

Hydrock

Dee Park Open Space

Drainage Strategy Report

For Reading Borough Council

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1. Introduction

1.1 Scope of The Report

Hydrock have been appointed to provide a Drainage Strategy report for the approval of Reading Borough 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 Thames 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 damage 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 situated on land adjacent to Glenmore Place, Reading, RG30 4EP, occupying a roughly rectangular plot of approximately 1,800m^2. The central National Grid Reference for the site is 468479, 173632.

Table 2.1: Site Referencing Information

Site Address	
Postcode	RG30 4EP
National Grid Reference	468479, 173632.

Figure 1: Site Location with Approximate Red Line Boundary



2.2 Site Topography

The site is generally level, with ground elevations ranging between approximately 50.7m and 53.0m Above Ordnance Datum (AOD. The existing surface comprises a mix of asphalt hardstanding, woodchip areas for play equipment, and soft landscaping, including grassed areas and mature vegetation along the site boundaries.

Key features of the site include a fenced-off sports court in the centre, a children's play area with woodchip surfacing in the southern section, and a temporary building located in the northern portion.

See **Appendix A** for Topographical Survey

2.3 Geology

The following information is a summary from Phase 2 Site Investigation Report:

"The British Geological Survey Solid and Drift Geology Map for the Reading area (Reading Sheet No. 268) revealed that the northern section of the site was underlain by the Lambeth Group (clay,silt and sand) whilst the southern section was underlain by Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). Areas of Worked Ground were recorded 1m northeast and 224m south of the site. An inferred bedrock fault was running through the middle of the site, separating the two areas.

A BGS borehole (SU67SE718) located ~290m northeast of the site revealed a 0.10m capping of Topsoil over chalk and clayey chalk fill to 1.20m bgl followed by a brown flinty clay to 1.60m bgl. From here up to 2.20m bgl a remoulded chalk with lumps of intact chalk, clay and flints was identified over remoulded chalk with some intact chalk up to 3.10m bgl. A rubbly chalk with some remoulded chalk and flints was then recorded to the base of the borehole at a depth of 6.0m bgl. No groundwater was recorded."

2.4 Hydrology & Hydrogeology

The following information is a summary from Phase 2 Site Investigation Report:

"A study of the aquifer maps on the DEFRA website revealed the northern section of the site was underlain by a Secondary A Aquifer comprising bedrock deposits of the Lambeth Group whilst the southern section of the site was underlain by a Principal Aquifer comprising bedrock deposits of the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).

Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

No surface water features were present within a 250m radius of the site. The nearest surface water feature was identified to be the River Thames ~940m north of the site flowing in an easterly direction.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Chalk Formation. Some amounts of groundwater however may be present at shallower depths within the Lambeth Group or within Made ground. It was considered that groundwater was flowing in a northern direction toward the River Thames and in line with local topography.

The Groundsure Datasheets revealed the site was at a low risk of flooding from rivers and the sea. The datasheets also revealed the site was at low risk of groundwater flooding. The risk of surface water flooding at the site ranged from low to high."

See **Appendix I** for Phase 2 Site Investigation Report.

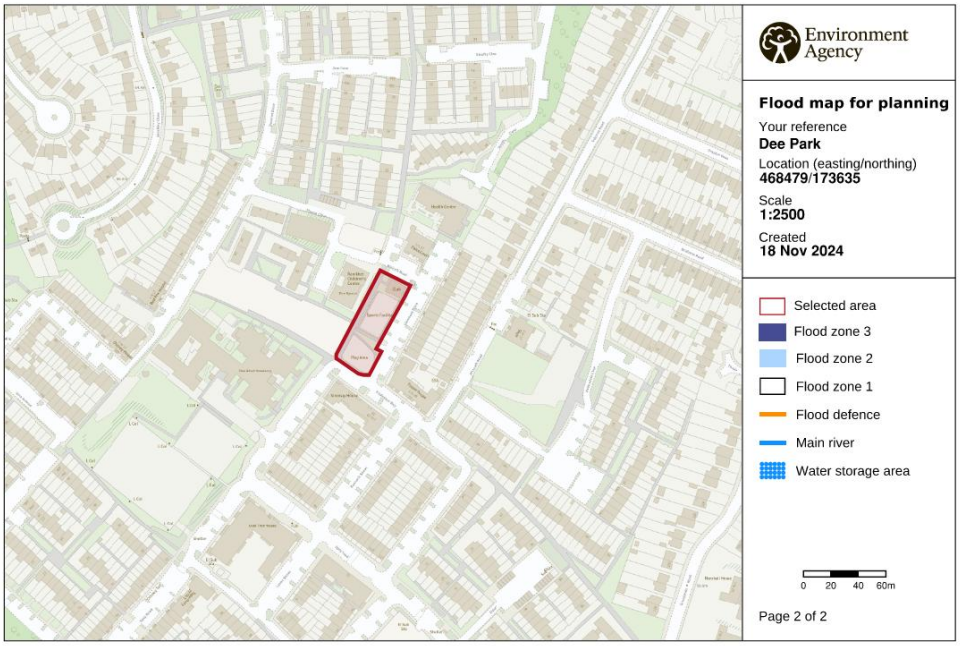
2.5 Fluvial Flood Risk

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 have a low probability of fluvial flooding (see figure 2).

Figure 2: EA Flood Map for Fluvial Flooding



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Table 2.2: 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 project involves the redevelopment of the site into a modernised playground. The plans include upgraded play equipment, resurfaced areas, and improved landscaping to create a safe and accessible recreational space. The site will retain some existing features, such as pathways and soft landscaping, while incorporating new drainage systems to manage surface water effectively.

See **Appendix B** 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

Review of Thames Water's sewer asset maps confirm that there are surface water sewers running along the southern and western edge of the site.

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

3.1.2 Existing Private Drainage

Utilities and CCTV surveys of the site were undertaken in August 2022.

The survey confirmed that the private drainage infrastructure is concentrated near the temporary building and surrounding hardstanding area. The system includes a combined foul and surface water network from the building, discharging off site via a combined sewer. No formal drainage infrastructure was identified within the existing playground or MUGA area, which appear to rely on surface runoff or natural infiltration through the current surfacing.

See **Appendix D** 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 (m^2)
Impermeable	
Building / Roof	118
Roads / Hardstanding	571
Permeable	
Permeable surfacing (bark)	402
Soft Landscaping	267
Total Area	1358

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

3.3 Pre-Development Surface Water Run-Off R ates

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.

Soakaway testing in accordance with BRE365 was undertaken within SA1-SA4 (refer to Ground Investigation for locations), with the results tabulated below.

Soakage Testing Results						
Trial Hole	**Test Number**	**Depth (m bgl)**	**Start Depth (m bgl)**	**Finish Depth (m bgl)**	**Time Taken (mins)**	**Infiltration Rate (m/sec)**
SA1*	1	1.50	0.60	0.65	240	6.86 x 10^-7
SA2*	1	1.50	0.60	0.61	240	1.34 x 10^-7
SA3*	1	1.50	0.68	0.71	240	4.40 x 10^-7
SA4	1	1.50	0.79	1.38	6	5.06 x 10^-4
	2	1.38	0.68	1.21	6	4.43 x 10^-4
	3	1.21	0.74	1.19	4	7.24 x 10^-4
***Given the relatively slow infiltration rate encountered, only one test could be undertaken and it did not reach 75% mark.**						

3.4 Summary of Pre-Development Flows

The pre-development surface water flows for the site have been assessed based on in situ testing with a rate of 4.43x10^{-}4 m/s, as per the Phase 2 Site Investigation Report.

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 site's western boundary.

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	Considered unsuitable due to safety and maintenance requirements	X
Infiltration	Partial infiltration techniques have been incorporated within the permeable pavement sub-base systems. However, the site utilises a controlled discharge to the existing Thames Water sewer network as the primary outfall.	✓
Surface Water Body	As discharge to existing sewer is viable this method has not been explored.	X
Surface Water Sewer	Existing Thames Water sewer available for controlled discharge via saddle connection	✓
Combined Sewer	As discharge to existing sewer is viable this method has not been explored.	X
Foul Water Sewer	As discharge to existing sewer is viable this method has not been explored.	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).

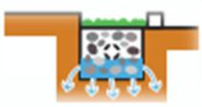
The implementation of SuDS can be divided into the management of sources and of the wider site and even region, with preference given to source control.

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.	No. Considered unsuitable due to maintenance requirements
	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.	No. Considered unsuitable due to maintenance requirements
	Permeable Surfaces 	Surfaces that allow water to penetrate into underlying layers to be stored, collected or made to infiltrate to groundwater.	Yes Permeable surfacing will be used across the site
	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.	No. Not deemed suitable for this site due to space constraints and potential conflicts with

			its primary recreational use.
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.	No. Not deemed suitable for this site due to space constraints and potential conflicts with its primary recreational use.
	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.	No. Not deemed suitable for the proposed positive discharge strategy to the existing Thames Water sewer network and the use of partial infiltration sub-base systems across the 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.	No. Not deemed suitable for this site due to space constraints in the playground and potential conflicts with its primary recreational use.
	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.	No. Not deemed suitable

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.	No. Not deemed suitable for this site due to space constraints
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.	No. Not deemed suitable for this site due to space constraints in the playground and potential conflicts with its primary recreational use.
Underground Storage 	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	Yes. Attenuation storage is provided within the permeable pavement sub-base systems prior to controlled discharge to the existing Thames Water sewer network.

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 is compliant for 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.	✓
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.	X
Infiltration Trenches	Roads drained by infiltration trenches can be considered to provide interception	X
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 proposed surface water drainage strategy for the development has been designed in accordance with the principles of sustainable drainage and will manage runoff through a combination of permeable surfacing, attenuating sub-base storage, partial infiltration and controlled discharge to the existing Thames Water surface water sewer network.

Southern Area: Partial Infiltration System (System B)

In the southern areas of the site, surface water runoff from the proposed permeable play surfacing and hard landscaped areas will be collected within a partial infiltrating permeable pavement construction incorporating attenuating sub-base storage (system B).

The system provides temporary storage of runoff within open graded crushed rock (OGCR) layers whilst allowing limited filtration into the underlying ground and conveying runoff through perforated collector pipes within the sub-base system.

Northern Area: Partial Infiltration System (System B)

In the northern areas of the site, surface water runoff from the proposed permeable surfacing and associated hard landscaped areas will similarly be collected within partial infiltrating permeable pavement construction and attenuating sub-base layers.

The system provides on-site attenuation storage whilst allowing limited infiltration into the underlying ground before conveying runoff towards the downstream flow control chamber and surface water outfall connection.

Underground Attenuation and Surface Water Discharge

Surface water runoff from both the northern and southern areas of the site will ultimately discharge via a flow control manhole incorporating a Hydro-Brake flow control device prior to discharge at a maximum rate of 1.0 l/s into the existing Thames Water surface water sewer network via a new saddle connection.

Attenuation storage is provided within the permeable pavement sub-base systems across the site and has been designed to accommodate runoff generated during storm events up to and including the 1 in 100-year rainfall event plus 40% climate change allowance.

Where applicable, the surface water management strategy has incorporated the recommendations of the Non-statutory Technical Standards for Sustainable Drainage and general best practice guidance to provide a sustainable drainage solution for the development.

See **Appendix G** for Drainage Strategy.

See **Appendix E** for Calculations

5.2 Post-Development Surface Water Catchment Areas

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

Table 5.1: Pre vs Post-Development Catchment Areas

Catchment	Area (m^2)
Impermeable	
Building / Roof	0
Roads / Hardstanding	0
Permeable	
Soft Landscaping	303
Permeable surfacing (wet pour/ Permeable paving)	1055
Total Area	1358

5.3 Post-Development Surface Water Run-Off Rates

The proposed drainage network has been designed to attenuate runoff generated by the development within permeable pavement sub-base systems prior to controlled discharge into the existing Thames Water surface water sewer network.

Surface water runoff collected within the permeable pavement construction layers will be conveyed through perforated collector pipework towards the downstream flow control manhole.

Flow control measures incorporated within flow control manhole FC-01 will restrict discharge from the site to a maximum rate of 1.0 l/s prior to discharge via a saddle connection into the existing Thames Water surface water sewer network.

Attenuation storage provided within the permeable pavement sub-base systems has been sized to accommodate storm events up to and including the 1 in 100 year rainfall event plus 40% climate change allowance without increasing flood risk on or off site.

In the event that runoff exceeds the design capacity of the drainage system, exceedance flows will follows overland flow routes away from buildings and critical infrastructure in accordance with the proposed site levels.

5.3.1 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.

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.

As the footprint of the site will remain majority impervious, this factor is not applied.

5.3.2 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 40% allowance for climate change will be retained within the site and managed to minimise the risk to people and property.

Attenuation flood storage will be distributed across the development with the use of attenuating permeable pavement sub-base systems providing temporary storage within open graded crushed rock layers prior to controlled discharge to the existing Thames Water surface water sewer network.

Expected attenuation requirements are shown below:

Table 5.2: Attenuation Requirements

Type of Storage Structure	Dimensions	Void Ratio	Total Attenuation Volume
Attenuating Sub-Base (System B) - AS-01	57m² x 0.46m deep	30%	**26m³**
Attenuating Sub-Base (System B) - AS-02	45m² x 0.47m deep	30%	**21m³**
Attenuating Sub-Base (System B) – AS-03	158m² x 0.38m deep	30%	**60m³**
Attenuating Sub-Base (System B) – AS-04	33m² x 0.3m deep	30%	**10m³**

5.4 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 critical infrastructure.

See **Appendix F** for Overland Flow Routes

5.5 Summary of Post-Development Flows

It has been determined that post-development runoff can be effectively managed through partial infiltration permeable pavement systems, on-site attenuation storage, and controlled discharge at a maximum rate of 1.0 l/s into the existing Thames Water surface water sewer network without increasing flood risk on or off site.

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

5.6 Water Quality

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

Playgrounds typically represent a low-pollution hazard environment, as defined in CIRIA C753 – The SuDS Manual, due to the absence of hydrocarbons and limited risks of heavy metals or high sediment loads.

The proposed drainage design incorporates different permeable surfacing types across the site. These SuDS components provide an effective first stage of treatment by allowing water to infiltrate and naturally filter through the surfacing and sub-base, removing suspended solids and pollutants.

The pollution mitigation provided by these SuDS elements exceeds the required levels for low-pollution land uses, ensuring compliance with water quality criteria outlined in CIRIA C753. The system is designed to provide sustainable and effective water treatment appropriate for the low-risk nature of the site.

5.6.1 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 permeable surfacing utilised across the site, will act as a pre-treatment mechanism, allowing for initial filtration of surface water before it enters the drainage system.

In addition, the attenuating sub-base systems will help further filter and slow water flow, reducing the risk of pollutants being transported into the downstream drainage network or other downstream areas. These measures collectively ensure the water quality is maintained while supporting the functionality and sustainability of the drainage system.

5.6.2 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.

5.7 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. Ownership and Maintenance

The key elements of the 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.

6.1 Post Development SuDS Features

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 6.1: 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

Flow Control Chamber / Hydro-Brake – Operation and Maintenance Requirements*		
Maintenance Schedule	**Required Action**	**Frequency**
Post-installation / prior to operation	Inspect the flow control unit and chamber to confirm no damage has occurred during installation or construction. Remove any extraneous material, including building materials, silt, debris, wood, plastic bottles/bags or similar items from the unit and chamber.	Prior to the system being made live.
Initial maintenance	Inspect the flow control unit and chamber. Check the inlet/outlet and intake area for silt, debris or other obstructions. Hose down the unit if required.	Monthly for the first three months after the system is made live.
Regular maintenance	Inspect the flow control unit and chamber for sediment, debris and signs of blockage. Check that the chamber benching, inlet/outlet and flow control opening remain clear. Hose down the unit if required.	Every six months.
Occasional maintenance	Remove accumulated silt, debris or other material from the chamber and flow control intake area.	As required, based on inspections.
Remedial actions	If a blockage occurs, clear the intake/flow control opening and remove the cause of the obstruction. Where fitted, the bypass door may be used to drain down the chamber to assist with maintenance.	As required.
Final O&M information	Product-specific supplier operation and maintenance information for the installed flow control unit should be provided on completion and included within the site O&M manual.	On completion / handover.

*The above maintenance requirements have been based on the Hydro International Maintenance and COSHH Statement for Hydro-Brake / vortex flow control units. The supplier guidance confirms that these units typically require limited maintenance as there are no moving parts within the flow control. Following installation, the chamber and unit should be checked to ensure all construction debris and other extraneous material has been removed. Once the system is live, the supplier recommends monthly inspections for the first three months, followed by inspections at six-monthly intervals thereafter, with the unit/chamber hosed down where required. Product-specific operation and maintenance information for the final installed flow control should also be provided by the contractor/supplier at handover and included within the site's O&M manual.

Hydro International Maintenance and COSHH Statement is attached in **Appendix J**

6.2 Post Development Drainage System

All drainage systems should be inspected at regular intervals then, if necessary, cleaned and repaired to ensure that system performance is maintained.

This guide includes recommendations on the methods and frequency of the inspection and cleaning but local factors may influence this, therefore this manual should be appended to include any revises or additional requirements determined during the life of the development.

6.3 Inspection And Cleaning of Surface Water Drainage

Inspection chambers, gullies and channels should be fully inspected regularly, at least annually, by removing covers and checking for obstructions, silt and damage.

The following should be carried out when cleaning a drainage system:

- Covers of inspection chambers and manholes should be removed and the sides, benching and channels cleaned.
- Main and branch drains should be cleaned and should be flushed with clean water afterwards. Any obstructions found should be removed and not flushed into the system.
- Periodically, accumulated deposits in gullies should be removed. The traps should then be plunged and thoroughly flushed out with clean water.
- Covers of inspection chambers and gullies should be replaced, bedded in suitable grease or other sealing material and/or bolted down as appropriate to the type. Missing bolts and broken items should be renewed.

6.4 Methods Of Cleaning

The drainage system should be cleaned, as appropriate, using one or more of the following methods:

6.4.1 Rodding

Appropriate cleaning tools and techniques should be chosen to avoid damage to the pipework during the cleaning process. A set of rods with appropriate ends is basic useful equipment.

It is important that correctly designed propriety ends are used on the rods. Makeshift devices attached to the ends of rods should be avoided, as they are not effective as the correctly designed article and could become detached and create a blockage which would be difficult to remove. Furthermore, is it possible that such devices could cause damage to the pipeline.

If the rods have brass ferrules, they should be checked to ensure that their fastenings are secure and that there are no protruding shoulders or fastenings, as these can cause damage to drain lines, especially when entering through rodding eyes.

6.4.2 Jetting

High pressure jetting techniques are suitable for use with all currently available pipe materials and should also be considered.

6.4.3 Hydraulic Rams, Compressed Air or Other Gases

Equipment is available for use with all sizes of drain likely to be encountered in building drainage and is suitable for use with all currently available pipe materials. The principle of operation is that a shock wave is induced and is transmitted by water to the point of blockage and the technique is effective where the pipe is surcharged or can be filled with water from the blockage to a point where the equipment can be used.

Table 6.2: Drainage Items - Ownership & Maintenance Responsibility Matrix

Drainage Items - Ownership & Maintenance Responsibility Matrix		
Feature	Maintenance	Frequency
Private Drains	Inspection	CCTV survey every 5-10 years.
	Regular Maintenance	Jet clean system fully every 5-10 years. (Recommend prior to CCTV drainage survey is)
	Remedial / Occasional Maintenance	Carry out remedial works as identified in CCTV survey.
Gully / Drainage Channels	Inspection	Quarterly
	Regular Maintenance	Remove silt and debris as necessary to prevent build up.

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

Table 6.3: 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 drainage channel	1. Risk to members of the public	1. Access to hazardous areas by members of the public to be prohibited

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.

