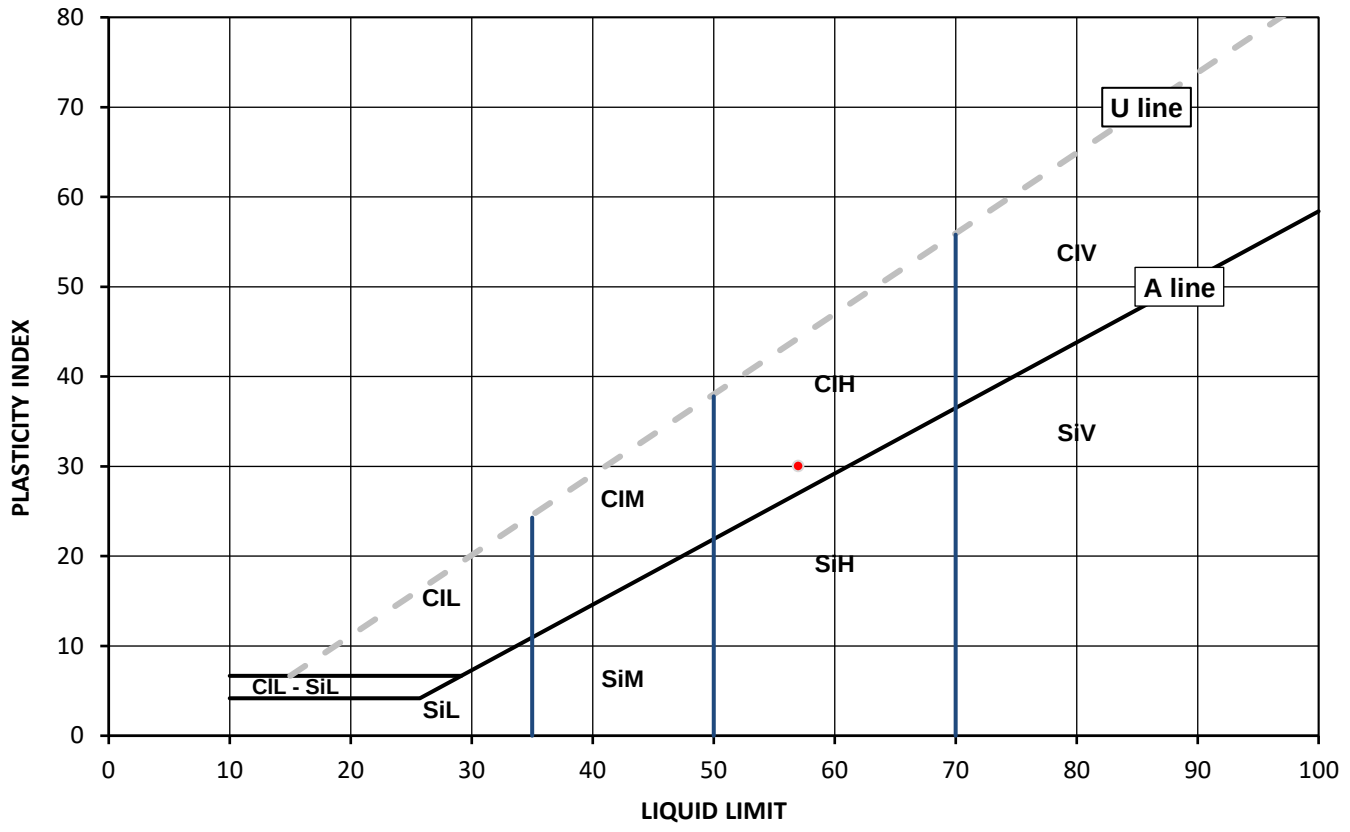
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	25/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704284	Depth Top [m]:	0.50
Hole No.:	BH01	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	57	27	30	73



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Environmental Science

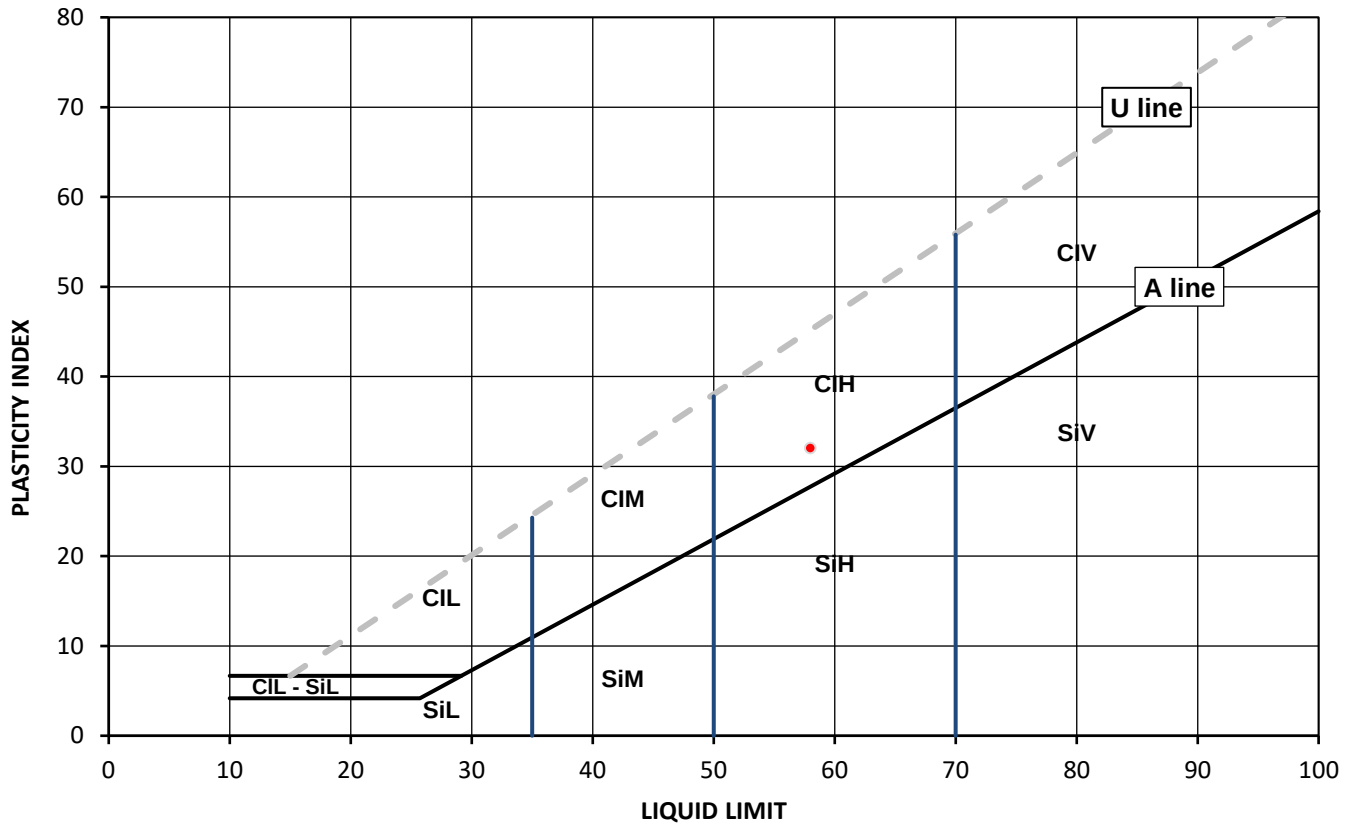
Client:	Hydrock Consultants Ltd	Client Reference:	27203
Client Address:	Over Court Barns, Over Lane, Bristol, BS32 4DF	Job Number:	23-37808-1
		Date Sampled:	24/05/2023
		Date Received:	01/06/2023
Contact:	Timothy Hatrey	Date Tested:	14/06/2023
Site Address:	Melksham	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2704285	Depth Top [m]:	1.00
Hole No.:	TP10	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brownish grey slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	58	26	32	73



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/06/2023

GF 232.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Hydrock Consultants Ltd

Client Address: Over Court Barns, Over Lane, Bristol, BS32 4DF

Contact: Timothy Hatrey

Site Address: Melksham

Client Reference: 27203
Job Number: 23-37808-1
Date Sampled: 24/05 - 26/05/2023
Date Received: 01/06/2023
Date Tested: 14/06/2023
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-1 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2704280	TP8	Not Given	1.00	Not Given	D	Brown slightly gravelly clayey SILT	Atterberg 1 Point	38		99	61	35	26						
2704281	TP10	Not Given	1.80	Not Given	D	Brownish grey sandy CLAY	Atterberg 1 Point	18		100	43	19	24						
2704282	WS07	Not Given	1.00	Not Given	D	Brown slightly gravelly slightly sandy silty CLAY	Atterberg 1 Point	29		99	56	31	25						
2704283	WS02	Not Given	1.70	Not Given	D	Light grey slightly sandy CLAY	Atterberg 1 Point	24		100	53	22	31						
2704284	BH01	Not Given	0.50	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY	Atterberg 1 Point	24		73	57	27	30						
2704285	TP10	Not Given	1.00	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY	Atterberg 1 Point	28		73	58	26	32						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 21/06/2023

GF 234.15

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Hydrock Consultants Ltd

Client Address: Over Court Barns, Over Lane,
Bristol, BS32 4DF

Contact: Timothy Hatrey

Site Address: Melksham

Client Reference: 27203
Job Number: 23-37808-1
Date Sampled: 24/05 - 26/05/2023
Date Received: 01/06/2023
Date Tested: 14/06/2023
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2704280	TP8	Not Given	1.00	Not Given	D	Brown slightly gravelly clayey SILT		38	Sample was quartered, oven dried at 106 °C			
2704281	TP10	Not Given	1.80	Not Given	D	Brownish grey sandy CLAY		18	Sample was quartered, oven dried at 106 °C			
2704282	WS07	Not Given	1.00	Not Given	D	Brown slightly gravelly slightly sandy silty CLAY		29	Sample was quartered, oven dried at 106 °C			
2704283	WS02	Not Given	1.70	Not Given	D	Light grey slightly sandy CLAY		24	Sample was quartered, oven dried at 106 °C			
2704284	BH01	Not Given	0.50	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY		24	Sample was quartered, oven dried at 108.1 °C			
2704285	TP10	Not Given	1.00	Not Given	D	Brownish grey slightly gravelly slightly sandy CLAY		28	Sample was quartered, oven dried at 108.1 °C			

Comments:

Signed:

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 21/06/2023

GF 099.16

Andrew Tidswell
Hydrock Consultants Ltd
4 Lakeside
Festival Park
Stoke on Trent
ST1 5RY

t: 01782 261919
f: 01782 262020
e: andrewtidswell@hydrock.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

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

Analytical Report Number : 23-38764

Project / Site name:	SCF Melksham	**Samples received on:**	01/06/2023
Your job number:	27203	**Samples instructed on/ Analysis started on:**	12/06/2023
Your order number:	PO26543	**Analysis completed by:**	19/06/2023
Report Issue Number:	1	**Report issued on:**	19/06/2023
Samples Analysed:	12 soil samples		

Signed:

Elżbieta Suchy
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710325	2710326	2710327	2710328	2710329
Sample Reference				TP06	TP07	TP09	TP09	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.50	1.00	1.00
Date Sampled				23/05/2023	24/05/2023	24/05/2023	24/05/2023	25/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	38	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	12	8	20	20
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.4	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	8	10.5	7.5	7.1
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	-	-	-	-	1100
Total Sulphate as SO4	%	0.005	MCERTS	-	-	-	-	0.115
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.3	0.98	0.39	0.038	0.085
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	85.4
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	-	-	-	-	26
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	13
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	660
Total Sulphur	%	0.005	MCERTS	-	-	-	-	0.066
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	-	-	-	-	13
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	1.34
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.011	0.0086	0.0062	0.035	0.037
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	-	-	-	-	300
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	-	-	-	-	150

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.15	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.19	0.09	0.07
Pyrene	mg/kg	0.05	MCERTS	0.09	< 0.05	0.2	0.09	0.09
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.07	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	1	< 0.80	< 0.80

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710325	2710326	2710327	2710328	2710329
Sample Reference				TP06	TP07	TP09	TP09	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.50	1.00	1.00
Date Sampled				23/05/2023	24/05/2023	24/05/2023	24/05/2023	25/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	17	19	16	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.92	0.91	0.66	0.81	0.86
Boron (water soluble)	mg/kg	0.2	MCERTS	2.1	2.1	1	2.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	27	16	26	26
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	27	16	26	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	12	19	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	19	15	19	27	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	30	16	18	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	48	46	28	51	48
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	78	66	87	78	78
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	23
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	12

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710330	2710331	2710332	2710333	2710334
Sample Reference				WS07	BH01	BH01	WS02	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.20	0.50	0.20	0.50
Date Sampled				26/05/2023	26/05/2023	26/05/2023	25/05/2023	24/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	22	19	21	22
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	JBH	JBH

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	7.4	8.2	7.6	7.7
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	740	-	-	-	1200
Total Sulphate as SO4	%	0.005	MCERTS	0.074	-	-	-	0.118
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.1	0.18	0.48	0.2	0.13
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	99.5	-	-	-	128
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	15	-	-	-	10
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	7.7	-	-	-	5
Total Sulphur	mg/kg	50	MCERTS	690	-	-	-	650
Total Sulphur	%	0.005	MCERTS	0.069	-	-	-	0.065
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	< 0.5	-	-	-	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.032	0.033	0.016	0.033	0.031
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	95	-	-	-	56
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	47	-	-	-	28

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.08	0.07	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.05	0.16	0.16	0.08	0.07
Pyrene	mg/kg	0.05	MCERTS	0.08	0.16	0.15	0.09	0.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.07	0.07	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.07	0.09	0.07	0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.09	0.08	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	0.06	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710330	2710331	2710332	2710333	2710334
Sample Reference				WS07	BH01	BH01	WS02	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.20	0.50	0.20	0.50
Date Sampled				26/05/2023	26/05/2023	26/05/2023	25/05/2023	24/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	16	19	17	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.9	0.88	0.91	0.94	0.85
Boron (water soluble)	mg/kg	0.2	MCERTS	2.4	0.3	0.4	1.1	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	27	27	27	25
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	28	28	28	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	19	22	20	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	30	24	28	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	20	22	21	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	61	55	43	56	52
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	79	98	89	72
Magnesium (water soluble)	mg/kg	5	NONE	22	-	-	-	21
Magnesium (leachate equivalent)	mg/l	2.5	NONE	11	-	-	-	11

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710335	2710336
Sample Reference				TP11	WS06
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.50
Date Sampled				24/05/2023	26/05/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	16	< 0.1
Moisture Content	%	0.01	NONE	13	13
Total mass of sample received	kg	0.001	NONE	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	11.2	7.9
Free Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	3600	2200
Total Sulphate as SO4	%	0.005	MCERTS	0.357	0.221
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.24	0.8
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	239	799
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	43	27
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	21	14
Total Sulphur	mg/kg	50	MCERTS	1400	1200
Total Sulphur	%	0.005	MCERTS	0.138	0.116
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	< 0.5	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	-	-
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	40	7
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	20	< 5.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710335	2710336
Sample Reference				TP11	WS06
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.50
Date Sampled				24/05/2023	26/05/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-
Chromium (III)	mg/kg	1	NONE	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	60
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	30

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2710325	TP06	None Supplied	0.2	Brown clay.
2710326	TP07	None Supplied	1	Brown clay.
2710327	TP09	None Supplied	0.5	Brown clay and sand with stones.
2710328	TP09	None Supplied	1	Brown sand with gravel and vegetation.
2710329	WS02	None Supplied	1	Brown loam with gravel and vegetation.
2710330	WS07	None Supplied	1	Brown sand with gravel and vegetation.
2710331	BH01	None Supplied	0.2	Brown clay.
2710332	BH01	None Supplied	0.5	Brown clay.
2710333	WS02	None Supplied	0.2	Brown clay.
2710334	TP08	None Supplied	0.5	Brown clay.
2710335	TP11	None Supplied	0.5	Brown clay and sand with vegetation and stones.
2710336	WS06	None Supplied	0.5	Brown clay with gravel.

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Nitrate, water soluble, in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Fraction Organic Carbon FOC Automated	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method	L009	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (leachate equivalent)	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	2710331	c	Free cyanide in soil	L080-PL	c
BH01	None Supplied	S	2710332	c	Free cyanide in soil	L080-PL	c
TP06	None Supplied	S	2710325	c	Free cyanide in soil	L080-PL	c
TP07	None Supplied	S	2710326	c	Free cyanide in soil	L080-PL	c
TP08	None Supplied	S	2710334	c	Free cyanide in soil	L080-PL	c
TP09	None Supplied	S	2710327	c	Free cyanide in soil	L080-PL	c
TP09	None Supplied	S	2710328	c	Free cyanide in soil	L080-PL	c
WS02	None Supplied	S	2710329	c	Free cyanide in soil	L080-PL	c
WS02	None Supplied	S	2710333	c	Free cyanide in soil	L080-PL	c
WS07	None Supplied	S	2710330	c	Free cyanide in soil	L080-PL	c

Geotechnical plots

Hydrock

Client	ISG Ltd
Project	SCF Melksham
Job number	27203

Location or material to which this assessment applies
Made Ground

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	4	4	4
No. tests in 20% data set	1	1	1
No. tests with suspected pyrite		0	
Maximum value	821.75	0.4	30
Mean of highest two values	552	0	21
Mean of highest 20%			
Characteristic Value	**821.75**	**0.4**	**30**
			Mg not required
	[no pyrite]	**[pyrite suspected]**	
DS Class	**DS-2**	**DS-2**	

If pyrite suspected, DS Class limited to **DS-2**

Is pyrite assumed to be present? **No** **Adopted DS Class =** **DS-2**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value (Maximum Level)	0	0 **Mg not required**
DS Class		

pH data

	Soil	Water
Number of tests	4	0
No. tests in 20% data set	1	
Lowest pH	7.1	
Mean of lowest 20%	7.1	
Characteristic value	**7.1**	
Design value	**7.1**	

Number of soil pH results less than 5.5 0

DS Class design value

Based on higher of soil and water data **DS-2**

ACEC Class design value

Brownfield
Mobile groundwater **AC-2**

Hydrock

Client	ISG Ltd
Project	SCF Melksham
Job number	27203

Location or material to which this assessment applies
Oxford Clay Member

Concrete in aggressive ground

After BRE Special Digest 1, 2005

Soil data

	(Adjusted) water soluble sulfate (mg/l)	Total potential sulfate (%)	Water soluble magnesium (mg/l)
Number of tests	1	1	1
No. tests in 20% data set	0	0	0
No. tests with suspected pyrite		0	
Maximum value	146.085	0.2	11
Mean of highest two values	146	0	11
Mean of highest 20%			
Characteristic Value	**146.085**	**0.2**	**11**
			Mg not required
	[no pyrite]	**[pyrite suspected]**	
DS Class	**DS-1**	**DS-1**	

If pyrite suspected, DS Class limited to **DS-1**

Is pyrite assumed to be present? **No** **Adopted DS Class =** **DS-1**

Water data

	(Adjusted) soluble sulfate (mg/l)	Soluble magnesium (mg/l)
Characteristic Value (Maximum Level)	0	0 **Mg not required**
DS Class		

pH data

	Soil	Water
Number of tests	1	0
No. tests in 20% data set	0	
Lowest pH	7.5	
Mean of lowest 20%		
Characteristic value	**7.5**	
Design value	**7.5**	
Number of soil pH results less than 5.5	0	

DS Class design value

Based on higher of soil and water data **DS-1**

ACEC Class design value

Brownfield Mobile groundwater **AC-1**

Appendix G Site monitoring data

Site monitoring data

STRUCTURAL SOILS LTD

INSITU TESTING REPORT

1774

Report No. 751384R.01(00)

Date	25-May-2023	Contract	Land west of Pathfinder Way, Melksham

Client Hydrock Contracting Limited
Address Over Court Barns
Over Lane
Almondsbury
Bristol
BS32 4DF
For the Attention of Andrew Tidswell

Samples submitted by client	N/A	Client Reference	None
Method of sampling	N/A	Client Order No.	PO25823
Testing Started	24-May-2023	Instruction Type	Written
Testing Completed	24-May-2023		

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

Not UKAS Accredited Tests

2no. Soakaway tests carried out at locations specified by the client.

The results represent the ground conditions at the specified locations and depths at the time of testing.

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.
Results relate only to items tested
This report shall not be reproduced except in full without written permission of SSL Laboratories

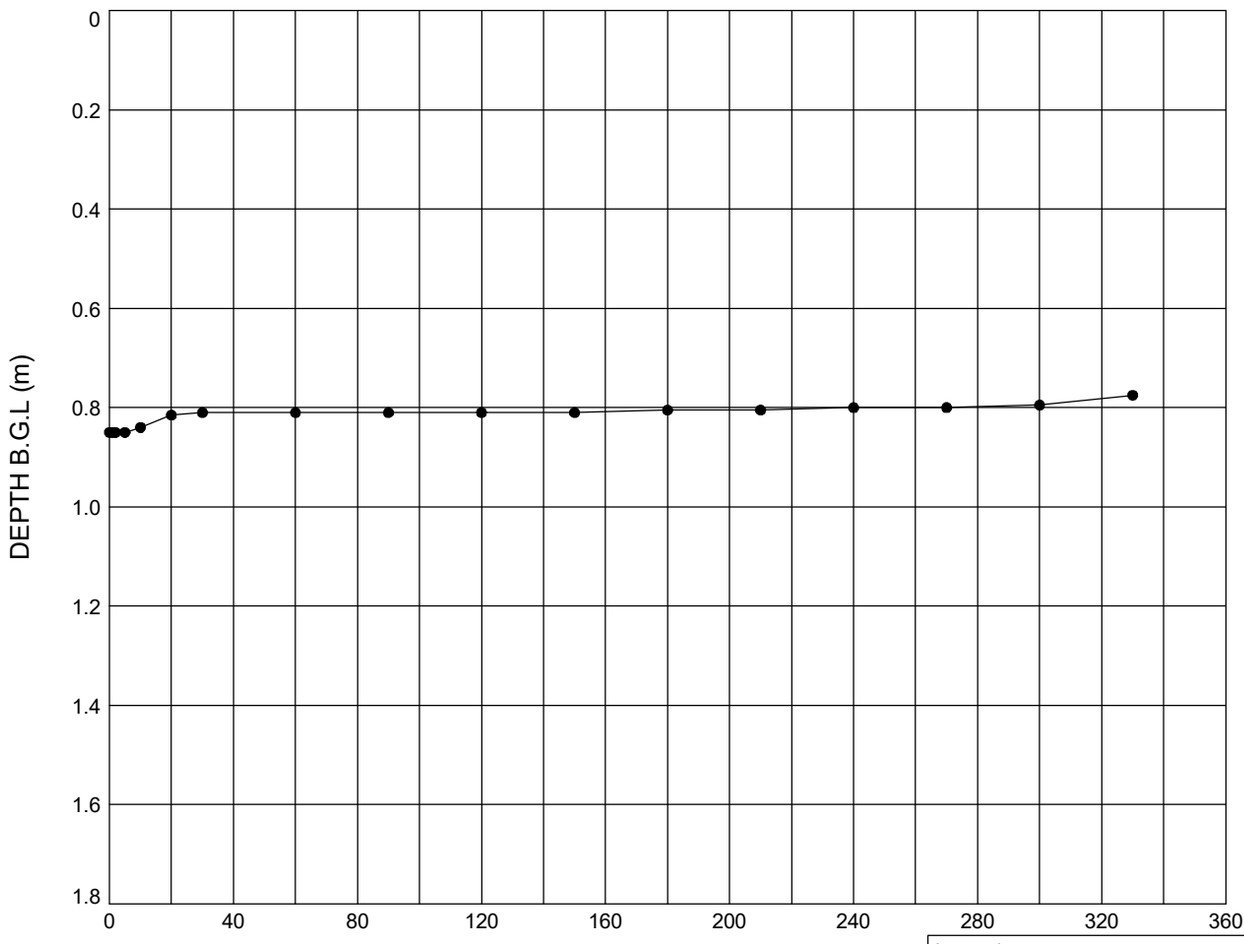
Structural Soils Ltd 1a Princess Street Bedminster Bristol BS3 4AG Tel.0117 9471000. e-mail dimitris.xirouchakis@soils.co.uk

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **SA1**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

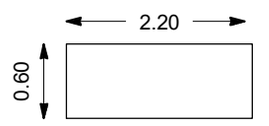
Pit start depth:	=	**1.86**	m
Pit final depth:	=	**1.85**	m
Effective depth, De	=	**1.00**	m
Effective storage volume, V_{p75-25}	=	**0.6600**	m^3
Surface area, a_{s50}	=	**4.1200**	m^2
Time, t_{p75-25}	=	**N/A**	secs
Infiltration rate, f	=	**N/A**	m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level.Groundwater notedin base of the pit prior to testing.

Legend

● Test 1 (24.05.23)

Plan (Not to scale)



No Bearing Taken

	Compiled By	Date	Checked By	Date
STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	KFlynacher	**25/05/23**		**25/05/23**
	Contract **Land West of Pathfinder Way, Melksham**		Contract Ref: **751384**	

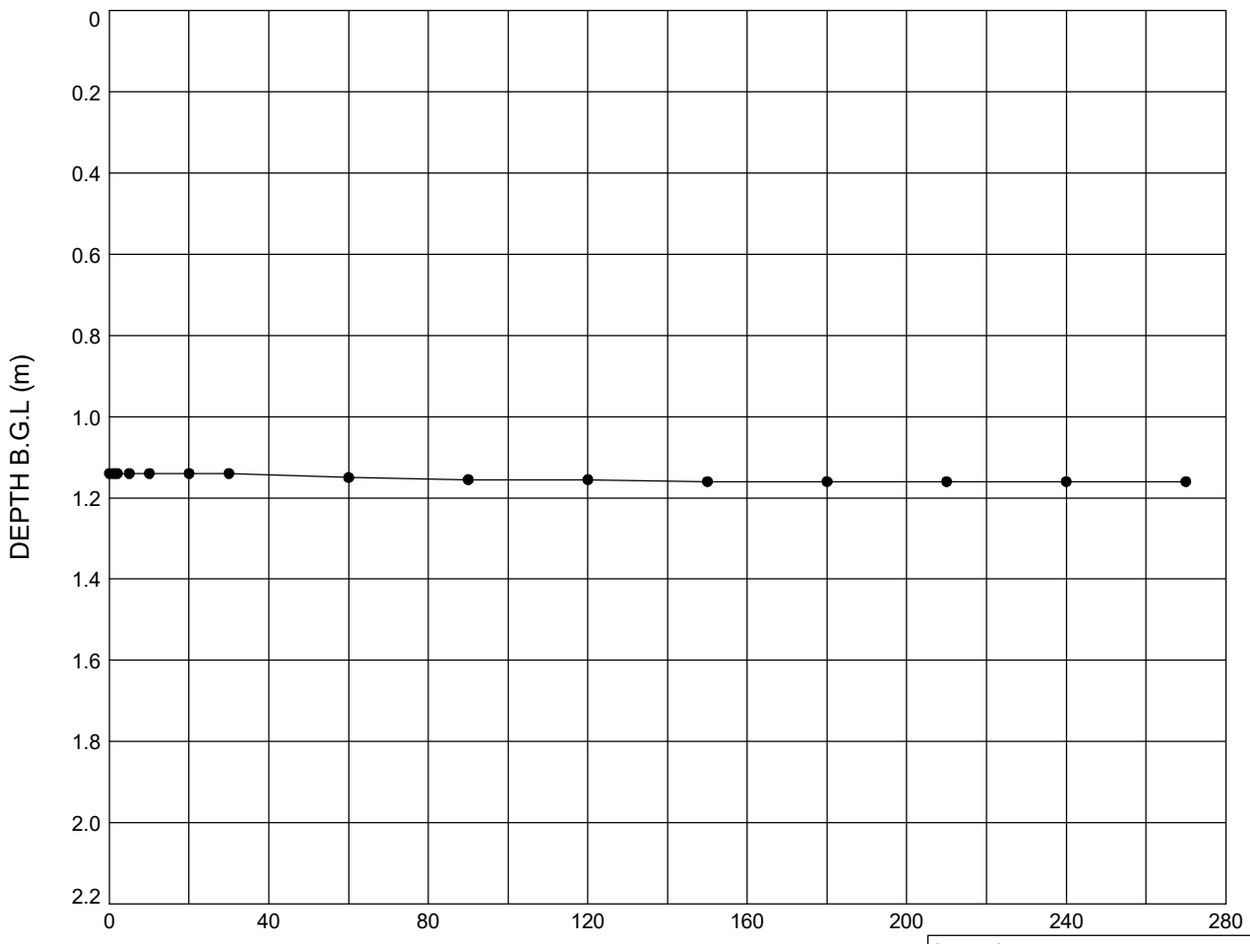
GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | Graph I - TP SOAKAWAY - 2 - FINAL REPORT - A4P | 751368-GINT.GPJ - v10_01. | 25/05/23 - 11:25 | KL2 |

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **SA2**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

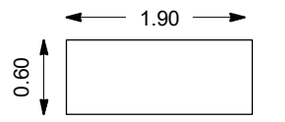
Pit start depth:	=	**2.19**	m
Pit final depth:	=	**2.03**	m
Effective depth, De	=	**0.89**	m
Effective storage volume, V_{p75-25}	=	**0.5073**	m^3
Surface area, a_{s50}	=	**3.3650**	m^2
Time, t_{p75-25}	=	**N/A**	secs
Infiltration rate, f	=	**N/A**	m/s

Notes: Test 1 - Unable to calculate infiltration rate due to insufficient drop in water level. Groundwater noted in base of the pit prior to testing.

Legend

● Test 1 (24.05.23)

Plan (Not to scale)



No Bearing Taken

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By	Date	Checked By	Date
KFlumacher	**25/05/23**		**25/05/23**

Contract

Land West of Pathfinder Way, Melksham

Contract Ref:

751384

GINT_LIBRARY_V10_01.GLB LibVersion: v8_07_001 PrjVersion: v8_07 | Graph I - TP SOAKAWAY - 2 - FINAL REPORT - A4P | 751368-GINT.GPJ - v10_01. | 25/05/23 - 11:26 | KL2 |

Hydrock

Site: SCF Melksham
Job number: 27203
Client: ISG Ltd

Gas analyser: GA5000
Equipment check OK: Y
Service in date: Y
Calibration check OK: Y
Name of person monitoring: Paddy Keene

Notes on site conditions:
12/06/2023: Weather was hot and dry (24°C). Ground conditions were firm and dry.
21/06/23: Weather was warm and dry (21°C). Ground conditions were firm and dry.

Notes: LEL = lower explosive limit = 5%v/v. * where the flow is less than the limit of detection of the instrument, the detection limit is reported. GSVs are rounded to 3 places.

Monitoring round		Borehole details						Pressure and flow					Gas concentrations									GSV		Local conditions
Date	Time	Borehole	Single or dual gas tap	Response zone depth (m)	Depth to water or depth of hole if dry (m)	D denotes dry hole	Volume of headspace in BH (well pipe & filter pack) (m^3)	Atmospheric pressure (hPa)	Atm pressure falling / rising / steady	Relative BH pressure (hPa)	Gas flow' (l/hr)	Gas flow* (absolute value) (l/hr)	VOC (as ppm using PID)	CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases PID	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes on condition of borehole and surrounding ground
														Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady				
								Max. individual values:				**0.3**		**9.8**				**3.0**		**20.3**			**0.0294**	**0.009**	
								Min. individual values:				0.3		0.0				0.0		13.6			0	0	**Summary statistics for this monitoring period.**
												Worst-case GSVs based on max. individual flow and max. individual conc. over the duration of this table:											**0.0294**	**0.009**	
12/06/23		WS04	S	0.30-1.30	1.37		0.00511	1010	S	0.02	0.3	0.3		0.1	0.1			0.1	0.5	20.9	19.6		0.0003	0.0015	DTB = 1.49m (measured from top of casing, 0.34m above gl. Corrected well depth of 1.15m and water depth of 1.03m). Initial flow of 0.1 l/hr and stable at 0.0 l/hr over 2 mins. CO measured at 1 ppm. Gas monitored over 3 mins.
21/06/23		WS04	S	0.30-1.30	0.46		0.00172	1011	R	0.04	0.3	0.3		0.1	0.1			0.1	0.1	20.8	20.1		0	0.0003	DTB = 1.49m (measured from top of casing, 0.34m above gl. Corrected well depth of 1.15m and corrected water depth of 0.12m). Initial flow of 0.0 l/hr and stable at 0.0 l/hr over 2 mins. CO measured at 1 ppm. Gas monitored over 3 mins. CO2 peaked to 0.50% after 1 min, but stayed steady at 0.10% after 3 mins.
26/06/23		WS04	S	0.30-1.30	0.12		0.00045	1017	S	0.19	0.3	0.3		0.1	0.1			0.1	0.3	20.6	20.2		0.0003	0.0009	DTB = 1.26m bgl. Initial flow of 0.1 l/hr then stable at 0.0 l/hr over 2 mins. CO measured at 2ppm. CO2 peaked at 0.4%. Gas monitored over 3 mins.
12/06/23		WS05	S	0.30-1.60	1.29		0.00481	1010	S	0.04	0.3	0.3		0	9.8			0.1	3	19.5	13.6		0.0294	0.009	DTB = 1.76m (measured from top of casing, 0.25m above gl. Corrected well depth of 1.47m and water depth of 1.04m). Initial flow of 0.1 l/hr and steady at 0.0 l/hr over 2 mins. CO measured at 1 ppm. Gas measured for 3 mins.
21/06/23		WS05	S	0.30-1.60	1.17		0.00436	1012	S	-0.07	0.3	0.3		0.1	0.1			0.1	0.5	20.2	19.7		0.0003	0.0015	DTB = 1.77 (measured from top of casing, 0.25m above gl. Corrected well depth of 1.52 and corrected water depth of 0.92m). Initial flow of 0.0 l/hr and stable at 0.0 l/hr after 2 mins. CO measured at 1 ppm. Gas measured for 3 mins.
26/06/23		WS05	S	0.3-1.60	1.1		0.00410	1017	S	0.07	-0.3	0.3		0.1	0.1			0	0.2	20.5	20.3		0.0003	0.0006	DTB = 1.62m bgl. Flow stable at -0.0 l/hr after 2 mins. Initial CO measured at 1 ppm, stable at 0ppm. Gas measured for 3 mins.
12/06/23		WS07	S	1.00-6.00	1.07		0.00399	1010	S	0.11	0.3	0.3		0.3	0			0.1	0	19.3	19.1		0	0	DTB = 6.17m (measured from top of casing, 0.27m above gl. Corrected well depth of 5.90 and water depth of 0.80m). Flow measured 0.0l/hr stable over 2 mins. Initial CO measured at 2 ppm, peaking at 3 ppm and steady at 1 ppm. Gas monitored over 3 mins.

Hydrock

Monitoring round		Borehole details						Pressure and flow					Gas concentrations									GSV		Local conditions
Date	Time	Borehole	Single or dual gas tap	Response zone depth (m)	Depth to water or depth of hole if dry (m)	D denotes dry hole	Volume of headspace in BH (well pipie & filter pack) (m^3)	Atmospheric pressure (hPa)	Atm pressure falling / rising / steady	Relative BH pressure (hPa)	Gas flow* (l/hr)	Gas flow* (absolute value) (l/hr)	VOC (as ppm using PID)	CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases PID	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes on condition of borehole and surrounding ground
														Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady				
21/06/23		WS07	S	1.00-6.00	1.08		0.00403	1012	S	0.00	0.3	0.3		0.1	0			0.1	0.2	20.4	20.1		0	0.0006	DTB = 6.16m (measured from top of casing, 0.27m above gl. Corrected well depth of 5.89m and corrected water depth of 0.81m). Initial flow meaured 0.0 l/hr and stable at -0.1 l/hr after 3 mins. Initial CO measured at 2 ppm, and stable at 1 ppm. Gas monitored over 3 mins.
26/06/23		WS07	S	1.00-6.00	0.95		0.00354	1018	R	0.11	-0.3	0.3		0	0			0	0.2	20.5	20.2		0	0.0006	DTB = 6.00m bgl. Initial flow meaured 0.0 l/hr and stable at -0.1 l/hr after 3 mins. Initial CO measured at 2 ppm, and stable at 1 ppm. Gas monitored over 3 mins.

Appendix H Contamination test results and GQRA

Contamination test results

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Analytical Report Number : 23-38593

Project / Site name:	SCF Melksham	**Samples received on:**	01/06/2023
Your job number:	27203	**Samples instructed on/ Analysis started on:**	12/06/2023
Your order number:	PO26550	**Analysis completed by:**	19/06/2023
Report Issue Number:	1	**Report issued on:**	19/06/2023
Samples Analysed:	1 leachate sample		

Signed:

Dominika Warjan
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical i2 Environmental Science

Analytical Report Number: 23-38593
Project / Site name: SCF Melksham

Your Order No: PO26550

Lab Sample Number				2709082
Sample Reference				TP02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/05/2023
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
General Inorganics				
pH (automated)	pH Units	N/A	ISO 17025	7.8
Electrical Conductivity	µS/cm	10	ISO 17025	210
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1
Sulphate as SO_4	µg/l	100	ISO 17025	64400
Chloride	mg/l	0.15	ISO 17025	2.4
Fluoride	µg/l	50	ISO 17025	470
Ammoniacal Nitrogen as N	µg/l	15	NONE	< 15
Ammoniacal Nitrogen as NH3	µg/l	15	NONE	18
Ammoniacal Nitrogen as NH4	µg/l	15	NONE	19
Nitrate as N	mg/l	0.01	NONE	0.3
Nitrate as NO_3	mg/l	0.05	NONE	1.32
Nitrite as N	µg/l	1	NONE	< 1.0
Nitrite as NO_2	µg/l	5	NONE	< 5.0
Bromate by IC	mg/l	0.002	ISO 17025	< 0.002
Total Phenols				
Total Phenols (monohydric)	µg/l	1	ISO 17025	< 1.0
Speciated PAHs				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.001	NONE	< 0.001
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.001	NONE	< 0.001
PAH Sums				
Sum of Benzo(b)fluoranthene & Benzo(k)fluoranthene	µg/l	0.02	NONE	< 0.02
Sum of Benzo(ghi)perylene & Indeno(1,2,3-cd)pyrene	µg/l	0.002	NONE	< 0.002
Sum of Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene & Indeno(1,2,3-cd)pyrene	µg/l	0.022	NONE	< 0.022
Total PAH				
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2

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Analytical i2 Environmental Science

Analytical Report Number: 23-38593
Project / Site name: SCF Melksham

Your Order No: PO26550

Lab Sample Number				2709082
Sample Reference				TP02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				23/05/2023
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Heavy Metals / Metalloids				
Aluminium (dissolved)	mg/l	0.012	ISO 17025	0.8
Antimony (dissolved)	µg/l	1.7	ISO 17025	< 1.7
Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0
Barium (dissolved)	µg/l	0.05	ISO 17025	18
Boron (dissolved)	µg/l	10	ISO 17025	26
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.7
Cobalt (dissolved)	µg/l	0.3	ISO 17025	< 0.3
Copper (dissolved)	µg/l	0.7	ISO 17025	20
Iron (dissolved)	mg/l	0.004	ISO 17025	0.66
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0
Manganese (dissolved)	µg/l	0.06	ISO 17025	63
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.7
Silver (dissolved)	µg/l	1	NONE	< 1.0
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0
Tin (dissolved)	µg/l	1	ISO 17025	< 1.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	5.5
Zinc (dissolved)	µg/l	0.4	ISO 17025	14
Sodium (dissolved)	mg/l	0.01	ISO 17025	4.5

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 23-38593
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Electrical conductivity at 20oC of leachate	Determination of electrical conductivity in leachate by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-PL	W	ISO 17025
Fluoride in leachate	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Nitrite, leachate soluble, in leachate	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton & Polish Standard Method PN-82/C-04579.08	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton & Polish Standard Method PN-82/C-04579.08	L077-PL	W	NONE
Nitrate, leachate soluble, in leachate	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	NONE
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate (LOW LEVEL Dets)	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L070-PL	W	NONE
Ammonia as NH3 in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Ammonium as NH4 in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Ammoniacal Nitrogen as N in leachate	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	NONE
Nitrite as N in leachate	Determination of nitrite in leachate by addition of sulphanilamide and NED followed by discrete analyser (colorimetry).	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton & Polish Standard Method PN-82/C-04579.08	L082-PL	W	NONE

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Analytical i2 Environmental Science

Analytical Report Number : 23-38593
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Nitrate as N in leachate	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08,	L078-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Chloride in leachate	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Bromate in Leachate	Determination of bromate in leachate based on ion chromatography	In house method based on Standard Methods for the Analysis of Water and Waste Water, method 4500	L008-PL	W	ISO 17025
Specific PAH sums in leachate	Determination of PAH compounds in leachate by extraction in hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L070-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 23-38764

Project / Site name:	SCF Melksham	**Samples received on:**	01/06/2023
Your job number:	27203	**Samples instructed on/ Analysis started on:**	12/06/2023
Your order number:	PO26543	**Analysis completed by:**	19/06/2023
Report Issue Number:	1	**Report issued on:**	19/06/2023
Samples Analysed:	12 soil samples		

Signed:

Elżbieta Suchy
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710325	2710326	2710327	2710328	2710329
Sample Reference				TP06	TP07	TP09	TP09	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.50	1.00	1.00
Date Sampled				23/05/2023	24/05/2023	24/05/2023	24/05/2023	25/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	38	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	12	8	20	20
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.4	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	8	10.5	7.5	7.1
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	-	-	-	-	1100
Total Sulphate as SO4	%	0.005	MCERTS	-	-	-	-	0.115
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.3	0.98	0.39	0.038	0.085
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	85.4
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	-	-	-	-	26
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	13
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	660
Total Sulphur	%	0.005	MCERTS	-	-	-	-	0.066
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	-	-	-	-	13
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	1.34
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.011	0.0086	0.0062	0.035	0.037
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	-	-	-	-	300
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	-	-	-	-	150

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.15	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.19	0.09	0.07
Pyrene	mg/kg	0.05	MCERTS	0.09	< 0.05	0.2	0.09	0.09
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.07	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	1	< 0.80	< 0.80

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710325	2710326	2710327	2710328	2710329
Sample Reference				TP06	TP07	TP09	TP09	WS02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	0.50	1.00	1.00
Date Sampled				23/05/2023	24/05/2023	24/05/2023	24/05/2023	25/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	17	19	16	14
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.92	0.91	0.66	0.81	0.86
Boron (water soluble)	mg/kg	0.2	MCERTS	2.1	2.1	1	2.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	27	16	26	26
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	27	16	26	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	12	19	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	19	15	19	27	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	30	16	18	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	48	46	28	51	48
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	78	66	87	78	78
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	23
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	12

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710330	2710331	2710332	2710333	2710334
Sample Reference				WS07	BH01	BH01	WS02	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.20	0.50	0.20	0.50
Date Sampled				26/05/2023	26/05/2023	26/05/2023	25/05/2023	24/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	22	19	21	22
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	JBH	JBH

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	7.4	8.2	7.6	7.7
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	740	-	-	-	1200
Total Sulphate as SO4	%	0.005	MCERTS	0.074	-	-	-	0.118
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.1	0.18	0.48	0.2	0.13
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	99.5	-	-	-	128
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	15	-	-	-	10
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	7.7	-	-	-	5
Total Sulphur	mg/kg	50	MCERTS	690	-	-	-	650
Total Sulphur	%	0.005	MCERTS	0.069	-	-	-	0.065
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	< 0.5	-	-	-	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	-	-	-	< 0.05
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.032	0.033	0.016	0.033	0.031
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	95	-	-	-	56
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	47	-	-	-	28

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.08	0.07	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.05	0.16	0.16	0.08	0.07
Pyrene	mg/kg	0.05	MCERTS	0.08	0.16	0.15	0.09	0.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.07	0.07	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.07	0.09	0.07	0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.09	0.08	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	0.06	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710330	2710331	2710332	2710333	2710334
Sample Reference				WS07	BH01	BH01	WS02	TP08
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.20	0.50	0.20	0.50
Date Sampled				26/05/2023	26/05/2023	26/05/2023	25/05/2023	24/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	16	19	17	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.9	0.88	0.91	0.94	0.85
Boron (water soluble)	mg/kg	0.2	MCERTS	2.4	0.3	0.4	1.1	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	27	27	27	25
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	28	28	28	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	19	22	20	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	30	24	28	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	20	22	21	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	61	55	43	56	52
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	79	98	89	72
Magnesium (water soluble)	mg/kg	5	NONE	22	-	-	-	21
Magnesium (leachate equivalent)	mg/l	2.5	NONE	11	-	-	-	11

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710335	2710336
Sample Reference				TP11	WS06
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.50
Date Sampled				24/05/2023	26/05/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	16	< 0.1
Moisture Content	%	0.01	NONE	13	13
Total mass of sample received	kg	0.001	NONE	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	11.2	7.9
Free Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO4	mg/kg	50	MCERTS	3600	2200
Total Sulphate as SO4	%	0.005	MCERTS	0.357	0.221
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.24	0.8
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	239	799
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	43	27
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	21	14
Total Sulphur	mg/kg	50	MCERTS	1400	1200
Total Sulphur	%	0.005	MCERTS	0.138	0.116
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	< 0.5	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	-	-
Water Soluble Nitrate (2:1) as NO3	mg/kg	2	NONE	40	7
Water Soluble Nitrate (2:1) as NO3 (leachate equivalent)	mg/l	5	NONE	20	< 5.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-

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Analytical Report Number: 23-38764
Project / Site name: SCF Melksham
Your Order No: PO26543

Lab Sample Number				2710335	2710336
Sample Reference				TP11	WS06
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.50
Date Sampled				24/05/2023	26/05/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-
Chromium (III)	mg/kg	1	NONE	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	60
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	30

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2710325	TP06	None Supplied	0.2	Brown clay.
2710326	TP07	None Supplied	1	Brown clay.
2710327	TP09	None Supplied	0.5	Brown clay and sand with stones.
2710328	TP09	None Supplied	1	Brown sand with gravel and vegetation.
2710329	WS02	None Supplied	1	Brown loam with gravel and vegetation.
2710330	WS07	None Supplied	1	Brown sand with gravel and vegetation.
2710331	BH01	None Supplied	0.2	Brown clay.
2710332	BH01	None Supplied	0.5	Brown clay.
2710333	WS02	None Supplied	0.2	Brown clay.
2710334	TP08	None Supplied	0.5	Brown clay.
2710335	TP11	None Supplied	0.5	Brown clay and sand with vegetation and stones.
2710336	WS06	None Supplied	0.5	Brown clay with gravel.

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Nitrate, water soluble, in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Fraction Organic Carbon FOC Automated	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method	L009	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (leachate equivalent)	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report

Analytical Report Number : 23-38764
Project / Site name: SCF Melksham

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	2710331	c	Free cyanide in soil	L080-PL	c
BH01	None Supplied	S	2710332	c	Free cyanide in soil	L080-PL	c
TP06	None Supplied	S	2710325	c	Free cyanide in soil	L080-PL	c
TP07	None Supplied	S	2710326	c	Free cyanide in soil	L080-PL	c
TP08	None Supplied	S	2710334	c	Free cyanide in soil	L080-PL	c
TP09	None Supplied	S	2710327	c	Free cyanide in soil	L080-PL	c
TP09	None Supplied	S	2710328	c	Free cyanide in soil	L080-PL	c
WS02	None Supplied	S	2710329	c	Free cyanide in soil	L080-PL	c
WS02	None Supplied	S	2710333	c	Free cyanide in soil	L080-PL	c
WS07	None Supplied	S	2710330	c	Free cyanide in soil	L080-PL	c

GAC derivation

Background

Initially, the Hydrock GAC were derived following the publishing of soil guideline values (SGV), toxicological (TOX) reports and associated publications by the Environment Agency (EA) in 2009 referenced under Science Report SC050021 (EA, 2009a, b, c, d). The Hydrock GAC have then been periodically updated following publication of new information on toxicological, physico-chemical, land use or receptor parameters, namely:

- LQM/CIEH, 2009. LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment, second edition. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D.
- CL:AIRE, 2010. 'The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment'. Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environment.
- CL:AIRE, 2014. 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010. Contaminated Land: Applications in Real Environment.
- LQM/CIEH, 2015. 'The LQM/CIEH S4ULs for Human Health Risk Assessment'. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F.
- CL:AIRE, 2021. 'C4SL Phase 2 Technical Reports'. Contaminated Land: Applications in Real Environment.

Land use scenarios

Hydrock has derived generic assessment criteria (GAC) for human health based on the six exposure scenarios defined in CL:AIRE (2014) using generic default assumptions from published guidance. GAC for each exposure scenario have been derived for three soil organic matter (SOM) contents, 1%, 2.5% and 6%.

All GAC have been rounded to two significant figures.

Exposure parameters

The exposure parameters used for the Hydrock GAC are the default parameters stated in SR3, unless updated in CL:AIRE (2014) where the CL:AIRE (2014) values have been adopted.

Approach to consumption rates

Hydrock have adopted the 90th percentile consumption rates from Table 3.4 of CL:AIRE (2014) for all produce types. This is noted to be more conservative than the "top two" approach taken in the derivation of C4SLs.

Approach to plant uptake for GAC omitted in CL:AIRE (2010)

Plant uptake factors were not identified in CL:AIRE (2010) for antimony, barium and molybdenum. Hydrock has sourced the required parameter values from ORNL (1984) in order to derive GAC that are inclusive of the homegrown produce exposure pathway.

Chemical and toxicity parameters

The chemical and toxicity parameters have been adopted based on the following documents:

- IRIS, 2016. 'Toxicological Review of Trimethylbenzenes'. Integrated Risk Information System, National Centre for Environmental Assessment, office of Research and Development, U.S. Environmental Protection Agency.
- LQM/CIEH, 2015.

- ORNL, 1984. 'ORNL-5786. A Review and Analysis of Parameters for Assessing Transport of Environmentally released Radionuclides through Agriculture'. Oak Ridge National Laboratory.
- CL:AIRE, 2010.
- RIVM, 2001. RIVM Report 711701 025 'HCV Re-evaluation of human-toxicological maximum-permissible risk levels'. National Institute of Public Health and the Environment.
- LQM/CIEH, 2009.
- EA, 2009a.

Approach to Cyanide GAC

The Hydrock GAC for free cyanide have been derived based on ingestion of a bolus of contaminated soil. The GAC are derived for acute exposure of a child (0-6 years old) for all land uses except commercial, where the GAC are derived for acute exposure of an adult (16-65 years old). For the purpose of GQRA, the child value may be adopted for all land use scenarios.

For complex cyanide, the GAC have been derived based on chronic exposure, using the default exposure scenarios but excluding the consumption of homegrown produce, soil attached to homegrown produce, indoor vapour and outdoor vapour pathways. The chronic health criteria value (HCV) for complex cyanide is based on the EA (2009a) HCV for free cyanide and the ratio of toxicity between free and complex cyanide proposed by RIVM (2001).

Approach to Phenol GAC

In accordance with the EA Science Report SC050021 / Phenol SGV, a $GAC_{ing/inh}$ has been derived for ingested and inhaled phenol using the CLEA model, with a GAC_{derm} derived for dermal contact using Equation 5.7 within SR3. The lower of the $GAC_{ing/inh}$ and GAC_{derm} has been adopted as the final GAC.

Approach to PCB GAC

GAC for assessing the non-dioxin-like risk from PCBs have been based on the "Dutch 7". As the TDI used by the authors of the Dutch guidance is for the sum of the 7 individual congeners, the TDI has been divided by 7 to create a TDI for each congener. The non-dioxin-like risk from PCBs is therefore assessed using a Hazard Index approach as for total petroleum hydrocarbons (TPH).

Sub-surface soil to indoor air correction factors

Reflecting the approach taken by the Environment Agency in the development of revised SGV in 2009 for BTEX, a sub-surface soil to indoor air correction factor of 10 has been applied for petroleum hydrocarbons in order to account for over-prediction of vapour intrusion into building using the Johnson and Ettinger approach.

The correction factor of 10 has been applied to the following petroleum hydrocarbons (it makes negligible difference to less volatile TPH and PAH compounds):

- TPHCWG fractions, namely aliphatic EC>5-44 and aromatic EC>6-44;
- PAHs (acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene), benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h,)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, pyrene);
- BTEX;
- Isopropylbenzene;
- Propylbenzene;
- 1,2,4- and 1,3,5-trimethylbenzene; and
- Styrene.

Approach to saturation limits

The CLEA model includes a traffic light colour system to highlight when saturated soil conditions have potentially been exceeded for the vapour pathways during calculation of assessment criteria. The colours represent:

- Green: the assessment criteria do not exceed the saturated soil concentration.
- Amber: the assessment criteria exceed the saturated soil concentration but the contribution of the indoor and outdoor vapour pathway to total exposure is less than 10% and will not significantly affect the assessment criteria.
- Red: the assessment criteria exceed the saturated soil concentration and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10% and will significantly affect the assessment criteria.

Hydrock have not applied any further calculations or assessment in relation to saturation limits during GAC derivation, with the CLEA-modelled GAC being presented as the GAC. Consideration of saturation limits is undertaken during the data assessment stage.

References

CL:AIRE, 2010. 'The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment'. Environmental Industries Commission, The Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environment.

CL:AIRE, 2014. 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination', Revision 2, DEFRA research project SP1010. Contaminated Land: Applications in Real Environment

CL:AIRE, 2021. C4SL Phase 2 Technical Reports for tetrachloroethene, trichloroethene and vinyl chloride. Contaminated Land: Applications in Real Environment.

EA, 2009a. 'Science Reports SC050021 – SGV and TOX reports for: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs'; 'Supplementary information for the derivation of SGV for: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs', and 'Contaminants in soil: updated collation of toxicological data and intake values for humans: benzene, toluene, ethylbenzene, xylene, arsenic, nickel, mercury, selenium, cadmium, inorganic cyanide, phenol, dioxins, furans and dioxin-like PCBs'. Environment Agency.

EA, 2009b. 'Science Report – SC050021/SR2. Human health toxicological assessment of contaminants in soil'. Environment Agency.

EA, 2009c. 'Science Report – SC050021/SR3. Updated technical background to the CLEA model'. Environment Agency.

EA, 2009d. 'Science Report – SC050021/SR4. CLEA Software (version 1.05) Handbook'. Environment Agency.

IRIS, 2016. 'Toxicological Review of Trimethylbenzenes'. Integrated Risk Information System, National Centre for Environmental Assessment, office of Research and Development, U.S. Environmental Protection Agency.

LQM/CIEH, 2009. LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment, second edition. Nathanial, C. P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A. G., Ogden, R. C. and Scott, D.

LQM/CIEH, 2015. 'The LQM/CIEH S4ULs for Human Health Risk Assessment'. Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C. and Nathanial, J. F.

ORNL, 1984. 'ORNL-5786. A Review and Analysis of Parameters for Assessing Transport of Environmentally released Radionuclides through Agriculture'. Oak Ridge National Laboratory.

RIVM, 2001. RIVM Report 711701 025 'HCV Re-evaluation of human-toxicological maximum-permissible risk levels'. National Institute of Public Health and the Environment.

Human health GQRA

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	**Default - Human Health - residential with home-grown produce (2.5%SOM)**
Client:	ISG Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	**All**
Strata	**All**
Depth Min (m bgl)	**0.5**
Depth Max (m bgl)	**1**
Dataset mean SOM%	**2.66**
Scenario SOM%	**2.5**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	Strata	Date	24/05/23	24/05/23	26/05/23	24/05/23	
															Zone					
															Location	TP07	TP09	BH01	TP08	
															Depth (m bgl)	1	0.5	0.5	0.5	
-	**Asbestos**																			
P1020	Asbestos Identified	text	Y/N	4	-	-	-	-	No. of detects:	0	-	-	-		MG	N	N	N	N	
o	**Hydrock Default Suite - FOC / SOM / pH**										-									
P1085	FOC (dimensionless)	||	0.001	4	0.006	0.031	0.015	0.012	0.01		-	-	-			0.0086	0.0062	0.016	0.031	
-	SOM (calculated)	%	0.1724	4	1.07	5.34	2.66	2.12	1.93		-	-	-			148264	1.06888	2.7584	5.3444	
P1334	pH (su)	pH Units	0.1	4	7.70	10.50	8.60	8.10	1.28		-	-	-			8	10.5	8.2	7.7	
-	**Hydrock Default Suite - Metals & PAH**																			
7440-38-2	Arsenic	mg/kg	1	4	15.00	19.00	17.50	18.00	1.91	0	NR	37	C4SL - CL:AIRE 2014			17	19	19	15	
7440-41-7	Beryllium	mg/kg	0.06	4	0.66	0.91	0.83	0.88	0.12	0	NR	1.7	Hydrock Derived			0.91	0.66	0.91	0.85	
7440-42-8	Boron	mg/kg	0.2	4	0.40	2.10	0.98	0.70	0.80	0	NR	300	Hydrock Derived			2.1	1	0.4	0.4	
7440-43-9	Cadmium	mg/kg	0.2	4	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014			<0.2	<0.2	<0.2	<0.2	
16065-83-1	Chromium (III)	mg/kg	1	4	16.00	27.00	23.75	26.00	5.25	0	NR	890	Hydrock Derived			27	16	27	25	
18540-29-9	Chromium (VI)	mg/kg	1.8	4	1.80	1.80	1.80	1.80	0.00	0	NR	21	C4SL - CL:AIRE 2014			<1.8	<1.8	<1.8	<1.8	
7440-47-3	Chromium (Total)	mg/kg	1	4	16.00	28.00	24.25	26.50	5.56			-				27	16	28	26	
7440-50-8	Copper	mg/kg	1	4	12.00	22.00	16.75	16.50	4.11	0	NR	2500	Hydrock Derived			16	12	22	17	
7439-92-1	Lead	mg/kg	1	2	24.00	26.00	25.00	25.00	1.41	0	NR	200	C4SL - CL:AIRE 2014					24	26	
7439-97-6	Mercury, inorganic	mg/kg	0.3	4	0.30	0.30	0.30	0.30	0.00	0	NR	40	Hydrock Derived			<0.3	<0.3	<0.3	<0.3	
7440-02-0	Nickel	mg/kg	1	4	16.00	30.00	21.50	20.00	6.19	0	NR	130	Hydrock Derived			30	16	22	18	
7782-49-2	Selenium	mg/kg	1	4	1.00	1.00	1.00	1.00	0.00	0	NR	260	Hydrock Derived			<1	<1	<1	<1	
7440-62-2	Vanadium	mg/kg	1	4	28.00	52.00	42.25	44.50	10.21	0	NR	410	Hydrock Derived			46	28	43	52	
7440-66-6	Zinc	mg/kg	1	4	66.00	98.00	80.75	79.50	14.50	0	NR	3900	Hydrock Derived			66	87	98	72	
P1095	Cyanide (free)	mg/kg	1	4	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020			<1	<1	<1	<1	
P1186	Total Phenols (Monohydric)	mg/kg	1	4	1.00	1.00	1.00	1.00	0.00	0	38058	210	Hydrock Derived			<1	<1	<1	<1	
83-32-9	Acenaphthene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	141	540	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
208-96-8	Acenaphthylene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	212	440	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
120-12-7	Anthracene	mg/kg	0.05	4	0.05	0.08	0.06	0.05	0.02	0	2.91	5500	Hydrock Derived			<0.05	0.08	<0.05	<0.05	
56-55-3	Benz(a)anthracene	mg/kg	0.05	4	0.05	0.08	0.06	0.06	0.02	0	4.28	12	Hydrock Derived			<0.05	0.08	0.07	<0.05	
50-32-8	Benzo(a)pyrene	mg/kg	0.05	4	0.05	0.07	0.06	0.06	0.01	0	2.28	5	C4SL - CL:AIRE 2014			<0.05	0.07	0.07	<0.05	
205-99-2	Benzo(b)fluoranthene	mg/kg	0.05	4	0.05	0.09	0.07	0.06	0.02	0	3.04	3.3	Hydrock Derived			<0.05	0.07	0.09	<0.05	
191-24-2	Benzo(ghi)perylene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	0.04	340	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
207-08-9	Benzo(k)fluoranthene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	1.72	93	Hydrock Derived			<0.05	0.05	<0.05	<0.05	
218-01-9	Chrysene	mg/kg	0.05	4	0.05	0.11	0.08	0.07	0.03	0	1.10	22	Hydrock Derived			<0.05	0.11	0.09	0.05	
53-70-3	Dibenz(ah)anthracene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	0.010	0.29	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
206-44-0	Fluoranthene	mg/kg	0.05	4	0.05	0.19	0.12	0.12	0.07	0	47	560	Hydrock Derived			<0.05	0.19	0.16	0.07	
86-73-7	Fluorene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	77	420	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
193-39-5	Indeno(123cd)pyrene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	0.15	36	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
91-20-3	Naphthalene	mg/kg	0.05	4	0.05	0.05	0.05	0.05	0.00	0	183	30	Hydrock Derived			<0.05	<0.05	<0.05	<0.05	
85-01-8	Phenanthrene	mg/kg	0.05	4	0.05	0.15	0.08	0.06	0.05	0	90	220	Hydrock Derived			<0.05	0.15	0.07	<0.05	
129-00-0	Pyrene	mg/kg	0.05	4	0.05	0.20	0.13	0.13	0.06	0	5.5	1200	Hydrock Derived			<0.05	0.2	0.15	0.1	
P1310	PAH 16 Total	mg/kg	0.8	4	0.80	1.00	0.85	0.80	0.10			-				<0.8	1	<0.8	<0.8	

Legend:

MG	Made Ground
<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
•	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	**Default - Human Health - residential with home-grown produce (2.5%SOM)**
Client:	ISG Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	**All**
Strata	**All**
Depth Min (m bgl)	**0.2**
Depth Max (m bgl)	**0.2**
Dataset mean SOM%	**4.42**
Scenario SOM%	**2.5**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	Strata				
Date															23/05/23	26/05/23	25/05/23	
Zone																		
Location															TP06	BH01	WS02	
Depth (m bgl)															0.2	0.2	0.2	
-	**Asbestos**																	
P1020	Asbestos Identified	text	Y/N	3	-	-	-	-	No. of detects:	0	-	-	-		N	N	N	
0	**Hydrock Default Suite - FOC / SOM / pH**										-							
P1085	FOC (dimensionless)	II	0.001	3	0.011	0.033	0.026	0.033	0.01		-	-	-		0.011	0.033	0.033	
-	SOM (calculated)	%	0.1724	3	1.90	5.69	4.42	5.69	2.19		-	-	-		1.8964	5.6892	5.6892	
P1334	pH (su)	pH Units	0.1	3	7.40	7.60	7.53	7.60	0.12		-	-	-		7.6	7.4	7.6	
-	**Hydrock Default Suite - Metals & PAH**																	
7440-38-2	Arsenic	mg/kg	1	3	16.00	17.00	16.67	17.00	0.58	0	NR	37	C4SL - CL:AIRE 2014		17	16	17	
7440-41-7	Beryllium	mg/kg	0.06	3	0.88	0.94	0.91	0.92	0.03	0	NR	1.7	Hydrock Derived		0.92	0.88	0.94	
7440-42-8	Boron	mg/kg	0.2	3	0.30	2.10	1.17	1.10	0.90	0	NR	300	Hydrock Derived		2.1	0.3	1.1	
7440-43-9	Cadmium	mg/kg	0.2	3	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014		<0.2	<0.2	<0.2	
16065-83-1	Chromium (III)	mg/kg	1	3	27.00	28.00	27.33	27.00	0.58	0	NR	890	Hydrock Derived		28	27	27	
18540-29-9	Chromium (VI)	mg/kg	1.8	3	1.80	1.80	1.80	1.80	0.00	0	NR	21	C4SL - CL:AIRE 2014		<1.8	<1.8	<1.8	
7440-47-3	Chromium (Total)	mg/kg	1	3	28.00	29.00	28.33	28.00	0.58			-			29	28	28	
7440-50-8	Copper	mg/kg	1	3	15.00	20.00	18.00	19.00	2.65	0	NR	2500	Hydrock Derived		15	19	20	
7439-92-1	Lead	mg/kg	1	1	28.00	28.00	28.00	28.00	-	0	NR	200	C4SL - CL:AIRE 2014				28	
7439-97-6	Mercury, inorganic	mg/kg	0.3	3	0.30	0.30	0.30	0.30	0.00	0	NR	40	Hydrock Derived		<0.3	<0.3	<0.3	
7440-02-0	Nickel	mg/kg	1	3	20.00	28.00	23.00	21.00	4.36	0	NR	130	Hydrock Derived		28	20	21	
7782-49-2	Selenium	mg/kg	1	3	1.00	1.00	1.00	1.00	0.00	0	NR	260	Hydrock Derived		<1	<1	<1	
7440-62-2	Vanadium	mg/kg	1	3	48.00	56.00	53.00	55.00	4.36	0	NR	410	Hydrock Derived		48	55	56	
7440-66-6	Zinc	mg/kg	1	3	78.00	89.00	82.00	79.00	6.08	0	NR	3900	Hydrock Derived		78	79	89	
P1095	Cyanide (free)	mg/kg	1	3	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020		<1	<1	<1	
P1186	Total Phenols (Monohydric)	mg/kg	1	3	1.00	1.00	1.00	1.00	0.00	0	38058	210	Hydrock Derived		<1	<1	<1	
83-32-9	Acenaphthene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	141	540	Hydrock Derived		<0.05	<0.05	<0.05	
208-96-8	Acenaphthylene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	212	440	Hydrock Derived		<0.05	<0.05	<0.05	
120-12-7	Anthracene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	2.91	5500	Hydrock Derived		<0.05	<0.05	<0.05	
56-55-3	Benz(a)anthracene	mg/kg	0.05	3	0.05	0.07	0.06	0.05	0.01	0	4.28	12	Hydrock Derived		<0.05	0.07	<0.05	
50-32-8	Benzo(a)pyrene	mg/kg	0.05	3	0.05	0.06	0.05	0.05	0.01	0	2.28	5	C4SL - CL:AIRE 2014		<0.05	<0.05	0.06	
205-99-2	Benzo(b)fluoranthene	mg/kg	0.05	3	0.05	0.08	0.06	0.05	0.02	0	3.04	3.3	Hydrock Derived		<0.05	<0.05	0.08	
191-24-2	Benzo(ghi)perylene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	0.04	340	Hydrock Derived		<0.05	<0.05	<0.05	
207-08-9	Benzo(k)fluoranthene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	1.72	93	Hydrock Derived		<0.05	<0.05	<0.05	
218-01-9	Chrysene	mg/kg	0.05	3	0.05	0.07	0.06	0.07	0.01	0	1.10	22	Hydrock Derived		<0.05	0.07	0.07	
53-70-3	Dibenz(ah)anthracene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	0.010	0.29	Hydrock Derived		<0.05	<0.05	<0.05	
206-44-0	Fluoranthene	mg/kg	0.05	3	0.08	0.16	0.11	0.08	0.05	0	47	560	Hydrock Derived		0.08	0.16	0.08	
86-73-7	Fluorene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	77	420	Hydrock Derived		<0.05	<0.05	<0.05	
193-39-5	Indeno(123cd)pyrene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	0.15	36	Hydrock Derived		<0.05	<0.05	<0.05	
91-20-3	Naphthalene	mg/kg	0.05	3	0.05	0.05	0.05	0.05	0.00	0	183	30	Hydrock Derived		<0.05	<0.05	<0.05	
85-01-8	Phenanthrene	mg/kg	0.05	3	0.05	0.08	0.06	0.05	0.02	0	90	220	Hydrock Derived		<0.05	0.08	<0.05	
129-00-0	Pyrene	mg/kg	0.05	3	0.09	0.16	0.11	0.09	0.04	0	5.5	1200	Hydrock Derived		0.09	0.16	0.09	
P1310	PAH 16 Total	mg/kg	0.8	3	0.80	0.80	0.80	0.80	0.00			-			<0.8	<0.8	<0.8	