7. Consent / Planning

Summary of expected consents required:

- Ordinary Watercourse Consent – No
- Sewerage Undertaker Consent – Yes – Consent given via pre development instructions
- Section 104 / 106 Drainage Adoption - No
- Build Over / Build Near - No

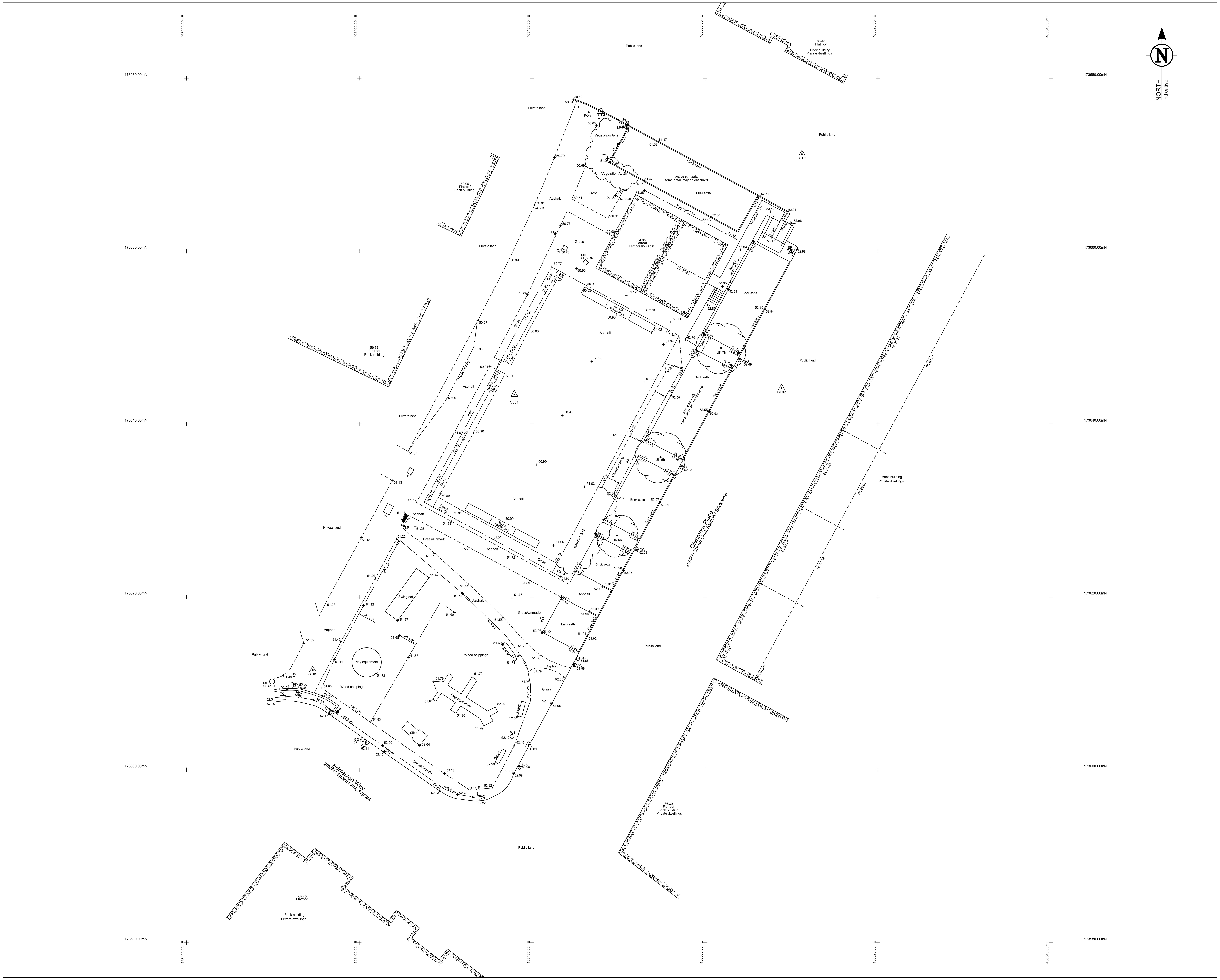
In addition to the above it is anticipated that details of the drainage scheme will need to be approved by Reading Borough Council Lead Local Flood Authority (LLFA) through a formal planning application.

8. Conclusions

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

- The surface water drainage system for the development has been designed to accommodate the required flows for the lifetime of the development, utilising permeable surfacing and partial infiltration sub-base systems to provide source control, attenuation, and water quality treatment benefits.
- Surface water runoff from the development will be attenuated within permeable pavement sub-base systems prior to controlled discharge at a maximum rate of 1.0 l/s into the existing Thames Water surface water sewer network via a Hydro-Brake flow control chamber and saddle connection.
- All surface water runoff from storm events up to and including the 1 in 100 year plus 40% climate change event will be retained within the site drainage system without increasing flood risk on or off site.
- In the event that flows from rainfall exceed the 1 in 100 year rainfall event or system failure occurs through lack of maintenance, surface water runoff will be directed via exceedance routes away from buildings and critical infrastructure.
- The use of permeable surfacing and partial infiltration sub-base systems ensures that water quality requirements outlined within CIRIA C753 – The SuDS Manual are achieved, minimising pollution risks associated with the development.
- Ownership and maintenance responsibilities for the surface water drainage system will be clearly defined to ensure the drainage infrastructure continues to operate effectively throughout the lifetime of the development.
- Ownership and maintenance liabilities for the 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



TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	ER	Earth Rod	RSD	Roller Shutter Door
A/B	Air Brick	ET	EP+Transformer	RSJ	Rolled Steel Joist
AR	Assumed Route	FB	Flower Bed	SI	Sign Post
AV	Air Valve	FBD	Floor Board Direction	SP	Arch Spring Point Height
BB	Belisha Beacon	FH	Fire Hydrant	SV	Stop Valve
BH	Bore Hole	FL	Floor Level	SW	Surface Water
BL	Bed Level	FP	Flag Pole	SY	Cable Stay
BO	Bollard	FW	Foul Water	Tac	Tactile Paving
BrP	Brace Post	GG	Gully Grate	TC	Telecom Cover
BS	Bus Stop	GV	Gas Valve	TH	Trial Pit
BU	Bush	HH	Head Height	THL	Threshold Level
B/W	Barbed Wire Fence	IC	Inspection Cover	TL	Traffic Light
BX	Box (Utilities)	IL	Invert Level	ToW	Top of Wall
C/B	Close Board Fence	I/R	Iron Railings	TP	Telegraph Pole
CH	Cill Height	KO	Kerb Outlet	TS	Traffic Signal Cover
CL	Cover Level	LP	Lamp Post	TV	Cable TV Cover
C/L	Chain Link Fence	MH	Manhole	UB	Universal Beam
C-Lev	Ceiling Level	MP	Marker Post	UC	Unknown Cover
Col	Column	NB	Name Board	UK	Unknown Tree
C/P	Chestnut Paling Fence	OHL	Overhead Line (approx)	UMG	Unmade Ground
CR	Cable Riser	Pan	Panel Fence	USB	Under Side Beam
C/W	Chicken Wire	PB	Post Box	UTL	Unable To Lift
DC	Drainage Channel	PM	Parking Meter	UTS	Unable To Survey
DH	Door Head Height	PO	Post	VP	Vent Pipe
Dil.	Dilapidated	P/R	Post & Rail Fence	WB	Waste Bin
DP	Down Pipe	P/W	Post & Wire Fence	WH	Weep Hole
DR	Drain	P/Wall	Partition Wall	WL	Water Level
EBx	Electric Box	RE	Rodding Eye	WM	Water Meter
EC	Electric Supply Cover	RL	Ridge Level	WO	Wash Out
EL	Eaves Level	RP	Reflector Post	(X.XX)	Floor to Ceiling Height
EP	Electric Pole	RS	Road Sign	(X.XX)F/C	Floor to False Ceiling Ht
				△	Survey Control Station

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, description, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

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Do not scale from this drawing.

SURVEY CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
S501	468477.933	173643.433	50.936	PK Nail
ST01	468479.581	173602.881	52.143	PK Nail
ST02	468508.853	173644.154	52.998	PK Nail
ST03	468511.207	173671.220	52.810	PK Nail
ST04	468487.952	173676.171	50.781	PK Nail
ST05	468454.621	173611.548	51.476	PK Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE RANNOCH STREET, READING, BERKSHIRE, RG30 4FU				
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 1 of 1				
CLIENT GLEEDS MANAGEMENT SERVICES LTD				SCALE 1:200
SURVEYOR JK	SURVEY DATE 07/07/22	CHECKED BY JPH	APPROVED BY RG	DWG STATUS FINAL
DRAWING NUMBER 43004CVLS-01			REVISION	ISSUE DATE 14/07/22

RICS · chartered ices · THE SURVEY ASSOCIATION · ISO 9001 REGISTERED FIRM · QMS ISO 14001 : 2015 REGISTERED

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Original Sheet Size A1H

Appendix B Proposed Site Layout

Rev O - Minor amendments to levels

Footpath to be replaced with block paving as part of separate highways works. Levels will tie into existing.

Manhole cover - to be located outside of play equipment fall zones

Manhole cover

RUN-OFF 1.05m

PRINCIPLE PLAYING AREA 26 X 14m

Legend

Site Boundary

Levels

Existing level retained (+51.03)

Proposed level (+51.25)

Proposed fall/ gradient (1:21)

Surface Finishes & Edges

H1 wetpour surfacing (porous).
NBS ref: Q26/360

H2 Permeable block paving Hydropave Braemar (colour 'Silver Alto') 300x200x80 mm. 6.5mm joints.
NBS ref: Q24/116

H3 Porous tarmac to ball sports area - thermoplastic markings tbc.
NBS ref: Q22/127

H4 Resin Bound gravel to tree pit aperture. NBS ref: Q23/ 20

H5 Tactile Paving
NBS ref: Q25/320

E1 Timber sleeper retaining wall - grade A European Oak, 100X200X2400mm.
NBS ref: Q50/111

E2a Flat Top edging 50mm wide - Flush
NBS ref: Q10/110a

E2b Flat Top edging 50mm wide - 50mm upstand
NBS ref: Q10/110b

E3 Sheet pile retaining wall

E4 BS standard precast kerb 300x150x915mm - Max 150mm upstand

S1 Precast concrete steps
NBS ref: Q10/112

S1 Precast concrete seating steps.
NBS ref:Q50/225

Boundary Treatments

B1 Double metal gate (gate to open outwards from park).
NBS ref: Q50/120

B2 Single metal gate (gate to open outwards from park).
NBS ref: Q50/121

B3 Metal flat top fence to playground 1.1m high.
NBS ref:Q40/340

B4 Rebound fence to ball sports area 3m high.
NBS ref: Q40/125

B5 Rebound fence to ball sports area 4m high.
NBS ref: Q40/126

B6 Knee rail to Eddleston Way - existing/ retained and made good following construction if required.

B7 Bollards to back of parking bays along Glenmore Place and Kinloch Road. To engineer's specification.

Play

P1 MUGA - Sport England size for basketball (26 x 14m plus 1.05m run-off). Line markings to be 50mm width in a contrasting colour to playing surface. Markings to Basketball England recommendations.
NBS ref: Q52/140

P2 Cliff-rider extreme, junior climbing structure.
NBS ref: Q52/340

P3 Mega deck with roof, infant climbing structure.
NBS ref: Q52/341

P4 Wheelchair carousel.
NBS ref: Q52/431

P5 Spider nest swing.
NBS ref: Q52/441

P6 Double swing set.
NBS ref: Q52/440

P7 Double somersault bars.
NBS ref: Q52/432

P8 See-saw.
NBS ref: Q52/391

P9 Spinner bowl.
NBS ref: Q52/430

P10 Wetpour tunnel.
NBS ref: Q52/355

P11 Play panel - Maze.
NBS ref: Q52/380

P12 - omitted

P13 Half sphere - various sizes.
3 no large - 695mm dia.
8 no medium - 500mm dia.
10 no small - 345mm dia.
NBS ref: Q52/356

P14 MUGA goal and basketball hoop.
P14a - Multi Goal, 8m. NBS ref: Q52/580
P14b - Multi Goal, 3m. NBS ref: Q52/581

P15 Spring rocker.
NBS ref: Q52/390

Furniture

Refer to Landscape NBS specification for details.

F1 Timber bench - two beam.
F1a - 3m length with back and arm rests.
NBS ref: Q50/220

F1 Timber bench - two beam.
F1b - 3m length - no back or arm rests.
F1c - 2m length - no back or arm rests.
NBS ref: Q50/221

F2 Litter bin.
NBS ref: Q50/240

F3 Reclaimed metal arch.
NBS ref: Q50/340

F4 Bicycle stands.
Sheffield Cycle Stand with single tapping bar.
NBS ref: Q50/210

F5 Tree grille.
Zeta grille by Greenblue Urban.
1.2m square with 600mm square aperture. F5a - irrigation inlet.
NBS ref: Q50/262

F6 Metal handrail.
NBS ref: Q41/240

F7 Lecturn display board.
NBS ref: N91/540

F8 Street Sign - Existing street sign to be retained and protected during the construction works.

F9 Signage to park entrance - fixed to wall.
NBS ref: N91/575

Refer to Stage 4 Report RP_0002 and NBS specification SP_0001 for details of paving, edges, boundary treatments, play equipment and furniture.

Planting

Groundcover planting with bulbs. Refer to Planting Plan and schedule.

Specimen tree - (SF) standard form, clear stem 2m minimum.

Specimen tree - (ms) multi-stem form, height 3m minimum with raised stems.

Specimen shrub

Existing trees to be retained.

Refer to Softworks Plan DR_1902, Plant Schedule SH_0001, Stage 4 Report RP_0002 and NBS specification SP_0001 for details of planting.

Rev	Date	Drawn	Description
E	08.10.24	RBL	For planning
F	14.10.24	RBL	Note added to legend. For planning
G	20.11.24	RBL	Permeable paving annotated. For planning
H	17.12.24	RBL	Permeable paving removed from highways land. For planning
I	07.01.25	RBL	Block paving removed from highways land. For planning
J	09.05.25	RBL	Redesign following consultation. For coordination.
K	19.05.25	RBL	For planning
L	12.06.25	RBL	Minor amendments following Streetscene review. For planning
M	09.04.26	RBL	Issued for discharge of planning conditions
N	25.06.26	RBL	Additional levels added to footpath, along with bollards B7 Issued for discharge of planning conditions
O	10.07.26	RBL	Minor mendments to levels as clouded.

Notes:
Do not scale from drawings unless by agreement with HTA. Use figured dimensions only. Check all dimensions on site prior to commencing the works. Drawing to be read in conjunction with other relevant consultant information.

This drawing is the copyright of HTA Design LLP and must not be copied or reproduced in part, or in whole, without the express permission of HTA Design LLP. Drawing to be read in conjunction with specification.

Legend

NOTE: The Dee Park Open Space footpaths have been designed to tie in with the existing levels of the footpath that separates the community centre. When this footpath is replaced (as part of separate highways works), the levels will be set to the existing levels. This is shown by levels on the plan.

Hardworks General Arrangement
drawing title

RBC-DPR_HTA-L_DR_0901
drawing number

O
revision

Reading Borough Council
Dee Park Open Space
client / project

1:100
scale @ A1

RBC-DPR
project number

ELI
originated by

PLANNING
status

HTA Design LLP
www.hta.co.uk
London | Edinburgh | Manchester | Bristol

Appendix C Sewer Asset Map

Asset Location Search

Thames Water Property Searches

Hydrock
Merchants House North
Wapping Road
BRISTOL
BS1 4RW

Search address supplied 14
Glenmore Place
Tilehurst
Reading
RG30 4EP

Your reference 36064

Our reference ALS/ALS Standard/2024_5084063

Search date 21 November 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: 14, Glenmore Place, Tilehurst, Reading, RG30 4EP

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset Location Search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

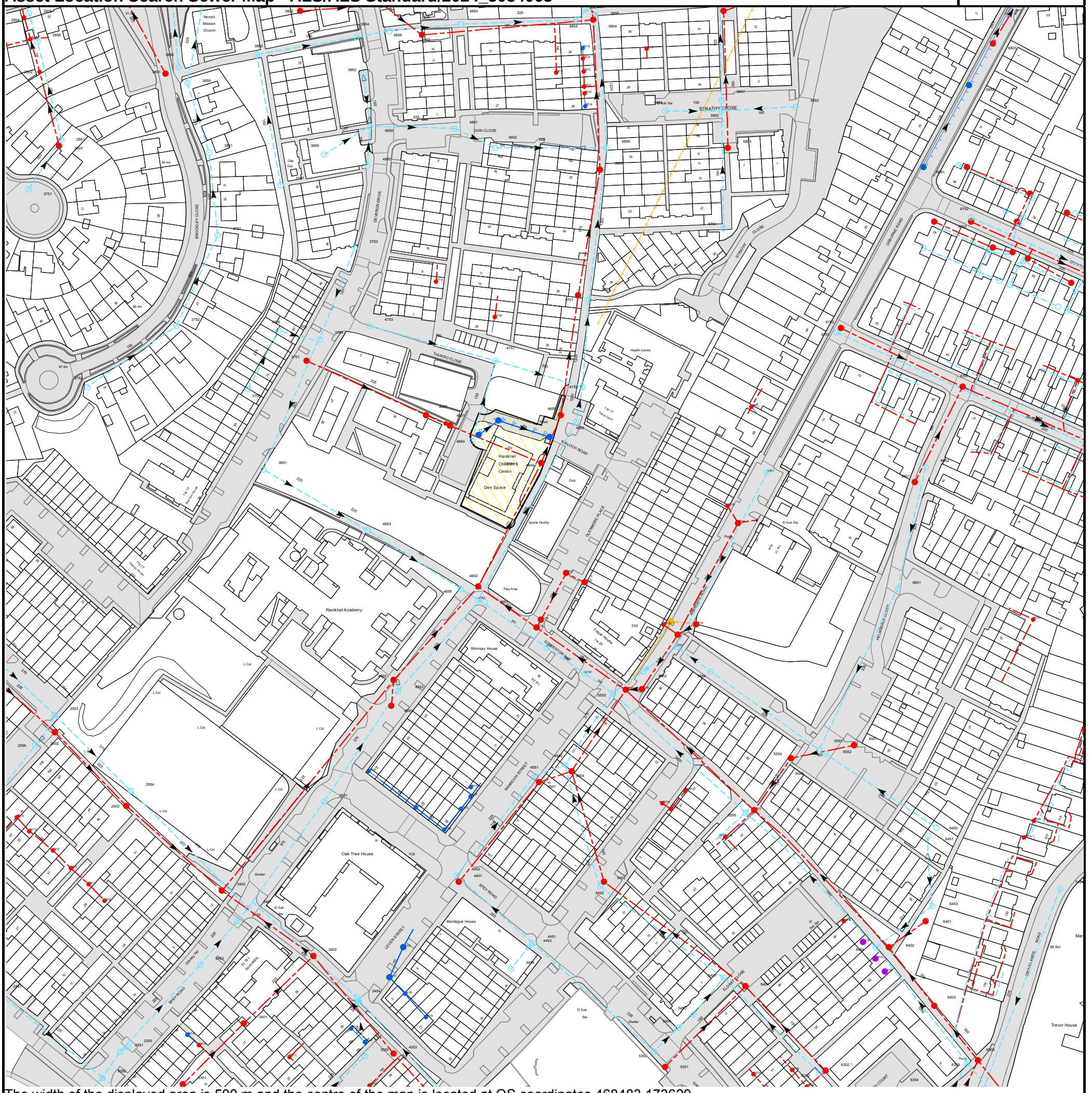
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2024_5084063



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 468483,173629

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
67JM	n/a	n/a
77LD	n/a	n/a
67KJ	n/a	n/a
6703	55.71	53.8
67JH	n/a	n/a
6752	55.72	54.13
77KM	n/a	n/a
77HK	n/a	n/a
77FN	n/a	n/a
67KH	n/a	n/a
77LE	n/a	n/a
77LC	n/a	n/a
3751	65.69	n/a
2751	69.38	67.83
3757	61.6	59.84
3855	59.72	58.48
3851	63.58	n/a
2803	n/a	n/a
2851	n/a	n/a
3859	62.85	n/a
3801	62.69	60.22
77JJ	n/a	n/a
77JD	n/a	n/a
77HN	n/a	n/a
77JH	n/a	n/a
67JK	n/a	n/a
67JL	n/a	n/a
67JE	n/a	n/a
67KC	n/a	n/a
67JF	n/a	n/a
67KE	n/a	n/a
77HE	n/a	n/a
2752	67.14	n/a
3752	66.51	n/a
3756	n/a	n/a
3651	56.9	54.79
3755	n/a	n/a
3701	57.55	54.81
3754	57.28	56.04
3753	58.87	56.72
4653	53.06	50.41
4753	56.72	53.61
4603	n/a	n/a
471A	n/a	n/a
4601	52.67	49.56
4656	n/a	n/a
4654	50.99	48.75
4652	51.95	46.84
4602	51.53	48.28
n/a	n/a	n/a
471D	n/a	n/a
4751	52.35	48.42
n/a	n/a	n/a
4604	50.74	48.15
n/a	n/a	n/a
4605	50.45	47.9
461C	52.05	50.7
4655	50.67	46.27
4701	50.25	47.49
4752	50.35	46.14
461D	52.5	51.366
5752	50.05	46.07
5751	48.44	46.91
561B	n/a	n/a
561A	58.62	56.58
561C	n/a	n/a
5651	59.07	57.45
6751	56.84	55.57
6702	56.87	54.68
751C	n/a	n/a
751D	n/a	n/a
6651	59.37	57.03
6601	58.96	55.43
6652	58.9	57.34
6701	57.47	54.31
771D	n/a	n/a
77KK	n/a	n/a
77JK	n/a	n/a
77KJ	n/a	n/a
77JM	n/a	n/a
67KF	n/a	n/a
77KH	n/a	n/a
77JC	n/a	n/a
77JE	n/a	n/a
67JN	n/a	n/a
67KD	n/a	n/a
2556	58.57	57.37
2502	58.46	56.08
2553	n/a	n/a
4504	53.46	49.79
551E	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5553	53.72	47.48
5502	54.12	51.36
551B	54.62	52.97
5552	55.17	51.24
551H	n/a	n/a
551D	n/a	n/a
5551	57.13	55.25
551C	57.14	55.41
551F	n/a	n/a
551A	n/a	n/a
5554	57.27	56.13
5556	n/a	n/a
5504	57.37	55.35
6551	57.95	56.37
6552	58.01	56.36
6501	58.46	56.36
451D	n/a	n/a
4503	55.37	50.99
4502	54.88	50.83
4553	54.97	49.75
451E	n/a	n/a
451G	n/a	n/a
451F	n/a	n/a
451H	n/a	n/a
4651	51.88	50.66
4551	53.39	50.96
451B	52.37	48.609
4501	53.23	50.22
451A	52.3	50.533
451C	n/a	n/a
4552	53.35	48.98
3453	61.41	55.7
3402	59.7	57.25
3452	n/a	n/a
3451	56.62	54.08
241E	n/a	n/a
3403	56.75	54.93
241J	n/a	n/a
241I	n/a	n/a
241F	n/a	n/a
241G	n/a	n/a
251A	n/a	n/a
2503	60.03	55.46
3551	56.69	51.78
2554	n/a	n/a
631A	n/a	n/a
531D	n/a	n/a
6352	55.24	52.86
6302	55.19	52.79
531E	n/a	n/a
6359	55.85	52.08
6303	55.82	52.36
6403	55.6	51.79
5401	55.69	51.77
641H	n/a	n/a
641G	n/a	n/a
6454	55.8	50.08
6402	56.37	51.56
641F	n/a	n/a
6401	57.13	55.56
641E	n/a	n/a
6453	57.85	55.29
7451	59.78	57.76
741A	n/a	n/a
541A	n/a	n/a
6451	58.64	56.2
6450	58.96	57.54
751A	n/a	n/a
5555	55.46	49.21
5503	55.68	50.63
341B	n/a	n/a
3454	60.41	54.73
341C	n/a	n/a
3352	62.09	59.61
431C	n/a	n/a
441C	n/a	n/a
4303	61.69	n/a
441D	n/a	n/a
441B	n/a	n/a
441A	n/a	n/a
441E	n/a	n/a
4452	55.67	53.9
4401	56.38	53.54
4454	58.02	55.87
4453	57.83	54.62
4451	57.32	54.41
5452	56.96	49.7
5402	55.81	50.47
5350	57.24	55.16
5301	57.12	52.77
551G	n/a	n/a
5454	57.05	54.94
5450	56.68	54.81