Legend:

TP	Topsoil

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
♦	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	Default - Human Health - residential without home-grown produce (6%SOM)
Client:	IS Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	All
Strata	ROC
Depth Min (m bgl)	0.2
Depth Max (m bgl)	1
Dataset mean SOM%	6.03
Scenario SOM%	6

Date	24/05/2023	
Zone		
Location	TP09	
Depth (m bgl)	1	
Strata	ROC	

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @6% SOM	GAC	GAC Source	TP09
-	**Asbestos**													
P1020	Asbestos Identified	text	Y/N	10	-	-	-	-	No. of detects:	0	-	-	-	N
0	**Hydrock Default Suite - FOC / SOM / pH**										-			
P1085	FOC (dimensionless)	II	0.001	1	0.035	0.035	0.035	0.035	-		-	-	-	0.035
-	SOM (calculated)	%	0.1724	1	6.03	6.03	6.03	6.03	-		-	-	-	6.034
P1334	pH (su)	pH Units	0.1	1	7.50	7.50	7.50	7.50	-		-	-	-	7.5
-	**Hydrock Default Suite - Metals & PAH**													
7440-38-2	Arsenic	mg/kg	1	1	16.00	16.00	16.00	16.00	-	0	NR	40	C4SL - CL:AIRE 2014	16
7440-41-7	Beryllium	mg/kg	0.06	1	0.81	0.81	0.81	0.81	-	0	NR	1.7	Hydrock Derived	0.81
7440-42-8	Boron	mg/kg	0.2	1	2.50	2.50	2.50	2.50	-	0	NR	11000	Hydrock Derived	2.5
7440-43-9	Cadmium	mg/kg	0.2	1	0.20	0.20	0.20	0.20	-	0	NR	150	C4SL - CL:AIRE 2014	<0.2
16065-83-1	Chromium (III)	mg/kg	1	1	1.80	1.80	1.80	1.80	-	0	NR	890	Hydrock Derived	<1.8
18540-29-9	Chromium (VI)	mg/kg	1.8	1	1.80	1.80	1.80	1.80	-	0	NR	21	C4SL - CL:AIRE 2014	<1.8
7440-47-3	Chromium (Total)	mg/kg	1	1	26.00	26.00	26.00	26.00	-			-		26
7440-50-8	Copper	mg/kg	1	1	19.00	19.00	19.00	19.00	-	0	NR	7100	Hydrock Derived	19
7439-92-1	Lead	mg/kg	1	1	27.00	27.00	27.00	27.00	-	0	NR	310	C4SL - CL:AIRE 2014	27
7439-97-6	Mercury, inorganic	mg/kg	0.3	1	0.30	0.30	0.30	0.30	-	0	NR	56	Hydrock Derived	<0.3
7440-02-0	Nickel	mg/kg	1	1	18.00	18.00	18.00	18.00	-	0	NR	180	Hydrock Derived	18
7782-49-2	Selenium	mg/kg	1	1	1.00	1.00	1.00	1.00	-	0	NR	430	Hydrock Derived	<1
7440-62-2	Vanadium	mg/kg	1	1	51.00	51.00	51.00	51.00	-	0	NR	1200	Hydrock Derived	51
7440-66-6	Zinc	mg/kg	1	1	78.00	78.00	78.00	78.00	-	0	NR	40000	Hydrock Derived	78
P1095	Cyanide (free)	mg/kg	1	1	1.00	1.00	1.00	1.00	-	0	NR	24	Acute Risk - SoBRA 2020	<1
P1186	Total Phenols (Monohydric)	mg/kg	1	1	1.00	1.00	1.00	1.00	-	0	70308	690	Hydrock Derived	<1
83-32-9	Acenaphthene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	336	7400	Hydrock Derived	<0.05
208-96-8	Acenaphthylene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	506	7400	Hydrock Derived	<0.05
120-12-7	Anthracene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	6.96	38000	Hydrock Derived	<0.05
56-55-3	Benz(a)anthracene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	10.27	16	Hydrock Derived	<0.05
50-32-8	Benzo(a)pyrene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	5.46	5.3	C4SL - CL:AIRE 2014	<0.05
205-99-2	Benzo(b)fluoranthene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	7.29	4.1	Hydrock Derived	<0.05
191-24-2	Benzo(ghi)perylene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	0.09	360	Hydrock Derived	<0.05
207-08-9	Benzo(k)fluoranthene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	4.12	110	Hydrock Derived	<0.05
218-01-9	Chrysene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	2.64	32	Hydrock Derived	<0.05
53-70-3	Dibenz(ah)anthracene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	0.024	0.32	Hydrock Derived	<0.05
206-44-0	Fluoranthene	mg/kg	0.05	1	0.09	0.09	0.09	0.09	-	0	113	1600	Hydrock Derived	0.09
86-73-7	Fluorene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	183	5000	Hydrock Derived	<0.05
193-39-5	Indeno(123cd)pyrene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	0.37	46	Hydrock Derived	<0.05
91-20-3	Naphthalene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	432	120	Hydrock Derived	<0.05
85-01-8	Phenanthrene	mg/kg	0.05	1	0.05	0.05	0.05	0.05	-	0	214	1600	Hydrock Derived	<0.05
129-00-0	Pyrene	mg/kg	0.05	1	0.09	0.09	0.09	0.09	-	0	13.2	3800	Hydrock Derived	0.09
P1310	PAH 16 Total	mg/kg	0.8	1	0.80	0.80	0.80	0.80	-			-		<0.8

Legend:

MG	Made Ground
RTS	Relict Topsoil
ROC	Residual Oxford Clay Formation

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
'<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
♦	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter:	Phytotoxic pH >7
Client:	IS Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	All
Strata	ROC
Depth Min (m bgl)	0.2
Depth Max (m bgl)	1
Dataset mean pH	7.50
Scenario pH	>7

Hydrock

Date	24/05/2023	
Zone		
Location	TP09	
Depth (m bgl)	1	
Strata	ROC	

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source			
0	**Hydrock Default Suite - FOC / SOM / pH**														
P1334	pH (su)	pH Units	0.1	1	7.50	7.50	7.50	7.50	-		-	-		7.5	
-	**Hydrock Default Suite - Metals & PAH**														
7440-38-2	Arsenic	mg/kg	1	1	16.00	16.00	16.00	16.00	-	0	250	MAFF 1998		16	
7440-42-8	Boron	mg/kg	0.2	1	2.50	2.50	2.50	2.50	-	0	5	Nable, et al. 1997		2.5	
16065-83-1	Chromium (III)	mg/kg	1	1	1.80	1.80	1.80	1.80	-	0	400	MAFF 1998 (Cr(T))		<1.8	
18540-29-9	Chromium (VI)	mg/kg	1.8	1	1.80	1.80	1.80	1.80	-	0	25	ICRCL 70/90 1990		<1.8	
7440-50-8	Copper	mg/kg	1	1	19.00	19.00	19.00	19.00	-	0	200	BS3882 2015		19	
7440-02-0	Nickel	mg/kg	1	1	18.00	18.00	18.00	18.00	-	0	110	BS3882 2015		18	
7440-66-6	Zinc	mg/kg	1	1	78.00	78.00	78.00	78.00	-	0	300	BS3882 2015		78	

Legend:

MG	Made Ground
RTS	Relict Topsoil
ROC	Residual Oxford Clay Formation

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
***<10**	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
*	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Assessment of Chemicals of Potential Concern to Human Health

Risk parameter:	**Default - Human Health - residential with home-grown produce (2.5%SOM)**
Client:	IS Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	**All**
Strata	**RTS**
Depth Min (m bgl)	**0.2**
Depth Max (m bgl)	**1**
Dataset mean SOM%	**3.50**
Scenario SOM%	**2.5**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	Soil Saturation Limit @2.5% SOM	GAC	GAC Source	Strata	24/05/2023	26/05/2023	
														Date			
														Zone			
														Location	TP07	WS07	
														Depth (m bgl)	1	1	
-	**Asbestos**																
P1020	Asbestos Identified	text	Y/N	10	-	-	-	-	No. of detects:	0	-	-	-		N	N	
0	**Hydrock Default Suite - FOC / SOM / pH**										-						
P1085	FOC (dimensionless)	II	0.001	2	0.009	0.032	0.020	0.020	0.02		-	-	-		0.0086	0.032	
-	SOM (calculated)	%	0.1724	2	1.48	5.52	3.50	3.50	2.85		-	-	-		1.48264	5.5168	
P1334	pH (su)	pH Units	0.1	2	7.50	8.00	7.75	7.75	0.35		-	-	-		8	7.5	
-	**Hydrock Default Suite - Metals & PAH**																
7440-38-2	Arsenic	mg/kg	1	2	16.00	17.00	16.50	16.50	0.71	0	NR	37	C4SL - CL:AIRE 2014		17	16	
7440-41-7	Beryllium	mg/kg	0.06	2	0.90	0.91	0.91	0.91	0.01	0	NR	1.7	Hydrock Derived		0.91	0.9	
7440-42-8	Boron	mg/kg	0.2	2	2.10	2.40	2.25	2.25	0.21	0	NR	300	Hydrock Derived		2.1	2.4	
7440-43-9	Cadmium	mg/kg	0.2	2	0.20	0.20	0.20	0.20	0.00	0	NR	22	C4SL - CL:AIRE 2014		<0.2	<0.2	
16065-83-1	Chromium (III)	mg/kg	1	2	1.80	1.80	1.80	1.80	0.00	0	NR	890	Hydrock Derived		<1.8	<1.8	
18540-29-9	Chromium (VI)	mg/kg	1.8	2	1.80	1.80	1.80	1.80	0.00	0	NR	21	C4SL - CL:AIRE 2014		<1.8	<1.8	
7440-47-3	Chromium (Total)	mg/kg	1	2	27.00	28.00	27.50	27.50	0.71			-			27	28	
7440-50-8	Copper	mg/kg	1	2	16.00	20.00	18.00	18.00	2.83	0	NR	2500	Hydrock Derived		16	20	
7439-92-1	Lead	mg/kg	1	1	30.00	30.00	30.00	30.00	-	0	NR	200	C4SL - CL:AIRE 2014			30	
7439-97-6	Mercury, inorganic	mg/kg	0.3	2	0.30	0.30	0.30	0.30	0.00	0	NR	40	Hydrock Derived		<0.3	<0.3	
7440-02-0	Nickel	mg/kg	1	2	18.00	30.00	24.00	24.00	8.49	0	NR	130	Hydrock Derived		30	18	
7782-49-2	Selenium	mg/kg	1	2	1.00	1.00	1.00	1.00	0.00	0	NR	260	Hydrock Derived		<1	<1	
7440-62-2	Vanadium	mg/kg	1	2	46.00	61.00	53.50	53.50	10.61	0	NR	410	Hydrock Derived		46	61	
7440-66-6	Zinc	mg/kg	1	2	66.00	76.00	71.00	71.00	7.07	0	NR	3900	Hydrock Derived		66	76	
P1095	Cyanide (free)	mg/kg	1	2	1.00	1.00	1.00	1.00	0.00	0	NR	24	Acute Risk - SoBRA 2020		<1	<1	
P1186	Total Phenols (Monohydric)	mg/kg	1	2	1.00	1.00	1.00	1.00	0.00	0	38058	210	Hydrock Derived		<1	<1	
83-32-9	Acenaphthene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	141	540	Hydrock Derived		<0.05	<0.05	
208-96-8	Acenaphthylene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	212	440	Hydrock Derived		<0.05	<0.05	
120-12-7	Anthracene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	2.91	5500	Hydrock Derived		<0.05	<0.05	
56-55-3	Benz(a)anthracene	mg/kg	0.05	2	0.07	0.08	0.08	0.08	0.01	0	4.28	12	Hydrock Derived		0.08	0.07	
50-32-8	Benzo(a)pyrene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	2.28	5	C4SL - CL:AIRE 2014		<0.05	<0.05	
205-99-2	Benzo(b)fluoranthene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	3.04	3.3	Hydrock Derived		<0.05	<0.05	
191-24-2	Benzo(ghi)perylene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	0.04	340	Hydrock Derived		<0.05	<0.05	
207-08-9	Benzo(k)fluoranthene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	1.72	93	Hydrock Derived		<0.05	<0.05	
218-01-9	Chrysene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	1.10	22	Hydrock Derived		<0.05	<0.05	
53-70-3	Dibenz(ah)anthracene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	0.010	0.29	Hydrock Derived		<0.05	<0.05	
206-44-0	Fluoranthene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	47	560	Hydrock Derived		<0.05	0.05	
86-73-7	Fluorene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	77	420	Hydrock Derived		<0.05	<0.05	
193-39-5	Indeno(123cd)pyrene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	0.15	36	Hydrock Derived		<0.05	<0.05	
91-20-3	Naphthalene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	183	30	Hydrock Derived		<0.05	<0.05	
85-01-8	Phenanthrene	mg/kg	0.05	2	0.05	0.05	0.05	0.05	0.00	0	90	220	Hydrock Derived		<0.05	<0.05	
129-00-0	Pyrene	mg/kg	0.05	2	0.05	0.08	0.07	0.07	0.02	0	5.5	1200	Hydrock Derived		<0.05	0.08	
P1310	PAH 16 Total	mg/kg	0.8	2	0.80	0.80	0.80	0.80	0.00			-			<0.8	<0.8	

Legend:

MG	Made Ground
RTS	Relict Topsoil
ROC	Residual Oxford Clay Formation

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
♦	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter:	**Phytotoxic pH >7**
Client:	IS Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	**All**
Strata	**RTS**
Depth Min (m bgl)	**0.2**
Depth Max (m bgl)	**1**
Dataset mean pH	**7.75**
Scenario pH	**>7**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source	Date	24/05/2023	26/05/2023	
													Zone			
													Location	TP07	WS07	
													Depth (m bgl)	1	1	
0	**Hydrock Default Suite - FOC / SOM / pH**												Strata	RTS	RTS	
P1334	pH (su)	pH Units	0.1	2	7.50	8.00	7.75	7.75	0.35		-	-		8	7.5	
-	**Hydrock Default Suite - Metals & PAH**															
7440-38-2	Arsenic	mg/kg	1	2	16.00	17.00	16.50	16.50	0.71	0	250	MAFF 1998		17	16	
7440-42-8	Boron	mg/kg	0.2	2	2.10	2.40	2.25	2.25	0.21	0	5	Nable, et al. 1997		2.1	2.4	
16065-83-1	Chromium (III)	mg/kg	1	2	1.80	1.80	1.80	1.80	0.00	0	400	MAFF 1998 (Cr(T))		<1.8	<1.8	
18540-29-9	Chromium (VI)	mg/kg	1.8	2	1.80	1.80	1.80	1.80	0.00	0	25	ICRCL 70/90 1990		<1.8	<1.8	
7440-50-8	Copper	mg/kg	1	2	16.00	20.00	18.00	18.00	2.83	0	200	BS3882 2015		16	20	
7440-02-0	Nickel	mg/kg	1	2	18.00	30.00	24.00	24.00	8.49	0	110	BS3882 2015		30	18	
7440-66-6	Zinc	mg/kg	1	2	66.00	76.00	71.00	71.00	7.07	0	300	BS3882 2015		66	76	

Legend:

MG	Made Ground
RTS	Relict Topsoil
ROC	Residual Oxford Clay Formation

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
***<10**	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
♦	represents a data point that is not included in the current filter settings

Template Version:

1.05 11/04/23

Phytotoxic GQRA

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter:	Phytotoxic pH >7
Client:	ISG Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	All
Strata	All
Depth Min (m bgl)	0.5
Depth Max (m bgl)	1

Dataset mean pH **8.60**

Scenario pH **>7**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source	Strata	24/05/23	24/05/23	26/05/23	24/05/23	
													Date	24/05/23	24/05/23	26/05/23	24/05/23	
													Zone					
													Location	TP07	TP09	BH01	TP08	
													Depth (m bgl)	1	0.5	0.5	0.5	
0	**Hydrock Default Suite - FOC / SOM / pH**																	
P1334	pH (su)	pH Units	0.1	4	7.70	10.50	8.60	8.10	1.28		-	-		8	10.5	8.2	7.7	
-	**Hydrock Default Suite - Metals & PAH**																	
7440-38-2	Arsenic	mg/kg	1	4	15.00	19.00	17.50	18.00	1.91	0	250	MAFF 1998		17	19	19	15	
7440-42-8	Boron	mg/kg	0.2	4	0.40	2.10	0.98	0.70	0.80	0	5	Nable, et al. 1997		2.1	1	0.4	0.4	
16065-83-1	Chromium (III)	mg/kg	1	4	16.00	27.00	23.75	26.00	5.25	0	400	MAFF 1998 (Cr(T))		27	16	27	25	
18540-29-9	Chromium (VI)	mg/kg	1.8	4	1.80	1.80	1.80	1.80	0.00	0	25	ICRCL 70/90 1990		<1.8	<1.8	<1.8	<1.8	
7440-50-8	Copper	mg/kg	1	4	12.00	22.00	16.75	16.50	4.11	0	200	BS3882 2015		16	12	22	17	
7440-02-0	Nickel	mg/kg	1	4	16.00	30.00	21.50	20.00	6.19	0	110	BS3882 2015		30	16	22	18	
7440-66-6	Zinc	mg/kg	1	4	66.00	98.00	80.75	79.50	14.50	0	300	BS3882 2015		66	87	98	72	

Legend:

MG	Made Ground

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
64.00	Value exceed saturation limit and substance is liquid or solid at ambient temperature
*<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
+	represents a data point that is not included in the current filter settings

Template Version:

1.05 11/04/23

Assessment of Chemicals of Potential Concern to Plant Life

Risk parameter:	**Phytotoxic pH >7**
Client:	ISG Ltd
Site:	SCF Melksham
Job no.:	27203
Lab. report no(s).:	23-38764-1

Data Filters

Zone	**All**
Strata	**All**
Depth Min (m bgl)	**0.2**
Depth Max (m bgl)	**0.2**
Dataset mean pH	**7.53**
Scenario pH	**>7**

All values in mg/kg unless otherwise stated

CAS No / P Code	Chemical of Potential Concern	Units	LoD	No. Samples	Min. Value	Max. Value	Mean	Median	Standard Deviation	No. Samples >= GAC & > LoD	GAC	GAC Source	Strata	Date	23/05/23	26/05/23	25/05/23	
														Zone				
														Location	TP06	BH01	WS02	
														Depth (m bgl)	0.2	0.2	0.2	
0	**Hydrock Default Suite - FOC / SOM / pH**																	
P1334	pH (su)	pH Units	0.1	3	7.40	7.60	7.53	7.60	0.12		-	-			7.6	7.4	7.6	
-	**Hydrock Default Suite - Metals & PAH**																	
7440-38-2	Arsenic	mg/kg	1	3	16.00	17.00	16.67	17.00	0.58	0	250	MAFF 1998			17	16	17	
7440-42-8	Boron	mg/kg	0.2	3	0.30	2.10	1.17	1.10	0.90	0	5	Nable, et al. 1997			2.1	0.3	1.1	
16065-83-1	Chromium (III)	mg/kg	1	3	27.00	28.00	27.33	27.00	0.58	0	400	MAFF 1998 (Cr(T))			28	27	27	
18540-29-9	Chromium (VI)	mg/kg	1.8	3	1.80	1.80	1.80	1.80	0.00	0	25	ICRCL 70/90 1990			<1.8	<1.8	<1.8	
7440-50-8	Copper	mg/kg	1	3	15.00	20.00	18.00	19.00	2.65	0	200	BS3882 2015			15	19	20	
7440-02-0	Nickel	mg/kg	1	3	20.00	28.00	23.00	21.00	4.36	0	110	BS3882 2015			28	20	21	
7440-66-6	Zinc	mg/kg	1	3	78.00	89.00	82.00	79.00	6.08	0	300	BS3882 2015			78	79	89	

Legend:

TP	Topsoil

<0.02	Value below the laboratory reporting limit and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
0.02	Value greater than, or equal to, the generic assessment criterion (GAC).
*<10	Value excluded from statistical analysis
Y	Text result
-	Represents a determinand that was not tested.
•	represents a data point that is not included in the current filter settings

Template Version:
1.05 11/04/23

Controlled waters GQRA

Summary of Remedial Targets Methodology Screening

Hydrock

Hydrock Scenario: Scenario A - DWS
RTM Level: RTM Level 2 - Groundwater Beneath Source Assessment - groundwater samples
Water body receptor(s): Groundwater and surface water
Secondary receptor(s): Human health (abstraction)
Data set: Leachate
Client: ISG Ltd
Site: SCF
Melksham
Job no: 27203
Test Certificates(s): 23-38593-1
Dataset ALL ZONES

PNEC calculated (inland EQS)

2013/39/EU Annex I
P = priority substance
PH = priority hazardous substances.
WFD Designation (2015 Directions)
OP = Other substance identical to previous legislation
SP = Specific Pollutant

JAGDAG Hazardous Substances Determination (UK)
H Hazardous substance
NP Non-hazardous pollutant
(blank) Not included in assessment

CAS / AGS Number	Chemicals of Potential Concern (concentrations in µg/l)	WFD Designation	Hazardous Substance Status	Summary of Sample Data						Value Being Compared to Target = Maximum Value	Water Quality Target (Exceeded if Red		No. Samples Exceeding Water Quality Target		No. Samples above LoD Exceeding Water Quality		Notes
				No. of Samples	No. of Samples > LoD	Limit of Detection	Minimum Value	Maximum Value	95-%ile Value		DWS		DWS		DWS		
P1133	Hardness as mg/l $CaCO_3$			-	-	-	10	-	-	-	-						
7440-22-4	Silver (Ag) (dissolved)			1	0	1	0.66	0.66	0.66	0.66	n/a						
7429-90-5	Aluminium (Al) (dissolved)			1	1	0.012	0.8	0.8	0.8	0.8	200		0		0		
7440-38-2	Arsenic (As) (dissolved)	SP	**H**	1	0	1	<1	<1	<1	<1	10		0		0		
7440-42-8	Boron (B) (dissolved)		NP	1	1	10	26	26	26	26	1000		0		0		
7440-39-3	Barium (Ba) (dissolved)			1	1	0.05	18	18	18	18	1300		0		0		
7440-43-9	Cadmium (Cd) (dissolved)	**PH**	NP	1	0	0.08	<0.08	<0.08	<0.08	<0.08	5		0		0		
7440-48-4	Cobalt (Co) (dissolved)		NP	1	0	0.3	<0.3	<0.3	<0.3	<0.3	n/a						
18540-29-9	Chromium (VI) (Cr) (dissolved)	SP	**H**	1	0	5	<5	<5	<5	<5	n/a						
16065-83-1	Chromium (III) (Cr) (dissolved)	SP		1	0	5	<5	<5	<5	<5	n/a						
7440-47-3	Chromium (Cr) (total) (dissolved)			1	1	0.4	1.7	1.7	1.7	1.7	50		0		0		
7440-50-8	Copper (Cu) (dissolved)	SP	NP	1	1	0.7	20	20	20	20	2000		0		0		
7439-89-6	Iron (Fe) (dissolved)	SP		1	1	0.004	0.66	0.66	0.66	0.66	200		0		0		
7439-97-6	Mercury (Hg) (dissolved)	**PH**	**H**	1	0	0.5	<0.5	<0.5	<0.5	<0.5	1		0		0		
P1286	Manganese (Mn) (dissolved)	SP		1	1	0.06	63	63	63	63	50		1		1		
7440-23-5	Sodium (Na) (dissolved)			1	1	0.01	4.5	4.5	4.5	4.5	200000		0		0		
7440-02-0	Nickel (Ni) (dissolved)	***P***	NP	1	1	0.3	2.7	2.7	2.7	2.7	20		0		0		
7439-92-1	Lead (Pb) (dissolved)	***P***	**H**	1	0	1	<1	<1	<1	<1	10		0		0		
7440-36-0	Antimony (Sb) (dissolved)		NP	1	0	1.7	<1.7	<1.7	<1.7	<1.7	5		0		0		
7782-49-2	Selenium (Se) (dissolved)		NP	1	0	4	<4	<4	<4	<4	10		0		0		
7440-31-5	Tin (Sn) (dissolved)			1	0	1	<1	<1	<1	<1	n/a						
7440-62-2	Vanadium (V) (dissolved)			1	1	1.7	5.5	5.5	5.5	5.5	n/a						
7440-66-6	Zinc (Zn) (dissolved)	SP	NP	1	1	0.4	14	14	14	14	n/a						
P1095	Cyanide (free) (hydrogen cyanide)	SP	NP	1	0	1	<1	<1	<1	<1	n/a						
57-12-5	Cyanide (total)			1	0	1	<1	<1	<1	<1	50		0		0		
P1140	Ammonium (NH_4^+)		NP	1	1	15	19	19	19	19	500		0		0		
P1238	Ammnoniacal Nitrogen (as N)		NP	1	0	15	<15	<15	<15	<15	n/a						
P1720	Ammonia (unionised) (NH_3 as N) {free ammonia}	SP	NP	1	1	15	18	18	18	18	n/a						
15541-45-4	Bromate (BrO_3)			1	0	0.002	<0.002	<0.002	<0.002	<0.002	10		0		0		
16887-00-6	Chloride (Cl^-)			1	1	0.15	2.4	2.4	2.4	2.4	250000		0		0		
16984-48-8	Fluoride (F^-)			1	1	50	470	470	470	470	1500		0		0		
P1348	Nitrate (NO_3^-)			1	1	0.05	1.32	1.32	1.32	1.32	50000		0		0		
P1349	Nitrite (NO_2^-)			1	0	5	<5	<5	<5	<5	500		0		0		
14808-79-8	Sulfate (SO_4^{2-})			1	1	100	64400	64400	64400	64400	250000		0		0		
P1134	pH (min.) (su)			1	1	0	7.8	7.8	7.8	7.8	6.5		0		0		
P1134	pH (max.) (su)			1	1	0	7.8	7.8	7.8	7.8	9.5		0		0		
P1287	Electrical conductivity (µS/cm)			1	1	10	210	210	210	210	2500		0		0		
120-12-7	Anthracene	**PH**	**H**	1	0	0.01	<0.01	<0.01	<0.01	<0.01	n/a						
50-32-8	Benzo(a)pyrene	**PH**	H	1	0	0.01	<0.01	<0.01	<0.01	<0.01	0.01		0		0		
206-44-0	Fluoranthene	***P***	**H**	1	0	0.01	<0.01	<0.01	<0.01	<0.01	n/a						
91-20-3	Naphthalene	***P***	NP	1	0	0.01	<0.01	<0.01	<0.01	<0.01	n/a						
GRP01	PAHs = sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene	***P***	**H**	1	0	0.022	<0.022	<0.022	<0.022	<0.022	0.1		0		0		
P1877	Phenol	SP	**NP**	1	0	1	<1	<1	<1	<1	n/a						

Appendix I Waste assessment

HazWasteOnline™ assessment

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

RFGDR-RWJA1-OGLBQ

Job name

23-38764_HWOL_Results

Description/Comments

i2 lab cert: 23-38764

Project

27203

Site

SCF Melksham

Classified by

Name:
Alison Holland
Company:
Hydrock Consultants Ltd
Date:
29 Jun 2023 12:51 GMT
Telephone:

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	08 Sep 2020

Next 3 year Refresher due by Sep 2023

Purpose of classification

2 - Material Characterisation

Address of the waste

Pathfinder Way, Melksham, SN12 6YP **Post Code** SN12 6YP

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

The site was a greenfield site. An attenuation pond has been built in the north west of the site and Made Ground has been placed across the site more recently.

Description of the specific process, sub-process and/or activity that created the waste

Building of the new school building, including excavating of soils and building materials.

Description of the waste

Made ground consists of sandy gravelly clay with brick, concrete and general construction material. From the construction of the building, general building materials.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP06--23052023-0.20		Non Hazardous		3
2	TP07--24052023-1.00		Non Hazardous		5
3	TP09--24052023-0.50		Non Hazardous		7
4	TP09--24052023-1.00		Non Hazardous		9
5	WS02--25052023-1.00		Non Hazardous		11
6	WS07--26052023-1.00		Non Hazardous		13
7	BH01--26052023-0.20		Non Hazardous		15
8	BH01--26052023-0.50		Non Hazardous		17
9	WS02--25052023-0.20		Non Hazardous		19
10	TP08--24052023-0.50		Non Hazardous		21

Related documents

#	Name	Description
1	23-38764_HWOL_Results.hwol	i2 Analytical .hwol file used to populate the Job
2	Hydrock Standard plus Cresol (ammended Lead)	waste stream template used to create this Job

Report

Created by: Alison Holland

Created date: 29 Jun 2023 12:51 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	23
Appendix B: Rationale for selection of metal species	25
Appendix C: Version	25

Classification of sample: TP06--23052023-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP06--23052023-0.20
Moisture content:
19%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17 mg/kg	1.32	18.181 mg/kg	0.00182 %	✓	
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.92 mg/kg	2.775	2.068 mg/kg	0.000207 %	✓	
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		2.1 mg/kg	13.43	22.844 mg/kg	0.00228 %	✓	
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		28 mg/kg	1.462	40.924 mg/kg	0.00409 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				15	mg/kg	1.126	13.68	mg/kg	0.00137 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.08	mg/kg		0.0648	mg/kg	0.00000648 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	19	mg/kg		15.39	mg/kg	0.00154 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				28	mg/kg	1.579	35.823	mg/kg	0.00358 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.6	pH		7.6	pH	7.6 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				0.09	mg/kg		0.0729	mg/kg	0.00000729 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				78	mg/kg	1.245	78.641	mg/kg	0.00786 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				48	mg/kg	1.785	69.408	mg/kg	0.00694 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0306 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP07--24052023-1.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP07--24052023-1.00
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17	mg/kg	1.32	19.752	mg/kg	0.00198 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.91	mg/kg	2.775	2.222	mg/kg	0.000222 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		2.1	mg/kg	13.43	24.819	mg/kg	0.00248 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27	mg/kg	1.462	39.462	mg/kg	0.00395 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
15		chrysene	601-048-00-0	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				16	mg/kg	1.126	15.853	mg/kg	0.00159 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	15	mg/kg		13.2	mg/kg	0.00132 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				30	mg/kg	1.579	41.699	mg/kg	0.00417 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				8	pH		8	pH	8pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				66	mg/kg	1.245	72.293	mg/kg	0.00723 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				46	mg/kg	1.785	72.264	mg/kg	0.00723 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0311 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09--24052023-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP09--24052023-0.50
Moisture content:
8%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
3		anthracene		204-371-1	120-12-7		0.08	mg/kg		0.0736	mg/kg	0.00000736 %	✓	
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		19	mg/kg	1.32	23.079	mg/kg	0.00231 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.08	mg/kg		0.0736	mg/kg	0.00000736 %	✓	
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.07	mg/kg		0.0644	mg/kg	0.00000644 %	✓	
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.07	mg/kg		0.0644	mg/kg	0.00000644 %	✓	
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.05	mg/kg		0.046	mg/kg	0.0000046 %	✓	
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.66	mg/kg	2.775	1.685	mg/kg	0.000169 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1	mg/kg	13.43	12.356	mg/kg	0.00124 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16	mg/kg	1.462	23.385	mg/kg	0.00234 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.11	mg/kg		0.101	mg/kg	0.0000101 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				12	mg/kg	1.126	12.43	mg/kg	0.00124 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.19	mg/kg		0.175	mg/kg	0.0000175 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	19	mg/kg		17.48	mg/kg	0.00175 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				16	mg/kg	1.579	23.25	mg/kg	0.00233 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				10.5	pH		10.5	pH	10.5 pH		
				PH									
27		phenanthrene				0.15	mg/kg		0.138	mg/kg	0.0000138 %	✓	
			201-581-5	85-01-8									
28		pyrene				0.2	mg/kg		0.184	mg/kg	0.0000184 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				87	mg/kg	1.245	99.627	mg/kg	0.00996 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				28	mg/kg	1.785	45.986	mg/kg	0.0046 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0269 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09--24052023-1.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP09--24052023-1.00
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	16.9	mg/kg	0.00169 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.81	mg/kg	2.775	1.798	mg/kg	0.00018 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		2.5	mg/kg	13.43	26.86	mg/kg	0.00269 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		26	mg/kg	1.462	38	mg/kg	0.0038 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
15		chrysene	601-048-00-0	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				19	mg/kg	1.126	17.114	mg/kg	0.00171 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	27	mg/kg		21.6	mg/kg	0.00216 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				18	mg/kg	1.579	22.745	mg/kg	0.00227 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.5	pH		7.5	pH	7.5 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				78	mg/kg	1.245	77.67	mg/kg	0.00777 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				51	mg/kg	1.785	72.836	mg/kg	0.00728 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0305 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS02--25052023-1.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--25052023-1.00
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14	mg/kg	1.32	14.788	mg/kg	0.00148 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.86	mg/kg	2.775	1.909	mg/kg	0.000191 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.7	mg/kg	13.43	7.521	mg/kg	0.000752 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		26	mg/kg	1.462	38	mg/kg	0.0038 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
15		chrysene	601-048-00-0	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				18	mg/kg	1.126	16.213	mg/kg	0.00162 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.07	mg/kg		0.056	mg/kg	0.0000056 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	26	mg/kg		20.8	mg/kg	0.00208 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				20	mg/kg	1.579	25.272	mg/kg	0.00253 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.1	pH		7.1	pH	7.1 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-581-5	85-01-8									
28		pyrene				0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
		034-002-00-8											
30		zinc { zinc oxide }				78	mg/kg	1.245	77.67	mg/kg	0.00777 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				48	mg/kg	1.785	68.551	mg/kg	0.00686 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
33		magnesium { magnesium phosphide; trimagnesium diphosphide }				23	mg/kg	1.85	34.032	mg/kg	0.0034 %	✓	
		015-005-00-3	235-023-7	12057-74-8									
										Total:	0.0314 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
	This determinand is defined in the EU CLP Table 3
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS07--26052023-1.00