Manhole Reference	Manhole Cover Level	Manhole Invert Level
541B	n/a	n/a
5451	n/a	n/a
3301	63.58	60.78
2352	64.92	60.31
331C	n/a	n/a
2351	64.21	58.19
2355	64.02	62.31
331A	n/a	n/a
341A	n/a	n/a
3401	61.7	58.43
3858	62.56	60.66
3862	60.24	58.06
3802	n/a	n/a
3857	61.54	59.84
2852	64.46	63.15
2804	64.93	63.66
2855	64.82	63.98
281A	n/a	n/a
2856	n/a	n/a
2802	n/a	n/a
3854	55.17	53.85
3863	58.61	56.88
4860	58.47	56.57
4859	58.58	56.18
4801	58.69	55.96
4856	55.06	53.23
4802	55.54	53.15
4851	55.09	53.44
4854	54.3	52.69
4852	52.5	50.33
481F	n/a	n/a
4855	50.69	48.62
481A	n/a	n/a
481B	n/a	n/a
481C	n/a	n/a
481D	n/a	n/a
481E	n/a	n/a
5852	48.04	46.83
6851	55.78	54.06
68KM	n/a	n/a
68KK	n/a	n/a
6852	54.71	53.36
6803	n/a	n/a
5856	50.37	49.48
581A	n/a	n/a
5804	50.32	46.97
5855	n/a	n/a
5805	49.51	47.41
5858	49.6	45.76
581B	n/a	n/a
5854	48.03	46.35
5853	47.46	46.09
5857	47.48	46.09
5802	47.34	45.48
5803	47.81	46.31

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

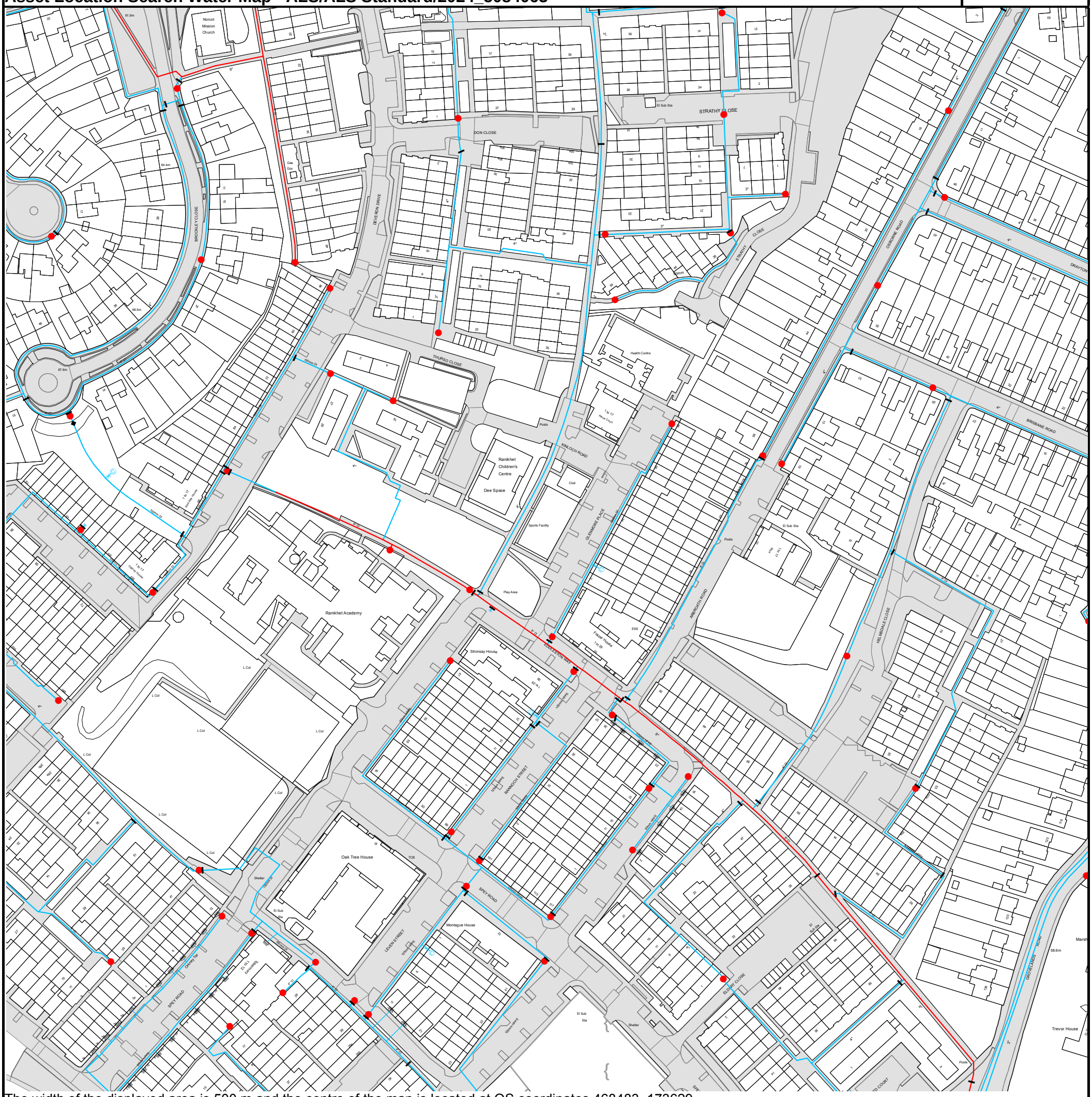
Ducts or Crossings

- Casement — Ducts may contain high voltage cables. Please check with Thames Water.
- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2024_5084063



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 468483, 173629.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger
- **Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 980 8800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

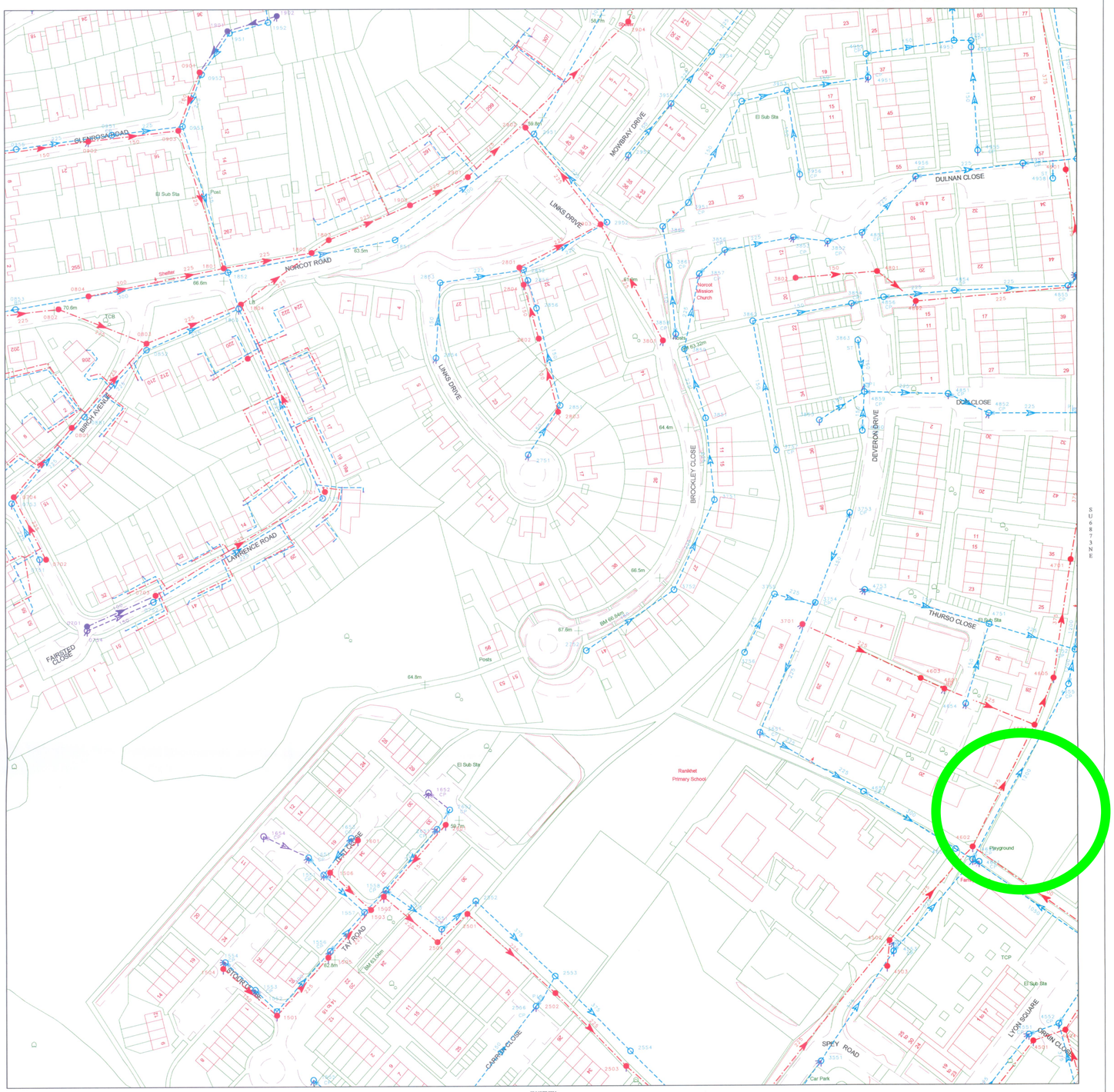
If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

SU6873NW

SU6874SW



SEWERAGE ASSET ABBREVIATIONS AND SYMBOLS

MANHOLES: COMBINED, FOUL, SURFACE, PROPOSED, JOINT, BACKDROP, OTHER / UNKNOWN MANHOLE, ABANDONED, PRIVATE

SEWERS: PRIVATE COMBINED, PRIVATE FOUL, PRIVATE SURFACE, PUBLIC COMBINED, PUBLIC FOUL, PUBLIC SURFACE, TRUNK COMBINED, TRUNK FOUL, TRUNK SURFACE; RISING COMBINED, RISING FOUL, RISING SURFACE, RISING SLUDGE, STORM OVERFLOW, HIGHWAY DRAIN / GULLEY / GALLERY, TRADE EFFLUENT, BIO-SOLIDS (SLUDGE); CULVERTED WATERCOURSE / VENT PIPE, ABANDONED, PROPOSED, UNKNOWN / OTHER SEWER

AREAS: BUILDING OVER CASE, CHAMBER, DRAWING AREA, LICENSE AREA, LOW LYING LAND, SEWER SUBWAY, SURVEY AREA, TUNNEL, UNKNOWN AREA, SEWERAGE TREATMENT WORKS OR PUMPING STATION

FITTINGS: AV AIR VALVE, BS BLIND SHAFT, CP CATCH PIT, DC DAM CHASE, DF DOUBLE FLUSHING TANK / CHAMBER, SF SINGLE FLUSHING TANK / CHAMBER, GP GAUGING POINT, GU GULLEY, HB HATCH BOX, LH LAMP HOLE, LS LIFTING SHAFT, ME METER, RE RODDING EYE, PT TEST POINT / ANODE, VC VENT COLUMN, VT VENT, XX OTHER / UNKNOWN FITTING

END ITEMS: STW EFFLUENT DISCHARGE, SOAKAWAY, OUTFALL, U/S/D UNDEFINED END, FLUSHING INLET, OTHER / UNKNOWN OUTFALL

OPERATIONAL CONTROLS: BB BAFFLE BOARD, BV BUTTERFLY VALVE, CL CLOUGH, DB DAM BOARD, FV FLAP VALVE, HW HEAD WALL, HY HYDROBRAKE, PI PETROL INTERCEPTOR, SV SLUICE VALVE, SY SYPHON, TA TANK, WB WEIR BOARD

OTHER: SEWERAGE TREATMENT WORKS, SEWERAGE PUMPING STATION, IL100.35 INVERT LEVEL

NOTE: 1. ALL LEVELS ARE TO ORDNANCE DATUM NEWLYN. 2. ALL MEASUREMENTS ARE METRIC.

Comments:
ALS/ALS/24/2008_999224

inspace Regeneration & New Homes — REVIEWED — PRELIMINARY / FOR COMMENT / FOR CONSTRUCTION — STATUS A B C — SIGNED — DATE 13/1/08

Thames Water

Thames Water Utilities
Nugent House
Vastern Road
Reading Berks RG1 8DB

REGISTERED IN ENGLAND AND WALES NO 2366661

IN CASE OF QUERIES PLEASE CONTACT:

Rose Kiln Court
Rose Kiln Lane
Reading
Berkshire
RG2 0HP

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THAMES WATER EAGLE GIS PLOTTING SYSTEM VERSION 4.0.3

ORIGIN
EAST 468250°
NORTH 173750°

SCALE 1:1250
ISSUE DATE 24.1.2008

SU6774SE	SU6874SW	SU6874SE
SU6773NE	This Map	SU6873NE
SU6773SE	SU6873SW	SU6873SE

SU6873NW

REFERENCE	COVER LEVEL	INVERT LEVEL
SU67739801	71.78	68.71
SU67739901	70.11	68.49
SU68730701	75.29	73.64
SU68730702	76.46	-9999.0
SU68730703	73.05	71.29
SU68730704	76.70	73.73
SU68730751	76.45	74.87
SU68730752	73.02	71.54
SU68730753	76.75	74.21
SU68730754	75.22	73.96
SU68730801	0.0	-9999.0
SU68730802	70.41	67.14
SU68730803	68.80	64.88
SU68730804	69.68	66.40
SU68730851	70.63	69.06
SU68730852	68.79	66.76
SU68730853	71.32	68.31
SU68730901	67.23	65.08
SU68730902	67.41	65.50
SU68730903	65.90	63.77
SU68730951	67.06	65.44
SU68730952	0.0	-9999.0
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SU68730955	-9999.0	-9999.0
SU68731501	64.01	62.17
SU68731502	61.43	59.02
SU68731503	61.59	59.36
SU68731504	64.09	62.82
SU68731505	62.93	61.18
SU68731506	62.09	60.11
SU68731551	62.14	59.56
SU68731552	63.97	61.94
SU68731553	64.16	62.31
SU68731554	64.05	62.69
SU68731555	63.55	62.85
SU68731556	62.85	60.22
SU68731557	61.70	59.09
SU68731558	61.37	58.35
SU68731601	61.63	60.41
SU68731651	61.89	60.02
SU68731652	60.02	59.08
SU68731653	61.64	60.07
SU68731654	62.48	61.68
SU68731701	69.74	67.10
SU68731751	69.75	67.56
SU68731801	66.67	63.46
SU68731802	64.70	61.94
SU68731803	64.06	61.56
SU68731804	66.57	63.25
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SU68731853	66.58	64.55
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SU68731901	0.0	-9999.0
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SU68731903	62.34	60.34
SU68731951	0.0	-9999.0
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SU68732452	60.62	58.95
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SU68732502	58.46	56.08
SU68732503	60.03	55.46
SU68732504	59.42	57.76
SU68732551	59.46	57.38
SU68732552	59.03	57.09
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SU68732554	0.0	-9999.0
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SU68732652	59.68	58.99
SU68732751	69.38	67.83
SU68732752	67.14	-9999.0
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SU68732803	0.0	-9999.0
SU68732804	64.93	63.66
SU68732851	0.0	-9999.0
SU68732852	64.46	63.15
SU68732853	66.73	65.13
SU68732854	68.81	67.62
SU68732855	64.82	63.98
SU68732856	0.0	-9999.0
SU68732901	61.30	59.41
SU68732902	60.04	58.57
SU68732903	61.93	59.88
SU68732904	58.68	56.69
SU68732951	60.05	57.75
SU68732952	61.89	59.48
SU68732953	59.25	56.70
SU68733551	56.69	51.78
SU68733651	56.90	54.79
SU68733701	57.55	54.81
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SU68733755	0.0	-9999.0
SU68733756	0.0	-9999.0
SU68733757	61.60	59.84
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SU68733802	0.0	-9999.0
SU68733851	63.58	-9999.0
SU68733852	59.18	57.40
SU68733853	59.64	57.88
SU68733854	55.17	53.85
SU68733855	59.72	58.48
SU68733856	60.65	58.94
SU68733857	61.54	59.84
SU68733858	62.56	60.66
SU68733859	62.85	-9999.0
SU68733860	57.77	56.55
SU68733861	58.25	56.83
SU68733862	60.24	58.06
SU68733863	58.61	56.88
SU68733951	57.78	55.56
SU68733952	57.11	55.50
SU68733953	56.21	55.27
SU68733954	56.39	-9999.0
SU68733955	57.67	55.52
SU68733956	58.53	57.05
SU68734501	53.23	50.22
SU68734502	54.88	50.83
SU68734503	55.37	50.99
SU68734504	53.46	49.79
SU68734551	53.39	50.96
SU68734552	53.35	48.98
SU68734553	54.97	49.75
SU68734601	52.67	49.56
SU68734602	51.53	48.28
SU68734603	0.0	-9999.0
SU68734604	50.74	48.15
SU68734605	50.45	47.90
SU68734651	51.88	50.66
SU68734652	51.95	46.84
SU68734653	53.06	50.41
SU68734654	50.99	48.75
SU68734655	50.67	46.27
SU68734656	0.0	-9999.0
SU68734701	50.25	47.49
SU68734751	52.35	48.42
SU68734752	50.35	46.14
SU68734753	56.72	53.61
SU68734801	58.69	55.96
SU68734802	55.54	53.15
SU68734851	55.09	53.44
SU68734852	52.50	50.33
SU68734854	54.30	52.69
SU68734855	50.69	48.62
SU68734856	55.06	53.23
SU68734857	58.60	56.43
SU68734859	58.58	56.18
SU68734860	58.47	56.57
SU68734901	51.38	46.83
SU68734951	52.98	51.69
SU68734952	52.94	51.31
SU68734953	50.94	48.77
SU68734954	50.67	49.43
SU68734955	52.21	51.22
SU68734956	55.14	54.35
SU68734957	52.09	50.58
SU68734958	52.23	-9999.0
SU68734959	50.75	-9999.0
SU68735954	50.76	-9999.0

NOTE:
1. THE INVERT LEVEL SHOWN MAY EITHER BE THE INVERT LEVEL OF THE MANHOLE OR OF THE PRINCIPAL OUTGOING PIPE.
2. DUE TO THE PRESENCE OF BACKDROPS AND GRADIENT CHANGES A STRAIGHT LINE INTERPOLATION OF GRADIENT BETWEEN THE INVERT LEVELS QUOTED ABOVE MAY NOT BE VALID.

Appendix D Existing Drainage / Utilities

PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD
IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY
All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

CCTV DRAINAGE SURVEY
All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity
Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

British Telecoms
BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

Cable TV & Communications
CTV and/or Com cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Fibre Optic
FO cables will have been predominantly located using GPR methodology. This is due to the materials used within fibre optic cabling. In some rare instances, tracer cabling or conductible non fibre optic cabling will be present within some or all ducting. When this is the case, both EML and GPR methodology will be combined to identify service network and achieve greater quality levels.

Lighting, Traffic Signal & Security Cables
LC, TS and/or Sec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Gas & Water Inc. Fuel Pipes and Hot Water Pipes
GM/GS and/or WM/WS pipe work will have been attempted and located using both EML & GPR methodology with electronically derived depths shown for the former and depths to crown levels shown for the latter.
When the Gas/Water pipe work is constructed using conductible materials, then we are able to to employ multiple geophysical techniques to identify service network and achieve greater quality levels. When a non conductible material is used, GPR methodology will be employed to locate and plot the final service layout.

Ground Penetrating Radar
GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces
All UITs will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Every effort has been made to identify the service but in this instance, is not achievable. We recommend excavation work to determine identity and depth where applicable.

Scarring (QL-C)
Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)
Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

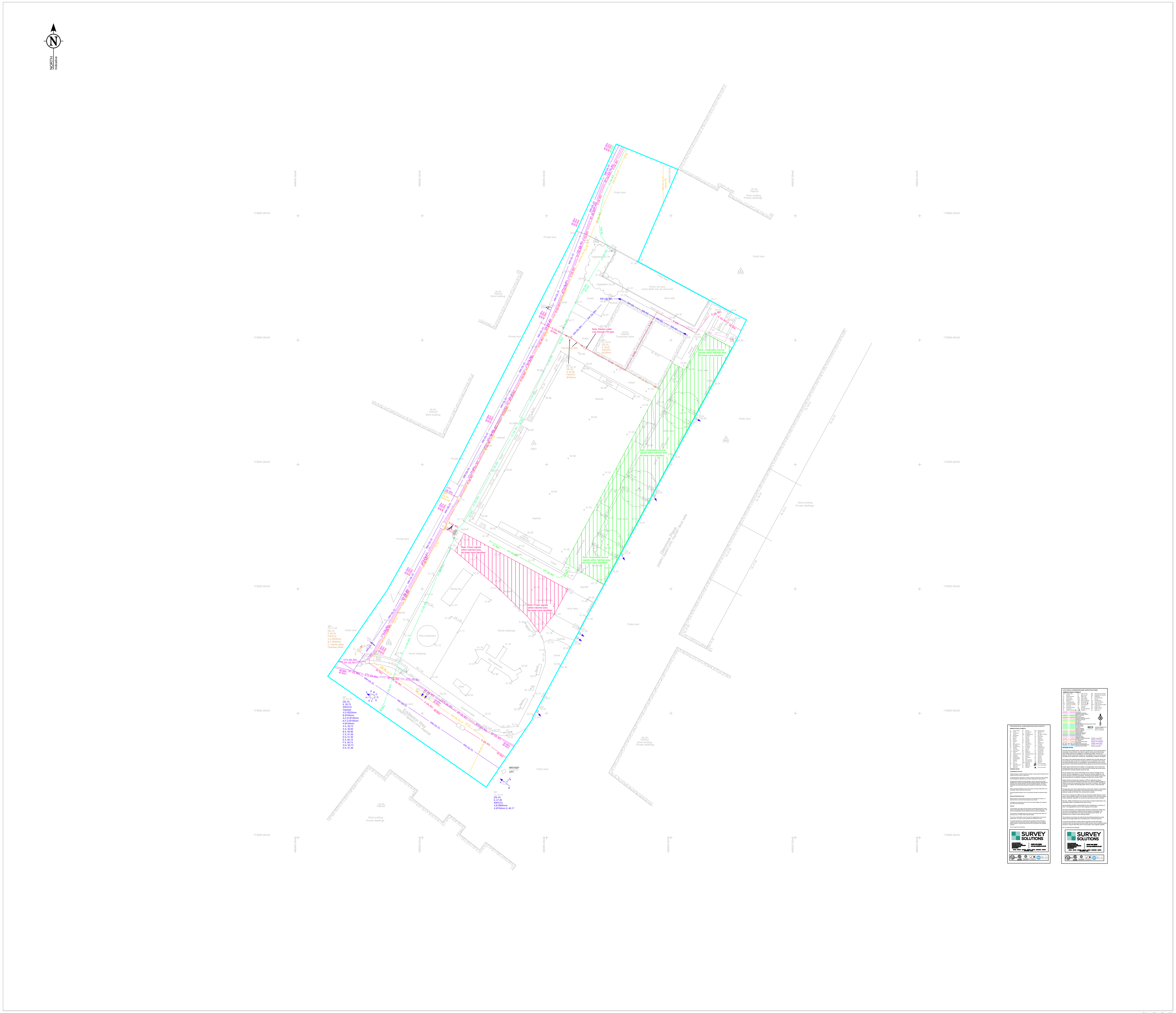
Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.

SURVEY RECOMMENDATIONS

To undertake a CCTV drainage survey of the entire site area to establish a more comprehensive drainage network, and asset condition of the pipework.

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out within critical areas for verification and to eliminate the possibility of undetectable services present.

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Original Sheet Size A0H

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
AG	Above Ground	DTB	Depth To Base	SA	Survey Abandoned
AR	Assumed Route	DTW	Depth To Water	SL	Silt Level
BL	Base Level	DTS	Depth To Surcharge	SuL	Surcharge Level
CB	Concrete Benching	EBD	External Backdrop	TFR	Taken From Records
CBC	Circular Brick Chamber	EOT	End Of Trace	UTC	Unable To CCTV
CCC	Circular Conc Chamber	IBD	Internal Backdrop	UTDO	Unable To Determine Outfall
CL	Cover Level	IL	Invert Level	UTL	Unable To Lift
CPC	Circ Plastic Chamber	OH	Overhead	UTS	Unable To Survey
CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water	RB ●	Rest Bend	WL	Water Level

BT CABLE(S)
OVERHEAD BT CABLE(S)
COMMUNICATIONS CABLE(S)
CABLE TV CABLE(S)
EMPTY DUCT
ELECTRIC CABLE(S)
OVERHEAD ELECTRIC CABLE(S)
FIBREOPTIC CABLE(S)
FUEL PIPE(S)
GAS MAIN
GAS SERVICE
GROUND PENETRATING RADAR (GPR) TRACE
HOT WATER PIPE
LIGHTING CIRCUIT
OIL PIPE(S)
VISIBLE SCARRING
SECURITY CABLING
TELECOM CABLE(S)
TRAFFIC SIGNAL
UNIDENTIFIED SERVICE
UNIDENTIFIED TRACE
WATER MAIN
WATER SERVICE
COMBINED SEWER
COMBINED WATER RISING MAIN
EFFLUENT WATER
FOUL SEWER
FOUL WATER RISING MAIN
RISING MAIN
SURFACE WATER SEWER
SURFACE WATER RISING MAIN
INVESTIGATION EXTENTS

Note: .... UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m DEPTH TO SERVICE
??-AC AUDIBLE CONNECTION
??-AG SERVICE ABOVE GROUND
??-CU CAMERA UNDER WATER
??-OH SERVICE OVERHEAD

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

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Do not scale from this drawing.

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 43004BWUG from Gleeds Management Services LTD. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION
TOPOGRAPHICAL SURVEY DATE 14/07/2022

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	SURVEY SOLUTIONS	NONE
OUTDATED		
OS		
NTS		

GENERAL SITE CONDITIONS
AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: YES

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	PUBLIC	THAMES WATER
WATER MAIN	PUBLIC	THAMES WATER
GAS MAIN	PUBLIC	SGN
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	PUBLIC	VIRGIN MEDIA
ELECTRICITY	PUBLIC	SSE ELECTRICITY
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE
RANNOCH STREET, READING, BERKSHIRE, RG30 4FU.

DRAWING DETAIL
UTILITIES AND DRAINAGE SURVEY. SHEET 1 OF 1

CLIENT				SCALE
GLEEDS MANAGEMENT SERVICES LTD.				1:200
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
RJB	26/07/2022	AJM	GSB	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
43004BWUG-01				03/08/2022

RICS chartered ices THE SURVEY ASSOCIATION ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

Appendix E Pre/Post Development Catchments

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).

LEGEND

	BUILDING / ROOF	= 118m²
	HARDSTANDING	= 571m²
	SOFT LANDSCAPING	= 267m²
	PERMEABLE SURFACING	= 402m²
	TOTAL	= 1358m²

REV						
P02	SITE PLAN UPDATED					
	B.MURPHY	16/05/25	H.MILER	16/05/25	A.TODD	16/05/25
P01	PRELIMINARY ISSUE					
	C.HOPKINSON	18/11/24	A.TODD	18/11/24	A.TODD	18/11/24
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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e: bristolcentral@hydrock.com

CLIENT
READING BOROUGH COUNCIL

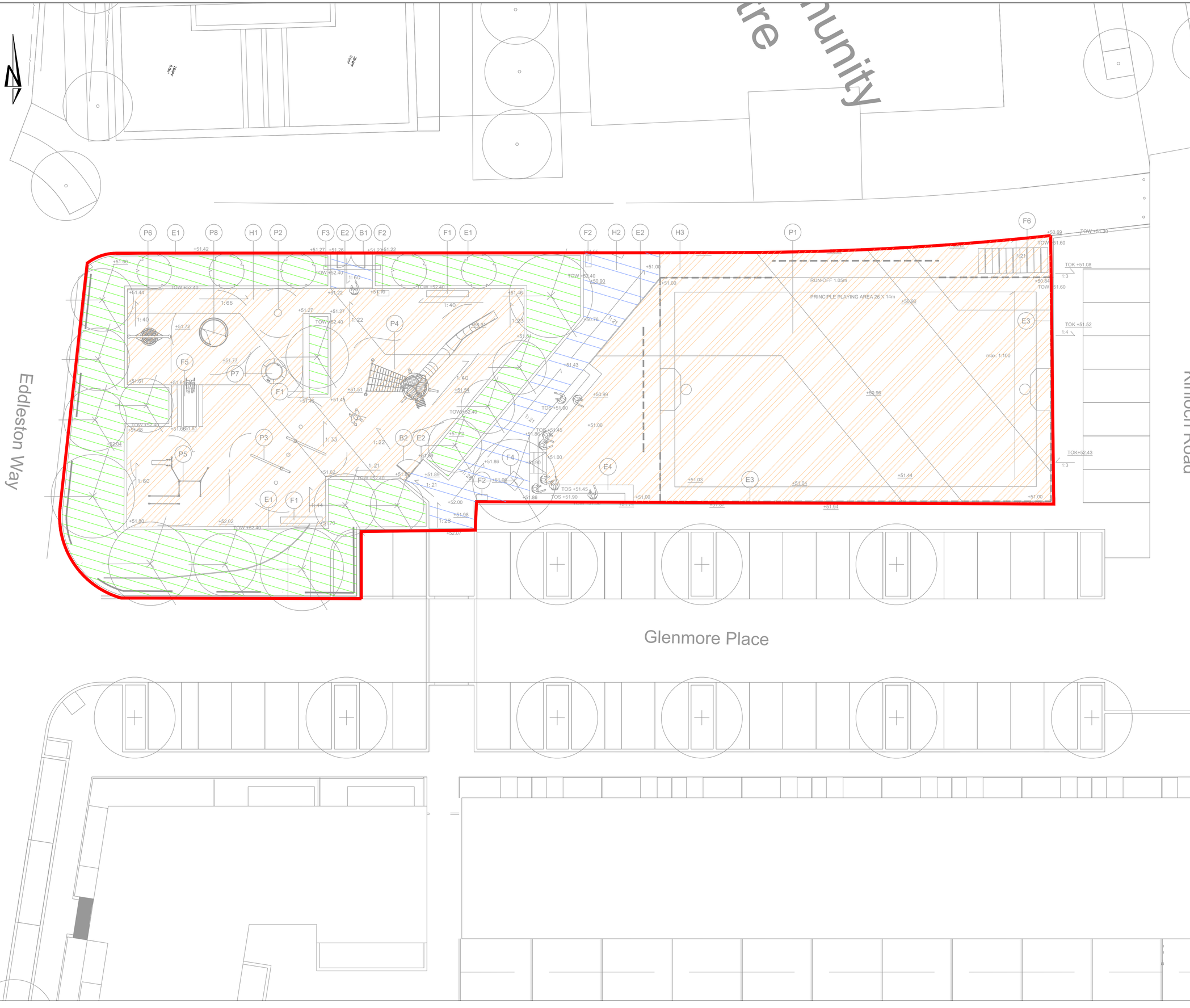
PROJECT
DEE PARK OPEN SPACE

TITLE
PRE-DEVELOPMENT
CACTHCMENT PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-36064-C	1:125

STATUS DESCRIPTION	STATUS
PLANNING	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
36064-HYD-00-ZZ-SK-C-7710	P02



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.
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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).

LEGEND

	BUILDING / ROOF	= 0m^2
	HARDSTANDING	= 0m^2
	SOFT LANDSCAPING	= 303m^2
	PERMEABLE SURFACING	= 1055m^2
	TOTAL	= 1358m^2

REV						
P02	SITE PLAN UPDATED					
	B.MURPHY	16/05/25	H.MILER	16/05/25	A.TODD	16/05/25
P01	PRELIMINARY ISSUE					
	H.MILLER	18/11/24	A.TODD	18/11/24	A.TODD	18/11/24
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT

READING BOROUGH COUNCIL

PROJECT

DEE PARK OPEN SPACE

TITLE

POST DEVELOPMENT
CATCHMENT PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C-36064-C	1:125

STATUS DESCRIPTION	STATUS
PLANNING	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
36064-HYD-00-ZZ-SK-C-7720	P02

Appendix F Calculations

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Stantec:		



Catchment Area

Type : Catchment Area

Area (ha)	0.019

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.005

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.019

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.001

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (5)

Type : Catchment Area

Area (ha)	0.057

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.950
Winter Volumetric Runoff	0.950
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Stantec:		

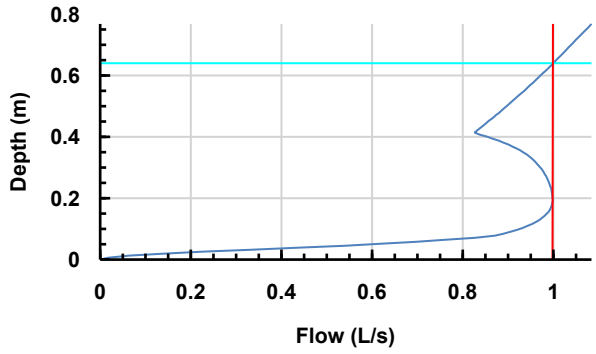
Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW-01	Manhole	468472.007	173634.154	51.350	0.575	50.775	Circular	0.600
FC-01 (flow control)	Manhole	468488.625	173664.797	50.840	0.640	50.200	Circular	0.600
PUBLIC SEWER OUTFALL	Manhole	468484.649	173666.936	51.000	4.000	47.000	Circular	1.200

Name	Lock
SW-01	None
FC-01 (flow control)	None
PUBLIC SEWER OUTFALL	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW-01	Outlet	Pipe (1)	Free Discharge
FC-01 (flow control)	Outlet	Pipe (4)	Hydro-Brake®

Invert Level (m)	50.200
Design Depth (m)	0.640
Design Flow (L/s)	1.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☑
Unit Reference	SHE-0051-1000-0640-1000



Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Stantec:		



AS-01

Type : Porous Paving

Dimensions

Exceedance Level (m)	51.820
Depth (m)	0.540
Base Level (m)	51.280
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	50.0
Porosity (%)	30
Length (m)	22.739
Long. Slope (1:X)	200.00
Width (m)	8.312
Total Volume (m³)	26.082

Advanced

Conductivity (m/hr)	216.0



AS-02

Type : Porous Paving

Dimensions

Exceedance Level (m)	51.350
Depth (m)	0.550
Base Level (m)	50.800
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	50.0
Porosity (%)	30
Length (m)	29.513
Long. Slope (1:X)	200.00
Width (m)	6.303
Total Volume (m³)	26.229

Advanced

Conductivity (m/hr)	216.0



AS-03

Type : Porous Paving

Dimensions

Exceedance Level (m)	50.760
Depth (m)	0.460
Base Level (m)	50.300
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	50.0
Porosity (%)	30
Length (m)	38.755
Long. Slope (1:X)	150.00
Width (m)	13.574
Total Volume (m³)	59.969

Advanced

Conductivity (m/hr)	216.0

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Stantec:		



AS-04

Type : Porous Paving

Dimensions

Exceedance Level (m)	51.000
Depth (m)	0.600
Base Level (m)	50.400
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	50.0
Porosity (%)	30
Length (m)	22.517
Long. Slope (1:X)	21.00
Width (m)	3.134
Total Volume (m^3)	9.950

Advanced

Conductivity (m/hr)	216.0

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	Stantec:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	AS-01		Time of Concentration	0.019	100	0	100	0.019
Catchment Area (1)	AS-02		Time of Concentration	0.005	100	0	100	0.005
Catchment Area (2)	AS-02		Time of Concentration	0.019	100	0	100	0.019
Catchment Area (3)	AS-04		Time of Concentration	0.007	100	0	100	0.007
Catchment Area (4)	AS-01		Time of Concentration	0.001	100	0	100	0.001
Catchment Area (5)	AS-03		Time of Concentration	0.057	100	0	100	0.057
TOTAL		**0.0**		**0.108**				**0.108**

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Title: Rainfall Analysis Criteria	Stantec:		

Runoff Type	Dynamic
Output Interval (mins)	10
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	100
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England And Wales
M5-60 (mm)	18.8
Ratio R	0.400
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	35.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Stantec:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 1 years: +0 %: 15 mins: Summer	0.02	3.0	1.301
Catchment Area (1)	FSR: 1 years: +0 %: 15 mins: Summer	0.01	0.8	0.350
Catchment Area (2)	FSR: 1 years: +0 %: 15 mins: Summer	0.02	2.9	1.280
Catchment Area (3)	FSR: 1 years: +0 %: 15 mins: Summer	0.01	1.1	0.485
Catchment Area (4)	FSR: 1 years: +0 %: 15 mins: Summer	0.00	0.2	0.093
Catchment Area (5)	FSR: 1 years: +0 %: 15 mins: Summer	0.06	9.0	3.906

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Stantec:		

FSR: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 30 years: +35 %: 15 mins: Summer	0.02	9.9	4.306
Catchment Area (1)	FSR: 30 years: +35 %: 15 mins: Summer	0.01	2.7	1.150
Catchment Area (2)	FSR: 30 years: +35 %: 15 mins: Summer	0.02	9.8	4.243
Catchment Area (3)	FSR: 30 years: +35 %: 15 mins: Summer	0.01	3.7	1.602
Catchment Area (4)	FSR: 30 years: +35 %: 15 mins: Summer	0.00	0.7	0.308
Catchment Area (5)	FSR: 30 years: +35 %: 15 mins: Summer	0.06	29.8	12.937

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Stantec:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 100 years: +40 %: 15 mins: Summer	0.02	13.4	5.786
Catchment Area (1)	FSR: 100 years: +40 %: 15 mins: Summer	0.01	3.6	1.545
Catchment Area (2)	FSR: 100 years: +40 %: 15 mins: Summer	0.02	13.1	5.694
Catchment Area (3)	FSR: 100 years: +40 %: 15 mins: Summer	0.01	5.0	2.159
Catchment Area (4)	FSR: 100 years: +40 %: 15 mins: Summer	0.00	0.9	0.410
Catchment Area (5)	FSR: 100 years: +40 %: 15 mins: Summer	0.06	40.1	17.368

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Stantec:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW-01	FSR: 1 years: +0 %: 30 mins: Summer	51.350	50.775	50.789	0.014	0.5	0.004	0.000	0.5	0.515	OK
FC-01 (flow control)	FSR: 1 years: +0 %: 60 mins: Summer	50.840	50.200	50.303	0.103	1.0	0.029	0.000	0.9	2.017	Surcharged
PUBLIC SEWER OUTFALL	FSR: 1 years: +0 %: 60 mins: Summer	51.000	47.000	47.009	0.009	0.9	0.000	0.000	0.9	2.012	OK

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Stantec:		

FSR: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW-01	FSR: 30 years: +35 %: 1440 mins: Summer	51.350	50.775	50.829	0.054	0.5	0.015	0.000	0.5	31.942	OK
FC-01 (flow control)	FSR: 30 years: +35 %: 120 mins: Summer	50.840	50.200	50.389	0.189	1.1	0.053	0.000	1.0	11.751	Surcharged
PUBLIC SEWER OUTFALL	FSR: 30 years: +35 %: 60 mins: Summer	51.000	47.000	47.009	0.009	1.0	0.000	0.000	1.0	5.966	OK

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Stantec:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW-01	FSR: 100 years: +40 %: 1440 mins: Summer	51.350	50.775	50.904	0.129	0.7	0.036	0.000	0.7	42.749	OK
FC-01 (flow control)	FSR: 100 years: +40 %: 360 mins: Summer	50.840	50.200	50.483	0.283	1.0	0.080	0.000	1.0	36.485	Surcharged
PUBLIC SEWER OUTFALL	FSR: 100 years: +40 %: 15 mins: Summer	51.000	47.000	47.009	0.009	1.0	0.000	0.000	1.0	1.364	OK

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
AS-01	FSR: 1 years: +0 %: 960 mins: Summer	51.440	51.284	0.047	0.004	0.3	2.476	0.000	0.000	0.1	4.594	90.506	OK
AS-02	FSR: 1 years: +0 %: 2160 mins: Summer	51.086	50.808	0.139	0.008	0.3	5.435	0.000	0.000	0.1	13.169	79.277	OK
AS-03	FSR: 1 years: +0 %: 2880 mins: Summer	50.647	50.307	0.089	0.007	0.5	11.814	0.000	0.000	0.2	32.452	80.299	OK
AS-04	FSR: 1 years: +0 %: 120 mins: Summer	51.491	50.410	0.019	0.010	0.5	0.538	0.000	0.000	0.2	0.942	94.596	OK

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec:		