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS07--26052023-1.00
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	16.9	mg/kg	0.00169 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9	mg/kg	2.775	1.998	mg/kg	0.0002 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		2.4	mg/kg	13.43	25.786	mg/kg	0.00258 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		28	mg/kg	1.462	40.924	mg/kg	0.00409 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
15		chrysene	601-048-00-0	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				20	mg/kg	1.126	18.014	mg/kg	0.0018 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.05	mg/kg		0.04	mg/kg	0.000004 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	30	mg/kg		24	mg/kg	0.0024 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				18	mg/kg	1.579	22.745	mg/kg	0.00227 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.5	pH		7.5	pH	7.5 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				0.08	mg/kg		0.064	mg/kg	0.0000064 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				76	mg/kg	1.245	75.679	mg/kg	0.00757 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				61	mg/kg	1.785	87.117	mg/kg	0.00871 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
33		magnesium { magnesium phosphide; trimagnesium diphosphide }				22	mg/kg	1.85	32.552	mg/kg	0.00326 %	✓	
		015-005-00-3	235-023-7	12057-74-8									
										Total:	0.0355 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
	This determinand is defined in the EU CLP Table 3
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH01--26052023-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH01--26052023-0.20
Moisture content:
22%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	16.478	mg/kg	0.00165 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.07	mg/kg		0.0546	mg/kg	0.00000546 %	✓	
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.88	mg/kg	2.775	1.905	mg/kg	0.00019 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.3	mg/kg	13.43	3.143	mg/kg	0.000314 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27	mg/kg	1.462	39.462	mg/kg	0.00395 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.07	mg/kg		0.0546	mg/kg	0.00000546 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				19	mg/kg	1.126	16.686	mg/kg	0.00167 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.16	mg/kg		0.125	mg/kg	0.0000125 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	30	mg/kg		23.4	mg/kg	0.00234 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				20	mg/kg	1.579	24.64	mg/kg	0.00246 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.4	pH		7.4	pH	7.4 pH		
				PH									
27		phenanthrene				0.08	mg/kg		0.0624	mg/kg	0.00000624 %	✓	
			201-581-5	85-01-8									
28		pyrene				0.16	mg/kg		0.125	mg/kg	0.0000125 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				79	mg/kg	1.245	76.699	mg/kg	0.00767 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				55	mg/kg	1.785	76.584	mg/kg	0.00766 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0288 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH01--26052023-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH01--26052023-0.50
Moisture content:
19%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		19	mg/kg	1.32	20.32	mg/kg	0.00203 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.07	mg/kg		0.0567	mg/kg	0.00000567 %	✓	
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.07	mg/kg		0.0567	mg/kg	0.00000567 %	✓	
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.09	mg/kg		0.0729	mg/kg	0.00000729 %	✓	
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.91	mg/kg	2.775	2.046	mg/kg	0.000205 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.4	mg/kg	13.43	4.351	mg/kg	0.000435 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27	mg/kg	1.462	39.462	mg/kg	0.00395 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.09	mg/kg		0.0729	mg/kg	0.00000729 %	✓	

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	20.063	mg/kg	0.00201 %	✓	
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
19		fluoranthene		205-912-4	206-44-0		0.16	mg/kg		0.13	mg/kg	0.000013 %	✓	
20		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	24	mg/kg		19.44	mg/kg	0.00194 %	✓	
23		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		22	mg/kg	1.579	28.147	mg/kg	0.00281 %	✓	
26		pH			PH		8.2	pH		8.2	pH	8.2 pH		
27		phenanthrene		201-581-5	85-01-8		0.07	mg/kg		0.0567	mg/kg	0.00000567 %	✓	
28		pyrene		204-927-3	129-00-0		0.15	mg/kg		0.122	mg/kg	0.0000121 %	✓	
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		98	mg/kg	1.245	98.805	mg/kg	0.00988 %	✓	
31		monohydric phenols			P1186		<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
32		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		43	mg/kg	1.785	62.178	mg/kg	0.00622 %	✓	
											Total:	0.0304 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS02--25052023-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02--25052023-0.20
Moisture content:
21%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17	mg/kg	1.32	17.732	mg/kg	0.00177 %	✓	
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.06	mg/kg		0.0474	mg/kg	0.00000474 %	✓	
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.08	mg/kg		0.0632	mg/kg	0.00000632 %	✓	
8		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.94	mg/kg	2.775	2.061	mg/kg	0.000206 %	✓	
11		boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		1.1	mg/kg	13.43	11.671	mg/kg	0.00117 %	✓	
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		27	mg/kg	1.462	39.462	mg/kg	0.00395 %		
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8	mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<**LOD**
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.07	mg/kg		0.0553	mg/kg	0.00000553 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				20	mg/kg	1.126	17.789	mg/kg	0.00178 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.08	mg/kg		0.0632	mg/kg	0.00000632 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	28	mg/kg		22.12	mg/kg	0.00221 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				21	mg/kg	1.579	26.204	mg/kg	0.00262 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.6	pH		7.6	pH	7.6 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				0.09	mg/kg		0.0711	mg/kg	0.00000711 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				89	mg/kg	1.245	87.516	mg/kg	0.00875 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				56	mg/kg	1.785	78.977	mg/kg	0.0079 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
										Total:	0.0313 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP08--24052023-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP08--24052023-0.50
Moisture content:
22%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15 mg/kg	1.32	15.448 mg/kg	0.00154 %	✓	
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene		205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.85 mg/kg	2.775	1.84 mg/kg	0.000184 %	✓	
11	boron { boron tribromide/trichloride/trifluoride (combined) }			10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	4.19 mg/kg	0.000419 %	✓	
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		25 mg/kg	1.462	36.539 mg/kg	0.00365 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9		0.05 mg/kg		0.039 mg/kg	0.0000039 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		copper { dicopper oxide; copper (I) oxide }				17	mg/kg	1.126	14.929	mg/kg	0.00149 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.07	mg/kg		0.0546	mg/kg	0.00000546 %	✓	
			205-912-4	206-44-0									
20		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	26	mg/kg		20.28	mg/kg	0.00203 %	✓	
		082-001-00-6											
23		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
24		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel dihydroxide }				18	mg/kg	1.579	22.176	mg/kg	0.00222 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
26		pH				7.7	pH		7.7	pH	7.7 pH		
				PH									
27		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
28		pyrene				0.1	mg/kg		0.078	mg/kg	0.0000078 %	✓	
			204-927-3	129-00-0									
29		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
30		zinc { zinc oxide }				72	mg/kg	1.245	69.903	mg/kg	0.00699 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
31		monohydric phenols				<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
				P1186									
32		vanadium { divanadium pentaoxide; vanadium pentoxide }				52	mg/kg	1.785	72.407	mg/kg	0.00724 %	✓	
		023-001-00-8	215-239-8	1314-62-1									
33		magnesium { magnesium phosphide; trimagnesium diphosphide }				21	mg/kg	1.85	30.296	mg/kg	0.00303 %	✓	
		015-005-00-3	235-023-7	12057-74-8									
										Total:	0.0297 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
	This determinand is defined in the EU CLP Table 3
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **boron tribromide/trichloride/trifluoride (combined)** (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride
Data source: N/A
Data source date: 06 Aug 2015
Hazard Statements: EUH014 , Acute Tox. 2; H330 , Acute Tox. 2; H300 , Skin Corr. 1A; H314 , Skin Corr. 1B; H314

- **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

lead compounds with the exception of those specified elsewhere in this Annex

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 £ conc. < 3 % , Eye Irrit. 2; H319 1 £ conc. < 3 % , Aquatic Chronic 2; H411

divanadium pentaoxide; vanadium pentoxide (EC Number: 215-239-8, CAS Number: 1314-62-1)

GB MCL index number: 023-001-00-8
Description/Comments: Hazard statements H301, H330, H350 added by HazWasteOnline due to ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
Additional Hazard Statement(s): Carc. 1B; H350 , Acute Tox. 3; H301 , Acute Tox. 2; H330
Reason for additional Hazards Statement(s):
20 Sep 2022 - Carc. 1B; H350 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be Carc. 1B; H350. The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
28 Sep 2022 - Acute Tox. 3; H301 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 3; H301". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.
28 Sep 2022 - Acute Tox. 2; H330 hazard statement sourced from: ATP 18 (Regulation (EU) 2022/692) considers vanadium pentoxide to be "Acute tox 2; H330". The GB MCL Agency has reached the same opinion [but is yet to formerly make this change to the MCL List]. Substance has therefore been self-classified.

magnesium phosphide; trimagnesium diphosphide (EC Number: 235-023-7, CAS Number: 12057-74-8)

EU CLP index number: 015-005-00-3
Description/Comments:
Data source: Commission Regulation (EU) No 944/2013 - 5th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP5)
)
Hazard Statements: Water-react. 1; H260 , Acute Tox. 2; H300 , Acute Tox. 3; H311 , Acute Tox. 1; H330 , Aquatic Acute 1; H400 (M=100) , EUH029 , EUH032 , Water-react. 1; H260 >= 0.3 % , EUH032 >= 0.3 % , EUH029 >= 0.3 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - Water-react. 1; H260 >= 0.3 % hazard statement sourced from: WM3, Table C3.2
14 Dec 2015 - EUH032 >= 0.3 % hazard statement sourced from: WM3, Table C12.2
14 Dec 2015 - EUH029 >= 0.3 % hazard statement sourced from: WM3, Table C12.2

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

beryllium {beryllium oxide}

Worst case species based on hazard statements

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Worst case species based on hazard statements

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc oxide}

Worst case species based on hazard statements

vanadium {divanadium pentaoxide; vanadium pentoxide}

Worst case species based on hazard statements.

magnesium {magnesium phosphide; trimagnesium diphosphide}

Worst case species based on hazard statements.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.178.5649.10417 (27 Jun 2023)
HazWasteOnline Database: 2023.178.5649.10417 (27 Jun 2023)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021

Appendix J Preliminary geotechnical risk register

Geotechnical hazard identification – desk study stage

Potential geotechnical hazards have been assessed in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622. The following pages set out the identified geotechnical risks and hazards which are associated with the proposed development and establish the approach which is to be taken to manage the risks including the geotechnical input and analysis.

Table J.1 is a preliminary assessment of possible geotechnical hazards at the site at Desk Study stage. This information is used to assist with ground investigation design.

Table J.1: Possible geotechnical hazards

Hazard	Comment	Hazard status based on desk study	
		Could be present and / or affect site **(i.e. Plausible)**	Unlikely to be present and/or affect site
Uncontrolled Made Ground (variable strength and compressibility).	Site level raise seen to be present during the site walkover. Made Ground likely to be encountered across the site.	✓	-
Soft / loose compressible ground (low strength and high settlement potential).	Made Ground likely to be encountered across the site.	✓	-
Shrink swell of the clay fraction of soils under the influence of vegetation.	There is potential for shrinkable residual clay at the site.	✓	-
Variable lateral and vertical changes in ground conditions.	Due to the presence of Made Ground there may be variable ground conditions across the site.	✓	-
High sulfates present in the soils.	The Oxford Clay formation is known to potentially have high sulphates present.	✓	-
Adverse chemical ground conditions, (e.g. expansive slag).	Unlikely.	-	✓

Hazard	Comment	Hazard status based on desk study	
		Could be present and / or affect site **(i.e. Plausible)**	Unlikely to be present and/or affect site
Obstructions.	There is the potential for existing services onsite.	✓	-
Existing below ground structures to remain (on or off-site tunnels, foundations, basements, and adjacent sub-structures).	Unlikely	-	✓
Shallow groundwater.	There is unlikely to be shallow ground water in the natural ground however there is the potential for shallow perched ground water at the interface between the Made Ground and the natural ground.	✓	-
Changing groundwater conditions.	Diurnal/annual cycles of groundwater bodies are likely. However, the groundwater is unlikely to be influenced by tides or subject to change.	-	✓
Risk from erosion.	Unlikely.	-	✓
Risk from flooding.	Unlikely.	-	✓
Running sands and / or loose Made Ground, leading to difficulty with excavation and collapse of side walls.	Unlikely.	-	✓
Slope stability issues – general slopes.	Unlikely.	-	✓
Slope stability issues – retaining walls.	Unlikely.	-	✓

Hazard	Comment	Hazard status based on desk study	
		Could be present and / or affect site **(i.e. Plausible)**	Unlikely to be present and/or affect site
Earthworks – settlement (fill on soft/loose ground).	Potential for settlement associated with the Made Ground observed on site during the site walkover to raise site levels.	✓	-
Earthworks – poor bearing capacity of new fill.	Potential for poor bearing capacity associated with the Made Ground observed on site during the site walkover to raise site levels.	✓	-
Earthworks – unsuitability of site won material to be reused as fill.	Potential for unsuitable material associated with the Made Ground observed on site during the site walkover to raise site levels.	✓	-

Geotechnical Hazard Identification – Following Ground Investigation

The preliminary Geotechnical Risk Register following Ground Investigation is set out in Table J.3.

The probability and impact of a hazard have been judged on a qualitative scale as set out in Table J.2. The degree of risk (R) is determined by combining tan assessment of the probability (P) of the hazard occurring with an assessment of the impact (I) of the hazard and associated mitigation it will require if it occurs (R = P x I).

Table J.2: Qualitative assessment of hazards and risks

P = Probability		I = Impact		R = Risk Rating (P x I)	
1	Very unlikely (VU)	1	Very Low	1 – 4	None / negligible
2	Unlikely (U)	2	Low	5 – 9	Minor
3	Plausible (P)	3	Medium	10 – 14	Moderate
4	Likely (Lk)	4	High	15 – 19	Substantial
5	Very Likely (VLk)	5	Very High	20 - 25	Severe

Table J.3: Geotechnical Risk Register following Ground Investigation

Hazard	Comments	Who is at Risk	Consequence	Risk Before Mitigation			Actions Required
				P	I	R	
Uncontrolled Made Ground (variable strength and compressibility).	There is Made Ground due to historical construction activity at the site. The Made Ground is up to 1.7m thick due to the cut to fill that has occurred at the site.	Development	Bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below Made Ground. The maximum depth of Made Ground across the site is 1.7m bgl.
		Roads and Pavements.	Settlement (total and differential) of roads and pavements.	2	2	4	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate.
		Services.	Settlement (differential), causing damage to services.	2	2	4	Anticipated settlements are significant with regard to services. There is a requirement to improve the Made Ground prior to installation of services. It is also advisable to steepen falls in drainage to prevent back fall and use rocker boxes and flexible couplings.
		Soft-landscaped areas.	Settlement (differential), soft-landscaped areas.	2	2	4	Soft-landscaped areas may be at risk from settlement as some areas of fill are underlain by 300mm of topsoil, which will consolidate over time.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	2	3	6	Where soft spots encountered, over-excavation and replacement with suitable fill. Outline design of working platform to include geo-grid. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Soft / loose ground (low strength and high	The shallow soils comprise placed Made Ground, which	Development	Foundation bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below any Made Ground.

settlement potential).	may have high settlement potential.	Roads and Pavements.	Settlement (total and differential), of roads and pavements.	3	3	9	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate. If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace soft soils.
		Services.	Settlement (differential), causing damage to services.	3	3	9	Natural ground levels have been raised across the site, and settlements may be significant. Ground improvement may be required to reduce post construction settlements to tolerable levels.
		Soft-landscaped areas	Settlement (differential), in soft-landscaped areas.	3	3	9	
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	2	3	6	Where soft spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Shrinkage / swelling of the clay fraction of soils under the influence of vegetation.	The clays of the Oxford Clay Formation are medium heave potential.	Foundations.	Shrinkage or heave of soils and associated damage to foundations.	3	3	9	Design foundations in accordance with standards. Deepen foundations due to trees and vegetation as appropriate. Deepen foundations due to the Made Ground as appropriate.
Variable lateral and vertical changes in	The Made Ground soils vary laterally and vertically,	Development	Foundation bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below Made Ground.

ground conditions.	both in composition and strength.	Roads and Pavements.	Settlement (total and differential), of roads and pavements.	3	3	9	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate. If anticipated settlements are significant, and cannot be mitigated by design, over-excavate and replace unsuitable soils.
		Services.	Settlement (differential), causing damage to services.	2	2	4	Soft-landscaped areas may be at risk from settlement as some areas of fill are underlain by 300mm of topsoil, which will consolidate over time.
		Soft-landscaped areas.	Settlement (differential), in gardens.	2	3	6	Sports pitches and soft-landscaped areas may be at risk from settlement. Consideration to be given to removing buried topsoil from beneath recently placed fill, or allow for 'topping-up' of soft-landscaped areas following consolidation.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	2	3	6	Where soft spots encountered, over-excavate and replace with suitable fill. Design working platform to suit the ground conditions. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Sulfates present in the soils.	Sulphate minerals have been encountered in the soils and further testing has been scheduled.	Attack of buried concrete.	Damage to concrete and reduction in strength.	1	4	4	Shallow Made Ground soils are classified as Design Sulfate Class DS-2 and ACEC Class AC-2. Soils from the Oxford Clay Formation are undergoing testing and this report shall be updated with the buried concrete class requirements upon receipt.
Obstructions.	There is a potential for	Construction staff, vehicles	Risk of collapse of excavation as	2	3	6	No obstructions were encountered during the ground investigations. However, due to the unknown composition of all

	obstructions to be present due to unknown fill in Made Ground.	and plant operators.	obstructions are pulled out.				of the Made Ground beneath the site, there is a possibility that obstructions may be present. Allow for a breaker to be present during construction and remove obstructions where encountered during construction.
		Roads and Pavements.	Hard spots in externals and roads / pavements.	2	2	4	
Shallow groundwater.	Monitoring after the ground investigations has proven a shallow groundwater table (at 0.96m in WS07)	Construction staff, vehicles and plant operators.	Difficulty with excavation. Limit state failure, excessive deformation, trafficking of site plant, inability to place and compact fill.	3	2	6	Contractor to appoint competent Temporary Works Designer to design temporary works, in accordance with BS 5975:2008+A1:2011. Temporary Works Designer to consider in their analysis the impact of, and requirements for, de-watering of excavations. Any water that collects at the base of excavations to be removed as soon as practicable.
		Foundations.	Bearing capacity failure, settlement (total and differential).	3	2	6	Contractor to appoint competent Temporary Works Designer to design temporary works, as required in accordance with BS 5975:2008+A1:2011. The shallow groundwater is to be taken into account during geotechnical design of the permanent works.
Earthworks – settlement (fill on soft/loose ground).	There is Made Ground due to historical construction activity at the site. The Made Ground is up to 1.7m thick due to the cut to fill that has	Development	Bearing capacity failure, settlement (total and differential).	3	4	12	Design foundations to found below Made Ground. The maximum depth of Made Ground across the site is 1.7m bgl.
		Roads and Pavements	Settlement (total and differential) of roads and pavements.	2	2	4	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate.

	occurred at the site.	Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions.	2	3	6	Where soft spots encountered, over-excavation and replacement with suitable fill. Outline design of working platform to include geo-grid. Site inspection and watching brief by Contractor to review working platform frequently and regularly.
Earthworks – poor bearing capacity of new fill.	There is Made Ground due to historical construction activity at the site. The Made Ground is up to 1.7m thick due to the cut to fill that has occurred at the site.	Development	Bearing capacity failure, settlement (total and differential	3	4	12	Design foundations to found below Made Ground. The maximum depth of Made Ground across the site is 1.7m bgl.
		Roads and Pavements.	Settlement (total and differential) of roads and pavements	2	2	4	Design roads and pavements using suitable geotechnical parameters and increase the sub-base and use geo-grids as appropriate.
		Services.	Settlement (differential), causing damage to services	2	2	4	Anticipated settlements are significant with regard to services. There is a requirement to improve the Made Ground prior to installation of services.
		Soft-landscaped areas.	Settlement (differential), in gardens.	2	3	6	Sports pitches and soft-landscaped areas may be at risk from settlement. Consideration to be given to removing buried topsoil from beneath recently placed fill, or allow for 'topping-up' of soft-landscaped areas following consolidation.
		Construction staff, vehicles and plant operators.	Trafficking of the site in temporary conditions. Overturning of plant during construction.	2	3	6	Where soft spots encountered, over-excavation and replacement with suitable fill. Outline design of working platform to include geo-grid. Site inspection and watching brief by Contractor to review working platform frequently and regularly.

Whilst the probability and impact of the hazard occurring can be reduced to a minimum by geotechnical design, the impact cannot be reduced below very low. The risk register will need to be up-dated, as necessary, to reflect design, additional information, data and experience as it is gained through the construction process.

Impacts of the design with regard to health and Safety considerations will need to be included by the designer at design stage.

Appendix K Plausible source-pathway-receptor contaminant linkages

Summary of potential contaminant linkages

Table K.2 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in LCRM (2019) and additional risk assessment is required.

Source – Pathway – Receptor Linkages have been assessed in general accordance with guidance in CIRIA Report C552 (Rudland *et al* 2001) but modified to add a 'no linkage' category and to remove low/moderate risk (See Table K.1).

It should be noted that whilst the risk assessment process undertaken in this report may identify potential risks to site demolition and redevelopment workers, consideration of occupational health and safety issues is beyond the scope of this report and need to be considered separately in the Construction Phase Health and Safety Plan.

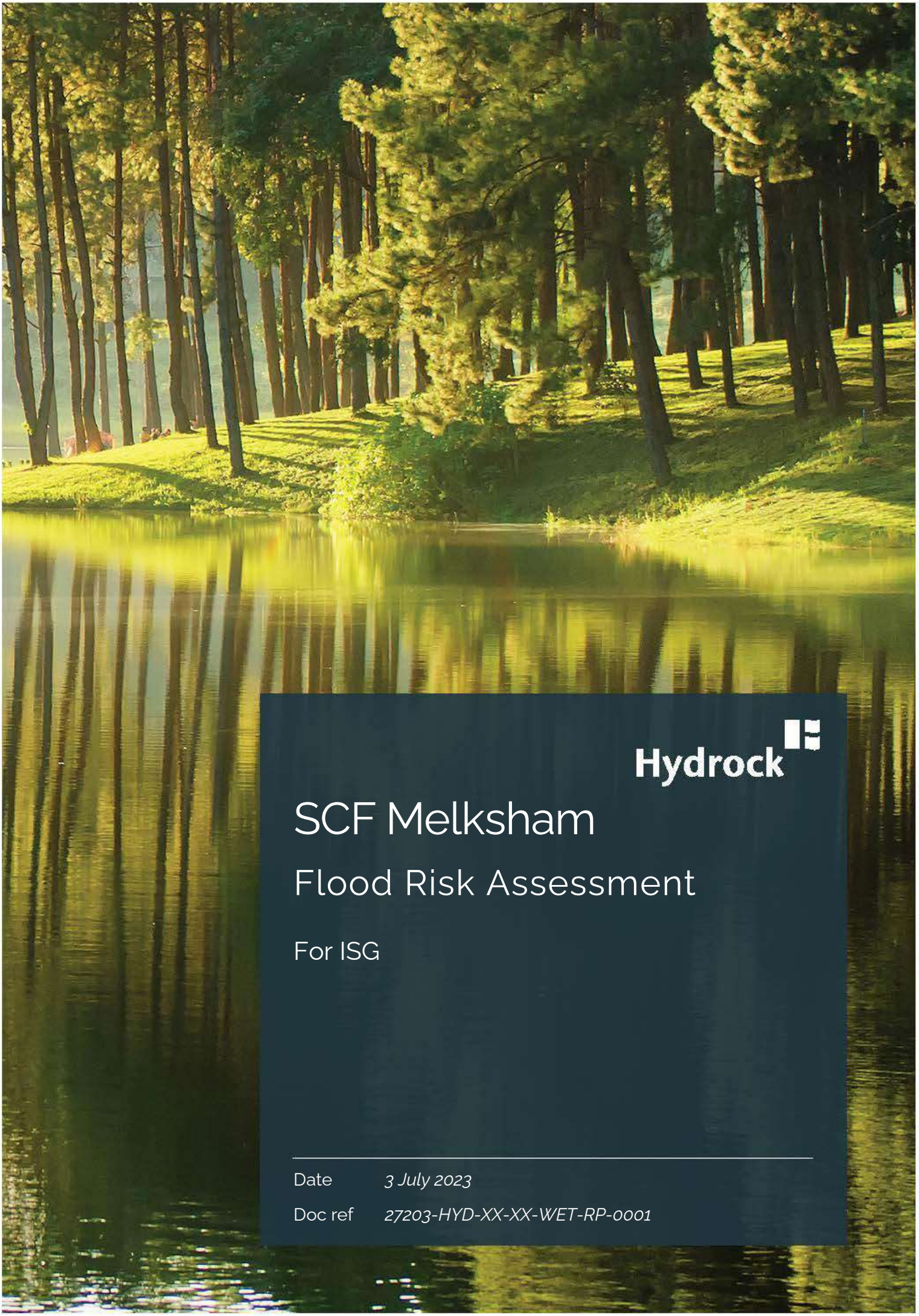
Table K.1: Consequence versus probability assessment.

		Consequence			
Probability		Severe	Medium	Mild	Minor
	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Very low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Very low risk	Very low risk	Very low risk
	No Linkage	No risk			

Table K.2: Exposure model – final source-pathway-receptor contaminant linkages

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments	
Made Ground, associated with historical construction activities and imported fill, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials, PAH and petroleum hydrocarbons (S01).	Direct contact, ingestion or inhalation	People (neighbours, site end users (R01)	Unlikely	Medium	Very low	There is Made Ground below the entire site, however there are no compounds which exceed the GAC for human health or phytotoxicity.	The GAC for residential with homegrown produce shows that the soils beneath the site are not harmful to human health or plant health. Therefore, this is no risk. Testing indicates low leachability of contaminants. Elevated concentrations of manganese were identified in the leachate sample when compared to the WQT. However, as this was only slightly exceeding the limit, this has been perceived as a low risk.
		Development end use (buildings, utilities and landscaping) (R02).	Unlikely	Medium	Very low		
	Migration of contaminant via leachate migration to the unsaturated zones (P03)	Surface water: features off-site (R03).	Low	Medium	Low		
	Uptake and consumption by flora and fauna (P04).	Flora and fauna (R04)	Unlikely	Medium	Very low		

Ground gases (carbon dioxide and methane) from organic materials in the Made Ground / natural soils (S02).	Migration and build-up of ground gas and vapours via permeable soils and/or construction gaps (P02).	Site users.	Low	Medium	Low	Ground gas monitoring has indicated typically low concentrations of carbon dioxide and methane in the Made Ground and natural soils.
		Neighbours.		Medium	Low	
Ground gases (carbon dioxide and methane) from organic materials in the made ground (S03).	Migration and build-up of ground gas and vapours via permeable soils and/or construction gaps (P02).	Site users.	Unlikely	Medium	Very low	Ground gas monitoring has indicated typically low concentrations of carbon dioxide and methane in the Made Ground and natural soils. Migration of gas from off-site sources will be limited due to the low permeability of the soils beneath the site.
		Neighbours.		Medium	Very low	



Hydrock

SCF Melksham

Flood Risk Assessment

For ISG

Date	*3 July 2023*
Doc ref	*27203-HYD-XX-XX-WET-RP-0001*

Document control sheet

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Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

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Appendix A Proposed Site Layout

1. INTRODUCTION

This report has been prepared by Hydrock Consultants Limited (Hydrock) on behalf of ISG to be submitted in support of a planning application for a proposed development of a primary school comprising of a single storey building, with associated car parking, play grounds and playing fields.

Local Planning Authorities are advised by the Government's National Planning Policy Framework (NPPF) to consult the Environment Agency (EA) on development proposals in areas at risk of flooding and/or for sites greater than 1 hectare in area. The EA requires a Flood Risk Assessment (FRA) to be submitted in support of the planning application for the proposed development.

The report has been prepared to consider the requirements of NPPF through:

- Assessing whether the proposed development is likely to be affected by flooding
- Assessing whether the proposed development is appropriate in the suggested location; and
- Detailing measures necessary to mitigate any flood risk identified, to ensure that the proposed development and occupants would be safe, and that flood risk would not be increased elsewhere.

This report considers the requirement for undertaking an FRA as stipulated in NPPF Technical Guidance. Only those requirements that are appropriate to a development of this nature have been considered in the compilation of this report.

This report has been prepared in accordance with current EA policy.

2. SITE INFORMATION

2.1 Site Location

The site is located to the southeast of Melksham, approximately 1km from the centre of the town. The specific location of the site is referenced in Table 1 and is shown in Figure 1 below.

Table 1: Site Referencing Information

Site Referencing Information	
Site Address	Pathfinder Way, Bowerhill, Melksham, Wiltshire, SN12 6XZ
Ordnance Survey Grid Reference	ST 91243 62730

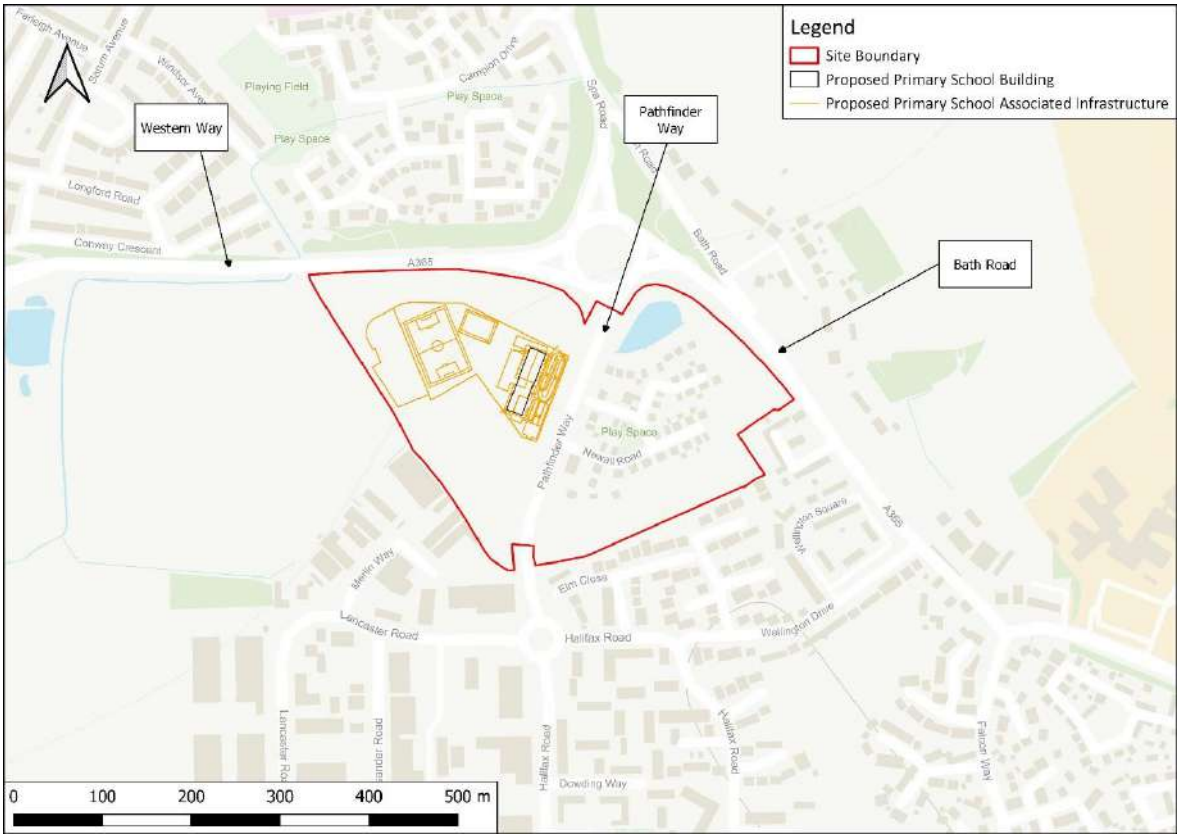

Figure 1: Site Location Plan

The existing site currently comprises two parcels of land that are separated by Pathfinder Way, which runs through the centre of the site from the centre of the northern boundary to the centre of the southern boundary. The western parcel currently consists of grassland and undeveloped land, whereas the eastern parcel consists of a housing development. In the northeast corner of the site there is a topographical low, containing a small ponded area.

Vehicular and pedestrian access to the site is via Pathfinder Way, either at the centre of the northern boundary or the centre of the southern boundary.

The site is surrounded by roads, including Western Way to the northwest and Bath Road to the northeast. Beyond the road network is a combination of housing developments, an industrial estate to the southwest and grassland to the west and east of the site.

2.2 Topography

A site wide topographic survey has been undertaken and is included in Appendix A.

The site is shown to fall in a general northward's direction from approximately 47.0m AOD at the southern boundary of the site to approximately 38.0m AOD in the northwest corner and 41.0m AOD in the northeast corners of the site.