FSR: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Avg. Depth

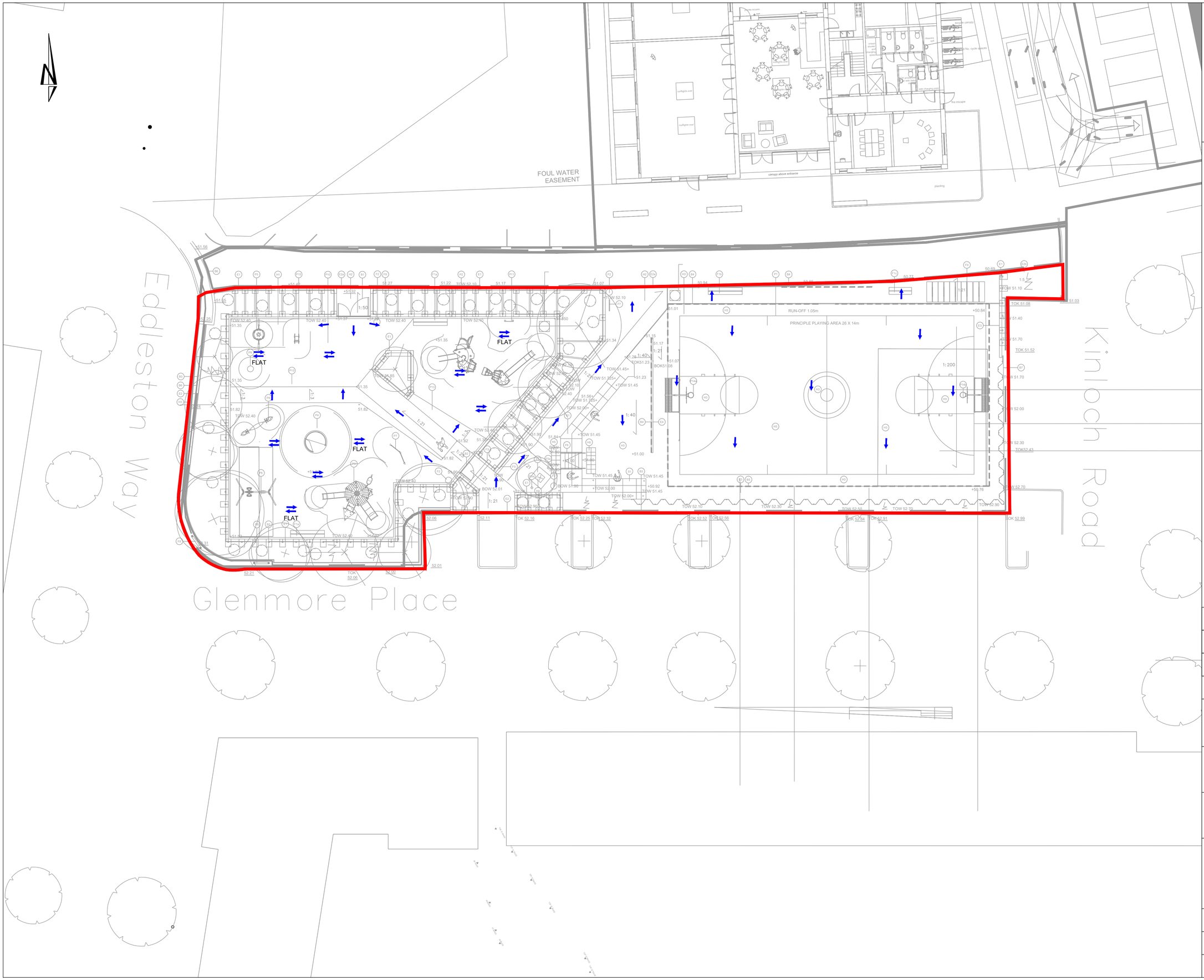
Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
AS-01	FSR: 30 years: +35 %: 720 mins: Summer	51.541	51.306	0.148	0.026	1.2	6.720	0.000	0.000	0.5	12.297	74.235	OK
AS-02	FSR: 30 years: +35 %: 1440 mins: Summer	51.296	50.830	0.349	0.030	1.2	13.054	0.000	0.000	0.5	31.949	50.232	OK
AS-03	FSR: 30 years: +35 %: 1440 mins: Winter	50.829	50.313	0.271	0.013	1.7	30.999	0.000	0.000	0.7	66.911	48.308	OK
AS-04	FSR: 30 years: +35 %: 120 mins: Summer	51.533	50.418	0.061	0.018	1.5	1.647	0.000	0.000	0.5	2.998	83.443	OK

Dee Park:	Date: 08/05/2026		
	Designed by: HM	Checked by: JM	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
AS-01	FSR: 100 years: +40 %: 480 mins: Summer	51.594	51.381	0.200	0.101	2.3	9.763	0.000	0.000	0.8	14.028	62.567	OK
AS-02	FSR: 100 years: +40 %: 960 mins: Summer	51.372	50.903	0.424	0.103	2.1	16.724	0.000	0.000	0.8	36.233	36.239	OK
AS-03	FSR: 100 years: +40 %: 720 mins: Summer	50.902	50.472	0.344	0.172	5.4	44.714	0.000	0.000	1.0	58.598	25.438	OK
AS-04	FSR: 100 years: +40 %: 120 mins: Summer	51.556	50.465	0.084	0.065	2.0	2.305	0.000	0.000	0.7	4.123	76.836	OK

Appendix G Overland Flow Routes



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).

LEGEND

OVERLAND FLOW ROUTE

REV						
P03	WESTERN GATEWAY LEVELS RAISED LOCALLY TO SUIT PLANNING COMMENTS					
	H.MILLER	13/07/26	J.MAGEE	13/07/26	J.MAGEE	13/07/26
P02	SITE PLAN UPDATED					
	B.MURPHY	16/05/25	H.MILLER	16/05/25	A.TODD	16/05/25
P01	PRELIMINARY ISSUE					
	H.MILLER	18/11/24	A.TODD	18/11/24	A.TODD	18/11/24
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT

READING BOROUGH COUNCIL

PROJECT

DEE PARK OPEN SPACE

TITLE

OVERLAND FLOW ROUTES

HYDROCK PROJECT NO.	SCALE @ A1
C-36064-C	1:125

STATUS DESCRIPTION	STATUS
PLANNING	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
36064-HYD-00-ZZ-SK-C-7730	P03

Appendix H Drainage Strategy

PROPOSED DRAINAGE - STORM

150Ø@1:100 — STORM WATER DRAIN - **PVCu**
(Structured walled pipe required at diameter >150mm)
Approx. gradient and diameter as noted, 100mm Ø UNO

SW-01 — STORM WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m
Connections over 150mm - chamber to be **RANGE 600**
NOTE: Drawn to 900mm Ø for clarity

RE — STORM RODDING EYE
Ø as noted

150Ø@1:100 — EXISTING PUBLIC FOUL SEWER

150Ø@1:100 — EXISTING PUBLIC STORM SEWER

PUBLIC STORM WATER SEWER EASEMENT

00.00 — PROPOSED GROUND LEVEL

00.00 — PROPOSED ATTENUATING SUB-BASE FORMATION LEVEL

1:200 — PROPOSED ATTENUATING SUB-BASE FORMATION LEVEL SLOPE

6m EASEMENT ASSUMED AROUND PUBLIC THAMES WATER SURFACE WATER SEWER

FOUL WATER EASEMENT

PARTIAL INFILTRATING SUB-BASE (SYSTEM B) - AS-02
LOCATED BENEATH WET POUR LAYER
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
21m³ STORAGE PROVIDED IN OPEN GRADED CRUSHED ROCK (OGCR) TYPE 3 OR SIMILAR WITH MIN 30% VOIDS.
470mm (min) DEEP.

PROPOSED SADDLE CONNECTION TO THAMES WATER SEWER.
THAMES WATER CONNECTION AND DISCHARGE RATE APPROVED

375Ø

1200Ø

RECESSED CHAMBER LID

SW-01
B125 CVR
CL: 51.350
IL: 50.600

RE
IL: 50.700

150Ø@1:200
PERFORATED COLLECTOR PIPE

100Ø@1:40
PERFORATED COLLECTOR PIPE

150Ø@1:55

150Ø PERFORATED PIPE

PLEASE NOTE:
REFER TO CALCULATIONS SHEETS:
36064-HYD-XX-XX-CA-C-0001
FOR STORMWATER CONTROLS DETAILS

FLOW CONTROL MANHOLE - FC-01
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO **1.0 l/s**
D400 CVR
CL: 50.840
IL: 50.200
HEAD: 0.640

H1 SURFACE (WETPOUR)

H2 SURFACE (PERMEABLE BLOCK PAVING)

H3 SURFACE (POROUS ASPHALT)

WATER TO FLOW THROUGH ATTENUATING SUBBASE AND BE COLLECTED BY PERFORATED PIPE

PERMAVOID DIFFUSER UNIT
PVOD05201 - 2130x355x300mm

PARTIAL INFILTRATING SUB-BASE (SYSTEM B) - CONVEYANCE AREA
USED TO CONVEY WATER FROM SUB-BASE AREA AS-01 TO AREA AS-02

1050Ø

300Ø

PARTIAL INFILTRATING SUB-BASE (SYSTEM B) - AS-01
LOCATED BENEATH WET POUR LAYER
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
26m³ STORAGE PROVIDED IN OPEN GRADED CRUSHED ROCK (OGCR) TYPE 3 OR SIMILAR WITH MIN 30% VOIDS.
460mm (min) DEEP.

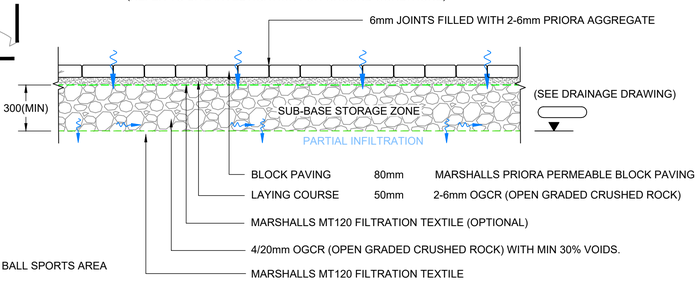
PARTIAL INFILTRATING SUB-BASE (SYSTEM B) - AS-04
LOCATED BENEATH PERMEABLE BLOCK PAVING
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
10m³ STORAGE PROVIDED IN OPEN GRADED CRUSHED ROCK (OGCR) TYPE 3 OR SIMILAR WITH MIN 30% VOIDS.
300mm (min) DEEP.

PARTIAL INFILTRATING SUB-BASE (SYSTEM B) - AS-03
LOCATED BENEATH POROUS ASPHALT LAYER
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
60m³ STORAGE PROVIDED IN OPEN GRADED CRUSHED ROCK (OGCR) TYPE 3 OR SIMILAR WITH MIN 30% VOIDS.
380mm (min) DEEP.

BUILD UP TO BE CONFIRMED WITH SUPPLIER

PAVEMENT BUILD-UPS ARE SUBJECT TO IN-SITU CBR TESTS AT SUB-GRADE LEVEL

(REFER TO SITE INVESTIGATION FOR GROUND CONDITIONS)

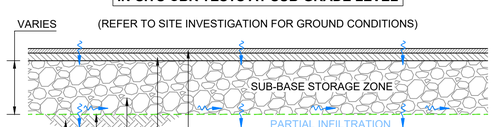


CBR of subgrade %	Additional thickness of course graded material (mm)
1%	300
2%	175
3%	125
4%	100
5%	0

NOTE:
- DETAIL ABOVE MAKES NO ALLOWANCE FOR ADDITIONAL REQUIREMENTS SHOULD THE PERMEABLE CONSTRUCTION BE USED FOR SITE TRAFFIC. REFER TO PARAGRAPH 5.6.4 OF BS7533-13:2009 FOR MORE INFORMATION.
- MATERIALS TO MARSHALLS SPECIFICATION

PAVEMENT BUILD-UPS ARE SUBJECT TO IN-SITU CBR TESTS AT SUB-GRADE LEVEL

VARIES (REFER TO SITE INVESTIGATION FOR GROUND CONDITIONS)

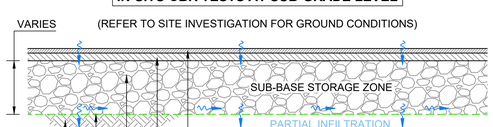


1. ANY FROST SUSCEPTIBLE MATERIAL WITHIN 450mm OF THE SURFACE TO BE REMOVED AND BACKFILLED. SOFT OR DAMAGED AREAS TO BE EXCAVATED AND REPLACED WITH SUB-BASE MATERIAL, COMPACTED IN LAYERS 300mm (MAX) THICK.

TYPE H1: POROUS ASPHALT PAVING CONSTRUCTION
SYSTEM TYPE B
(Outdoor Sports, Pedestrian Loading Only)
SCALE 1:20

PAVEMENT BUILD-UPS ARE SUBJECT TO IN-SITU CBR TESTS AT SUB-GRADE LEVEL

VARIES (REFER TO SITE INVESTIGATION FOR GROUND CONDITIONS)

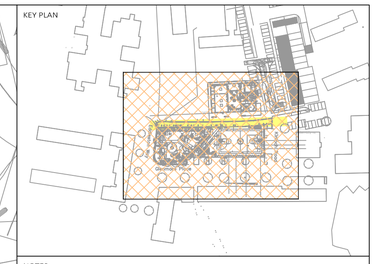


1. ANY FROST SUSCEPTIBLE MATERIAL WITHIN 450mm OF THE SURFACE TO BE REMOVED AND BACKFILLED. SOFT OR DAMAGED AREAS TO BE EXCAVATED AND REPLACED WITH SUB-BASE MATERIAL, COMPACTED IN LAYERS 300mm (MAX) THICK.

TYPE H3: POROUS ASPHALT PAVING CONSTRUCTION
SYSTEM TYPE B
(Outdoor Sports, Pedestrian Loading Only)
SCALE 1:20

TYPE H2: BLOCK PAVING CONSTRUCTION (PERMEABLE)
(Pedestrian Loading only)
SYSTEM TYPE B
SCALE 1:20

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.
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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).
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.

REV						
P04	WESTERN GATEWAY LEVELS LOCALLY RAISED TO SUIT PLANNING COMMENTS					
	H.MILLER	13/07/26	J.MAGEE	13/07/26	J.MAGEE	13/07/26
P03	PROPOSED SEWER CONNECTION UPDATED					
	H.MILLER	08/05/25	J.MAGEE	08/05/25	J.MAGEE	08/05/25
P02	UPDATED TO SUIT NEW LAYOUT					
	H.MILLER	16/05/25	J.MAGEE	16/05/25	J.MAGEE	16/05/25
P01	PRELIMINARY ISSUE					
	H.MILLER	18/11/24	A.TODD	18/11/24	A.TODD	18/11/24
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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PROJECT
DEE PARK OPEN SPACE

TITLE
DRAINAGE STRATEGY

HYDROCK PROJECT NO.	SCALE @ A1
C-36064-C	1:125

STATUS DESCRIPTION	STATUS
PLANNING	S2

DRAWING NO. (PROJECT-CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
36064-HYD-00-ZZ-DR-C-7000	P04

Appendix I Phase 2 Site Investigation Report

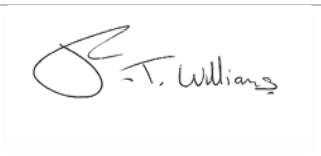
geotechnical and environmental consultants

ground&water

Phase II Site Investigation Report

Dee Park Sports, Reading, RG30 4EP

On behalf of Reading Borough Council

Report Reference: GWPR6479/SIR/March 2025			Status: Final
Issue	Prepared By	Checked By	Verified By
v.1.01			
	Libby Bennett BSc (Hons) Geotechnical and Geoenvironmental Engineer	Miltiadis Mellios MSc(Eng) CGeol FGS MIEnvSc GMICE Principal Engineer	Francis Williams MGeol (Hons) FGS CEnv CGeol Director

Site Investigations | Environmental Consultants | Geotechnical Engineers

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0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

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EXECUTIVE SUMMARY	
PROPOSED DEVELOPMENT	At the time of reporting, March 2025, the proposed development was understood to comprise redevelopment of the site into an updated play area.
GEOLOGY AND HYDROGEOLOGY	The British Geological Survey Solid and Drift Geology Map for the Reading area (Reading Sheet No. 268) revealed that the northern section of the site was underlain by the Lambeth Group (clay,silt and sand) whilst the southern section was underlain by Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). Areas of Worked Ground were recorded 1m northeast and 224m south of the site. An inferred bedrock fault was running through the middle of the site, separating the two areas. A study of the aquifer maps on the DEFRA website revealed the northern section of the site was underlain by a Secondary A Aquifer comprising bedrock deposits of the Lambeth Group whilst the southern section of the site was underlain by a Principal Aquifer comprising bedrock deposits of the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).
FOUNDATION DESIGN	Please consult relevant sections
SUB-SURFACE CONCRETE	**Lambeth Group** One sample was tested at the boundary between the Made Ground and the Lambeth Group. The water-soluble sulphates were noted to be 28 mg/l, with a pH of 8.1, from chemical and geotechnical laboratory testing. The total potential sulphate (3x total sulphur) was 0.054%, from chemical laboratory testing. According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 should be used for sub-surface concrete in contact with the Lambeth Group. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1. **Chalk** The water-soluble sulphates were noted to be 8.17 – 34.2 mg/l, with a pH of 8.1, from chemical and geotechnical laboratory testing. According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 should be used for sub-surface concrete in contact with the Chalk. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.

CONTAMINATION	The comparison between the laboratory analysis and the assessment criteria indicates that each of the determinands were identified at below the adopted screening value and are not considered to represent an unacceptable risk to future receptors.
REMEDIATION	A nominal capping of topsoil of at least 100mm is recommended for any soft-landscaped areas of the site. Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Reading Borough Council on the 10th February 2025 to conduct a Site Investigation on the site at Dee Park, Glenmore Place, Reading, RG30 4EP. The scope of the investigation was detailed within the fee proposal QU-1020, dated the 15th January 2025.

1.2. Aims of the Investigation

The aim of this report was to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

The investigation was to be undertaken to provide parameters for the design of foundations by means of in-situ and laboratory geotechnical testing undertaken on soil samples recovered from trial holes.

A contamination assessment was to be undertaken following chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified. The assessment comprises a Tier 2 Generic Quantitative Risk Assessment, under Land Contamination Risk Management (LCRM), with the intention of discharging planning conditions.

This Site Investigation Report must be read in conjunction with the Desk Study Report referenced GWPR6235/DS/October 2024.

The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

1.4. Technical Glossary

Generic technical terms and their description can be viewed within the glossary provided within Appendix B.

2. SITE SETTING

2.1. Site Location

The site comprised a ~1,600m^2 rectangular-shaped plot of land, along the north-western side of Glenmore Place. The site was located in the north-western portion of Reading, Berkshire.

The national grid reference for the centre of the site was approximately 468479 173632. A site location plan is given within Figure 1.

2.2. Site Description

A Site Walkover was undertaken on the 3rd February 2025. A description of the site, as noted during the Site Walkover, is tabulated below.

Site Description Sheet	
Use of site	At the time of the site walkover, 3rd February 2025, the site comprised a children's park and sports court.
Site topography	The site was noted to be generally flat.
Area topography	The surrounding area was noted to be generally flat.
Structures onsite	The site is occupied a fenced off sports court within the centre of the site and children's play area within the southern section.
Structures off-site	The site was surrounded by residential developments.
Use of surrounding ground	The surrounding ground comprised predominantly residential housing, gardens and parking.
Boundary features	Northern Boundary: An open boundary to residential development Eastern Boundary: An open boundary to residential development Southern Boundary: An open boundary to residential development Western Boundary: An open boundary to community centre
Site covering	The sports court was laid to tarmac hardstanding whilst the children's play area laid to wood chips. The remainder of the site generally comprised soft-landscaping with some tarmac pathways.
Contamination sources onsite	None noted.
Contamination sources off-site	None noted.
Vegetation onsite	Some 3 – 7m mature to semi-mature trees along the perimeters of the site.
Vegetation off-site	Some small shrubs/bushes and 3-5m trees.
Services	Drainage and lampposts along the eastern and western edges of the site.

2.3. Proposed Development

At the time of reporting, March 2025, the proposed development was understood to comprise redevelopment of the site into an updated play area.

The proposed development plan can be seen within Figure 4.

2.4. Geology

The British Geological Survey Solid and Drift Geology Map for the Reading area (Reading Sheet No. 268) revealed that the northern section of the site was underlain by the Lambeth Group (clay,silt and sand) whilst the southern section was underlain by Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). Areas of Worked Ground were

recorded 1m northeast and 224m south of the site. An inferred bedrock fault was running through the middle of the site, separating the two areas.

A BGS borehole (SU67SE718) located ~290m northeast of the site revealed a 0.10m capping of Topsoil over chalk and clayey chalk fill to 1.20m bgl followed by a brown flinty clay to 1.60m bgl. From here up to 2.20m bgl a remoulded chalk with lumps of intact chalk, clay and flints was identified over remoulded chalk with some intact chalk up to 3.10m bgl. A rubbly chalk with some remoulded chalk and flints was then recorded to the base of the borehole at a depth of 6.0m bgl. No groundwater was recorded.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website revealed the northern section of the site was underlain by a Secondary A Aquifer comprising bedrock deposits of the Lambeth Group whilst the southern section of the site was underlain by a Principal Aquifer comprising bedrock deposits of the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).

Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

No surface water features were present within a 250m radius of the site. The nearest surface water feature was identified to be the River Thames ~940m north of the site flowing in an easterly direction.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Chalk Formation. Some amounts of groundwater however may be present at shallower depths within the Lambeth Group or within Made ground. It was considered that groundwater was flowing in a northern direction toward the River Thames and in line with local topography.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a very low probability of flooding.

The Groundsure Datasheets revealed the site was at a low risk of flooding from rivers and the sea. The datasheets also revealed the site was at low risk of groundwater flooding. The risk of surface water flooding at the site ranged from low to high.

2.6. Radon

A review of the freely available UK Health Security Agency radon database, UK Radon, indicated that majority of the site was located within a 1km grid square, where the maximum radon potential of 1 – 3% was recorded for above ground structures. A small section of the site within the northeastern corner of the site and extending offsite to the east was within an area of where the maximum radon potential of less than 1% for above ground structures. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within a low -risk area associated with unexploded ordnance (UXO), as indicated by having <15 bombs dropped per 1000 acres.

2.7.2. Historical Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed no records of historical landfilling within a 250m radius of the site. The nearest record was noted ~925m northwest of the site.

2.8. Preliminary Risk Assessment

The tabulated Conceptual Site Model developed as part of the Ground and Water Ltd Desk Study (GWPR6235/DS/October 2024) is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below. Any risk deemed to be negligible within the Preliminary Risk Assessment have been excluded from this report.

Risk Categories used in the Tabulated CSM	
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities and infill of pit: • Asbestos, • PAHs, • TPHs, • VOCs,-negligible • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Ingestion of home-grown produce, and soils attached • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site workers/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Moderate**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** • Vegetation within soft landscaped areas	**Moderate**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** • Principal Aquifer (Lewes Nodular, Seaford and Newhaven Chalk Formation (undifferentiated)) • Secondary A Aquifer (Lambeth Group).	**Low**
Aggressive ground conditions with Made Ground and natural ground, including groundwater: • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**

Tabulated Conceptual Site Model – Pollutant Linkage Summary (Off-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works/development: • Asbestos, • PAHs, • TPHs, • VOCs,-negligible • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Residents/Future site visitors) • Construction workers during development • Site operatives during maintenance works	**Low**
	• Direct uptake of groundwater	**Flora and Fauna** • Vegetation within soft landscaped areas	**Low**
Aggressive ground conditions associated with impacted groundwater; • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**

3. SITE WORKS

3.1. Scope of Works

Site works were undertaken in February 2025 and comprised the drilling of 4No. Windowless Sampler Boreholes (WS01) to a depth of 5.45m bgl. Standard Penetration Tests were carried out at 1.00m intervals.

Additionally, 4No. Trial Pits (SA1 –SA2) were machine excavated up to 2.00m bgl to allow for the conduct of BRE365 soakage testing.

The location of the trial hole locations can be seen within Figure 5.

Prior to commencing the ground investigation, a walkover survey was carried out to identify the presence of underground services and drainage. Where underground services/drainage were suspected and/or positively identified, the exploratory position was relocated away from these areas.

As a further precautionary measure, the borehole was hand excavated to 1.20m below the local ground level (bgl) and scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

Upon completion of the drilling works, the trial holes were backfilled and made good, in relation to the surrounding area.

3.2. Sampling Procedures

Small disturbed samples and environmental samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons.

A selection of samples were despatched to a laboratory for both geotechnical and chemical testing purposes.

4. ENCOUNTERED GROUND CONDITIONS

4.1. Soil Conditions

The trial holes were logged by a Ground and Water Limited representative, generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A capping of Made Ground was noted to overlie the superficial Lambeth Group and the bedrock Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).

The succession of conditions and description of soils encountered in the trial holes in descending order is tabulated below.

Summary of Strata Encountered		
Strata	**Top Depth (m bgl)**	**Base Depth (m bgl)**
MADE GROUND: Generally, a brown sandy gravelly clay or light brown slightly clayey, gravelly SAND in places. To see the percentage of various fragments within the Made Ground, please refer to logs found within Appendix D.	GL	1.00 – 2.10
TOPSOIL: Orange brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint and chalk.	GL	0.30 – 0.50
LAMBETH GROUP (WS1, WS2, WS4) Generally a dark brown to orange brown soft to firm gravelly CLAY. Gravel is fine to medium, angular to sub angular, of flint.	1.00 – 2.10	2.00 – 4.00
UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATION: Recovered as structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white and rounded. Grade (Dm)	0.50 – 4.00	>5.00

For details of the composition of the soils encountered at particular points, reference must be made to the individual trial hole logs within Appendix D of this report. A trial hole location plan can also be viewed within Figure 5.

4.2. Roots Encountered

Roots were noted to a proved depth of 0.30 – 0.80m bgl within the exploratory holes.

It must be noted that the chance of determining actual depth of root penetration through a narrow diameter borehole is low. Roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

4.3. Groundwater Conditions

Groundwater was not encountered within the exploratory holes.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in February 2025 when groundwater levels are likely to be approaching their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

4.4. Obstructions

No other artificial or natural sub-surface obstructions were noted during construction of the trial holes.

5. IN-SITU AND LABORATORY TESTING

5.1. In-situ Strength Testing

Standard Penetration Tests (SPTs) and Super Heavy Dynamic Probes (SHDPs) were undertaken as part of the site investigation. The results of the SPT's have not been amended to consider hammer efficiency, rod lengths and overburden pressure in accordance with Eurocode 7. The test results are presented on the borehole logs within Appendix D. An interpretation of the in-situ geotechnical testing results is given in the table below.

Interpretation of In-situ Geotechnical Testing Results					
Strata	**SPT "N" Blow Counts/Equivalent SPT "N Value from DP**	**Equivalent Undrained Shear Strength (Cu) (kPa)**	**Soil Type**		**Trial Hole/s**
			Granular (Density)	**Cohesive (Cu)**	
Soft spots within Lambeth Group (Cohesive)	5	25	-	Low	WS1/2.00-2.45m bgl
Lambeth Group (Cohesive)	12 – 14	60 – 70	-	Medium	WS1/1.00 – 2.00m bgl WS2/2.10 – 4.00m bgl
Chalk	5 – 13				WS1/4.00-5.45m bgl WS2/4.00-5.45m bgl WS3/0.50-5.45m bgl WS4/2.00-5.45m bgl

It must be noted that field measurements of undrained shear strength (Cu) are dependent on a number of variables including disturbance of sample, method of investigation and also the size of specimen or test zone.

5.2. Geotechnical Laboratory Testing

A programme of geotechnical laboratory testing, scheduled by Ground and Water Limited and carried out by an accredited geotechnical testing laboratory was undertaken on samples recovered. Details of the specific tests used in each case are given below.

Standard Methodology for Laboratory Geotechnical Testing		
Test	**Standard**	**Number of Tests**
Atterberg Limit Tests	BS1377:2016:Part 2:Clauses 3.2, 4.3 & 5	3
Water Soluble Sulphate and pH Test	BS1377:2018:Part 3:Clause 5	1
BRE Special Digest 1 Tests	BRE Special Digest 1 "Concrete in Aggressive Ground (BRE, 2005).	2

5.2.1. Atterberg Limit Testing

A précis of Atterberg limit testing undertaken can be seen tabulated below. The test results are presented within Appendix E.

Atterberg Limit Tests Results Summary							
Stratum	Moisture Content (%)	Passing 425 µm sieve (%)	Modified PI (%)	Soil Class	Consistency Index (Ic)	Volume Change Potential	
						BRE	NHBC
Lambeth Group	16.7 – 30.4	87 – 92	12.8 – 36.54	CL – CH	Stiff - Very Stiff	Low to Medium	Low to Medium
• **NP – Non-plastic** • **BRE Volume Change Potential refers to BRE Digest 240 (based on Atterberg results)** • **Soil Classification based on British Soil Classification System.** • **Consistency Index (Ic) based on BS EN IS0 14688-2:2018.**							

5.2.2. Moisture Deficit Assessment

The results of the Atterberg Limit tests were analysed to determine the Liquidity Index of the samples, to give an indication as to whether the samples recovered showed a moisture deficit as well assessing their degree of consolidation. Liquid Limit analyses was undertaken to assess whether there were any potentially significant moisture deficits within the samples tested.

No significant potential moisture deficit was identified within the samples analysed.

5.2.3. Saturation Moisture Content

The results of the saturation moisture content testing undertaken can be seen in the following table. The test results are presented within Appendix F.

Summary of Saturation Moisture Content Test Results					
Stratum	Moisture Content (%)	Saturation Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	CIRIA Dry Density Classification
Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (WS2/5.00m bgl)	32	34	1.86	1.41	Low density
Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (WS3/3.00m bgl)	26	30	1.88	1.49	Low density
• **Density in accordance with CIRIA 574 Chapter 3.0, Table 3.7**					

6. ENGINEERING CONSIDERATIONS

6.1. Chalk Dissolution and Mining Risk Assessment

The presence of dissolution features on-site can prove problematic, as they often provide inconsistency within the underlying geology. Often formed during glacial and periglacial conditions, the depth and width of these features can vary substantially, often providing inconsistency in geological strength data.

If a dissolution feature is suspected, a geotechnical engineer and structural engineer should be contacted for suitable engineering designs, based on further works identifying and classifying the area the feature occupies.

The Groundsure Geoinsight datasheets, presented Appendix C of this report, revealed the following information which may be pertinent to this risk assessment.

- Ground Dissolution of Soluble Rocks – The northern section of the site was classified as a Low risk of ground dissolution of soluble rocks whilst the southern section of the site was classified as Moderate risk.
    - *Low Risk was described as "Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not to be considered except in exceptional circumstances".*
    - Moderate risk was described as *"Soluble rocks are present within the ground. Many dissolution features may be present. Potential for difficult ground conditions are at a level where they should be considered. Potential for subsidence is at a level where it may need to be considered".*
- An on-site Class B Non-coal Mining area was identified on-site. A Class B area was described as *"Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered."*. However, this is generally a precautionary statement attributed to all areas associated with chalk within the ground profile.
- 1no. record of researched mining on site relating to stone.
- 1No. Natural cavity, solution pipe and sinkhole, was identified 355m southeast of the site.
- 4No. Britpits were noted within 250m radius of the site, 21m south-east, 27m northeast, 164m northeast relating to gravel pits and 241m south relating to a brick, tile and pottery works.
- 7No. on-site and 13No. records of surface ground workings were noted. The on-site records correspond to old gravel and unspecified pits (1900-1961), with the off-site features comprising pits and ground workings.
- 1no. record of underground workings was noted within a 500m radius of the site located 396m south and relating to unspecified workings.
- 2no. records of Mining Cavities within 500m of the site relating to chalk located 305m south and 403m northwest.
- No records of JPB Mining Areas were noted within a 500m radius of the site.

- The Edmonds Procedure (Edmonds, C.N., 2001. Predicting natural cavities in chalk. Geological Society, London, Engineering Geology Special Publications, 18(1), pp.29-38.); highlighted a moderate subsidence hazard classification.

The historical mapping review confirmed the findings of the Groundsure datasheets discussed above. **Pits were identified adjacent to the east of the site (also noted to overlap into eastern section of the site)** and ~175m north of the site.

From a review of LiDAR data for the site and surrounding area a feature assumed to be a pit is noted ~440m northwest of the site.

This risk assessment indicates that there is a moderate risk from the dissolution of soluble rocks at the site. Furthermore, along the eastern boundary and extending off-site to the east a pit has been identified from historical mapping. The presence of potential dissolution features and former infilled pits should not be discounted, and it is recommended a site investigation is undertaken to investigate further.

The ground investigation consisted of a series of windowless sampling boreholes, and trial pits. Some of them were located near the indicated pit area. Made Ground was recorded to depths of 0.40 – 2.10m bgl, indicating variations in thickness. Below, most of the trial holes recorded soils considered being representative of the Lambeth Group, with the chalk bedrock beneath. Trial holes WS3 and SA4 (both located in the north-eastern part of the site), recorded chalk directly below the Made Ground.

The chalk was generally recorded at depths between 2.00 – 4.00m bgl where soils of the Lambeth Group were present, and from 0.50m bgl, where they were absent.

Some soft spots were noted within the Lambeth Group, namely at WS1 between 2.00 and 3.00m bgl. The chalk, where recorded, was generally towards the softer side, with N SPTs between 5 – 13 and typically around ~9 - 11.

It is understood that foundations will be minimal with no heavy buildings proposed. Any foundations should be kept as shallow as possible / permitted in order to avoid stressing any soft horizons at depth. If larger/heavier buildings / construction is proposed, then the foundation design will require probing at specific foundation locations and further assessment.

6.2. Soil Characteristics and Foundation Considerations

A summary of the soil characteristics following the intrusive site investigation and laboratory testing and the relevant foundation considerations has been provided below. The following information from the ground investigation was considered pertinent to the design of foundations.

It is understood that foundations will be minimal with no heavy buildings proposed. The below sections are more generalised and refer to the approach in foundation design.

- Foundations should be taken through any Made Ground/Topsoil and either into, or onto a suitable underlying natural stratum of adequate bearing characteristics.
- Foundations should be designed in accordance with soils of medium VCP, with regards to the Lambeth Group. The chalk is not anticipated to have VCP.

- Given the presence of cohesive soils at shallow depth, special foundation precautions may be required to prevent possible future shrinkage/swelling of the soils affecting the integrity of the faces of foundations (underfloor void diameter/compressible material/void formers etc.). A compressible layer must be provided to accommodate potential seasonal movement, based on NHBC guidance.
- The loads of proposed foundations should not exceed the allowable bearing capacity of the soils they are founding upon.
- If soft spots are encountered, they should be bypassed or designed against.
- Care should be taken not to overdig foundations as this may stress underlying soft spots, should they be present.
- Foundations must not be placed within fresh root penetrated and/or desiccated soils with volume change potential. It is recommended that foundations are taken at least 300mm into non-fresh root penetrated strata if the soils have volume change potential, or into soils of no volume change potential.
- The influence of trees on or surrounding the site will need to be taken into account in final design.
- Any water ingress must be prevented from entering foundation trenches and excavations must be kept dry and either concreted or blinded as soon after excavation as possible. If water were allowed to accumulate within the excavation for even a short period of time, an increase in heave may occur. The shear strength will also be reduced, resulting in lower bearing capacities, resulting in increased settlements. Instability issues may arise within the foundation trenches, in case of perched water being present.

6.3. Shallow Foundations

Based on the previous section, foundations should bypass any Made Ground/Topsoil and soft spots/loose granular soils, before extending 300mm below the proved depth of root penetration. Foundations should be constructed on competent, moisture stable soils of the Lambeth Group. Foundations should be constructed based on a bearing capacity of 60kPa, locally 90kpa.

Additional Comments

A number of comments and recommendations has been provided below.

- It is prudent to avoid having a foundation spanning across materials of different consistency, like clay and gravel, in order to avoid potential differential settlements. If unavoidable, foundations must be reinforced to allow for such potential differential movement. It should be noted that differential settlement may also occur between strip and isolated pad foundations.
- Foundation excavations must be carefully bottomed out and any loose soil or soft spots removed prior to the foundation concrete or blinding being placed. Failure to ensure that foundation excavations are suitably bottomed out could result in additional settlements.
- Inspection of foundation excavations, prior to concreting, must be made by a competent and suitably qualified person to check for soft spots and to check for the presence of roots.
- Foundations must not be cast over foundations of former structures and/or other hard spots.

- Isolated Pad Foundations must be at least 1.5 times the width of the widest pad apart to keep to the anticipated settlements.
- Final designs for the foundations should be carried out by a suitably qualified Engineer based on the findings of this investigation and with reference to the anticipated loadings, serviceability requirements for the structure and the developments proximity to former, present, and proposed trees. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

6.4. Piled Foundation

Based on the scheme, it is not anticipated that plies would be applicable/required.

6.5. Excavations and Stability

Shallow excavations in the Made Ground are likely to be marginally stable at best. Long, deep excavations, through these strata and into the underlying natural soils are likely to become unstable.

Unsupported earth faces formed during excavation may be liable to collapse without warning and suitable safety precautions should therefore be taken to ensure that such earth faces are adequately supported before excavations are entered by personnel.

6.6. Sub-Surface Concrete Design

Concrete to be placed in contact with soil or groundwater must be designed in accordance with the recommendations of Building Research Establishment Special Digest 1, 2005, *'Concrete in Aggressive Ground'* considering the pH of the soils. For the classification given below, the "mobile" and "natural" case was adopted given the geology encountered and the use of the site.

Made Ground

The water-soluble sulphates in the Made Ground was noted to be 6.4 – 102mg/l, with a pH of 8.2 – 8.7. A class of DS, AC1 should be used for concrete in contact with the Made Ground.

Lambeth Group

One sample was tested at the boundary between the Made Ground and the Lambeth Group. The water-soluble sulphates were noted to be 28 mg/l, with a pH of 8.1, from chemical and geotechnical laboratory testing. The total potential sulphate (3x total sulphur) was 0.054%, from chemical laboratory testing.

According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 should be used for sub-surface concrete in contact with the Lambeth Group. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.

Chalk

The water-soluble sulphates were noted to be 8.17 – 34.2 mg/l, with a pH of 8.1, from chemical and geotechnical laboratory testing.

According to BRE Special Digest 1, 2005, 'Concrete in Aggressive Ground' a Sulphate Design Class of DS-1 should be used for sub-surface concrete in contact with the Chalk. Table C1 of the Digest indicated an ACEC (Aggressive Chemical Environment for Concrete) classification of AC-1.

6.7. Roads and Hardstanding Design

This section provides information relating to the construction of roads and hardstanding, for each strata encountered.

6.7.1. Anticipated CBR Values and Frost Susceptibility

Topsoil

Roads and hardstanding should bypass Topsoil given the likely low strength, high compressibility and general variability.

Made Ground

Where roads and hardstanding are to be founded on Made Ground, a CBR value of 1% should be adopted, as a result of the variable nature of Made Ground in terms of consistency, strength and compressibility.

Lambeth Group (cohesive)

Roads and hardstanding constructed on the cohesive Aeolian Deposits should be designed based on a CBR value of 4.0%. This is based on reference to Table C1 of TRL1132 and average construction conditions. Based on wet conditions a CBR of 2.5% should be adopted, with dry conditions a CBR of 4.5% being applicable.

Due to their granular content, the soils should be treated as frost susceptible in design.

Chalk

In accordance with CIRIA 574, Part 4.7 *The Action of Frost on Chalk*, all chalk deposits can be seen to be frost susceptible. The magnitude of frost heave increases linearly with the saturation moisture content of the chalk aggregate. The weak chalk of south-east England is particularly prone to frost heave in the climatic conditions of the area. Therefore a minimum construction thickness of 450mm should be maintained.

All formation levels for roads and hardstanding should be proof rolled to highlight any soft areas which should then be dug out and replaced with selected granular material compacted in thin layers to a suitable specification.

6.8. Surface Water Disposal

Soakaway testing in accordance with BRE365 was undertaken within SA1-SA4, with the results tabulated below.

Soakage Testing Results						
Trial Hole	**Test Number**	**Depth (m bgl)**	**Start Depth (m bgl)**	**Finish Depth (m bgl)**	**Time Taken (mins)**	**Infiltration Rate (m/sec)**
SA1*	1	1.50	0.60	0.65	240	6.86 x 10^-7

SA2*	1	1.50	0.60	0.61	240	1.34 x 10^-7
SA3*	1	1.50	0.68	0.71	240	4.40 x 10^-7
SA4	1	1.50	0.79	1.38	6	5.06 x 10^-4
	2	1.38	0.68	1.21	6	4.43 x 10^-4
	3	1.21	0.74	1.19	4	7.24 x 10^-4
***Given the relatively slow infiltration rate encountered, only one test could be undertaken and it did not reach 75% mark.**						

Any soakaways should be located sufficiently away from buildings and infrastructure, in order to prevent undermining of foundations.

The submission of a Sustainable Urban Drainage Scheme (SUDS) is likely to be required for this site due to the proposed development increasing the amounts of hardstanding.

Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources, abstractions and surface water features/watercourses.

It should be noted that water discharge into the chalk may worsen / create dissolution features. Therefore, soakaways should be remote from structures and undertaken in accordance with available guidance.

A number of published information sources make reference to an appropriate distance at which a soakaway should be sited in relation to any building foundations in the vicinity:

- The British Standard BS8301 :1985 “Code of practice for building drainage” (1985), suggests that: “A soakaway is not desirable nearer to a building than about 5 metres nor in such a position that the ground below foundations is likely to be adversely affected.”
- The Building Research Establishment Digest 365 “Soakaway design” (1991), suggests that “Soakaways should not normally be constructed closer than 5m to building foundations. In chalk or other soil and fill material subject to modification or instability, the advice of a specialist geotechnologist should be sought as to the advisability and siting of a soakaway”.

In addition, the distance a soakaway is located from any foundations can be informed by both the soakaway type and chalk density present at the site.

- The Kent County Council Soakaway Design Guide (July 2000) states that “Highway soakaways shall be situated the following minimum distances from dwellings (measured from the outside edge of the soakaway): (1) 5 metres for conventional perforated soakaway; (2) 10 metres for deep bored soakaway. In addition, adjacent soakaways of a similar type shall also be spaced a minimum of 10 metres apart.
- CIRIA 574 states that soakaways should be sited at least 5-10m away from any structure, depending on the chalk density. Where the chalk present is of low or unknown density, soakaways should be sited at least 10m from any foundations, and where the chalk is of medium density or higher, any foundations should be sited at least 5m from any foundations.