The topography of the site derived from a 1m resolution EA composite Light Detecting and Ranging (LiDAR) DTM is shown in Figure 2.

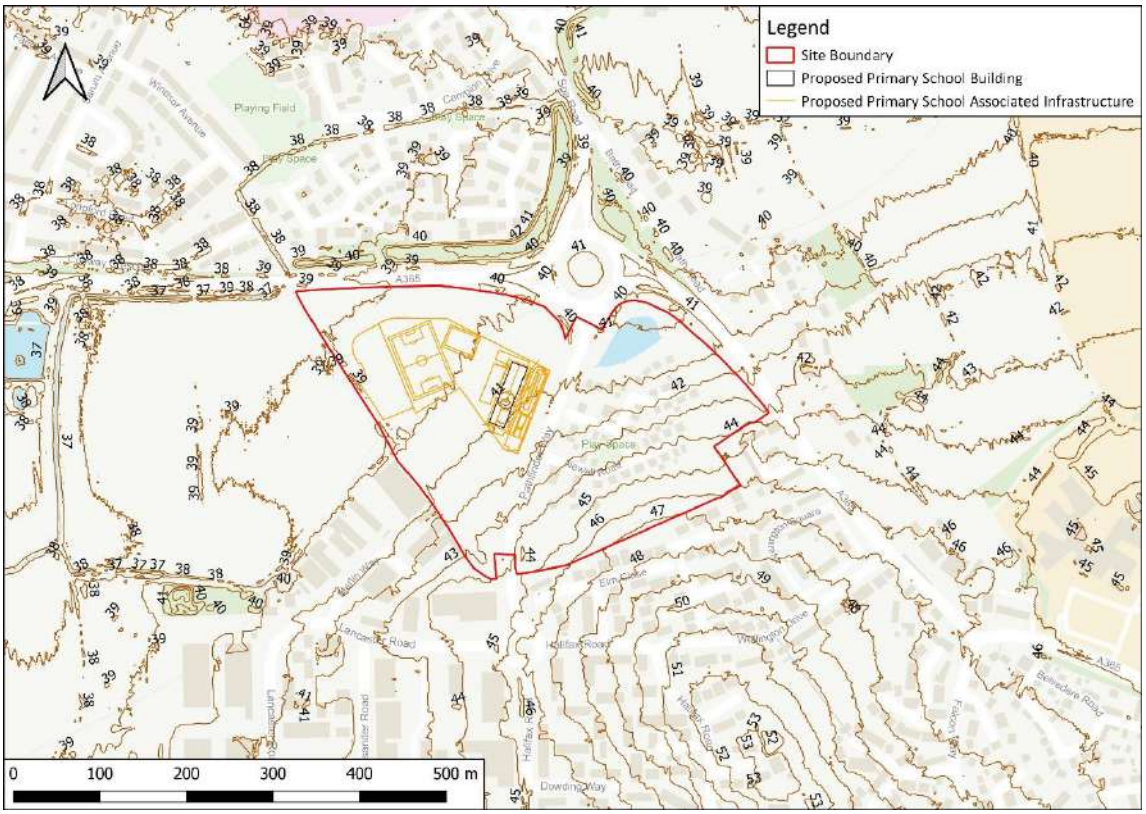

Figure 2: Site topography

2.3 Geology and Hydrogeology

2.3.1 Geology

The underlying geological profile of the site has been established through a review of the British Geological Survey's (BGS) online GeoIndex Onshore mapping and historic borehole records. BGS mapping shows the site to be underlain by the Oxford Clay Formation, consisting of mudstone. This is overlain by superficial deposits of Head.

Soilscapes mapping shows the site to be underlain by 'slowly permeable seasonally wet acid but base-rich loamy and clayey soils', which has impeded drainage.

2.3.2 *Hydrogeology*

Environment Agency (EA) mapping indicates that the solid strata underling the site is an 'Unproductive Aquifer' with aquifers of this classification described as 'strata with low permeability that have negligible significance for water supply and river base flows.

2.4 Proposed Development

The proposals are for development in the western parcel of the site, consisting of a primary school comprising of a single storey building, with associated car parking, play grounds and playing fields.

3. ASSESSMENT OF FLOOD RISK

3.1 Fluvial Flooding

Current EA Flood Zone Mapping (Figure 3) shows that the site is located entirely within Flood Zone 1 (Low Risk). The nearest area of land at increased (Medium and High) risk of fluvial flooding is located 800m to the northeast of the site and is associated with Clackers Brook, which acts as a tributary for the River Avon.



Figure 3: EA Flood Risk Map for Planning

For reference, the Environment Agency Flood Zones are defined as follows:

- Flood Zone 1 (Low Risk) comprises land assessed as having a ≤0.1% AEP of fluvial or tidal flooding in any given year, equivalent to the ≥1,000yr return period flood event.
- Flood Zone 2 (Medium Risk) comprises land assessed as having a 0.1-1% AEP of fluvial flooding or 0.1-0.5% AEP of tidal flooding in any given year, equivalent to the 1,000-100yr and the 1,000-200yr return period flood event, respectively.
- Flood Zone 3 (High Risk) comprises land assessed as having a ≥1% AEP of fluvial flooding or ≥0.5% AEP tidal flooding in any given year, equivalent to the ≤100yr return period flood event.

Publicly available EA data does not sure records of historic fluvial or tidal flooding within the site boundary or in the local area.

It is not expected that any increase in flood risk associated with climate change would be likely to be of a magnitude which would result in a significant increase in the risk to the site given the distance from the site to the nearest watercourse, and the difference in elevation between the watercourse and the site boundaries.

As such, the site is concluded to be at Low Risk of fluvial flooding.

3.2 Tidal Flooding

Given the site is located a significant distance from the nearest tidal waterbody, the site is concluded to be at negligible risk of tidal flooding, which is not considered to alter as a result of climate change.

3.3 Surface Water Flooding

Surface Water Flooding (also known as pluvial flooding), occurs when natural and engineered drainage systems have insufficient capacity to cope with the volume of rainfall. Flows generated by such events either enter drainage features or follow the general topography which can concentrate flows and lead to localised ponding/flooding.

In the scenario of the infiltration capacity of the site being exceeded (i.e., as a result of prolonged and/or intense rainfall), surface water run-off will likely be directed overland coinciding with the prevailing topography as shallow 'sheet-flow'. Therefore, the 'sheet-flow' will be directed in a northward's direction through the site,

This analysis is supported by the EA's Surface Water Flood Risk Mapping (Figure 4), which shows a large proportion of the site to be at 'very low' risk of surface water flooding. There is, however, a small percentage of the site is defined as being at 'low', 'medium' and 'high' risk of surface water flooding, corresponding to the annual chance of flooding of between 0.1% and 1%, between 1% and 3.3%, and greater than 3.3%, respectively.

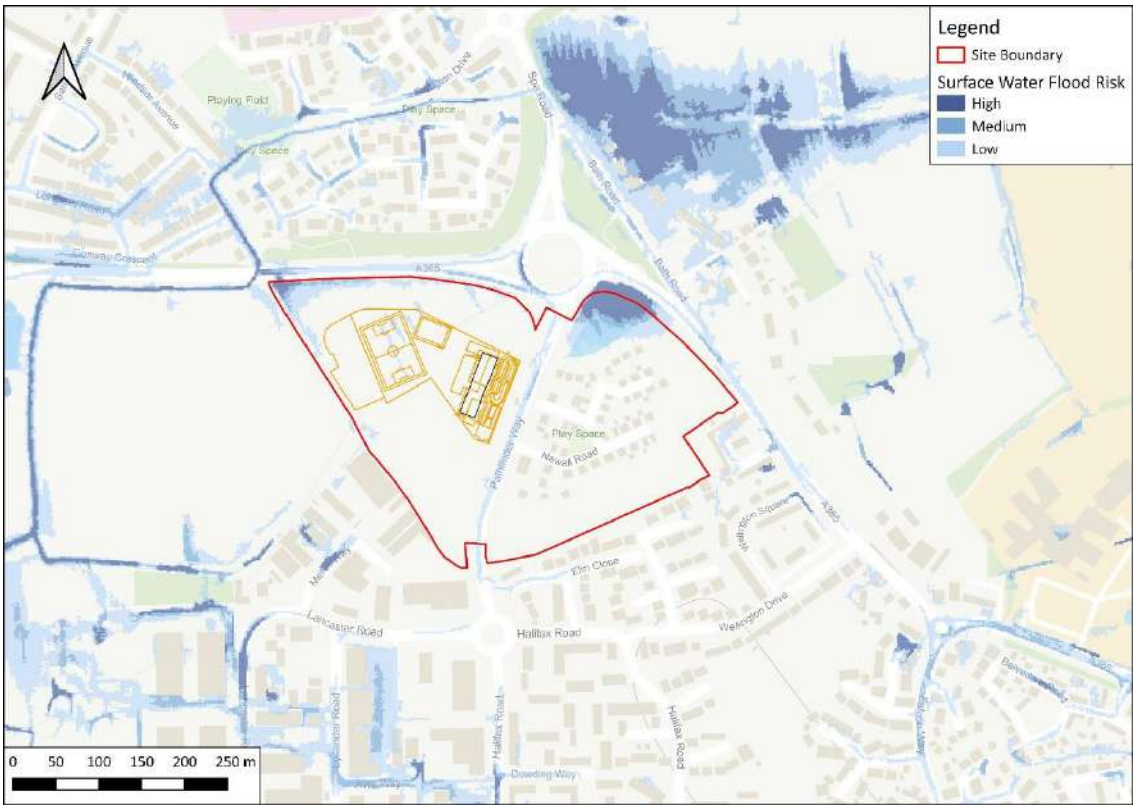

Figure 4: EA Flood Risk from Surface Water Flood Map

During 'high' and 'medium' risk surface water flooding events, surface water flooding is localised in lower-lying portions of the site, where the water is likely to pool. These areas are confined to the northeast and northwest corners of the site, where topographical low points are designated in the site proposals as attenuation features. The storage capacity of the onsite attenuation features is to

be addressed and discussed in the associated drainage strategy (report ref: 27203-HYD-00-ZZ-DR-C-7000).

During both 'high' and 'medium' risk flood events, surface water flooding in the northwest corner of the site is expected to remain <300mm. Flooding is deeper in the northeast corner, where depths are predicted to be <600mm during 'high' risk events, and <900mm during 'medium' risk events. During 'medium' risk surface water flooding there is a small area of flooding predicted on Pathfinder Way, which is expected to remain <150mm.

Surface water flooding during 'low' risk events is more widespread throughout the site, with flooding occurring the northwest and northeast corners of the site, as well as along Pathfinder Way, and some isolated areas in the western parcel. Flood depths are predicted to remain <300mm on Pathfinder Way and in the isolated areas within the western parcel. Surface water flooding is expected to be deeper in the northwest and northeastern corners of the site, with depths predicted to be <600mm in the northwestern corner and <1200mm in the northeastern corner.

The potential effects of climate change could increase the frequency, depth and extent of onsite surface water flooding, however, given the topography within the site, any increase in flood risk is considered to be unlikely to be a magnitude which would result in a significant increase in the risk of on-site surface water flooding, as any surface water run-off likely continue to be directed towards the attenuation features in the northeast and northwest corners of the site.

Whilst the majority of the site is concluded to be at 'very low' risk of surface water flooding, there is considered to be a potential risk of surface water flooding during 'low', 'medium' and 'high' events. However, overall, the risk of flooding at the proposed school building is concluded to be at low risk of surface water flooding.

3.4 Groundwater Flooding

Groundwater flooding is most likely to occur in low-lying areas with porous sub-surface geology. This flooding occurs when water emerges through the ground due to a high water table following prolonged periods of heavy rainfall.

The Wiltshire Strategic Flood Risk Assessment (SFRA) states that there is an increased risk of groundwater flooding in the south of the region, where the underlying bedrock geology consists of chalk. Given the site is underlain by the Oxford Clay Formation, consisting of mudstone, the generally low permeability of the bedrock is unlikely to be conducive to groundwater emergence.

Furthermore, as stated above, that the underlying aquifer is unproductive, indicating that the strata have a negligible significance for water supply and river base flow.

However, the presence of head deposits may result in perched groundwater. Perched groundwater is caused when unconfined groundwater is separated from the underlying body of groundwater by an unsaturated zone and is caused when subsurface water percolating downwards is held by a bed of low-permeability material. In this instance, the mudstone underling the superficial head deposit will act as the low-permeability material.

Historic borehole records for a borehole located to the north of the site (located at ST 91270 62790), which extends to a depth of 1.5m below ground level (bgl) indicate that groundwater strikes are not present.

As such, it can be concluded that the risk of groundwater flooding is low.

3.5 Infrastructure Flooding

Flooding from infrastructure failure refers to the risk of flooding from manmade waterbodies and features such as sewers, reservoirs, canals, docks or other such waterbodies. Sewer flooding is typically a result of heavy rainfall overwhelming the capacity of the local drainage system, or

blockages in the existing sewer network, whereas flooding from other types of infrastructure can result from failures in embankments or retaining walls.

Given the western portion of the site comprises greenfield and undeveloped land, it is considered unlikely that there is a significant sewer network present in this vicinity, and consequently there is a minimal risk of surcharged sewer flows being generated and directed onto the site.

In the eastern portion of the site, given the risk of sewer flooding is likely only in the event of failure or blockage, this is considered to be a 'residual' risk, and as such the risk of potential flooding from sewers onsite is concluded to be 'low'.

The EA Reservoir Failure Extent mapping shows that the site lies outside of the extent of the potential reservoir flooding, both when levels are normal, and when there is fluvial flooding. Table. Furthermore, there are no canals or further infrastructure in the surrounding area of the site and so it can be concluded that the risk of flooding from infrastructure failure is negligible.

Therefore, the risk of flooding from infrastructure failure is 'low'.

4. National Planning Policy Framework

4.1 Sequential and Exception Test

Paragraph 024 of the National Planning Policy Guidance (NPPG) requires that new developments are placed in 'areas with the lowest risk of flooding taking into account all sources of flood risk and climate change'.

This assessment has demonstrated that the site is on land designated by the EA's Flood Zone Mapping as Flood Zone 1 (Low Risk), and is at low or negligible risk of flooding from all other sources.

The NPPG Flood Risk Vulnerability and Flood Zone Incompatibility matrix (Table 2 of the NPPG) also indicates that all forms of development are "appropriate" in Flood Zone 1 without application of the Exception Test.

Accordingly, the application of the Sequential and Exception Tests are not concluded to be required in this instance.

4.2 Mitigation Measures

Whilst and Exception Test is not explicitly required under the NPPG, the following section details any measure recommended to mitigate any 'residual' flood risks and to ensure that the proposed development will be safer for its lifetime taking account of the vulnerability of its uses, without increasing flood risk elsewhere, akin to the requirements of section 'b' of the Exception Test as outlined in the NPPF.

4.2.1 Finished Flood Levels

It is recommended that, where possible, the ground floor thresholds are set above the adjacent ground levels by a minimum of 150mm, either by raising the floor level above existing ground levels or sloping ground levels away from the building. This will address any residual risks of surface water flooding (e.g., blockage of the proposed drainage network serving the site or exceedance of the drainage design capacity) by directing runoff away from the building.

4.2.2 Access and Egress

Access and egress to the site will be provided by Pathfinder Way. The road is predominantly at low risk of flooding from surface water flooding, with a small area of medium risk, based on the EA's Flood Risk from Surface Water Mapping. The potential surface water overland flow along the access and egress road is generally <0.15m, with some isolated areas at <0.3m during low risk events.

Although Pathfinder Way is indicated to be at 'low' or negligible risk of flooding from all other assessed sources, given there is a small area of medium surface water flood risk on the access and egress route, it is recommended that a Flood Evacuation and Management Plan is created to ensure there is safe access and egress to the site.

4.2.3 Floodplain Storage

The site has been demonstrated to be at low risk of flooding from all sources, and therefore outside of a functioning floodplain. As such, the proposed development is not considered to increase flooding within the catchment through a loss of floodplain storage, and accordingly no further mitigation measures are required in this respect.

5. CONCLUSION

This report has been prepared by Hydrock Consultants Limited (Hydrock) on behalf of ISG to be submitted in support of a planning application for a proposed development of a primary school comprising of a single storey building, with associated car parking, play grounds and playing fields.

A detailed assessment of flood risk has identified that the site is located within Flood Zone 1 (Low Risk) in respect to fluvial flood risk, and is at Low or negligible risk of flooding from all other potential sources.

In line with the NPPG, the application of the Sequential and Exception Tests is not required in this instance.

Site access and egress can be achieved using Pathfinder Way, running in a northern-southern direction through the centre of the site. It is recommended that a Flood Evacuation and Management Plan is created to account for the small area of medium surface water flood risk on Pathfinder Way.

This report therefore demonstrates that, in respect of flood risk, the proposed redevelopment of the site:

- Is suitable in the location proposed.
- Will be adequately flood resistant and resilient.
- Will not place additional persons at risk of flooding, and will offer a safe means of access and egress.
- Will not increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage or impedance of flood flows.
- Will put in place measures to ensure surface water is appropriately managed.

As such, the application is concluded to meet the flood risk requirements of the NPPF.

Appendix A Proposed Site Layout



Notes

Do not scale from this document, unless for the purposes of planning applications where a scale bar is provided. Refer to figured dimensions only. All dimensions to be verified on site prior to construction. Report all discrepancies or ambiguities to the Document Originator immediately. This document is to be read in conjunction with relevant documents, drawings and standards.

AWW Site Plan Key

SCHOOL SITE BOUNDARY

OUTLINE PLANNING PERMISSION BOUNDARY

For illustrative purposes only, drawing not based on survey information.

Subject to Client comments from CEM 1.

Rev	Date	Notes	Drn	Chk'd
P01	27/04/23	Issued for Information only	KS	JF

N

10 0 10 20 30 40 50

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Client

ISG

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Plymouth East Quay House, PL4 0HX 01752 261 282
Bristol pivot + mark, 48-52 Baldwin Street, BS1 1QB 0117 923 2535

RIBA Chartered Practice www.aww-uk.com

Client
ISG

AWW Project Number
4669

Project Stage
Stage 1

Project Title
Melksham 1FE School
Pathfinder Way, Bowerhill, Melksham

Title
Proposed Site Plan

Scale @ A1
As indicated

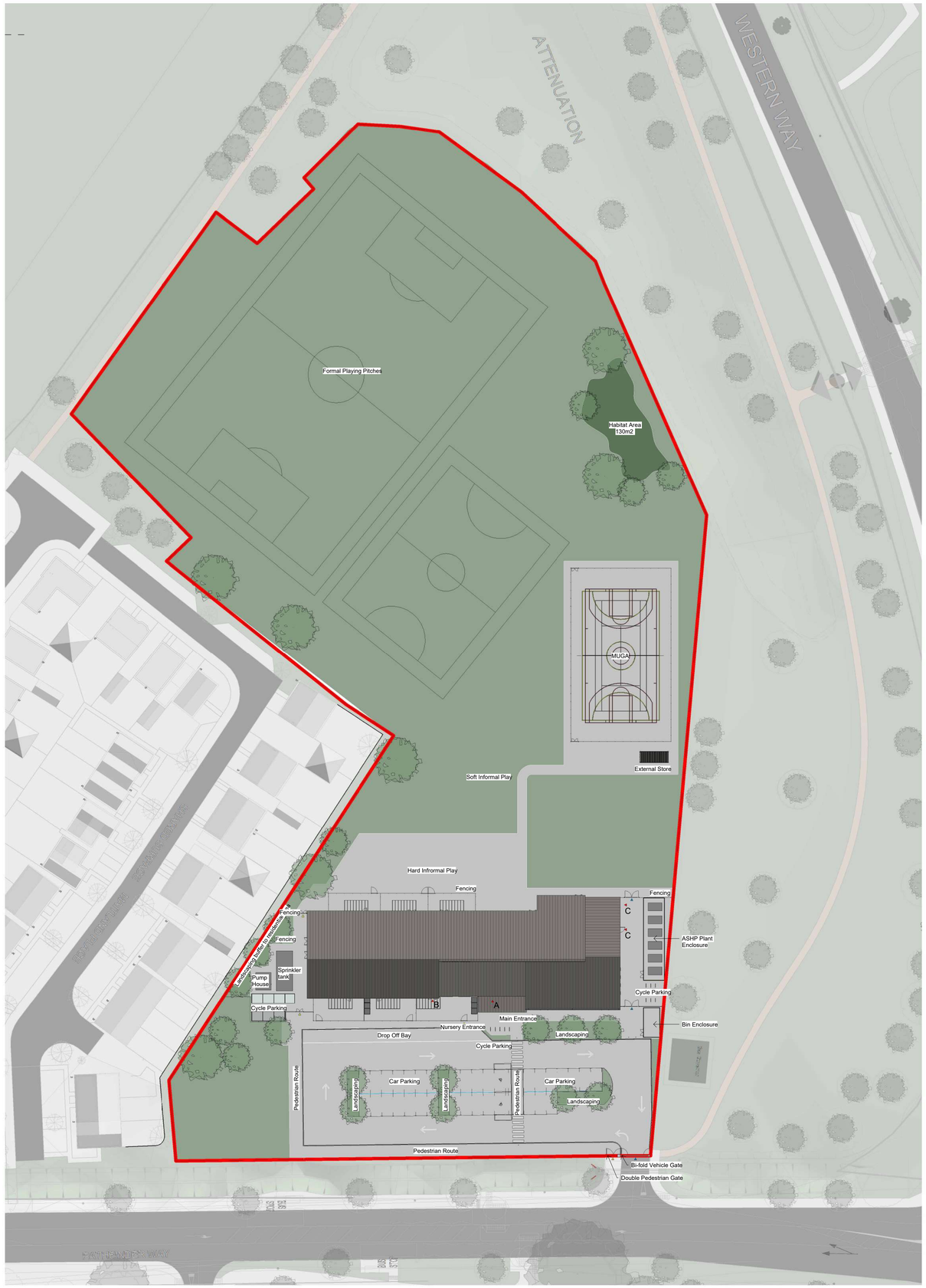
Document Status
WIP

Project	Origin.	Volume	Level	Type	Role	Number	Rev
4669	AWW	XX	XX	D	A	1100	P01

Appendix C Architect's Proposed Site Layout

MKS-AWW-XX-XX-D-A-0100-P03_Planning Issue - Proposed Site Plan

MKS-AWW-XX-XX-D-A-0101-P03_Planning Issue - Proposed Ground Floor Context Plan



Notes

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AWW Site Plan Key

- Site Boundary
- Proposed Tarmac
- Proposed Tree
- A - Main Entrance - Reception
  B - Secondary Entrance - Nursery
  C - Services Door
- Pedestrian Entrance Gate
- Vehicle Entrance Gate

Rev	Date	Notes	Drn	Chk'd
P03	18/09/23	Issued for Reserved Matters Application	KS	JF
P02	07/09/23	Draft Reserved Matters Applicaiton Issue	KS	JF
P01	13/07/23	Issued for Consultation & Pre App	KS	JF

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Plymouth East Quay House, PL4 0HX 01752 261 282
Bristol pivot + mark, 48-52 Baldwin Street, BS1 1QB 0117 923 2535

RIBA Chartered Practice www.aww-uk.com

Client

ISG

AWW Project Number
4669

Project Stage
Stage 3

Project Title
Melksham 1FE School
Pathfinder Way, Bowerhill, Melksham

Title
Planning Issue - Proposed Site Plan

Scale @ A1
As indicated

Document Status
PL – Issued for Planning

Project	Origin.	Volume	Level	Type	Role	Number	Rev
MKS	AWW	XX	XX	D	A	0100	P03


SHARED
Soft Informal Play
Hard Informal Play
External Store (shipping container
Fencing
External Play Space
SEN External Play Space
SEN External Play Space
Coats G.04
WC's G.06
Coats G.09
WC's G.11
Coats G.13
WC's G.15
Infant G.03
KS2 SEN G.08
KS1 SEN G.17
Stair 1 G.01
SGR G.07
SGR G.12
SGR G.16
Head's Office G.18
Therapy Room G.20
Store G.22
Medical Treatment G.21
Server G.19
Cleaner's Store G.61
Stair 2 G.24
Lobby G.26
Riser G.28
Lift G.27
Riser G.29
Elec Plant G.25
Mech Plant G.31
Production Kitchen & Servery G.35
DOC M Shower G.23
Changing WC G.55
Infant G.58
WC's G.50
WC's G.52
Reception G.49
SGR G.46
WC's G.47
Nursery G.45
Coats G.58
Coats G.54
Coats G.48
Nursery/Staff Kitchenette G.42
Changing WC G.43
Interview Room G.44
Sick Bay G.39
Chair & Table Store G.37
Reception G.40
Sports Equipment Store G.38
Hall G.36
External Play Space
External Reception Store
External Play Space
External Play Space
External Nursery Store
Planter
Planter
Fencing
Planter
Nursery Entrance
Cycle parking (29 Stands in total across the site)
Cycle Parking
Drop Off Bay
Landscaping
Pedestrian Route
Charging point
Future Car Charging
Car Charging
Pedestrian Route
Pedestrian Route
Bi-fold Vehicle Gate
Double Pedestrian Gate
External Plant (ASHP) enclosure
Cycle Parking
Bin enclosure
Sprinkler Tank
Pump House
Fencing
Fencing
Fencing
Fencing
Landscaping
Landscaping
Landscaping

Appendix D Sewer Asset Map

Wessex Water Maps 1 - 9

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet / Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM — Effluent Disposal
- Overflow
- S — Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW — Culverted Watercourse
- H — Highway Drain
- ? — Use Unknown
- SU — Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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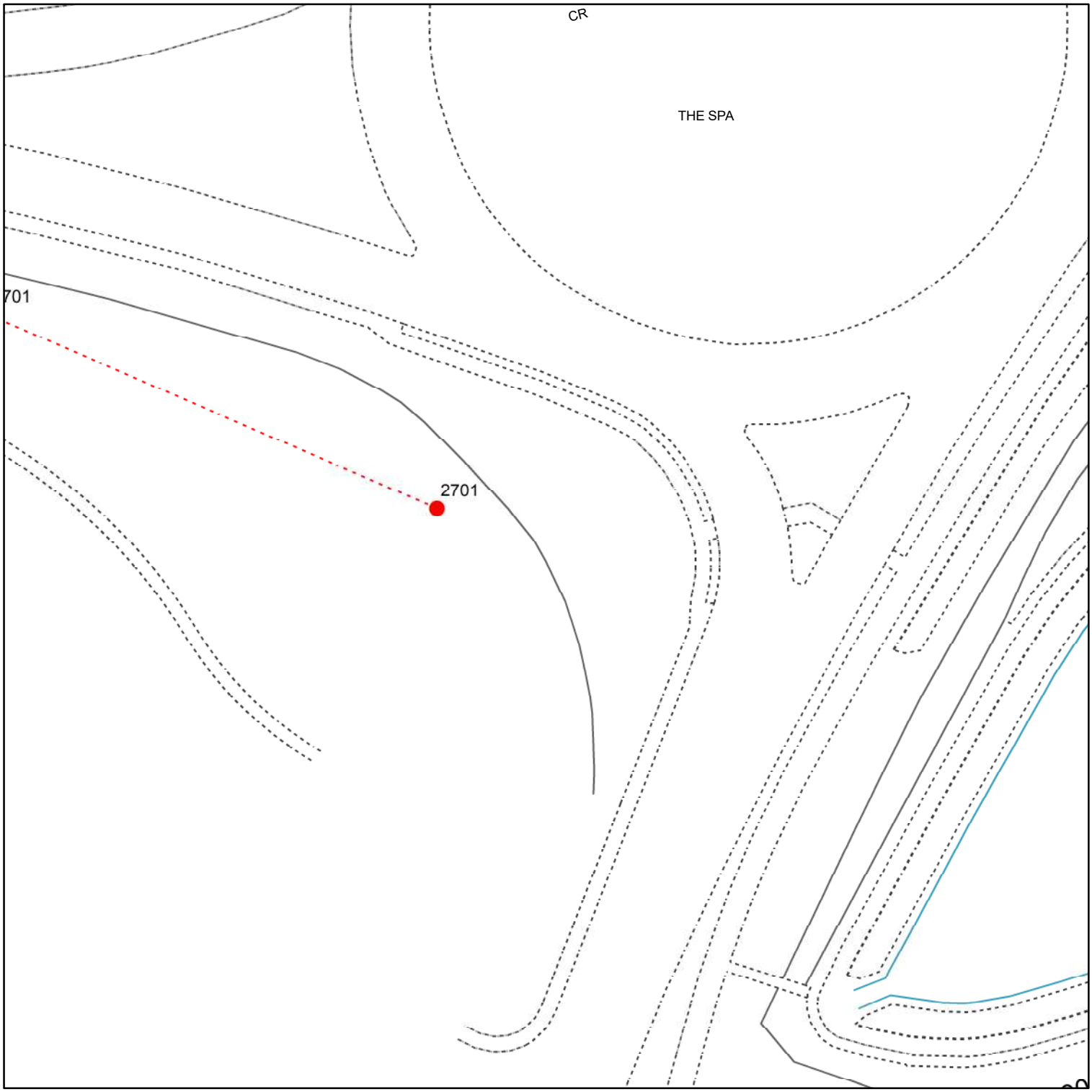
N
W E
S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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- Overflow
- S Syphon

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Wessex Water
YTL GROUP

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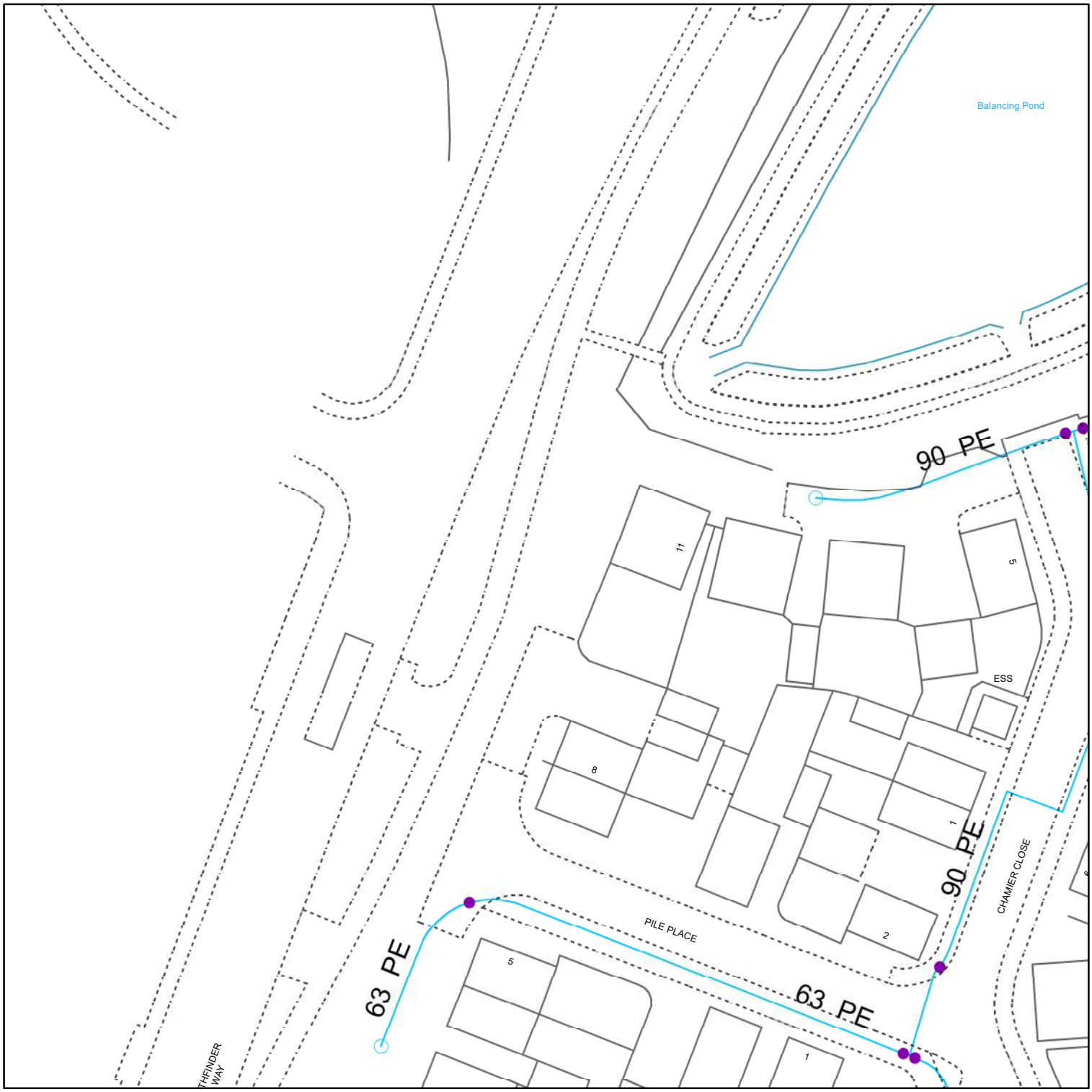
N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS

	STRATEGIC	PUBLIC	PRIVATE	SECTION 104
Foul				
Surface				
Combined				
Abandoned				

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
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Wessex Water
YTL GROUP