7. CONTAMINATION RISK ASSESSMENT

7.1. Results of the Preliminary Risk Assessment

The tabulated Conceptual Site Model (CSM) developed by the Ground and Water Desk Study (ref. GWPR6235/DS/October 2024) is reproduced in section 2.8. For the complete information please see the Desk Study report.

No additional source of contamination, pathway or receptor was identified between the desk study and the ground investigation and as such, it was not necessary to modify the CSM.

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If there is a linkage between any given source and receptor, then a quantitative risk assessment is used to assess the significance or impact of the pollutant linkage.

7.2. Sampling Locations

The synopsis for the trial hole locations and their final depth can be seen tabulated below. A trial hole location plan is provided within Figure 5. The table also indicates whether any locations targeted a source of contamination as well as the proposed end-use. The proposed development can be seen in Figure 4.

Trial Hole Location Synopsis		
Trial Hole/Final Depth	**Sampling Strategy**	**Proposed End-Use**
WS1/5.00m	Close to infilled pit / Coverage	Ball sports area
WS2/5.00m	Targeted – Infilled Pit	Proposed planting
WS3/5.00m	Random	Soft Landscaping
WS4/5.00m	Random	Proposed planting
SA1	Random	Ball sports area
SA2	Random	Ball sports area
SA3	Random	Proposed planting
SA4	Random	Proposed planting

The investigation area totals approximately 1,600m^2 and with eight sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 300m^2 and a radius of approximately 9.70m would be encountered (CLR 4).

7.3. Soil Risk Assessment

Sampling depths were chosen to reflect the receptor of concern (e.g. human health, controlled waters and vegetation). Samples where olfactory or visual evidence of contamination was present underwent targeted scheduling. The remaining samples were scheduled under a random strategy. The receptors relevant to the sampling depths are tabulated below.

Summary of Receptors per Sample Depth	
Depth	**Receptors**
Shallow Samples (< 0.75m bgl)	• End Users (Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public

	• Vegetation within soft landscaped areas (shallow rooted) • Secondary & Principal Aquifers (Lambeth Group / Chalk) • Buried Concrete • Receiving landfill

Chemical laboratory testing, scheduled by Ground and Water Limited, and carried out by I2 Analytical Limited, was undertaken on four samples of Made Ground. The samples were subjected to a combination of analysis that comprised:

- Asbestos screen;
- Semi-metals and heavy metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc;
- Polycyclic Aromatic Hydrocarbons (PAH's) incl. Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;
- Speciated TPH including full aliphatic/aromatic split;
- BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs);

A breakdown of the number of tests undertaken for each determinand is discussed in further sections. The chemical laboratory results are presented in Appendix C.

7.3.1. Soil Assessment Criteria and Results

At the time of reporting, March 2025, the proposed development was understood to comprise redevelopment of the site into an updated play area. Proposed site plans are provided as Figure 4.

Based on the proposed development, the results of the chemical laboratory testing were compared to the Generic Assessment Criteria (GAC) for a ***'Public Open Space – Park'*** land-use scenario, as this was considered the most appropriate land-use scenario.

Where a contaminant of concern's GAC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each uncontaminated soil type was used to derive the appropriate GAC for each soil type. A SOM value of 1%, the most conservative value, was utilised.

A summary of the analytical results and the comparison to the determinands adopted screening value are presented in the table below and overleaf.

Soil Contamination Test Results and Screening Values					
Determinand	**Number of Samples**	**Minimum Concentration (mg/kg)**	**Maximum Concentration (mg/kg)**	**Adopted Screening Value (mg/kg)**	**Was the adopted screening value exceeded for relevant land-use scenario?**
INORGANICS					
Asbestos	4	ND	ND	ND	No
Cyanide (total)	4	< 1	< 1	24	No
Phenols	4	< 1	< 1	760	No
METALS					

Arsenic	4	3.80	19	170	No
Boron	4	0.50	1.30	46000	No
Cadmium	4	< 0.2	0.80	532	No
Chromium (III)	4	6.80	33	33000	No
Chromium (Hexavalent)	4	< 1.80	< 1.80	220	No
Copper	4	17	43	44000	No
Lead	4	12	110	1300	No
Mercury	4	< 0.30	0.40	30	No
Nickel	4	9.60	39	800	No
Selenium	4	< 1	1.80	1800	No
Vanadium	4	15	63	5000	No
Zinc	4	51	120	170000	No
TOTAL PETROLEUM HYDROCARBONS (TPHs)					
Aliphatic >C5 - C6	3	< 0.01	< 0.01	95000	No
Aliphatic >C6 - C8	3	< 0.01	< 0.01	150,000	No
Aliphatic >C8 - C10	3	< 0.01	< 0.01	14,000	No
Aliphatic >C10 - C12	3	< 1.0	< 1.0	21,000	No
Aliphatic >C12 - C16	3	< 2.0	< 2.0	25,000	No
Aliphatic >C16 - C21	3	< 8.0	< 8.0	450000	No
Aliphatic >C21 - C35	3	< 8.0	< 8.0		
Aliphatic >C35 – C40	3			450000	No
Aromatic >C5 - C7	3	< 0.01	< 0.01	76,000	No
Aromatic >C7 - C8	3	< 0.01	< 0.01	87,000	No
Aromatic >C8 - C10	3	< 0.02	< 0.02	7,200	No
Aromatic >C10 - C12	3	< 1.0	< 1.0	9,200	No
Aromatic >C12 - C16	3	< 2.0	2.50	10000	No
Aromatic >C16 - C21	3	< 10	< 10	7600	No
Aromatic >C21 - C35	3	< 10	25	7800	No
Aromatic >C35 – C40	3			7800	
Benzene	3	< 0.005	< 0.005	90	No
Toluene	3	< 0.005	< 0.005	87000	No
Ethylbenzene	3	< 0.005	< 0.005	17000	No
m,p-Xylene	3	< 0.008	< 0.008	17000	No
o-Xylene	3	< 0.005	< 0.005	17000	No
POLYCYCLIC-AROMATIC HYDROCARBONS					
Acenapthene	4	< 0.05	0.06	29000	No
Acenapthylene	4	< 0.05	0.22	29000	No
Anthracene	4	< 0.05	0.31	150000	No
Benzo(a)anthracene	4	< 0.05	1.20	49	No
Benzo(a)pyrene	4	< 0.05	1.40	11	No
Benzo(b)fluoranthene	4	< 0.05	1.50	13	No
Benzo(ghi)perylene	4	< 0.05	0.90	1400	No
Benzo(k)fluoranthene	4	< 0.05	0.67	370	No
Chrysene	4	< 0.05	1.20	93	No
Dibenzo(a,h)anthracene	4	< 0.05	0.19	1.1	No
Fluoranthene	4	< 0.05	2.30	6300	No
Fluorene	4	< 0.05	0.13	20000	No
Indeno(1,2,3-cd)pyrene	4	< 0.05	0.82	150	No

Naphthalene	4	< 0.05	< 0.05	1200	No
Phenanthrene	4	< 0.05	0.94	6200	No
Pyrene	4	< 0.05	2.0	15000	No
MARKER FOR VOLATILE ORGANIC COMPOUND					
Methyl tert-butyl ether (MTBE)	3	< 0.005	< 0.005	73	No
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix D. The soil concentrations were typically compared to the LQM/CIEH Suitable for Use Levels (S4UL) (2014), based upon the assumption of 1% soil organic matter. A screening value for Lead is based on the Category 4 Screening Levels (C4SLs). Where no S4UL or C4SL is available for Cyanide, a SoBRA acute GAC is assigned. Where no S4UL or C4SL is available for MTBE, a CL:AIRE 2010 GAC is assigned. Where exceedances are noted, the trial hole and depth of sample is recorded.					

The proposed development includes areas of soft-landscaping, where shallow rooted vegetation may be exposed to aggressive ground conditions. The previous table compares the results of the laboratory analysis to GAC that is protective of Human Health and therefore different GAC is required for vegetation.

Soil Contamination Test Results and Screening Value					
Determinand	**Number of Samples**	**Minimum Concentration (mg/kg)**	**Maximum Concentration (mg/kg)**	**Adopted Screening Value (mg/kg)**	**Was the adopted screening value exceeded for relevant land-use scenario?**
Copper	4	17	43	100	No
Nickel	4	9.60	39	60	No
Zinc	4	51	120	200	No
The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix D. The soil concentrations were compared to BS3882:2015 *Specification for Topsoil* and based on differing pH. For the purpose of conservatism, the pH of the soils have been assumed to be below 6 within this table. Where exceedances are noted, the trial hole and depth of sample is recorded.					

7.3.2. Soil Assessment

The comparison between the laboratory analysis and the assessment criteria indicates that each of the determinands were identified at below the adopted screening value and are not considered to represent an unacceptable risk to future receptors.

Asbestos

No asbestos has been identified during the testing, however, an **Asbestos Management Strategy** should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

7.3.3. Water Supply Pipe Risk Assessment

As part of the proposed development it is expected that new water supply pipes will be installed at the site. Water supply pipes have the potential to be exposed to contaminants in the ground that can lead to unacceptable concentrations within the drinking water. If a risk is identified, specialist pipes that are protective of the drinking water are required.

A pipe selection risk assessment should be submitted to the water supply company as part of the development based on the supplier's assessment criteria. An indication of whether there is likely to

be a risk can be seen tabulated below, where the PE pipe thresholds are based on *UKWIR Contaminated Land Assessment Guidance, 2014*.

Pipe Selection Risk Assessment			
Determinand	**PE Pipe Threshold (mg/kg)**	**Laboratory Analysis Range (mg/kg)**	**Was the Threshold Exceeded?**
Total BTEX and MTBE	0.1	LOD	No
Total VOCs	0.5	N/A	No
Total SVOCs	2	N/A	No
Phenols	2	LOD	No
TPH EC5 – EC10 (aliphatics and aromatics)	2	LOD	No
TPH EC10 – EC16 (aliphatics and aromatics)	10	2.50	No
TPH EC16 – EC40 (aliphatics and aromatics)	500	38	No
Naphthalene	5	LOD	No

The results indicate that no determinands were above the threshold for the use of a PE pipe at the site.

7.4. Groundwater Risk Assessment

In the UK, the water environment is protected under a number of regulatory regimes, mainly governed by the Environment Agency. The Environment Agency is consulted when there may be a risk to Controlled Waters, or where a pollution incident has occurred historically. The Water Framework Directive is implemented in various guises covering groundwater, surface water and drinking water supply.

No surface water features were present within a 250m radius of the site. The nearest surface water feature was identified to be the River Thames ~940m north of the site flowing in an easterly direction.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Chalk Formation. Some amounts of groundwater however may be present at shallower depths within the Lambeth Group or within Made ground. It was considered that groundwater was flowing in a northern direction toward the River Thames and in line with local topography.

During the site investigation, Made Ground was encountered to 1.00 – 2.10m bgl. No groundwater was recorded.

Given the use of the site, the mainly cohesive Lambeth Group above the chalk and the low levels of contaminants found, it is not expected that the soils on-site represent an unacceptable risk to controlled water receptors. No further action is considered necessary.

7.5. Ground Gas & Vapours Risk Assessment

The CSM has identified a negligible risk from ground gases / vapours at the site as a result of the proposed development not anticipated to include buildings or confined spaces. If this changes, then more assessment will be required.

7.6. Updated Conceptual Site Model

Following completion of the Phase 2 Site Investigation, the CSM, inclusive of associated risk, within Section 2.8 of this report was re-evaluated.

For ease of reference and understanding, the risks have been re-assigned within this risk assessment against three possible levels / categories, summarised in the table below.

Risk Categories used in the Tabulated CSM	
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors.
Moderate Risk	Regarding this potential SPR linkage, the site is suitable for the proposed end-use however remediation and/or further investigation is required.
High Risk	Regarding this potential SPR linkage, the site is not suitable for proposed end-use and there is an unacceptable risk to receptors. Urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary (On-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from construction/ demolition activities and infill of pit: • Asbestos, • PAHs, • TPHs, • VOCs,-negligible • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Ingestion of home-grown produce, and soils attached • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Site workers/Future site visitors) • Construction workers during development • Site operatives during maintenance works • Neighbours and public	**Low**
	• Direct uptake of groundwater • Direct uptake of determinands in the soil	**Flora and Fauna** • Vegetation within soft landscaped areas	**Low**
	• Anthropogenic (man-made) pathways • Vertical and lateral migration in permeable strata • Surface water runoff	**Controlled Waters** • Principal Aquifer (Lewes Nodular, Seaford and Newhaven Chalk Formation (undifferentiated)) • Secondary A Aquifer (Lambeth Group).	**Low**
Aggressive ground conditions with Made Ground and natural ground, including groundwater: • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**

Tabulated Conceptual Site Model – Pollutant Linkage Summary (Off-Site Sources)			
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification
Made Ground from nearby works/development: • Asbestos, • PAHs, • TPHs, • VOCs,-negligible • Sulphates, and • Metals.	• Direct ingestion of soil and soil derived dust • Dermal contact of soil and soil derived dust • Inhalation of dust (indoors and outdoors) with elevated concentration of determinands • Direct ingestion of groundwater • Inhalation of volatile vapour (indoors and outdoors)	**Human Health** • End Users (Residents/Future site visitors) • Construction workers during development • Site operatives during maintenance works	**Low**
	• Direct uptake of groundwater	**Flora and Fauna** • Vegetation within soft landscaped areas	**Low**
Aggressive ground conditions associated with impacted groundwater; • Sulphates, • PAH/TPH.	• Direct contact with aggressive ground conditions	**Building Materials and Services** • Buried Concrete • Underground services (water pipes)	**Low**

8. CONTAMINATION RECOMMENDATIONS AND REMEDIATION STRATEGY

Based on the results of the intrusive works, chemical analyses and risk assessments undertaken, the following has been identified:

- No contaminants were found elevated from laboratory testing.
- The gas risk assessment should be revised if buildings / confined spaces are proposed. The risk in general however is low.

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

8.1. Soils

A nominal capping of topsoil of at least 100mm is recommended for any soft-landscaped areas of the site.

Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.

8.1.1. Clean Capping of Soil

It is recommended that at least the top 100mm of the clean capping should comprise suitable topsoil for use as a growing medium.

All subsoil and topsoil must be fit for purpose to ensure that the receptors cannot come into contact with determinands that could be detrimental to their health, see 'Imported Material' Section 8.5.

8.1.2. Water Supply Pipes

The Water Supply pipe risk assessment indicated that the use of PE pipes is appropriate at the site and no further measures are required.

8.2. Groundwater

Based on the risk assessment, there is no risk to controlled water receptors.

8.3. Ground Gas and Vapours

The gas risk assessment should be revised if buildings / confined spaces are proposed. The risk in general however is low.

8.4. Discovery Strategy

There may be areas of contamination that have not been identified during the course of the intrusive investigation (e.g. underground storage tanks). Such occurrences may be discovered during the construction phases for the redevelopment of the site.

Groundworkers should be instructed to report to the Site Manager any evidence for such contamination; this may comprise visual indicators, such as fibrous materials within the soil, discolouration, or odours and emission. Upon discovery advice must be taken from a suitably qualified person and then the Local Authority will need to be informed.

8.5. Imported Material

Any soil which is to be imported onto the site must undergo chemical analysis to prove that it is suitable for the purpose for which it is intended.

The soil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, prior to placing (ideally) and after placing, to ensure that the future receptors (human health and vegetation) cannot come into contact with compounds that could be detrimental to their health. The compounds that are to be tested for are those given in the Generic Assessment Criteria, which can be viewed in Appendix E of this report.

8.6. Waste Disposal

The excavation of foundations and other soils is likely to produce waste which will require classification and then recycling or removal from site.

Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal, all waste must be classified as either: Inert; Non-hazardous; or Hazardous.

The Environment Agency's Hazardous Waste Technical Guidance (WM3) document outlines the methodology for classifying wastes. Once classified the waste can be removed to the appropriately licensed facilities, with some waste requiring pre-treatments prior to disposal.

Following the investigation, 3No. samples were submitted to the analytical laboratory to undergo a suite of testing for contamination testing, as discussed in the previous sections. Sampling depths were chosen to reflect the receptor of concern, human health, and typically comprised a surface or near surface sample and periodically to 1.00m bgl. Any horizon where olfactory or visual evidence of contamination was present was also sampled.

Based on a risk phase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, all soil samples of Made Ground encountered on-site were NON-HAZARDOUS. The results of the assessment are given within Appendix H.

It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM3, therefore producing an initial classification in accordance with the guidance, this method classifies soils as either non-hazardous or hazardous and landfill operators have their own assessment tools and can often come to different conclusions. As a result, some landfill operators could refuse to take apparently suitable waste. It is recommended that the receiving landfill views the results of this assessment and the chemical laboratory results to determine their own classification.

In addition to the samples described above, 1No. sample of Made Ground was scheduled to undergo Waste Acceptance Criteria (WAC) testing with single batch leachate from samples with a range of depths. The results indicate that the sample was classified as non-inert as a result of high concentrations of Total Organic Carbon (TOC).

Where contaminated soils are to be removed, they should be placed on an impermeable membrane (visqueen or similar) to ensure that no cross-contamination of soils occurs.

8.7. Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust would be generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

FIGURES

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

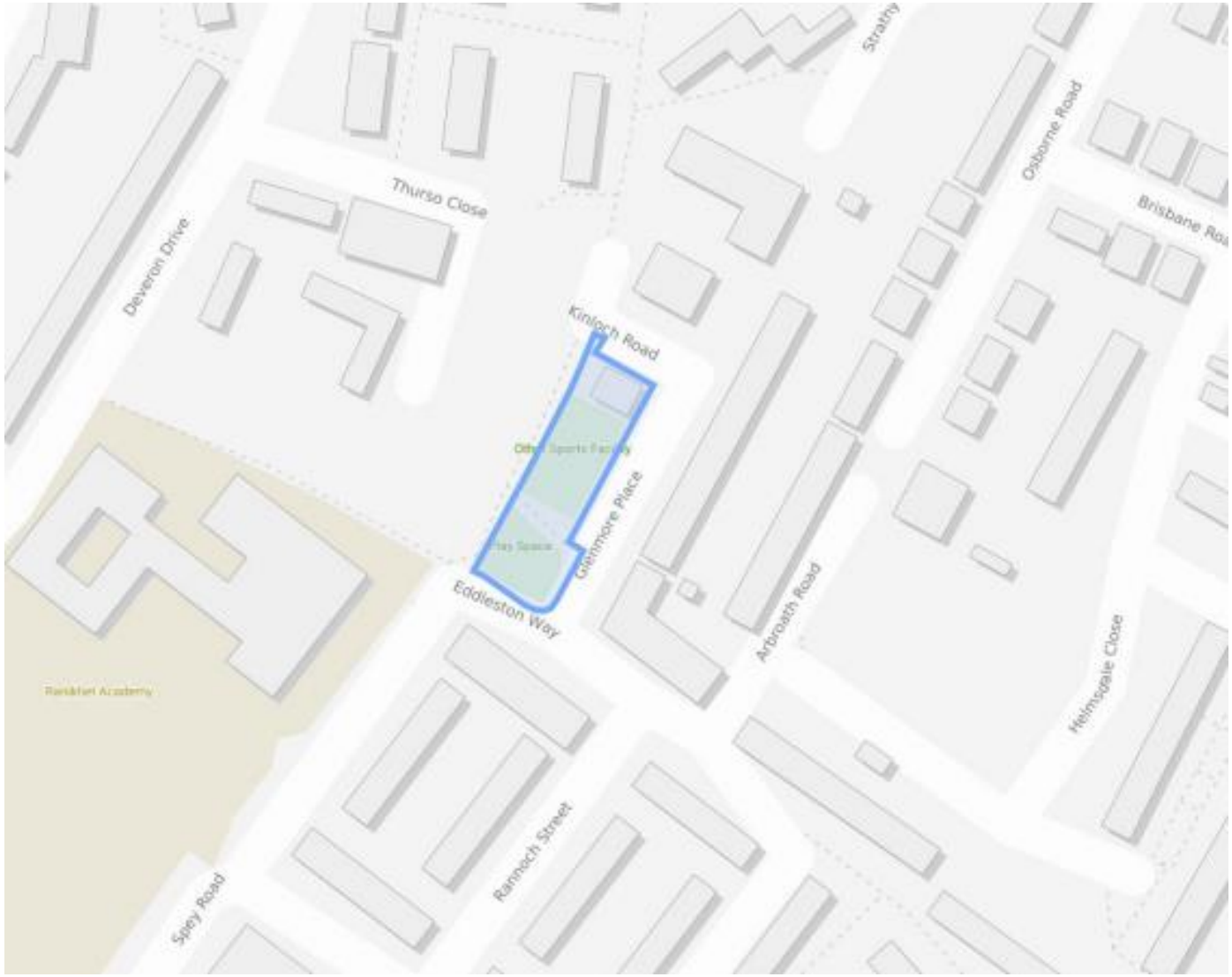


Site boundary

Not to Scale

Dee Park Sports, Reading, RG30 4EP	
Reading Borough Council c/o Gleeds	**March 2025**
Figure 1: Site Location Plan	**GWPR6479**

ground&water



Site boundary

Not to Scale

Dee Park Sports, Reading, RG30 4EP	
Reading Borough Council c/o Gleeds	**March 2025**
Figure 2: Site Development Area	**GWPR6479**