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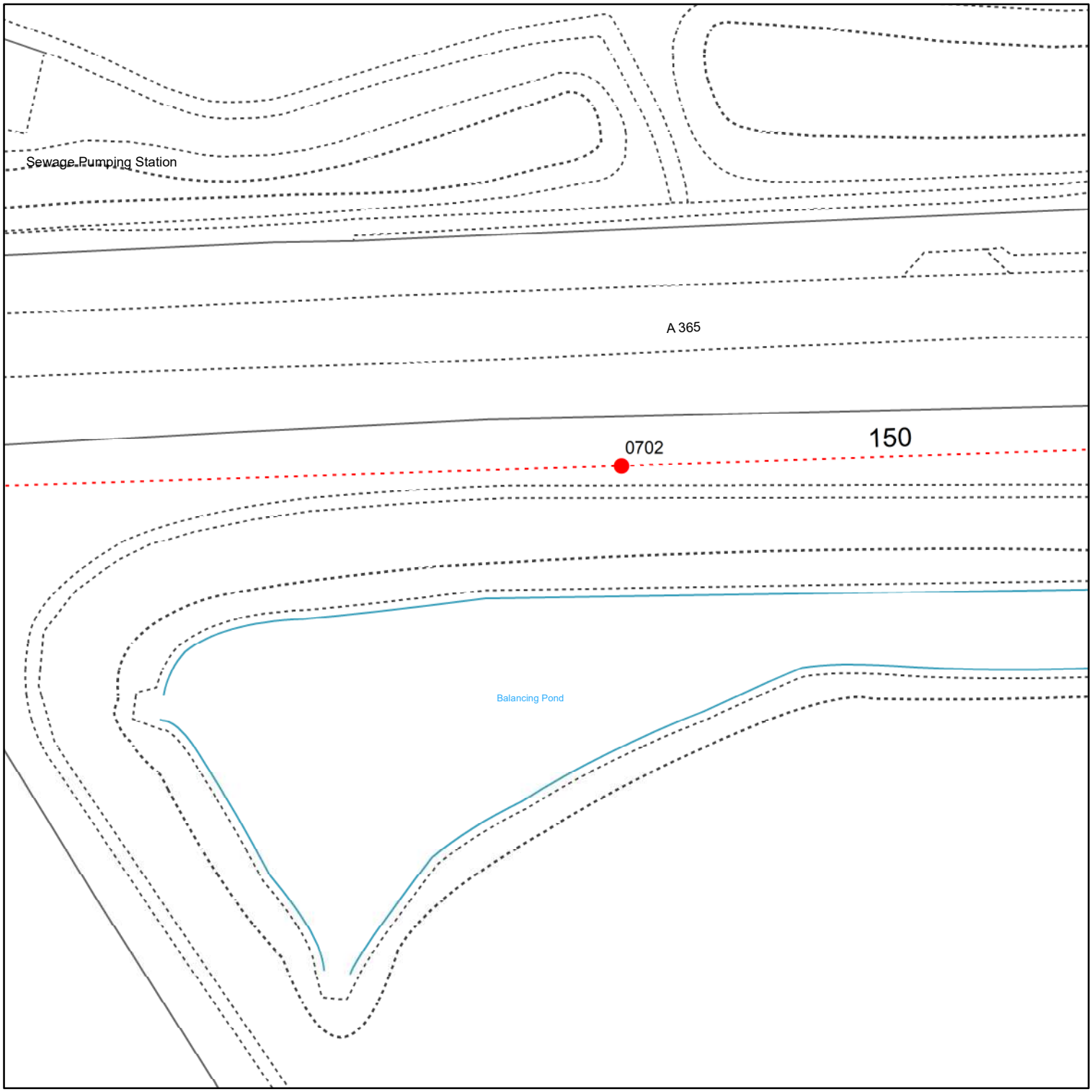
Wessex Water Network Map



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WATER MAINS
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- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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- Surface
- Combined
- Abandoned

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Wessex Water
YTL GROUP

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Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM — Effluent Disposal
- Overflow
- S — Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW — Culverted Watercourse
- H — Highway Drain
- ? — Use Unknown
- SU — Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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Date: 18/09/2023
Centre: 390986, 162657
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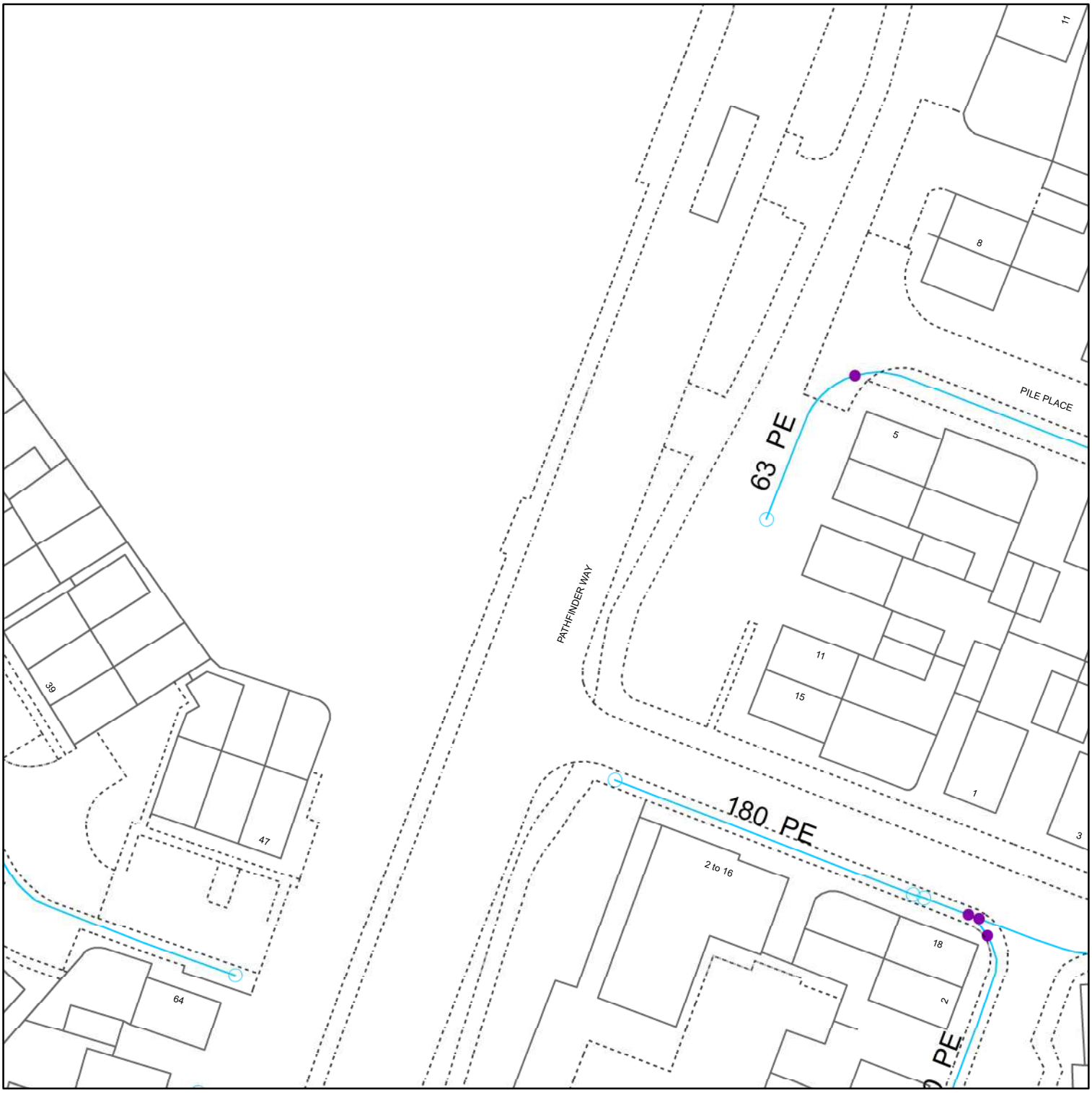
N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
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FITTINGS
- Hydrant
- Other

SEWERS

	STRATEGIC	PUBLIC	PRIVATE	SECTION 104
Foul				
Surface				
Combined				
Abandoned				

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
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- Soakaway
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- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
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- CW Culverted Watercourse
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- SU Status Unknown

OTHER STRUCTURES
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- Storage Tank
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Wessex Water
YTL GROUP

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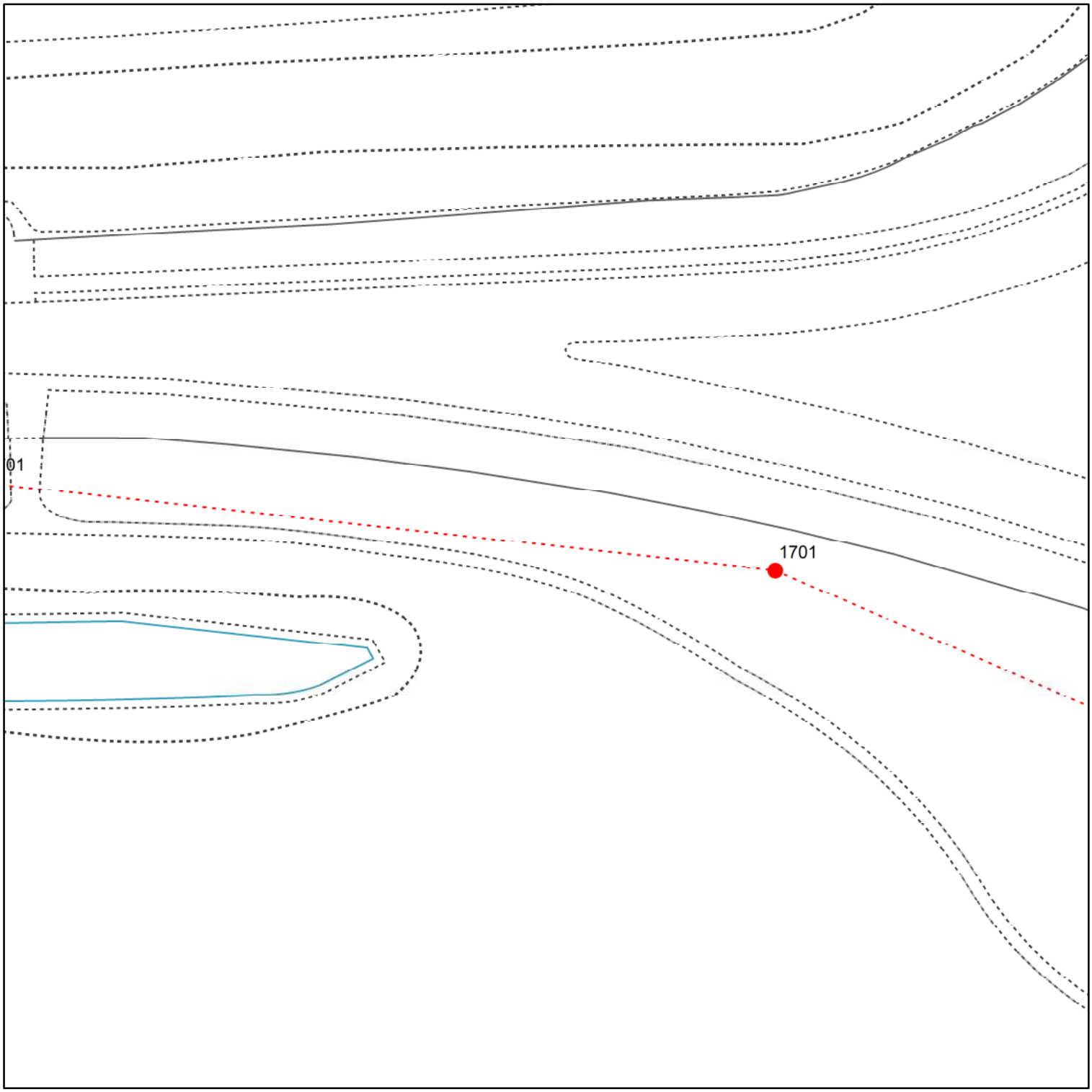
Date: 18/09/2023
Centre: 391191, 162600
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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FITTINGS
- Hydrant
- Other

SEWERS
- Foul
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- Combined
- Abandoned

STRATEGIC

PUBLIC

PRIVATE

SECTION 104

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Wessex Water
YTL GROUP

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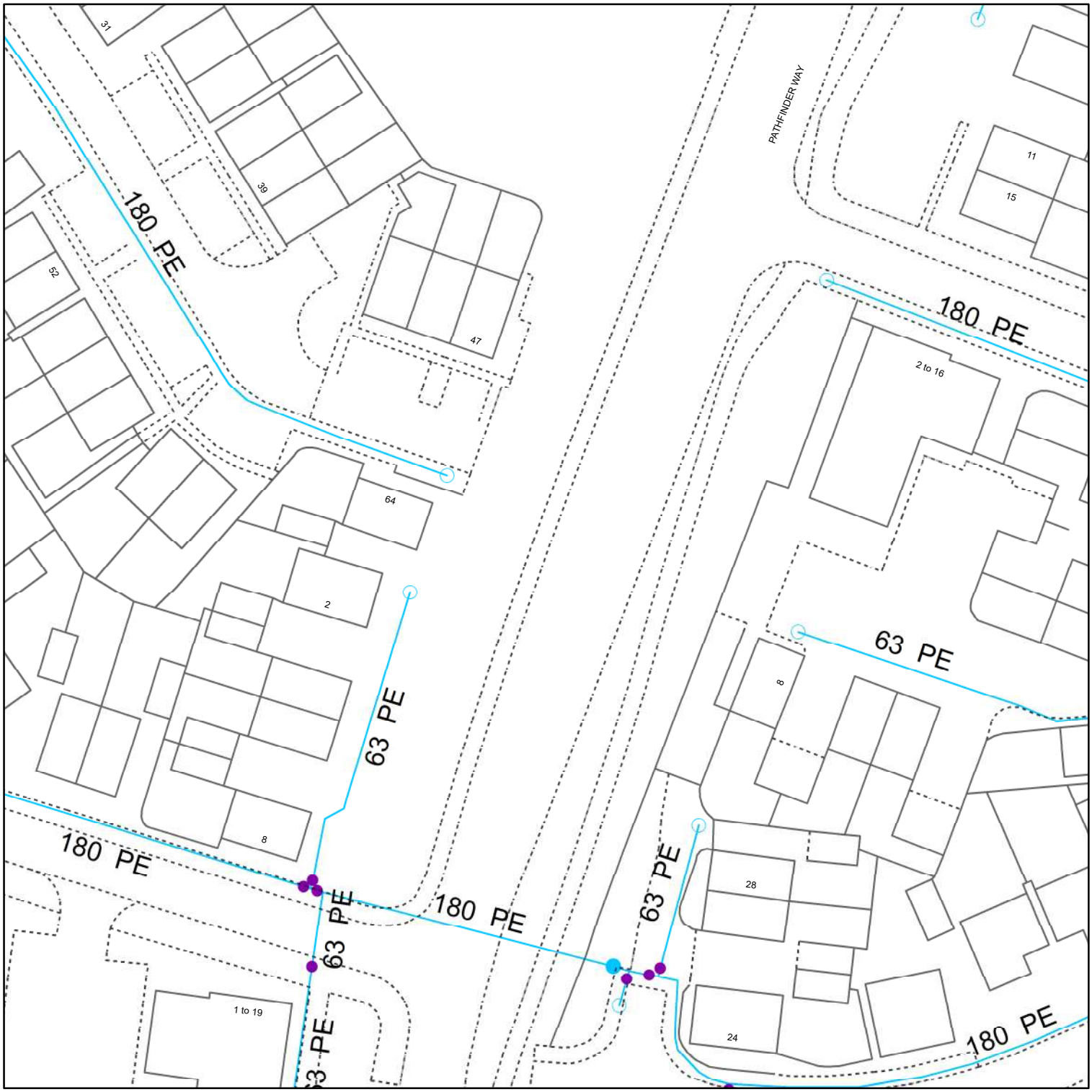
Date: 18/09/2023
Centre: 391128, 162763
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
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FITTINGS
- Hydrant
- Other

SEWERS

	STRATEGIC	PUBLIC	PRIVATE	SECTION 104
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Surface				
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Abandoned				

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Wessex Water
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Date: 18/09/2023
Centre: 391166, 162543
Scale: 1:625
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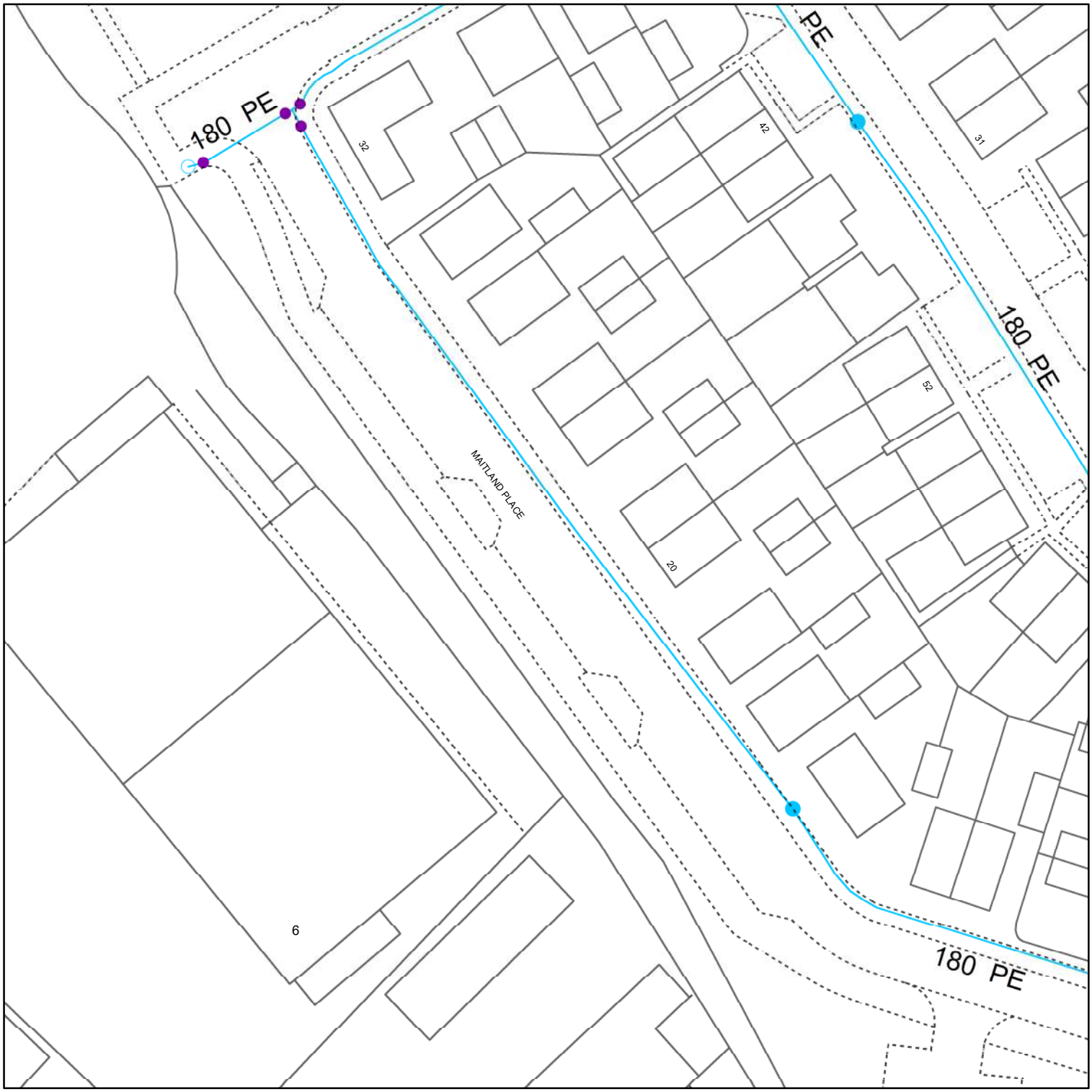
N W E S

Wessex Water Network Map



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Wessex Water
YTL GROUP

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Date: 18/09/2023
Centre: 391066, 162556
Scale: 1:625
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N W E S

Appendix E Existing Drainage Layout

MKS -HYD-XX-XX-G-C-9700 _Planning Issue - Existing Drainage Layout

PUBLIC AND PRIVATE EXISTING/PROPOSED DRAINAGE

150Ø@1:100	EXISTING PUBLIC COMBINED SEWER
150Ø@1:100	EXISTING PRIVATE FOUL SEWER
150Ø@1:100	EXISTING PRIVATE STORM SEWER

WESTERN WAY

ATTENUATION

EXFW-01
CL: 38.590
IL: 35.840

225Ø@1:TBC

150Ø@1:TBC

150Ø@1:14

EXFW-02
CL: 38.860
IL: 37.170

300Ø@1:TBC

EXSW-05
CL: 39.870
IL: 38.160

450Ø@1:TBC

OUTFALL

EXSW-04
CL: 39.850
IL: 38.130

150Ø@1:162

OUTFALL

575Ø@1:TBC

EXSW-01
CL: 40.030
IL: 38.870

EXFW-03
CL: 39.820
IL: 37.670

150Ø@1:118

575Ø@1:174

EXSW-02
CL: 40.570
IL: 38.940

EXFW-04
CL: 40.220
IL: 37.950

150Ø@1:83

575Ø@1:2100

EXSW-03
CL: 40.740
IL: 38.960

EXFW-04
CL: 40.870
IL: 38.430

375Ø

EXISTING CULVERT

KEY PLAN

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
2. The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWF, Adobe PDF files and/or hard copies and their associated information issue sheets.
3. Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydrock immediately.
4. All levels are shown in metres above Ordnance Datum (m AOD).

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	ISSUED FOR PLANNING					
	O.LAINCHBURY	22/09/23	M.STEWART	22/09/23	J.MAGEE	22/09/23

Hydrock
Merchants' House North
Wapping Road
Bristol
BS1 4RW
t: +44 (0)117 945 9225
e: bristolcentral@hydrock.com

CLIENT
ISG

PROJECT
MELKSHAM SCHOOL

TITLE
PLANNING ISSUE
EXISTING DRAINAGE LAYOUT

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	1:500

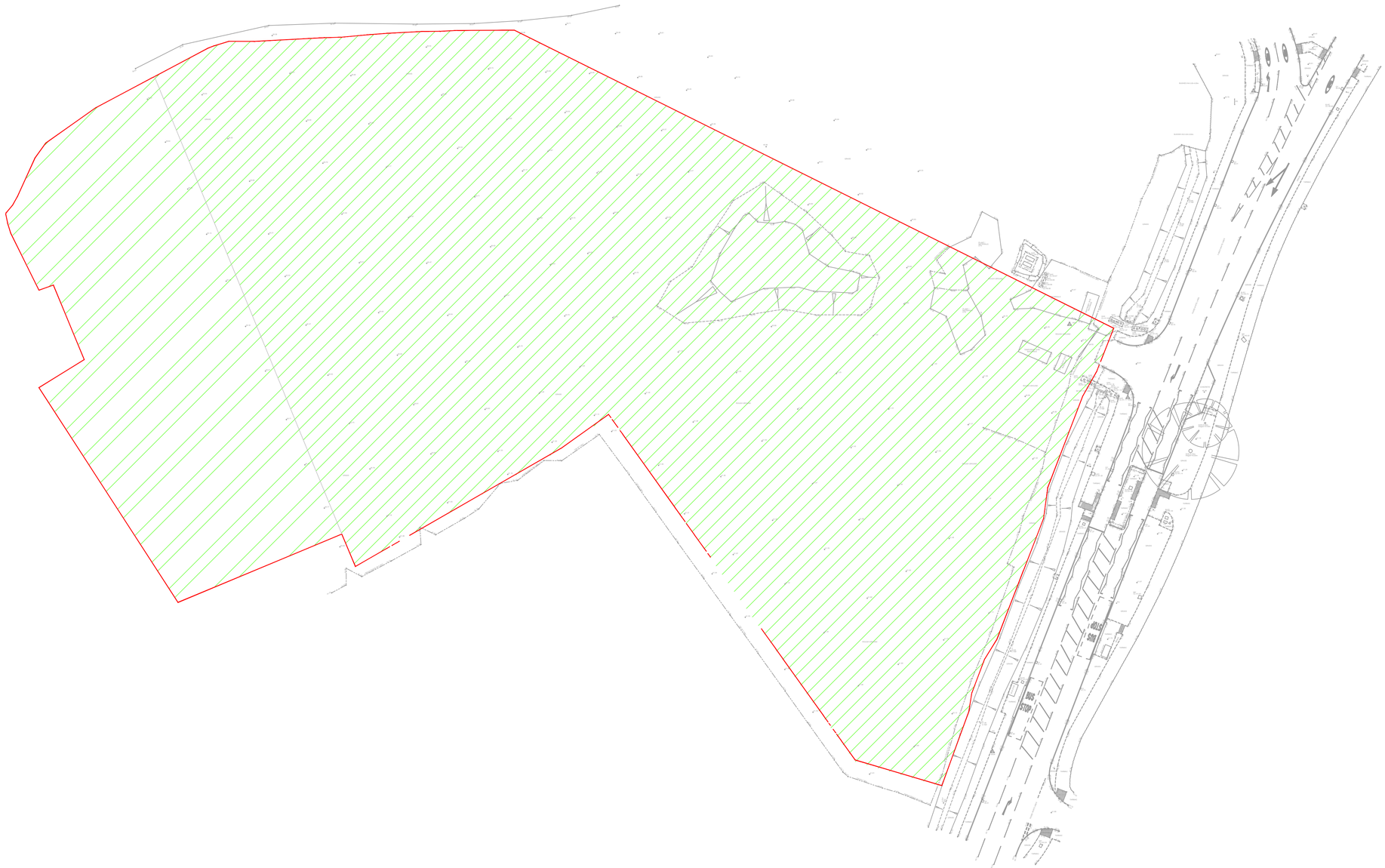
STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
MKS-HYD-XX-XX-G-C-9700	P01

Appendix F Pre / Post Development Catchments

MKS-HYD-XX-XX-G-C-9710_Planning Issue - Pre-Development Catchment Plan

MKS-HYD-XX-XX-G-C-9720_Planning Issue - Post-Development Catchment Plan



KEY PLAN

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LEGEND

	BUILDING / ROOF	= 0 m^2
	HARDSTANDING	= 0 m^2
	SOFT LANDSCAPING (1FE)	= 15,838 m^2
	SOFT LANDSCAPING (2FE)	= 3,889 m^2
	TOTAL	= 19,727 m^2

REV						
P01	ISSUED FOR PLANNING					
	O.LAINCHBURY	22/09/23	M.STEWART	22/09/23	J.MAGEE	22/09/23
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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e: bristolcentral@hydrock.com

CLIENT

ISG

PROJECT

MELKSHAM SCHOOL

TITLE

PRE-DEVELOPMENT CATCHMENT PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	NTS

STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
MKS-HYD-XX-XX-G-C-9710	P01

ENUATION

SHARED SURFACE

MAITLAND PLACE

KEY PLAN

NOTES

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HARDSTANDING/ CATCHMENT AREA

	BUILDING / ROOF	= 1516 m^2
	PERMEABLE PAVING	= 1198 m^2
	HARDSTANDING	= 3370 m^2
	TOTAL	= 6084 m^2

	PITCH (40%)	= 1643 m^2
	2FE HARDSTANDING	= 1186 m^2
	TOTAL	= 2829 m^2

OTHER

	ADOPTED ROAD	= 0 m^2
	FREE DRAINING CELLWEB	= 0 m^2
	SOFT LANDSCAPING (EXCLUDING 40% OF PITCH)	= 10,814 m^2
	TOTAL	= 10,814 m^2

TOTALS

TOTAL SITE	= 19,727m^2
HARDSTANDING & 40% PITCH	= 8913 m^2 (45%)

REV	ISSUED FOR PLANNING					
P01	O.LAINCHBURY	22/09/23	M.STEWART	22/09/23	J.MAGEE	22/09/23

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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e: bristolcentral@hydrock.com

CLIENT
ISG

PROJECT
MELKSHAM SCHOOL

TITLE
PLANNING ISSUE
POST-DEVELOPMENT CATCHMENT PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	NTS

STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
MKS-HYD-XX-XX-G-C-9720	P01

Appendix G Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.500	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.362	4-8	0.458	8-12	0.032

Total Area Contributing (ha) = 0.851

Total Pipe Volume (m³) = 35.447

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	27.281	0.091	299.8	0.132	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	8.571	0.029	295.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	22.706	0.345	65.8	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	29.635	0.099	299.3	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.50	40.000	0.132	0.0	0.0	0.0	0.90	63.8	17.9
S1.001	50.00	5.66	39.909	0.132	0.0	0.0	0.0	0.91	64.3	17.9
S2.000	50.00	5.23	40.300	0.027	0.0	0.0	0.0	1.61	64.2	3.6
S1.002	50.00	6.21	39.880	0.188	0.0	0.0	0.0	0.90	63.9	25.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.000	37.422	0.210	178.2	0.042	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	2.826	0.059	47.9	0.002	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	39.948	0.200	199.7	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	87.912	0.440	199.8	0.143	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	40.648	0.136	298.9	0.142	5.00	0.0	0.600	o	300	Pipe/Conduit	
S4.001	7.353	0.025	294.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	24.964	0.386	64.7	0.033	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.002	25.837	0.086	300.4	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.003	26.876	0.099	271.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.004	45.347	0.151	300.3	0.095	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.005	17.139	0.057	300.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.006	31.370	0.105	298.8	0.012	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	20.666	0.141	146.6	0.146	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.000	50.00	5.53	40.100	0.042	0.0	0.0	0.0	1.17	83.0	5.7
S3.001	50.00	5.55	39.840	0.044	0.0	0.0	0.0	2.28	161.0	5.9
S1.003	50.00	6.81	39.781	0.259	0.0	0.0	0.0	1.11	78.4	35.0
S1.004	50.00	8.13	39.581	0.401	0.0	0.0	0.0	1.11	78.4	54.4
S4.000	50.00	5.75	40.000	0.142	0.0	0.0	0.0	0.90	63.9	19.2
S4.001	50.00	5.88	39.864	0.142	0.0	0.0	0.0	0.91	64.4	19.2
S5.000	50.00	5.26	40.300	0.033	0.0	0.0	0.0	1.63	64.8	4.4
S4.002	50.00	6.36	39.839	0.197	0.0	0.0	0.0	0.90	63.7	26.6
S4.003	50.00	6.83	39.703	0.197	0.0	0.0	0.0	0.95	67.1	26.6
S4.004	50.00	7.67	39.554	0.292	0.0	0.0	0.0	0.90	63.8	39.5
S4.005	50.00	7.99	39.353	0.292	0.0	0.0	0.0	0.90	63.7	39.5
S4.006	50.00	8.57	39.246	0.304	0.0	0.0	0.0	0.90	63.9	41.1
S1.005	50.00	8.77	39.141	0.851	0.0	0.0	0.0	1.68	266.7	115.3

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.047	0.047	0.047
	User	-	100	0.018	0.018	0.065
	User	-	100	0.067	0.067	0.132
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.027	0.027	0.027
1.002	User	-	100	0.016	0.016	0.016
	User	-	100	0.004	0.004	0.020
	User	-	100	0.009	0.009	0.030
3.000	User	-	100	0.042	0.042	0.042
3.001	User	-	100	0.002	0.002	0.002
1.003	User	-	100	0.027	0.027	0.027
1.004	User	-	100	0.040	0.040	0.040
	User	-	100	0.072	0.072	0.112
	User	-	100	0.031	0.031	0.143
4.000	User	-	100	0.011	0.011	0.011
	User	-	100	0.131	0.131	0.142
4.001	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.033	0.033	0.033
4.002	User	-	100	0.022	0.022	0.022
4.003	-	-	100	0.000	0.000	0.000
4.004	User	-	100	0.095	0.095	0.095
4.005	-	-	100	0.000	0.000	0.000
4.006	User	-	100	0.012	0.012	0.012
1.005	User	-	100	0.146	0.146	0.146
				Total	Total	Total
				0.851	0.851	0.851

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Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	300	0.700	0.851	Unclassified	1200	0	0.700	Unclassified
S1.001	S2	300	0.850	0.851	Unclassified	1200	0	0.851	Unclassified
S2.000	S3	225	0.475	0.850	Unclassified	1200	0	0.475	Unclassified
S1.002	S4	300	0.850	1.029	Unclassified	1200	0	0.850	Unclassified
S3.000	S5	300	0.700	0.920	Unclassified	1200	0	0.700	Unclassified
S3.001	S6	300	0.970	1.029	Unclassified	1200	0	0.970	Unclassified
S1.003	S7	300	1.029	1.309	Unclassified	1200	0	1.029	Unclassified
S1.004	S8	300	0.459	1.309	Unclassified	1200	0	1.309	Unclassified
S4.000	S9	300	0.700	0.706	Unclassified	1200	0	0.700	Unclassified
S4.001	S10	300	0.706	0.871	Unclassified	1200	0	0.706	Unclassified
S5.000	S11	225	0.475	0.871	Unclassified	1200	0	0.475	Unclassified
S4.002	S12	300	0.871	1.017	Unclassified	1200	0	0.871	Unclassified
S4.003	S13	300	1.046	1.067	Unclassified	1200	0	1.067	Unclassified
S4.004	S14	300	1.096	1.347	Unclassified	1200	0	1.096	Unclassified
S4.005	S15	300	0.484	1.397	Unclassified	1200	0	1.397	Unclassified
S4.006	S16	300	0.459	0.534	Unclassified	1200	0	0.534	Unclassified
S1.005	S17	450	0.309	0.580	Unclassified	1200	0	0.309	Unclassified

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.005	S	40.030	39.000	0.000	0	0

Datum (m) 39.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.600	17	0.600	33	0.600	49	0.600	65	0.600	81	0.600
2	0.600	18	0.600	34	0.600	50	0.600	66	0.600	82	0.600
3	0.600	19	0.600	35	0.600	51	0.600	67	0.600	83	0.600
4	0.600	20	0.600	36	0.600	52	0.600	68	0.600	84	0.600
5	0.600	21	0.600	37	0.600	53	0.600	69	0.600	85	0.600
6	0.600	22	0.600	38	0.600	54	0.600	70	0.600	86	0.600
7	0.600	23	0.600	39	0.600	55	0.600	71	0.600	87	0.600
8	0.600	24	0.600	40	0.600	56	0.600	72	0.600	88	0.600
9	0.600	25	0.600	41	0.600	57	0.600	73	0.600	89	0.600
10	0.600	26	0.600	42	0.600	58	0.600	74	0.600	90	0.600
11	0.600	27	0.600	43	0.600	59	0.600	75	0.600	91	0.600
12	0.600	28	0.600	44	0.600	60	0.600	76	0.600	92	0.600
13	0.600	29	0.600	45	0.600	61	0.600	77	0.600	93	0.600
14	0.600	30	0.600	46	0.600	62	0.600	78	0.600	94	0.600
15	0.600	31	0.600	47	0.600	63	0.600	79	0.600	95	0.600
16	0.600	32	0.600	48	0.600	64	0.600	80	0.600	96	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
97	0.600	147	0.600	197	0.600	247	0.600	297	0.600	347	0.600
98	0.600	148	0.600	198	0.600	248	0.600	298	0.600	348	0.600
99	0.600	149	0.600	199	0.600	249	0.600	299	0.600	349	0.600
100	0.600	150	0.600	200	0.600	250	0.600	300	0.600	350	0.600
101	0.600	151	0.600	201	0.600	251	0.600	301	0.600	351	0.600
102	0.600	152	0.600	202	0.600	252	0.600	302	0.600	352	0.600
103	0.600	153	0.600	203	0.600	253	0.600	303	0.600	353	0.600
104	0.600	154	0.600	204	0.600	254	0.600	304	0.600	354	0.600
105	0.600	155	0.600	205	0.600	255	0.600	305	0.600	355	0.600
106	0.600	156	0.600	206	0.600	256	0.600	306	0.600	356	0.600
107	0.600	157	0.600	207	0.600	257	0.600	307	0.600	357	0.600
108	0.600	158	0.600	208	0.600	258	0.600	308	0.600	358	0.600
109	0.600	159	0.600	209	0.600	259	0.600	309	0.600	359	0.600
110	0.600	160	0.600	210	0.600	260	0.600	310	0.600	360	0.600
111	0.600	161	0.600	211	0.600	261	0.600	311	0.600	361	0.600
112	0.600	162	0.600	212	0.600	262	0.600	312	0.600	362	0.600
113	0.600	163	0.600	213	0.600	263	0.600	313	0.600	363	0.600
114	0.600	164	0.600	214	0.600	264	0.600	314	0.600	364	0.600
115	0.600	165	0.600	215	0.600	265	0.600	315	0.600	365	0.600
116	0.600	166	0.600	216	0.600	266	0.600	316	0.600	366	0.600
117	0.600	167	0.600	217	0.600	267	0.600	317	0.600	367	0.600
118	0.600	168	0.600	218	0.600	268	0.600	318	0.600	368	0.600
119	0.600	169	0.600	219	0.600	269	0.600	319	0.600	369	0.600
120	0.600	170	0.600	220	0.600	270	0.600	320	0.600	370	0.600
121	0.600	171	0.600	221	0.600	271	0.600	321	0.600	371	0.600
122	0.600	172	0.600	222	0.600	272	0.600	322	0.600	372	0.600
123	0.600	173	0.600	223	0.600	273	0.600	323	0.600	373	0.600
124	0.600	174	0.600	224	0.600	274	0.600	324	0.600	374	0.600
125	0.600	175	0.600	225	0.600	275	0.600	325	0.600	375	0.600
126	0.600	176	0.600	226	0.600	276	0.600	326	0.600	376	0.600
127	0.600	177	0.600	227	0.600	277	0.600	327	0.600	377	0.600
128	0.600	178	0.600	228	0.600	278	0.600	328	0.600	378	0.600
129	0.600	179	0.600	229	0.600	279	0.600	329	0.600	379	0.600
130	0.600	180	0.600	230	0.600	280	0.600	330	0.600	380	0.600
131	0.600	181	0.600	231	0.600	281	0.600	331	0.600	381	0.600
132	0.600	182	0.600	232	0.600	282	0.600	332	0.600	382	0.600
133	0.600	183	0.600	233	0.600	283	0.600	333	0.600	383	0.600
134	0.600	184	0.600	234	0.600	284	0.600	334	0.600	384	0.600
135	0.600	185	0.600	235	0.600	285	0.600	335	0.600	385	0.600
136	0.600	186	0.600	236	0.600	286	0.600	336	0.600	386	0.600
137	0.600	187	0.600	237	0.600	287	0.600	337	0.600	387	0.600
138	0.600	188	0.600	238	0.600	288	0.600	338	0.600	388	0.600
139	0.600	189	0.600	239	0.600	289	0.600	339	0.600	389	0.600
140	0.600	190	0.600	240	0.600	290	0.600	340	0.600	390	0.600
141	0.600	191	0.600	241	0.600	291	0.600	341	0.600	391	0.600
142	0.600	192	0.600	242	0.600	292	0.600	342	0.600	392	0.600
143	0.600	193	0.600	243	0.600	293	0.600	343	0.600	393	0.600
144	0.600	194	0.600	244	0.600	294	0.600	344	0.600	394	0.600
145	0.600	195	0.600	245	0.600	295	0.600	345	0.600	395	0.600
146	0.600	196	0.600	246	0.600	296	0.600	346	0.600	396	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
397	0.600	447	0.600	497	0.600	547	0.600	597	0.600	647	0.600
398	0.600	448	0.600	498	0.600	548	0.600	598	0.600	648	0.600
399	0.600	449	0.600	499	0.600	549	0.600	599	0.600	649	0.600
400	0.600	450	0.600	500	0.600	550	0.600	600	0.600	650	0.600
401	0.600	451	0.600	501	0.600	551	0.600	601	0.600	651	0.600
402	0.600	452	0.600	502	0.600	552	0.600	602	0.600	652	0.600
403	0.600	453	0.600	503	0.600	553	0.600	603	0.600	653	0.600
404	0.600	454	0.600	504	0.600	554	0.600	604	0.600	654	0.600
405	0.600	455	0.600	505	0.600	555	0.600	605	0.600	655	0.600
406	0.600	456	0.600	506	0.600	556	0.600	606	0.600	656	0.600
407	0.600	457	0.600	507	0.600	557	0.600	607	0.600	657	0.600
408	0.600	458	0.600	508	0.600	558	0.600	608	0.600	658	0.600
409	0.600	459	0.600	509	0.600	559	0.600	609	0.600	659	0.600
410	0.600	460	0.600	510	0.600	560	0.600	610	0.600	660	0.600
411	0.600	461	0.600	511	0.600	561	0.600	611	0.600	661	0.600
412	0.600	462	0.600	512	0.600	562	0.600	612	0.600	662	0.600
413	0.600	463	0.600	513	0.600	563	0.600	613	0.600	663	0.600
414	0.600	464	0.600	514	0.600	564	0.600	614	0.600	664	0.600
415	0.600	465	0.600	515	0.600	565	0.600	615	0.600	665	0.600
416	0.600	466	0.600	516	0.600	566	0.600	616	0.600	666	0.600
417	0.600	467	0.600	517	0.600	567	0.600	617	0.600	667	0.600
418	0.600	468	0.600	518	0.600	568	0.600	618	0.600	668	0.600
419	0.600	469	0.600	519	0.600	569	0.600	619	0.600	669	0.600
420	0.600	470	0.600	520	0.600	570	0.600	620	0.600	670	0.600
421	0.600	471	0.600	521	0.600	571	0.600	621	0.600	671	0.600
422	0.600	472	0.600	522	0.600	572	0.600	622	0.600	672	0.600
423	0.600	473	0.600	523	0.600	573	0.600	623	0.600	673	0.600
424	0.600	474	0.600	524	0.600	574	0.600	624	0.600	674	0.600
425	0.600	475	0.600	525	0.600	575	0.600	625	0.600	675	0.600
426	0.600	476	0.600	526	0.600	576	0.600	626	0.600	676	0.600
427	0.600	477	0.600	527	0.600	577	0.600	627	0.600	677	0.600
428	0.600	478	0.600	528	0.600	578	0.600	628	0.600	678	0.600
429	0.600	479	0.600	529	0.600	579	0.600	629	0.600	679	0.600
430	0.600	480	0.600	530	0.600	580	0.600	630	0.600	680	0.600
431	0.600	481	0.600	531	0.600	581	0.600	631	0.600	681	0.600
432	0.600	482	0.600	532	0.600	582	0.600	632	0.600	682	0.600
433	0.600	483	0.600	533	0.600	583	0.600	633	0.600	683	0.600
434	0.600	484	0.600	534	0.600	584	0.600	634	0.600	684	0.600
435	0.600	485	0.600	535	0.600	585	0.600	635	0.600	685	0.600
436	0.600	486	0.600	536	0.600	586	0.600	636	0.600	686	0.600
437	0.600	487	0.600	537	0.600	587	0.600	637	0.600	687	0.600
438	0.600	488	0.600	538	0.600	588	0.600	638	0.600	688	0.600
439	0.600	489	0.600	539	0.600	589	0.600	639	0.600	689	0.600
440	0.600	490	0.600	540	0.600	590	0.600	640	0.600	690	0.600
441	0.600	491	0.600	541	0.600	591	0.600	641	0.600	691	0.600
442	0.600	492	0.600	542	0.600	592	0.600	642	0.600	692	0.600
443	0.600	493	0.600	543	0.600	593	0.600	643	0.600	693	0.600
444	0.600	494	0.600	544	0.600	594	0.600	644	0.600	694	0.600
445	0.600	495	0.600	545	0.600	595	0.600	645	0.600	695	0.600
446	0.600	496	0.600	546	0.600	596	0.600	646	0.600	696	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
697	0.600	747	0.600	797	0.600	847	0.600	897	0.600	947	0.600
698	0.600	748	0.600	798	0.600	848	0.600	898	0.600	948	0.600
699	0.600	749	0.600	799	0.600	849	0.600	899	0.600	949	0.600
700	0.600	750	0.600	800	0.600	850	0.600	900	0.600	950	0.600
701	0.600	751	0.600	801	0.600	851	0.600	901	0.600	951	0.600
702	0.600	752	0.600	802	0.600	852	0.600	902	0.600	952	0.600
703	0.600	753	0.600	803	0.600	853	0.600	903	0.600	953	0.600
704	0.600	754	0.600	804	0.600	854	0.600	904	0.600	954	0.600
705	0.600	755	0.600	805	0.600	855	0.600	905	0.600	955	0.600
706	0.600	756	0.600	806	0.600	856	0.600	906	0.600	956	0.600
707	0.600	757	0.600	807	0.600	857	0.600	907	0.600	957	0.600
708	0.600	758	0.600	808	0.600	858	0.600	908	0.600	958	0.600
709	0.600	759	0.600	809	0.600	859	0.600	909	0.600	959	0.600
710	0.600	760	0.600	810	0.600	860	0.600	910	0.600	960	0.600
711	0.600	761	0.600	811	0.600	861	0.600	911	0.600	961	0.600
712	0.600	762	0.600	812	0.600	862	0.600	912	0.600	962	0.600
713	0.600	763	0.600	813	0.600	863	0.600	913	0.600	963	0.600
714	0.600	764	0.600	814	0.600	864	0.600	914	0.600	964	0.600
715	0.600	765	0.600	815	0.600	865	0.600	915	0.600	965	0.600
716	0.600	766	0.600	816	0.600	866	0.600	916	0.600	966	0.600
717	0.600	767	0.600	817	0.600	867	0.600	917	0.600	967	0.600
718	0.600	768	0.600	818	0.600	868	0.600	918	0.600	968	0.600
719	0.600	769	0.600	819	0.600	869	0.600	919	0.600	969	0.600
720	0.600	770	0.600	820	0.600	870	0.600	920	0.600	970	0.600
721	0.600	771	0.600	821	0.600	871	0.600	921	0.600	971	0.600
722	0.600	772	0.600	822	0.600	872	0.600	922	0.600	972	0.600
723	0.600	773	0.600	823	0.600	873	0.600	923	0.600	973	0.600
724	0.600	774	0.600	824	0.600	874	0.600	924	0.600	974	0.600
725	0.600	775	0.600	825	0.600	875	0.600	925	0.600	975	0.600
726	0.600	776	0.600	826	0.600	876	0.600	926	0.600	976	0.600
727	0.600	777	0.600	827	0.600	877	0.600	927	0.600	977	0.600
728	0.600	778	0.600	828	0.600	878	0.600	928	0.600	978	0.600
729	0.600	779	0.600	829	0.600	879	0.600	929	0.600	979	0.600
730	0.600	780	0.600	830	0.600	880	0.600	930	0.600	980	0.600
731	0.600	781	0.600	831	0.600	881	0.600	931	0.600	981	0.600
732	0.600	782	0.600	832	0.600	882	0.600	932	0.600	982	0.600
733	0.600	783	0.600	833	0.600	883	0.600	933	0.600	983	0.600
734	0.600	784	0.600	834	0.600	884	0.600	934	0.600	984	0.600
735	0.600	785	0.600	835	0.600	885	0.600	935	0.600	985	0.600
736	0.600	786	0.600	836	0.600	886	0.600	936	0.600	986	0.600
737	0.600	787	0.600	837	0.600	887	0.600	937	0.600	987	0.600
738	0.600	788	0.600	838	0.600	888	0.600	938	0.600	988	0.600
739	0.600	789	0.600	839	0.600	889	0.600	939	0.600	989	0.600
740	0.600	790	0.600	840	0.600	890	0.600	940	0.600	990	0.600
741	0.600	791	0.600	841	0.600	891	0.600	941	0.600	991	0.600
742	0.600	792	0.600	842	0.600	892	0.600	942	0.600	992	0.600
743	0.600	793	0.600	843	0.600	893	0.600	943	0.600	993	0.600
744	0.600	794	0.600	844	0.600	894	0.600	944	0.600	994	0.600
745	0.600	795	0.600	845	0.600	895	0.600	945	0.600	995	0.600
746	0.600	796	0.600	846	0.600	896	0.600	946	0.600	996	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
997	0.600	1047	0.600	1097	0.600	1147	0.600	1197	0.600	1247	0.600
998	0.600	1048	0.600	1098	0.600	1148	0.600	1198	0.600	1248	0.600
999	0.600	1049	0.600	1099	0.600	1149	0.600	1199	0.600	1249	0.600
1000	0.600	1050	0.600	1100	0.600	1150	0.600	1200	0.600	1250	0.600
1001	0.600	1051	0.600	1101	0.600	1151	0.600	1201	0.600	1251	0.600
1002	0.600	1052	0.600	1102	0.600	1152	0.600	1202	0.600	1252	0.600
1003	0.600	1053	0.600	1103	0.600	1153	0.600	1203	0.600	1253	0.600
1004	0.600	1054	0.600	1104	0.600	1154	0.600	1204	0.600	1254	0.600
1005	0.600	1055	0.600	1105	0.600	1155	0.600	1205	0.600	1255	0.600
1006	0.600	1056	0.600	1106	0.600	1156	0.600	1206	0.600	1256	0.600
1007	0.600	1057	0.600	1107	0.600	1157	0.600	1207	0.600	1257	0.600
1008	0.600	1058	0.600	1108	0.600	1158	0.600	1208	0.600	1258	0.600
1009	0.600	1059	0.600	1109	0.600	1159	0.600	1209	0.600	1259	0.600
1010	0.600	1060	0.600	1110	0.600	1160	0.600	1210	0.600	1260	0.600
1011	0.600	1061	0.600	1111	0.600	1161	0.600	1211	0.600	1261	0.600
1012	0.600	1062	0.600	1112	0.600	1162	0.600	1212	0.600	1262	0.600
1013	0.600	1063	0.600	1113	0.600	1163	0.600	1213	0.600	1263	0.600
1014	0.600	1064	0.600	1114	0.600	1164	0.600	1214	0.600	1264	0.600
1015	0.600	1065	0.600	1115	0.600	1165	0.600	1215	0.600	1265	0.600
1016	0.600	1066	0.600	1116	0.600	1166	0.600	1216	0.600	1266	0.600
1017	0.600	1067	0.600	1117	0.600	1167	0.600	1217	0.600	1267	0.600
1018	0.600	1068	0.600	1118	0.600	1168	0.600	1218	0.600	1268	0.600
1019	0.600	1069	0.600	1119	0.600	1169	0.600	1219	0.600	1269	0.600
1020	0.600	1070	0.600	1120	0.600	1170	0.600	1220	0.600	1270	0.600
1021	0.600	1071	0.600	1121	0.600	1171	0.600	1221	0.600	1271	0.600
1022	0.600	1072	0.600	1122	0.600	1172	0.600	1222	0.600	1272	0.600
1023	0.600	1073	0.600	1123	0.600	1173	0.600	1223	0.600	1273	0.600
1024	0.600	1074	0.600	1124	0.600	1174	0.600	1224	0.600	1274	0.600
1025	0.600	1075	0.600	1125	0.600	1175	0.600	1225	0.600	1275	0.600
1026	0.600	1076	0.600	1126	0.600	1176	0.600	1226	0.600	1276	0.600
1027	0.600	1077	0.600	1127	0.600	1177	0.600	1227	0.600	1277	0.600
1028	0.600	1078	0.600	1128	0.600	1178	0.600	1228	0.600	1278	0.600
1029	0.600	1079	0.600	1129	0.600	1179	0.600	1229	0.600	1279	0.600
1030	0.600	1080	0.600	1130	0.600	1180	0.600	1230	0.600	1280	0.600
1031	0.600	1081	0.600	1131	0.600	1181	0.600	1231	0.600	1281	0.600
1032	0.600	1082	0.600	1132	0.600	1182	0.600	1232	0.600	1282	0.600
1033	0.600	1083	0.600	1133	0.600	1183	0.600	1233	0.600	1283	0.600
1034	0.600	1084	0.600	1134	0.600	1184	0.600	1234	0.600	1284	0.600
1035	0.600	1085	0.600	1135	0.600	1185	0.600	1235	0.600	1285	0.600
1036	0.600	1086	0.600	1136	0.600	1186	0.600	1236	0.600	1286	0.600
1037	0.600	1087	0.600	1137	0.600	1187	0.600	1237	0.600	1287	0.600
1038	0.600	1088	0.600	1138	0.600	1188	0.600	1238	0.600	1288	0.600
1039	0.600	1089	0.600	1139	0.600	1189	0.600	1239	0.600	1289	0.600
1040	0.600	1090	0.600	1140	0.600	1190	0.600	1240	0.600	1290	0.600
1041	0.600	1091	0.600	1141	0.600	1191	0.600	1241	0.600	1291	0.600
1042	0.600	1092	0.600	1142	0.600	1192	0.600	1242	0.600	1292	0.600
1043	0.600	1093	0.600	1143	0.600	1193	0.600	1243	0.600	1293	0.600
1044	0.600	1094	0.600	1144	0.600	1194	0.600	1244	0.600	1294	0.600
1045	0.600	1095	0.600	1145	0.600	1195	0.600	1245	0.600	1295	0.600
1046	0.600	1096	0.600	1146	0.600	1196	0.600	1246	0.600	1296	0.600

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Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1297	0.600	1347	0.600	1397	0.600	1447	0.600	1497	0.600	1547	0.600
1298	0.600	1348	0.600	1398	0.600	1448	0.600	1498	0.600	1548	0.600
1299	0.600	1349	0.600	1399	0.600	1449	0.600	1499	0.600	1549	0.600
1300	0.600	1350	0.600	1400	0.600	1450	0.600	1500	0.600	1550	0.600
1301	0.600	1351	0.600	1401	0.600	1451	0.600	1501	0.600	1551	0.600
1302	0.600	1352	0.600	1402	0.600	1452	0.600	1502	0.600	1552	0.600
1303	0.600	1353	0.600	1403	0.600	1453	0.600	1503	0.600	1553	0.600
1304	0.600	1354	0.600	1404	0.600	1454	0.600	1504	0.600	1554	0.600
1305	0.600	1355	0.600	1405	0.600	1455	0.600	1505	0.600	1555	0.600
1306	0.600	1356	0.600	1406	0.600	1456	0.600	1506	0.600	1556	0.600
1307	0.600	1357	0.600	1407	0.600	1457	0.600	1507	0.600	1557	0.600
1308	0.600	1358	0.600	1408	0.600	1458	0.600	1508	0.600	1558	0.600
1309	0.600	1359	0.600	1409	0.600	1459	0.600	1509	0.600	1559	0.600
1310	0.600	1360	0.600	1410	0.600	1460	0.600	1510	0.600	1560	0.600
1311	0.600	1361	0.600	1411	0.600	1461	0.600	1511	0.600	1561	0.600
1312	0.600	1362	0.600	1412	0.600	1462	0.600	1512	0.600	1562	0.600
1313	0.600	1363	0.600	1413	0.600	1463	0.600	1513	0.600	1563	0.600
1314	0.600	1364	0.600	1414	0.600	1464	0.600	1514	0.600	1564	0.600
1315	0.600	1365	0.600	1415	0.600	1465	0.600	1515	0.600	1565	0.600
1316	0.600	1366	0.600	1416	0.600	1466	0.600	1516	0.600	1566	0.600
1317	0.600	1367	0.600	1417	0.600	1467	0.600	1517	0.600	1567	0.600
1318	0.600	1368	0.600	1418	0.600	1468	0.600	1518	0.600	1568	0.600
1319	0.600	1369	0.600	1419	0.600	1469	0.600	1519	0.600	1569	0.600
1320	0.600	1370	0.600	1420	0.600	1470	0.600	1520	0.600	1570	0.600
1321	0.600	1371	0.600	1421	0.600	1471	0.600	1521	0.600	1571	0.600
1322	0.600	1372	0.600	1422	0.600	1472	0.600	1522	0.600	1572	0.600
1323	0.600	1373	0.600	1423	0.600	1473	0.600	1523	0.600	1573	0.600
1324	0.600	1374	0.600	1424	0.600	1474	0.600	1524	0.600	1574	0.600
1325	0.600	1375	0.600	1425	0.600	1475	0.600	1525	0.600	1575	0.600
1326	0.600	1376	0.600	1426	0.600	1476	0.600	1526	0.600	1576	0.600
1327	0.600	1377	0.600	1427	0.600	1477	0.600	1527	0.600	1577	0.600
1328	0.600	1378	0.600	1428	0.600	1478	0.600	1528	0.600	1578	0.600
1329	0.600	1379	0.600	1429	0.600	1479	0.600	1529	0.600	1579	0.600
1330	0.600	1380	0.600	1430	0.600	1480	0.600	1530	0.600	1580	0.600
1331	0.600	1381	0.600	1431	0.600	1481	0.600	1531	0.600	1581	0.600
1332	0.600	1382	0.600	1432	0.600	1482	0.600	1532	0.600	1582	0.600
1333	0.600	1383	0.600	1433	0.600	1483	0.600	1533	0.600	1583	0.600
1334	0.600	1384	0.600	1434	0.600	1484	0.600	1534	0.600	1584	0.600
1335	0.600	1385	0.600	1435	0.600	1485	0.600	1535	0.600	1585	0.600
1336	0.600	1386	0.600	1436	0.600	1486	0.600	1536	0.600	1586	0.600
1337	0.600	1387	0.600	1437	0.600	1487	0.600	1537	0.600	1587	0.600
1338	0.600	1388	0.600	1438	0.600	1488	0.600	1538	0.600	1588	0.600
1339	0.600	1389	0.600	1439	0.600	1489	0.600	1539	0.600	1589	0.600
1340	0.600	1390	0.600	1440	0.600	1490	0.600	1540	0.600	1590	0.600
1341	0.600	1391	0.600	1441	0.600	1491	0.600	1541	0.600	1591	0.600
1342	0.600	1392	0.600	1442	0.600	1492	0.600	1542	0.600	1592	0.600
1343	0.600	1393	0.600	1443	0.600	1493	0.600	1543	0.600	1593	0.600
1344	0.600	1394	0.600	1444	0.600	1494	0.600	1544	0.600	1594	0.600
1345	0.600	1395	0.600	1445	0.600	1495	0.600	1545	0.600	1595	0.600
1346	0.600	1396	0.600	1446	0.600	1496	0.600	1546	0.600	1596	0.600

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Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1597	0.600	1647	0.600	1697	0.600	1747	0.600	1797	0.600	1847	0.600
1598	0.600	1648	0.600	1698	0.600	1748	0.600	1798	0.600	1848	0.600
1599	0.600	1649	0.600	1699	0.600	1749	0.600	1799	0.600	1849	0.600
1600	0.600	1650	0.600	1700	0.600	1750	0.600	1800	0.600	1850	0.600
1601	0.600	1651	0.600	1701	0.600	1751	0.600	1801	0.600	1851	0.600
1602	0.600	1652	0.600	1702	0.600	1752	0.600	1802	0.600	1852	0.600
1603	0.600	1653	0.600	1703	0.600	1753	0.600	1803	0.600	1853	0.600
1604	0.600	1654	0.600	1704	0.600	1754	0.600	1804	0.600	1854	0.600
1605	0.600	1655	0.600	1705	0.600	1755	0.600	1805	0.600	1855	0.600
1606	0.600	1656	0.600	1706	0.600	1756	0.600	1806	0.600	1856	0.600
1607	0.600	1657	0.600	1707	0.600	1757	0.600	1807	0.600	1857	0.600
1608	0.600	1658	0.600	1708	0.600	1758	0.600	1808	0.600	1858	0.600
1609	0.600	1659	0.600	1709	0.600	1759	0.600	1809	0.600	1859	0.600
1610	0.600	1660	0.600	1710	0.600	1760	0.600	1810	0.600	1860	0.600
1611	0.600	1661	0.600	1711	0.600	1761	0.600	1811	0.600	1861	0.600
1612	0.600	1662	0.600	1712	0.600	1762	0.600	1812	0.600	1862	0.600
1613	0.600	1663	0.600	1713	0.600	1763	0.600	1813	0.600	1863	0.600
1614	0.600	1664	0.600	1714	0.600	1764	0.600	1814	0.600	1864	0.600
1615	0.600	1665	0.600	1715	0.600	1765	0.600	1815	0.600	1865	0.600
1616	0.600	1666	0.600	1716	0.600	1766	0.600	1816	0.600	1866	0.600
1617	0.600	1667	0.600	1717	0.600	1767	0.600	1817	0.600	1867	0.600
1618	0.600	1668	0.600	1718	0.600	1768	0.600	1818	0.600	1868	0.600
1619	0.600	1669	0.600	1719	0.600	1769	0.600	1819	0.600	1869	0.600
1620	0.600	1670	0.600	1720	0.600	1770	0.600	1820	0.600	1870	0.600
1621	0.600	1671	0.600	1721	0.600	1771	0.600	1821	0.600	1871	0.600
1622	0.600	1672	0.600	1722	0.600	1772	0.600	1822	0.600	1872	0.600
1623	0.600	1673	0.600	1723	0.600	1773	0.600	1823	0.600	1873	0.600
1624	0.600	1674	0.600	1724	0.600	1774	0.600	1824	0.600	1874	0.600
1625	0.600	1675	0.600	1725	0.600	1775	0.600	1825	0.600	1875	0.600
1626	0.600	1676	0.600	1726	0.600	1776	0.600	1826	0.600	1876	0.600
1627	0.600	1677	0.600	1727	0.600	1777	0.600	1827	0.600	1877	0.600
1628	0.600	1678	0.600	1728	0.600	1778	0.600	1828	0.600	1878	0.600
1629	0.600	1679	0.600	1729	0.600	1779	0.600	1829	0.600	1879	0.600
1630	0.600	1680	0.600	1730	0.600	1780	0.600	1830	0.600	1880	0.600
1631	0.600	1681	0.600	1731	0.600	1781	0.600	1831	0.600	1881	0.600
1632	0.600	1682	0.600	1732	0.600	1782	0.600	1832	0.600	1882	0.600
1633	0.600	1683	0.600	1733	0.600	1783	0.600	1833	0.600	1883	0.600
1634	0.600	1684	0.600	1734	0.600	1784	0.600	1834	0.600	1884	0.600
1635	0.600	1685	0.600	1735	0.600	1785	0.600	1835	0.600	1885	0.600
1636	0.600	1686	0.600	1736	0.600	1786	0.600	1836	0.600	1886	0.600
1637	0.600	1687	0.600	1737	0.600	1787	0.600	1837	0.600	1887	0.600
1638	0.600	1688	0.600	1738	0.600	1788	0.600	1838	0.600	1888	0.600
1639	0.600	1689	0.600	1739	0.600	1789	0.600	1839	0.600	1889	0.600
1640	0.600	1690	0.600	1740	0.600	1790	0.600	1840	0.600	1890	0.600
1641	0.600	1691	0.600	1741	0.600	1791	0.600	1841	0.600	1891	0.600
1642	0.600	1692	0.600	1742	0.600	1792	0.600	1842	0.600	1892	0.600
1643	0.600	1693	0.600	1743	0.600	1793	0.600	1843	0.600	1893	0.600
1644	0.600	1694	0.600	1744	0.600	1794	0.600	1844	0.600	1894	0.600
1645	0.600	1695	0.600	1745	0.600	1795	0.600	1845	0.600	1895	0.600
1646	0.600	1696	0.600	1746	0.600	1796	0.600	1846	0.600	1896	0.600

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Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1897	0.600	1947	0.600	1997	0.600	2047	0.600	2097	0.600	2147	0.600
1898	0.600	1948	0.600	1998	0.600	2048	0.600	2098	0.600	2148	0.600
1899	0.600	1949	0.600	1999	0.600	2049	0.600	2099	0.600	2149	0.600
1900	0.600	1950	0.600	2000	0.600	2050	0.600	2100	0.600	2150	0.600
1901	0.600	1951	0.600	2001	0.600	2051	0.600	2101	0.600	2151	0.600
1902	0.600	1952	0.600	2002	0.600	2052	0.600	2102	0.600	2152	0.600
1903	0.600	1953	0.600	2003	0.600	2053	0.600	2103	0.600	2153	0.600
1904	0.600	1954	0.600	2004	0.600	2054	0.600	2104	0.600	2154	0.600
1905	0.600	1955	0.600	2005	0.600	2055	0.600	2105	0.600	2155	0.600
1906	0.600	1956	0.600	2006	0.600	2056	0.600	2106	0.600	2156	0.600
1907	0.600	1957	0.600	2007	0.600	2057	0.600	2107	0.600	2157	0.600
1908	0.600	1958	0.600	2008	0.600	2058	0.600	2108	0.600	2158	0.600
1909	0.600	1959	0.600	2009	0.600	2059	0.600	2109	0.600	2159	0.600
1910	0.600	1960	0.600	2010	0.600	2060	0.600	2110	0.600	2160	0.600
1911	0.600	1961	0.600	2011	0.600	2061	0.600	2111	0.600	2161	0.600
1912	0.600	1962	0.600	2012	0.600	2062	0.600	2112	0.600	2162	0.600
1913	0.600	1963	0.600	2013	0.600	2063	0.600	2113	0.600	2163	0.600
1914	0.600	1964	0.600	2014	0.600	2064	0.600	2114	0.600	2164	0.600
1915	0.600	1965	0.600	2015	0.600	2065	0.600	2115	0.600	2165	0.600
1916	0.600	1966	0.600	2016	0.600	2066	0.600	2116	0.600	2166	0.600
1917	0.600	1967	0.600	2017	0.600	2067	0.600	2117	0.600	2167	0.600
1918	0.600	1968	0.600	2018	0.600	2068	0.600	2118	0.600	2168	0.600
1919	0.600	1969	0.600	2019	0.600	2069	0.600	2119	0.600	2169	0.600
1920	0.600	1970	0.600	2020	0.600	2070	0.600	2120	0.600	2170	0.600
1921	0.600	1971	0.600	2021	0.600	2071	0.600	2121	0.600	2171	0.600
1922	0.600	1972	0.600	2022	0.600	2072	0.600	2122	0.600	2172	0.600
1923	0.600	1973	0.600	2023	0.600	2073	0.600	2123	0.600	2173	0.600
1924	0.600	1974	0.600	2024	0.600	2074	0.600	2124	0.600	2174	0.600
1925	0.600	1975	0.600	2025	0.600	2075	0.600	2125	0.600	2175	0.600
1926	0.600	1976	0.600	2026	0.600	2076	0.600	2126	0.600	2176	0.600
1927	0.600	1977	0.600	2027	0.600	2077	0.600	2127	0.600	2177	0.600
1928	0.600	1978	0.600	2028	0.600	2078	0.600	2128	0.600	2178	0.600
1929	0.600	1979	0.600	2029	0.600	2079	0.600	2129	0.600	2179	0.600
1930	0.600	1980	0.600	2030	0.600	2080	0.600	2130	0.600	2180	0.600
1931	0.600	1981	0.600	2031	0.600	2081	0.600	2131	0.600	2181	0.600
1932	0.600	1982	0.600	2032	0.600	2082	0.600	2132	0.600	2182	0.600
1933	0.600	1983	0.600	2033	0.600	2083	0.600	2133	0.600	2183	0.600
1934	0.600	1984	0.600	2034	0.600	2084	0.600	2134	0.600	2184	0.600
1935	0.600	1985	0.600	2035	0.600	2085	0.600	2135	0.600	2185	0.600
1936	0.600	1986	0.600	2036	0.600	2086	0.600	2136	0.600	2186	0.600
1937	0.600	1987	0.600	2037	0.600	2087	0.600	2137	0.600	2187	0.600
1938	0.600	1988	0.600	2038	0.600	2088	0.600	2138	0.600	2188	0.600
1939	0.600	1989	0.600	2039	0.600	2089	0.600	2139	0.600	2189	0.600
1940	0.600	1990	0.600	2040	0.600	2090	0.600	2140	0.600	2190	0.600
1941	0.600	1991	0.600	2041	0.600	2091	0.600	2141	0.600	2191	0.600
1942	0.600	1992	0.600	2042	0.600	2092	0.600	2142	0.600	2192	0.600
1943	0.600	1993	0.600	2043	0.600	2093	0.600	2143	0.600	2193	0.600
1944	0.600	1994	0.600	2044	0.600	2094	0.600	2144	0.600	2194	0.600
1945	0.600	1995	0.600	2045	0.600	2095	0.600	2145	0.600	2195	0.600
1946	0.600	1996	0.600	2046	0.600	2096	0.600	2146	0.600	2196	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2197	0.600	2247	0.600	2297	0.600	2347	0.600	2397	0.600	2447	0.600
2198	0.600	2248	0.600	2298	0.600	2348	0.600	2398	0.600	2448	0.600
2199	0.600	2249	0.600	2299	0.600	2349	0.600	2399	0.600	2449	0.600
2200	0.600	2250	0.600	2300	0.600	2350	0.600	2400	0.600	2450	0.600
2201	0.600	2251	0.600	2301	0.600	2351	0.600	2401	0.600	2451	0.600
2202	0.600	2252	0.600	2302	0.600	2352	0.600	2402	0.600	2452	0.600
2203	0.600	2253	0.600	2303	0.600	2353	0.600	2403	0.600	2453	0.600
2204	0.600	2254	0.600	2304	0.600	2354	0.600	2404	0.600	2454	0.600
2205	0.600	2255	0.600	2305	0.600	2355	0.600	2405	0.600	2455	0.600
2206	0.600	2256	0.600	2306	0.600	2356	0.600	2406	0.600	2456	0.600
2207	0.600	2257	0.600	2307	0.600	2357	0.600	2407	0.600	2457	0.600
2208	0.600	2258	0.600	2308	0.600	2358	0.600	2408	0.600	2458	0.600
2209	0.600	2259	0.600	2309	0.600	2359	0.600	2409	0.600	2459	0.600
2210	0.600	2260	0.600	2310	0.600	2360	0.600	2410	0.600	2460	0.600
2211	0.600	2261	0.600	2311	0.600	2361	0.600	2411	0.600	2461	0.600
2212	0.600	2262	0.600	2312	0.600	2362	0.600	2412	0.600	2462	0.600
2213	0.600	2263	0.600	2313	0.600	2363	0.600	2413	0.600	2463	0.600
2214	0.600	2264	0.600	2314	0.600	2364	0.600	2414	0.600	2464	0.600
2215	0.600	2265	0.600	2315	0.600	2365	0.600	2415	0.600	2465	0.600
2216	0.600	2266	0.600	2316	0.600	2366	0.600	2416	0.600	2466	0.600
2217	0.600	2267	0.600	2317	0.600	2367	0.600	2417	0.600	2467	0.600
2218	0.600	2268	0.600	2318	0.600	2368	0.600	2418	0.600	2468	0.600
2219	0.600	2269	0.600	2319	0.600	2369	0.600	2419	0.600	2469	0.600
2220	0.600	2270	0.600	2320	0.600	2370	0.600	2420	0.600	2470	0.600
2221	0.600	2271	0.600	2321	0.600	2371	0.600	2421	0.600	2471	0.600
2222	0.600	2272	0.600	2322	0.600	2372	0.600	2422	0.600	2472	0.600
2223	0.600	2273	0.600	2323	0.600	2373	0.600	2423	0.600	2473	0.600
2224	0.600	2274	0.600	2324	0.600	2374	0.600	2424	0.600	2474	0.600
2225	0.600	2275	0.600	2325	0.600	2375	0.600	2425	0.600	2475	0.600
2226	0.600	2276	0.600	2326	0.600	2376	0.600	2426	0.600	2476	0.600
2227	0.600	2277	0.600	2327	0.600	2377	0.600	2427	0.600	2477	0.600
2228	0.600	2278	0.600	2328	0.600	2378	0.600	2428	0.600	2478	0.600
2229	0.600	2279	0.600	2329	0.600	2379	0.600	2429	0.600	2479	0.600
2230	0.600	2280	0.600	2330	0.600	2380	0.600	2430	0.600	2480	0.600
2231	0.600	2281	0.600	2331	0.600	2381	0.600	2431	0.600	2481	0.600
2232	0.600	2282	0.600	2332	0.600	2382	0.600	2432	0.600	2482	0.600
2233	0.600	2283	0.600	2333	0.600	2383	0.600	2433	0.600	2483	0.600
2234	0.600	2284	0.600	2334	0.600	2384	0.600	2434	0.600	2484	0.600
2235	0.600	2285	0.600	2335	0.600	2385	0.600	2435	0.600	2485	0.600
2236	0.600	2286	0.600	2336	0.600	2386	0.600	2436	0.600	2486	0.600
2237	0.600	2287	0.600	2337	0.600	2387	0.600	2437	0.600	2487	0.600
2238	0.600	2288	0.600	2338	0.600	2388	0.600	2438	0.600	2488	0.600
2239	0.600	2289	0.600	2339	0.600	2389	0.600	2439	0.600	2489	0.600
2240	0.600	2290	0.600	2340	0.600	2390	0.600	2440	0.600	2490	0.600
2241	0.600	2291	0.600	2341	0.600	2391	0.600	2441	0.600	2491	0.600
2242	0.600	2292	0.600	2342	0.600	2392	0.600	2442	0.600	2492	0.600
2243	0.600	2293	0.600	2343	0.600	2393	0.600	2443	0.600	2493	0.600
2244	0.600	2294	0.600	2344	0.600	2394	0.600	2444	0.600	2494	0.600
2245	0.600	2295	0.600	2345	0.600	2395	0.600	2445	0.600	2495	0.600
2246	0.600	2296	0.600	2346	0.600	2396	0.600	2446	0.600	2496	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2497	0.600	2547	0.600	2597	0.600	2647	0.600	2697	0.600	2747	0.600
2498	0.600	2548	0.600	2598	0.600	2648	0.600	2698	0.600	2748	0.600
2499	0.600	2549	0.600	2599	0.600	2649	0.600	2699	0.600	2749	0.600
2500	0.600	2550	0.600	2600	0.600	2650	0.600	2700	0.600	2750	0.600
2501	0.600	2551	0.600	2601	0.600	2651	0.600	2701	0.600	2751	0.600
2502	0.600	2552	0.600	2602	0.600	2652	0.600	2702	0.600	2752	0.600
2503	0.600	2553	0.600	2603	0.600	2653	0.600	2703	0.600	2753	0.600
2504	0.600	2554	0.600	2604	0.600	2654	0.600	2704	0.600	2754	0.600
2505	0.600	2555	0.600	2605	0.600	2655	0.600	2705	0.600	2755	0.600
2506	0.600	2556	0.600	2606	0.600	2656	0.600	2706	0.600	2756	0.600
2507	0.600	2557	0.600	2607	0.600	2657	0.600	2707	0.600	2757	0.600
2508	0.600	2558	0.600	2608	0.600	2658	0.600	2708	0.600	2758	0.600
2509	0.600	2559	0.600	2609	0.600	2659	0.600	2709	0.600	2759	0.600
2510	0.600	2560	0.600	2610	0.600	2660	0.600	2710	0.600	2760	0.600
2511	0.600	2561	0.600	2611	0.600	2661	0.600	2711	0.600	2761	0.600
2512	0.600	2562	0.600	2612	0.600	2662	0.600	2712	0.600	2762	0.600
2513	0.600	2563	0.600	2613	0.600	2663	0.600	2713	0.600	2763	0.600
2514	0.600	2564	0.600	2614	0.600	2664	0.600	2714	0.600	2764	0.600
2515	0.600	2565	0.600	2615	0.600	2665	0.600	2715	0.600	2765	0.600
2516	0.600	2566	0.600	2616	0.600	2666	0.600	2716	0.600	2766	0.600
2517	0.600	2567	0.600	2617	0.600	2667	0.600	2717	0.600	2767	0.600
2518	0.600	2568	0.600	2618	0.600	2668	0.600	2718	0.600	2768	0.600
2519	0.600	2569	0.600	2619	0.600	2669	0.600	2719	0.600	2769	0.600
2520	0.600	2570	0.600	2620	0.600	2670	0.600	2720	0.600	2770	0.600
2521	0.600	2571	0.600	2621	0.600	2671	0.600	2721	0.600	2771	0.600
2522	0.600	2572	0.600	2622	0.600	2672	0.600	2722	0.600	2772	0.600
2523	0.600	2573	0.600	2623	0.600	2673	0.600	2723	0.600	2773	0.600
2524	0.600	2574	0.600	2624	0.600	2674	0.600	2724	0.600	2774	0.600
2525	0.600	2575	0.600	2625	0.600	2675	0.600	2725	0.600	2775	0.600
2526	0.600	2576	0.600	2626	0.600	2676	0.600	2726	0.600	2776	0.600
2527	0.600	2577	0.600	2627	0.600	2677	0.600	2727	0.600	2777	0.600
2528	0.600	2578	0.600	2628	0.600	2678	0.600	2728	0.600	2778	0.600
2529	0.600	2579	0.600	2629	0.600	2679	0.600	2729	0.600	2779	0.600
2530	0.600	2580	0.600	2630	0.600	2680	0.600	2730	0.600	2780	0.600
2531	0.600	2581	0.600	2631	0.600	2681	0.600	2731	0.600	2781	0.600
2532	0.600	2582	0.600	2632	0.600	2682	0.600	2732	0.600	2782	0.600
2533	0.600	2583	0.600	2633	0.600	2683	0.600	2733	0.600	2783	0.600
2534	0.600	2584	0.600	2634	0.600	2684	0.600	2734	0.600	2784	0.600
2535	0.600	2585	0.600	2635	0.600	2685	0.600	2735	0.600	2785	0.600
2536	0.600	2586	0.600	2636	0.600	2686	0.600	2736	0.600	2786	0.600
2537	0.600	2587	0.600	2637	0.600	2687	0.600	2737	0.600	2787	0.600
2538	0.600	2588	0.600	2638	0.600	2688	0.600	2738	0.600	2788	0.600
2539	0.600	2589	0.600	2639	0.600	2689	0.600	2739	0.600	2789	0.600
2540	0.600	2590	0.600	2640	0.600	2690	0.600	2740	0.600	2790	0.600
2541	0.600	2591	0.600	2641	0.600	2691	0.600	2741	0.600	2791	0.600
2542	0.600	2592	0.600	2642	0.600	2692	0.600	2742	0.600	2792	0.600
2543	0.600	2593	0.600	2643	0.600	2693	0.600	2743	0.600	2793	0.600
2544	0.600	2594	0.600	2644	0.600	2694	0.600	2744	0.600	2794	0.600
2545	0.600	2595	0.600	2645	0.600	2695	0.600	2745	0.600	2795	0.600
2546	0.600	2596	0.600	2646	0.600	2696	0.600	2746	0.600	2796	0.600

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2797	0.600	2811	0.600	2825	0.600	2839	0.600	2853	0.600	2867	0.600
2798	0.600	2812	0.600	2826	0.600	2840	0.600	2854	0.600	2868	0.600
2799	0.600	2813	0.600	2827	0.600	2841	0.600	2855	0.600	2869	0.600
2800	0.600	2814	0.600	2828	0.600	2842	0.600	2856	0.600	2870	0.600
2801	0.600	2815	0.600	2829	0.600	2843	0.600	2857	0.600	2871	0.600
2802	0.600	2816	0.600	2830	0.600	2844	0.600	2858	0.600	2872	0.600
2803	0.600	2817	0.600	2831	0.600	2845	0.600	2859	0.600	2873	0.600
2804	0.600	2818	0.600	2832	0.600	2846	0.600	2860	0.600	2874	0.600
2805	0.600	2819	0.600	2833	0.600	2847	0.600	2861	0.600	2875	0.600
2806	0.600	2820	0.600	2834	0.600	2848	0.600	2862	0.600	2876	0.600
2807	0.600	2821	0.600	2835	0.600	2849	0.600	2863	0.600	2877	0.600
2808	0.600	2822	0.600	2836	0.600	2850	0.600	2864	0.600	2878	0.600
2809	0.600	2823	0.600	2837	0.600	2851	0.600	2865	0.600	2879	0.600
2810	0.600	2824	0.600	2838	0.600	2852	0.600	2866	0.600	2880	0.600

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.500	Storm Duration (mins)	30
Ratio R	0.400		

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Storage Structures for Storm

Porous Car Park Manhole: S2, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	29.0
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	193.3	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	40.085	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S10, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	43.5
Membrane Percolation (mm/hr)	1000	Length (m)	24.0
Max Percolation (l/s)	290.0	Slope (1:X)	33.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	40.085	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S14, DS/PN: S4.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	21.3
Membrane Percolation (mm/hr)	1000	Length (m)	37.0
Max Percolation (l/s)	218.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	40.640	Cap Volume Depth (m)	0.300

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.950
M5-60 (mm)	20.500	Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	100.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 50

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	1	+0%	30/15 Summer				40.132
S1.001	S2	15 Summer	1	+0%	30/15 Summer				40.059
S2.000	S3	15 Summer	1	+0%	100/15 Summer				40.342
S1.002	S4	15 Summer	1	+0%	30/15 Summer				40.035
S3.000	S5	15 Summer	1	+0%	100/15 Summer				40.162
S3.001	S6	15 Summer	1	+0%	30/15 Summer				39.967
S1.003	S7	15 Summer	1	+0%	30/15 Summer				39.966
S1.004	S8	15 Summer	1	+0%	1/15 Summer				39.921
S4.000	S9	15 Summer	1	+0%	30/15 Summer				40.134
S4.001	S10	30 Summer	1	+0%	30/15 Summer				40.023
S5.000	S11	15 Summer	1	+0%	100/15 Summer				40.346
S4.002	S12	30 Summer	1	+0%	30/15 Summer				40.018
S4.003	S13	30 Summer	1	+0%	30/15 Summer				40.002
S4.004	S14	30 Summer	1	+0%	1/15 Summer				39.953
S4.005	S15	30 Summer	1	+0%	1/15 Summer				39.876
S4.006	S16	15 Summer	1	+0%	1/15 Summer				39.808
S1.005	S17	60 Summer	1	+0%	1/15 Summer				39.744

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.168	0.000	0.39			22.4	OK	
S1.001	S2	-0.150	0.000	0.45		4	22.1	OK	
S2.000	S3	-0.183	0.000	0.08			4.6	OK	
S1.002	S4	-0.145	0.000	0.52			30.0	OK	
S3.000	S5	-0.238	0.000	0.09			7.1	OK	
S3.001	S6	-0.173	0.000	0.12			7.2	OK	
S1.003	S7	-0.115	0.000	0.51			37.2	OK	
S1.004	S8	0.040	0.000	0.63			47.4	SURCHARGED	
S4.000	S9	-0.166	0.000	0.40			23.9	OK	
S4.001	S10	-0.141	0.000	0.45		4	21.3	OK	
S5.000	S11	-0.179	0.000	0.09			5.6	OK	
S4.002	S12	-0.121	0.000	0.50			28.3	OK	
S4.003	S13	-0.001	0.000	0.39			23.4	OK	
S4.004	S14	0.099	0.000	0.45		10	27.1	SURCHARGED	
S4.005	S15	0.223	0.000	0.47			25.8	SURCHARGED	
S4.006	S16	0.262	0.000	0.45			26.1	SURCHARGED	
S1.005	S17	0.153	0.000	0.37			78.3	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.950
M5-60 (mm)	20.500	Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	100.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 50

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	30	+0%	30/15 Summer				40.462
S1.001	S2	15 Summer	30	+0%	30/15 Summer				40.384
S2.000	S3	15 Summer	30	+0%	100/15 Summer				40.383
S1.002	S4	15 Summer	30	+0%	30/15 Summer				40.365
S3.000	S5	15 Summer	30	+0%	100/15 Summer				40.396
S3.001	S6	15 Summer	30	+0%	30/15 Summer				40.357
S1.003	S7	15 Summer	30	+0%	30/15 Summer				40.349
S1.004	S8	15 Summer	30	+0%	1/15 Summer				40.304
S4.000	S9	15 Summer	30	+0%	30/15 Summer				40.373
S4.001	S10	15 Summer	30	+0%	30/15 Summer				40.269
S5.000	S11	15 Summer	30	+0%	100/15 Summer				40.373
S4.002	S12	30 Summer	30	+0%	30/15 Summer				40.248
S4.003	S13	15 Summer	30	+0%	30/15 Summer				40.181
S4.004	S14	15 Summer	30	+0%	1/15 Summer				40.116
S4.005	S15	15 Summer	30	+0%	1/15 Summer				39.936
S4.006	S16	15 Summer	30	+0%	1/15 Summer				39.862
S1.005	S17	60 Winter	30	+0%	1/15 Summer				39.741

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.162	0.000	0.92			53.0	SURCHARGED	
S1.001	S2	0.175	0.000	0.73		8	35.7	SURCHARGED	
S2.000	S3	-0.142	0.000	0.19			11.2	OK	
S1.002	S4	0.185	0.000	0.70			40.4	SURCHARGED	
S3.000	S5	-0.004	0.000	0.21			16.3	OK	
S3.001	S6	0.217	0.000	0.33			20.4	SURCHARGED	
S1.003	S7	0.268	0.000	0.77			56.1	SURCHARGED	
S1.004	S8	0.423	0.000	1.01			76.2	SURCHARGED	
S4.000	S9	0.073	0.000	0.96			56.9	SURCHARGED	
S4.001	S10	0.105	0.000	0.87		8	41.1	SURCHARGED	
S5.000	S11	-0.152	0.000	0.23			13.8	OK	
S4.002	S12	0.109	0.000	0.87			49.5	SURCHARGED	
S4.003	S13	0.178	0.000	0.80			48.4	SURCHARGED	
S4.004	S14	0.262	0.000	1.02		18	61.0	SURCHARGED	
S4.005	S15	0.283	0.000	1.09			59.4	SURCHARGED	
S4.006	S16	0.316	0.000	1.07			62.5	SURCHARGED	
S1.005	S17	0.150	0.000	0.66			139.9	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.950
M5-60 (mm)	20.500	Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	100.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 50

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+50%	30/15 Summer				40.933
S1.001	S2	30 Summer	100	+50%	30/15 Summer				40.727
S2.000	S3	15 Summer	100	+50%	100/15 Summer				40.788
S1.002	S4	15 Summer	100	+50%	30/15 Summer				40.748
S3.000	S5	15 Summer	100	+50%	100/15 Summer				41.085
S3.001	S6	15 Summer	100	+50%	30/15 Summer				40.981
S1.003	S7	15 Summer	100	+50%	30/15 Summer				40.900
S1.004	S8	15 Summer	100	+50%	1/15 Summer				40.949
S4.000	S9	15 Summer	100	+50%	30/15 Summer				40.930
S4.001	S10	30 Summer	100	+50%	30/15 Summer				40.525
S5.000	S11	15 Summer	100	+50%	100/15 Summer				40.554
S4.002	S12	30 Summer	100	+50%	30/15 Summer				40.505
S4.003	S13	15 Summer	100	+50%	30/15 Summer				40.463
S4.004	S14	15 Summer	100	+50%	1/15 Summer				40.470
S4.005	S15	15 Summer	100	+50%	1/15 Summer				40.201
S4.006	S16	15 Summer	100	+50%	1/15 Summer				40.078
S1.005	S17	15 Summer	100	+50%	1/15 Summer				39.896

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.633	0.000	1.82			104.6	FLOOD RISK	
S1.001	S2	0.518	0.000	1.07		17	52.2	SURCHARGED	
S2.000	S3	0.263	0.000	0.37			21.9	SURCHARGED	
S1.002	S4	0.568	0.000	0.95			55.0	SURCHARGED	
S3.000	S5	0.685	0.000	0.46			35.4	FLOOD RISK	
S3.001	S6	0.841	0.000	0.64			39.3	SURCHARGED	
S1.003	S7	0.819	0.000	0.90			65.8	SURCHARGED	
S1.004	S8	1.068	0.000	1.43			108.1	SURCHARGED	
S4.000	S9	0.630	0.000	1.88			111.9	FLOOD RISK	
S4.001	S10	0.361	0.000	0.99		14	46.5	SURCHARGED	
S5.000	S11	0.029	0.000	0.43			25.6	SURCHARGED	
S4.002	S12	0.366	0.000	1.09			62.3	SURCHARGED	
S4.003	S13	0.460	0.000	1.07			64.5	SURCHARGED	
S4.004	S14	0.616	0.000	1.32		32	79.1	SURCHARGED	
S4.005	S15	0.548	0.000	1.43			77.7	SURCHARGED	
S4.006	S16	0.532	0.000	1.52			88.4	FLOOD RISK	
S1.005	S17	0.305	0.000	1.44			305.4	FLOOD RISK	

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Appendix H Overland Flow Routes

MKS-HYD-XX-XX-G-C-9730_Planning Issue - Overland Flow Routes

Attenuation

Habitat Area 130m2

MUGA

External Store

Formal Playing Pitches

Soft Informal Play

Hard Informal Play

Fencing

Maintainance access and future construction access road

ASHP Plant

Cycle Parking

Bin Store

Landscaping

Car Parking

Pedestrian Route

Nursery Entrance

Drop Off Bay

Sprinkler Tank

Pump House

Landscaped buffer to residential area

SHARED SURFACE

MAITLAND PLACE

1FE Cycle parking (29 Stands in total across the site)

Way

KEY PLAN

NOTES

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4. All levels are shown in metres above Ordnance Datum (m AOD).

LEGEND

OVERLAND FLOW ROUTE

PERMEABLE SURFACE

REV	ISSUED FOR PLANNING					
P01	O.LAINCHBURY	22/09/23	M.STEWART	22/09/23	J.MAGEE	22/09/23
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT
ISG

PROJECT
MELKSHAM SCHOOL

TITLE
PLANNING ISSUE - OVERLAND FLOW ROUTES

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	NTS

STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
MKS-HYD-XX-XX-G-C-7730	P01

Appendix I Proposed Drainage Strategy Layout

MKS-HYD-XX-XX-D-C-9000_Planning Issue - Drainage Strategy Sheet 1

MKS-HYD-XX-XX-D-C-9001_Planning Issue - Drainage Strategy Sheet 2

LEGEND - DRAINAGE STRATEGY

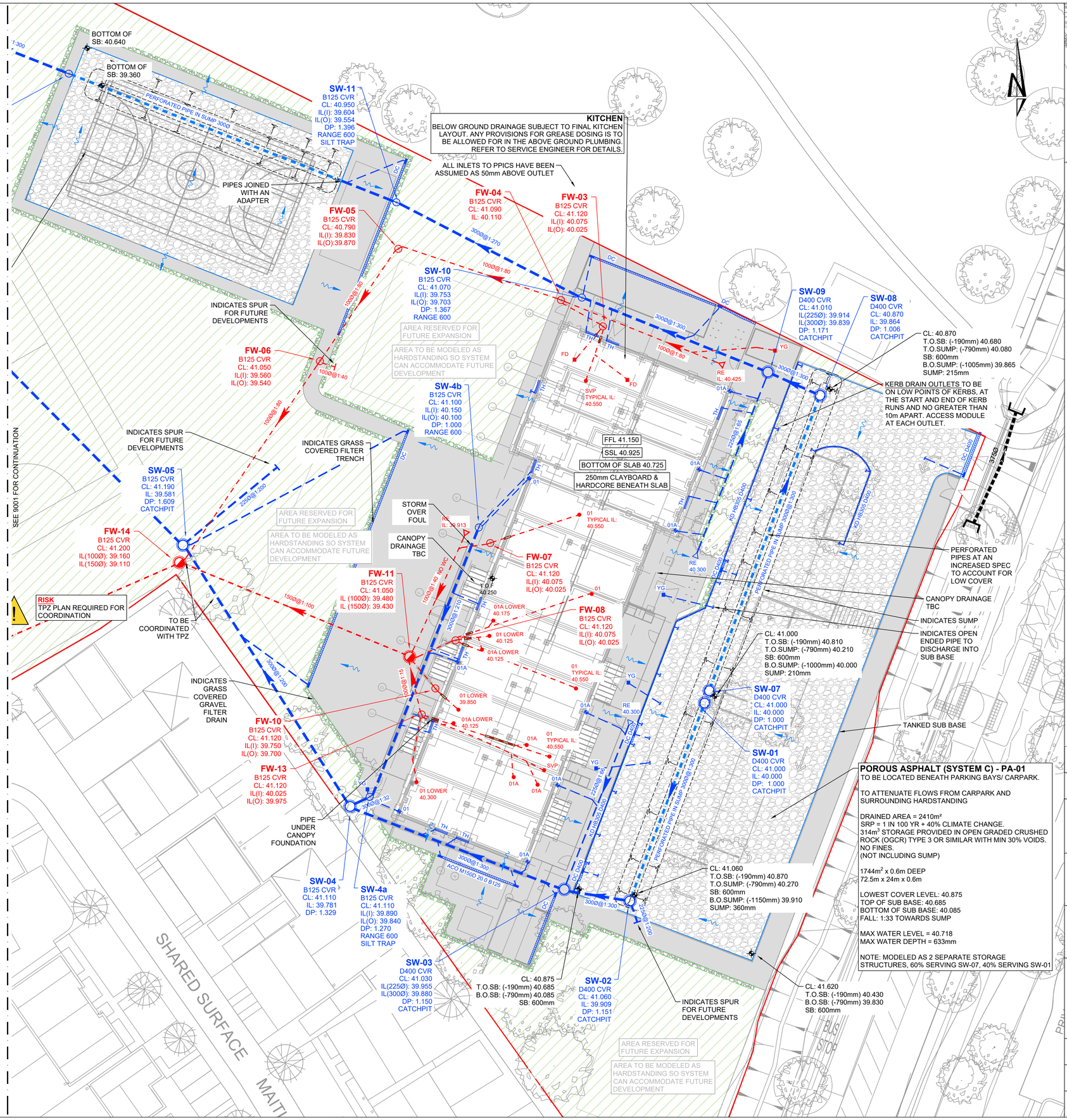
PROPOSED DRAINAGE - FOUL

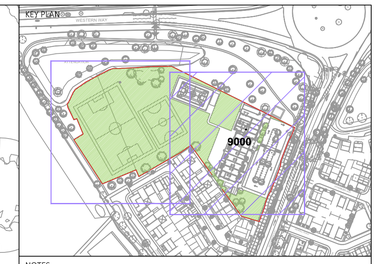
- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- FOUL WATER INSPECTION CHAMBER
- FOUL WATER SHALLOW ACCESS CHAMBER
- YG — FOUL YARD GULLY
- FD — FLOOR DRAIN
- 01 — FOUL OUTLET / STACK POSITION (Refer to Service Engineer / Architect for Details) (Shown indicative)

PROPOSED DRAINAGE - STORM

- STORM WATER DRAIN
- STORM WATER MANHOLE
- STORM WATER INSPECTION CHAMBER
- RG — ROAD GULLY
- PG — 'PAVED AREA' GULLY
- YG — YARD GULLY
- RWO — RAIN WATER DOWNPIPE
- DC — DRAINAGE CHANNEL
- PERFORATED PIPE

NOTE: DRAINAGE HAS ONLY BEEN SHOWN INDICATIVELY TO DEMONSTRATE THE PRINCIPLES OF THE DRAINAGE STRATEGY AND SHOULD NOT BE USED FOR PRICING





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5. All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
6. Drainage pipework routes under building footprint will require Co-ordination with foundations.
7. Final foul pipe connection routes and manholes are subject to confirmation of above ground drainage design discharge points at ground level by others to allow final pipe sizes, configuration and connections.
8. Door threshold drainage channel requirements to be advised by others.
9. Surface water drainage RWP locations to be confirmed by Architect.
10. External levels shown on this drawing relating to the civils, drainage works etc are to be confirmed on receipt of final external levels drawing (by others).
11. Foul drainage shown indicative subject to detailed design.

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	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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e: bristolcentral@hydrock.com

CLIENT: ISG

PROJECT: MELKSHAM SCHOOL

TITLE: PLANNING ISSUE - DRAINAGE STRATEGY SHEET 1

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	1:250

STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
MKS-HYD-XX-XX-D-C-9000	P01

ATTENUATION

LEGEND - DRAINAGE STRATEGY

PROPOSED DRAINAGE - FOUL

- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- FOUL WATER INSPECTION CHAMBER
- FOUL WATER SHALLOW ACCESS CHAMBER
- YG — FOUL YARD GULLY
- FD — FLOOR DRAIN
- 01 — FOUL OUTLET / STACK POSITION (Refer to Service Engineer / Architect for Details) (Shown indicative)

PROPOSED DRAINAGE - STORM

- STORM WATER DRAIN
- STORM WATER MANHOLE
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- RG — ROAD GULLY
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- RWO — RAIN WATER DOWNPIPE
- DC — DRAINAGE CHANNEL
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HEADWALL PROVIDED BY OTHERS

+50%CC IN 1 IN 100YR STORM
39.600mAOD SURCHARGE 2880MIN
ASSUMED SURCHARGE AT TOP OF BASIN

HEADWALL - HW-01
CONNECTION TO BE PROVIDED AND CONFIRMED BY OTHERS
INVERT: 39.000mAOD
PIPE Ø: 450Ø (INSIDE DIAMETER)
FLAP VALVE REQUIRED ON OUTFALL
ASSUMED UP TO 600mm SURCHARGE

TAYLOR WIMPEY TO CONFIRM IF INVERT AND PIPE DIAMETER ARE ACHIEVABLE

EXISTING PWR @ 1.3m DEPTH ~ 38.300mAOD

LANDSCAPING TO BE RAISED TO PROVIDE INCREASE COVER OVER 450Ø PIPE AND TO DIRECT OVERLAND FLOWS AWAY FROM BACK OF HEADWALL

450Ø@1:45

SUDS OVERFLOW GULLY

GL: 39.780

BIORETENTION SOIL IN HABITAT AREA WITH PERFORATED PIPE

GL: 39.820

300Ø@1:300

GL: 40.300

300Ø and 450Ø PIPES TO BE AT LEVEL INVERT. FLAP VALVE PREVENTS WATER BACKING UP.

SW-06
B125 CVR
CL: 39.900
IL(300Ø): 39.141
IL(450Ø): 39.141
(INVERT-INVERT)
DP: 0.759
CATCHPIT

SW-13
B125 CVR
CL: 40.080
IL(I): 39.296
IL(O): 39.246
DP: 0.834
RANGE 600
SILT TRAP

SW-12
B125 CVR
CL: 41.050
IL(I): 39.403
IL(O): 39.353
DP: 1.697
RANGE 600
SILT TRAP

BOTTOM OF SB: 40.640

BOTTOM OF SB: 39.360

PERFORA

MODELING ASSUMES THAT 40% OF PITCH AREA WILL BE DRAINED, 60% WILL INFILTRATE/ RUN OFF. ACTUAL CATCHMENT AREA TBC BY SPECIALIST. MODELED AS UNRESTRICTED FLOW.

OUTFALL IN OFFSITE ATTENUATION BASIN.

575Ø@1:TBC

EXSW-01
CL: 40.030
IL: 38.870

EXFW-03
CL: 39.820
IL: 37.670

575Ø@1:714

150Ø@1:118

CONCRETE SURROUND TO INCREASE PROTECTION DURING CONSTRUCTION AND USE

3000@1:200

POROUS ASPHALT (SYSTEM C) - PA-02
TO BE LOCATED BENEATH MUGA.

TO ATTENUATE FLOWS FROM MUGA, SCHOOL ROOF AND PLAY AREA

DRAINED AREA = 790m² (MUGA ONLY)

SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
71m³ STORAGE PROVIDED IN OPEN GRADED CRUSHED ROCK (OGCR) TYPE 3 OR SIMILAR WITH MIN 30% VOIDS. NO FINES.

790m² x 0.3m DEEP (DEPTH TBC)
37m x 21.3m x 0.3m

LOWEST COVER LEVEL: 41.020
TOP OF SUB BASE: 40.940
BOTTOM OF SUB BASE: 40.640
FALL: 1:100 TOWARDS SUMP

MAX WATER LEVEL: 40.470

INDICATES SPU FOR FUTUR DEVELOPMENT

SEE 9000 FOR CONTINUATION

SW-05
B125 CVR
CL: 41.190
IL: 39.58
DP: 1.60
CATCHPIT

FW-14
B125 CVR
CL: 41.200
IL(100Ø): 39.160
IL(150Ø): 39.110

TO COORDINA WITH

EXSW-02
CL: 40.570
IL: 38.940

EXFW-04
CL: 40.220
IL: 37.950

150Ø@1:100

FW-15
B125 CVR
CL: 40.860
IL: 38.510

150Ø@1:100

150Ø@1:83

575Ø@1:2100

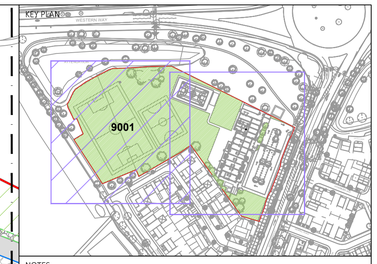
TO BE COORDINATED WITH TPZ

EXSW-03
CL: 40.740
IL: 38.960

EXFW-05
CL: 40.870
IL: 38.430

SHA

KEY PLAN



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MELKSHAM SCHOOL

TITLE
PLANNING ISSUE - DRAINAGE STRATEGY SHEET 2

HYDROCK PROJECT NO.	SCALE @ A1
C-27203-C	1:250

STATUS DESCRIPTION	STATUS
PLANNING	PL

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
MKS-HYD-XX-XX-D-C-9001

REVISION
P01