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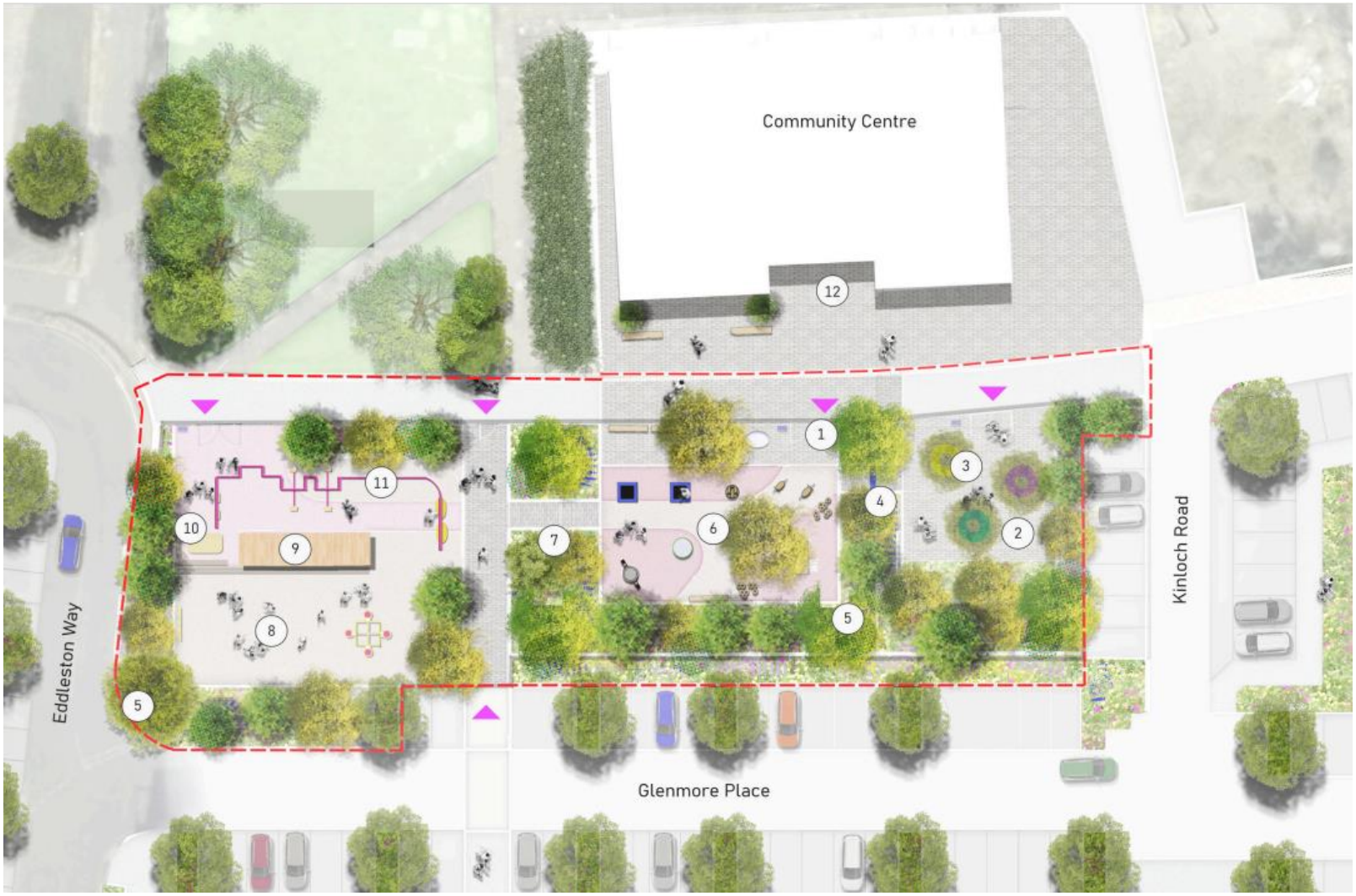


Site boundary

Not to Scale

Dee Park Sports, Reading, RG30 4EP	
Reading Borough Council c/o Gleeds	**March 2025**
Figure 3: Aerial View of the Site	**GWPR6479**

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Site boundary

Key

1. Paved space to link to community centre
2. Flexible space for events
3. Circular tree seats
4. Arch from Lyons square
5. Proposed tree planting
6. Proposed play area for under 5's with in-ground trampolines, basket swing, roundabout and play frame
7. Proposed planting between play areas with link path
8. Proposed ball sports area with target wall and 4-way basketball hoops
9. Proposed stage with shelter
10. Proposed seating area
11. Proposed multi-element play structure with swings, see-saws, balance beam, up-and-over bars and monkey bars
12. Community Centre entrance

Entrance to park

Not to Scale

Dee Park Sports, Reading, RG30 4EP	
Reading Borough Council c/o Gleeds	**March 2025**
Figure 4: Proposed Development	**GWPR6479**

ground&water



Site boundary

Machine Excavated Trial Pit (BRE365)

Windowless Sampler Borehole

CBR by DCP

Not to Scale

Dee Park Sports, Reading, RG30 4EP	
Reading Borough Council c/o Gleeds	**March 2025**
Figure 5: Trial Hole Location Plan	**GWPR6479**

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APPENDIX A: Conditions and Limitations

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist.

The conclusions and recommendations relate to Dee Park Sports, Reading, RG30 4EP.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B: Technical Glossary

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
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Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with 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.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

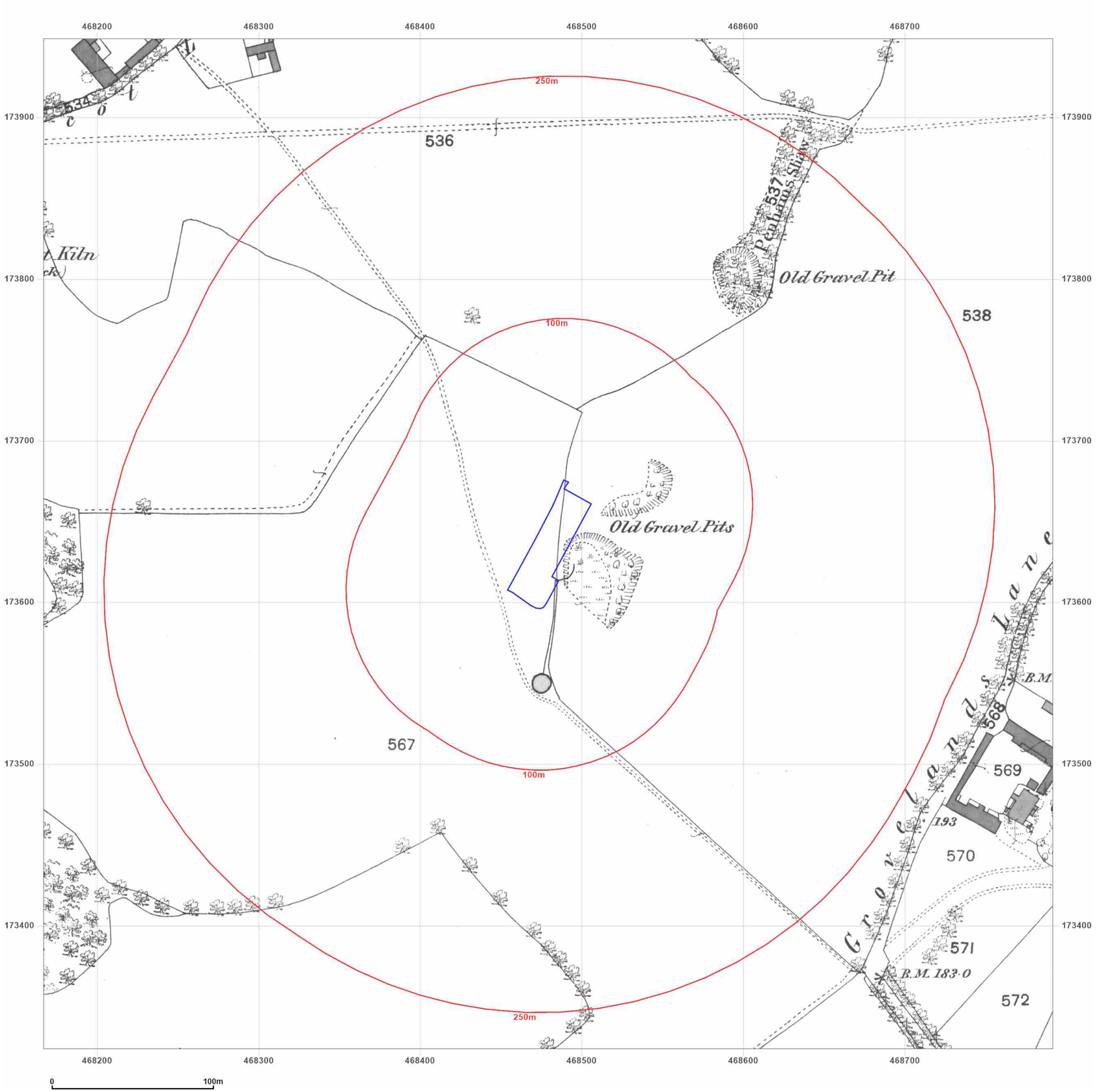
Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

APPENDIX C:
Groundsure
Historical Mapping

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001



Groundsure INSIGHTS

Site Details:

Dee Park, Glenmore Place,
Reading, RG30 4EP

Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: County Series

Map date: **1881**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

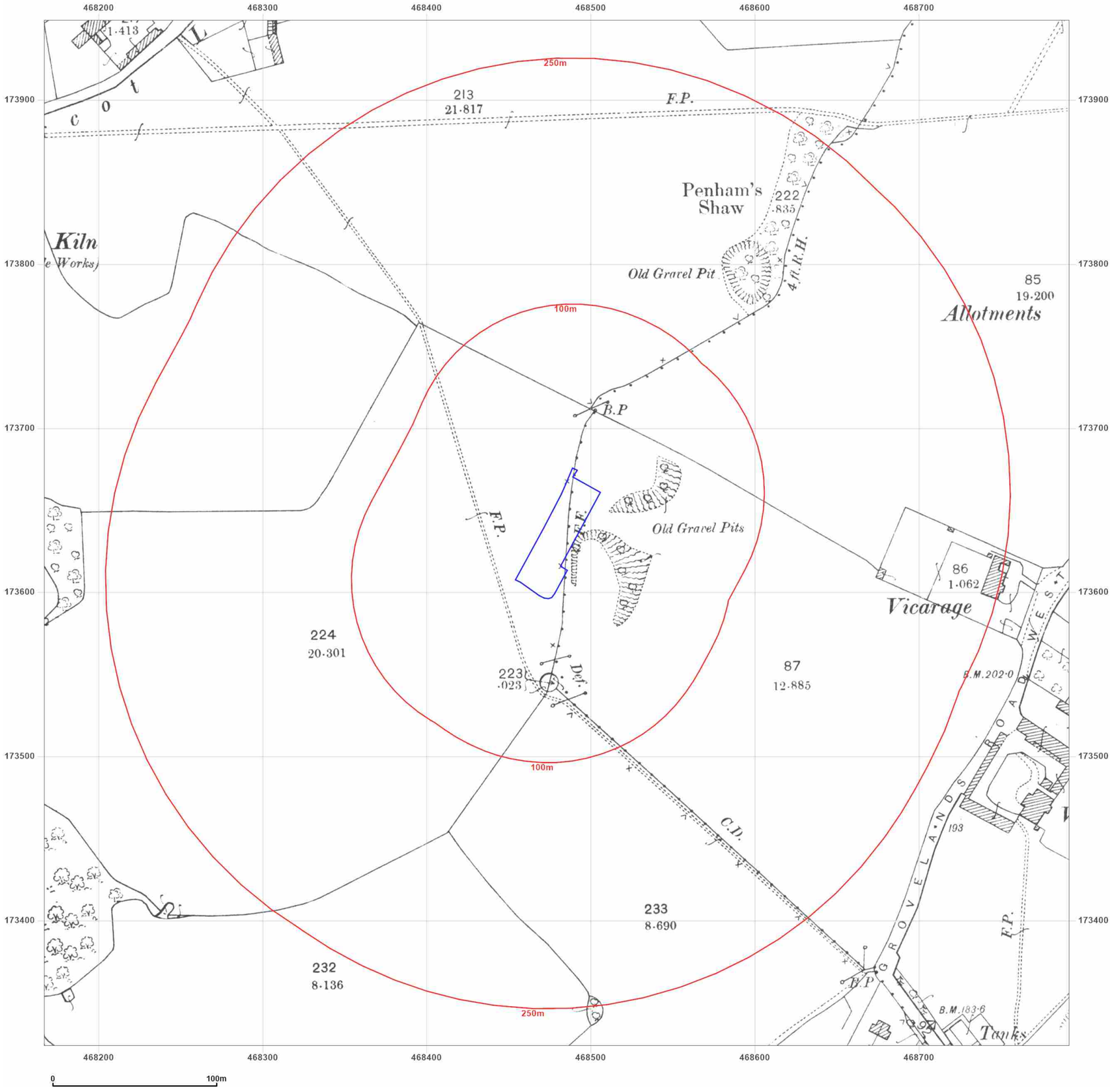
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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: County Series

Map date: **1899**

Scale: 1:2,500

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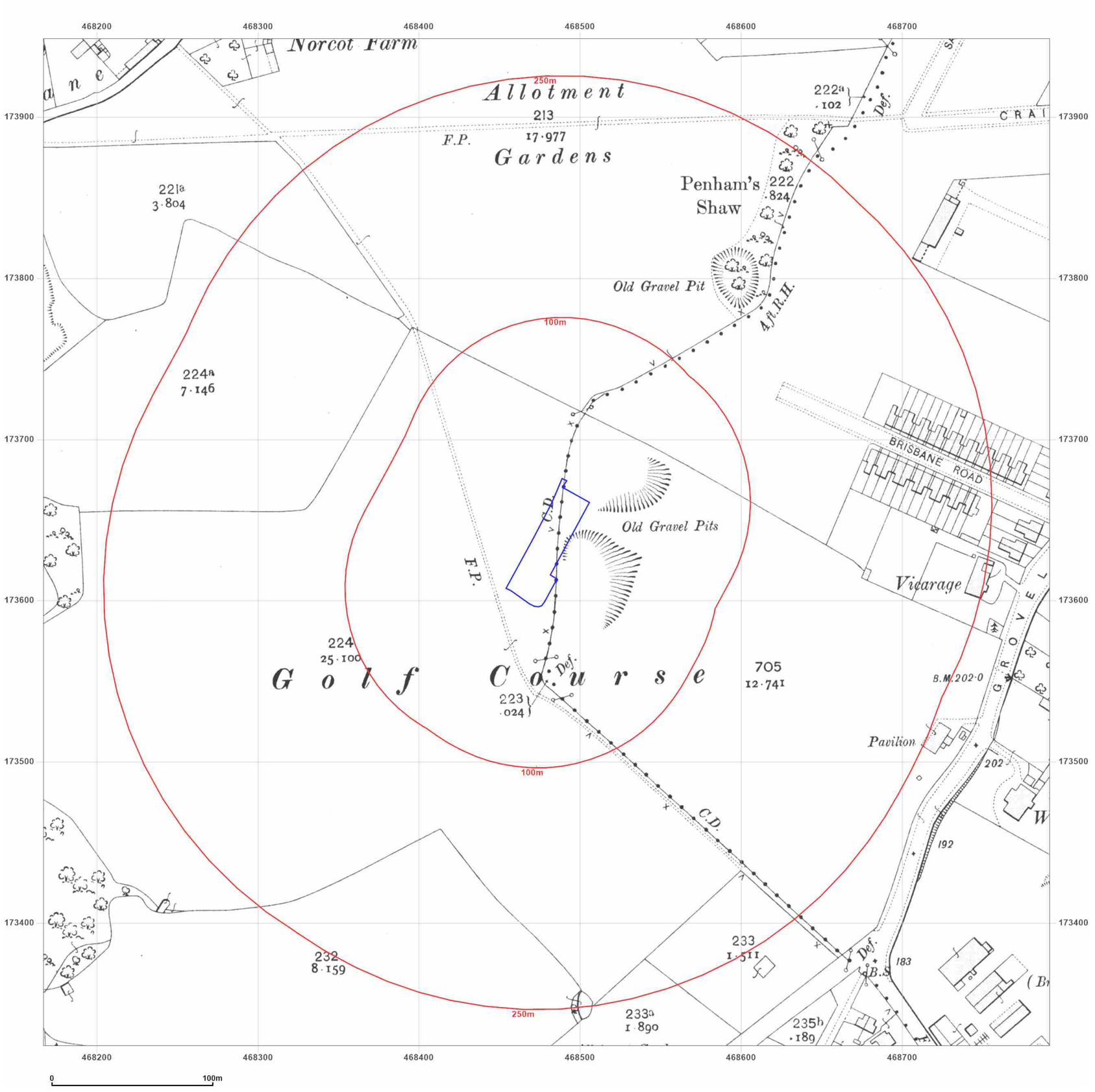
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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: County Series

Map date: **1911**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1911
Edition N/A
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Levelled N/A

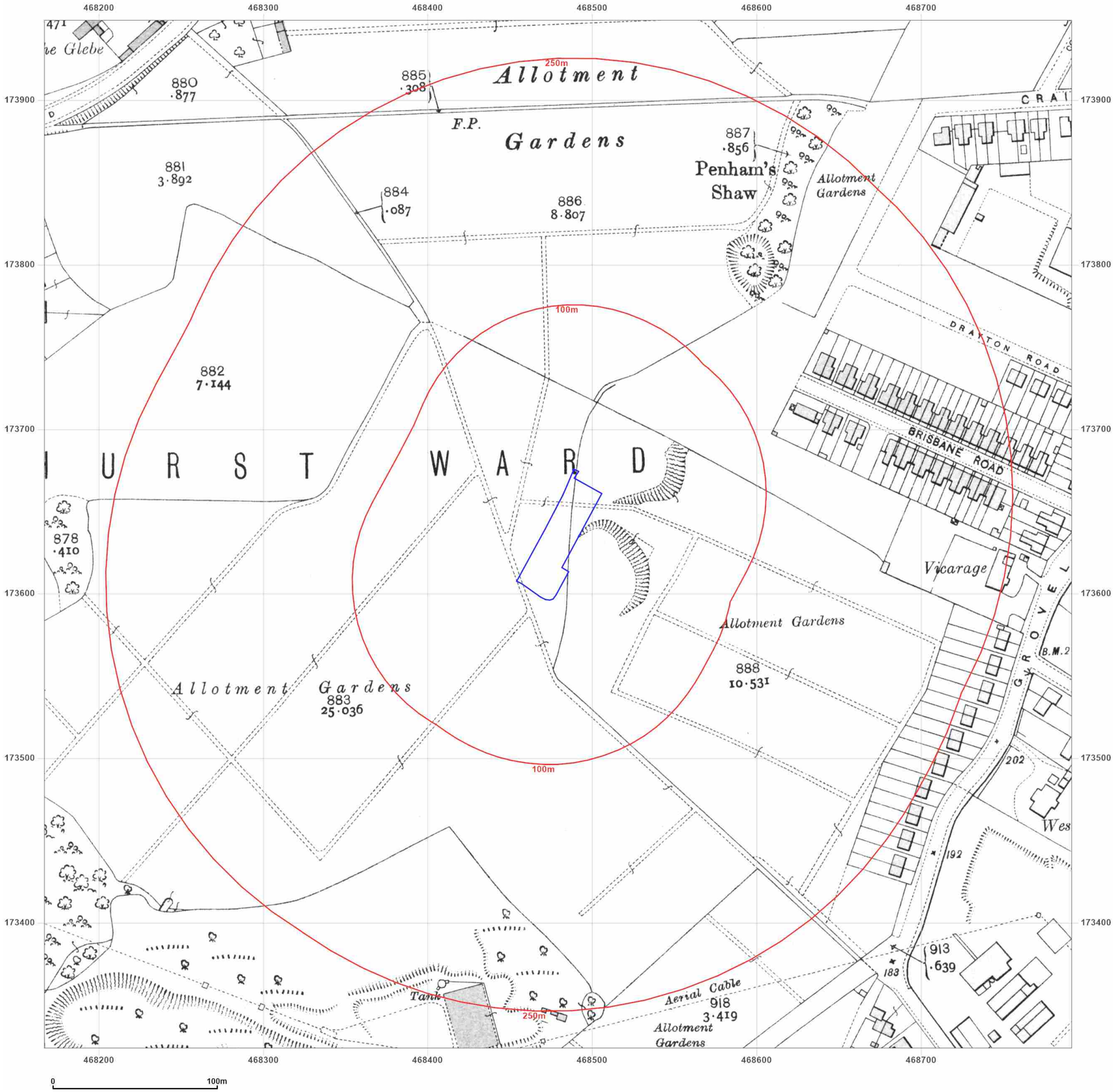
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Grid Ref: 468479, 173636

Map Name: County Series

Map date: **1932**

Scale: 1:2,500

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Edition N/A
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Client Ref: GWPR6235
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Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1961**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1951

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Revised 1961
Edition N/A
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Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1962**

Scale: 1:2,500

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Edition 1962
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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1967-1971**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960 Revised 1967 Edition N/A Copyright 1967 Levelled 1951	Surveyed 1960 Revised 1970 Edition N/A Copyright 1970 Levelled 1951
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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1971**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960		Surveyed N/A
Revised 1970		Revised N/A
Edition N/A		Edition N/A
Copyright 1971		Copyright 1971
Levelled 1951		Levelled N/A

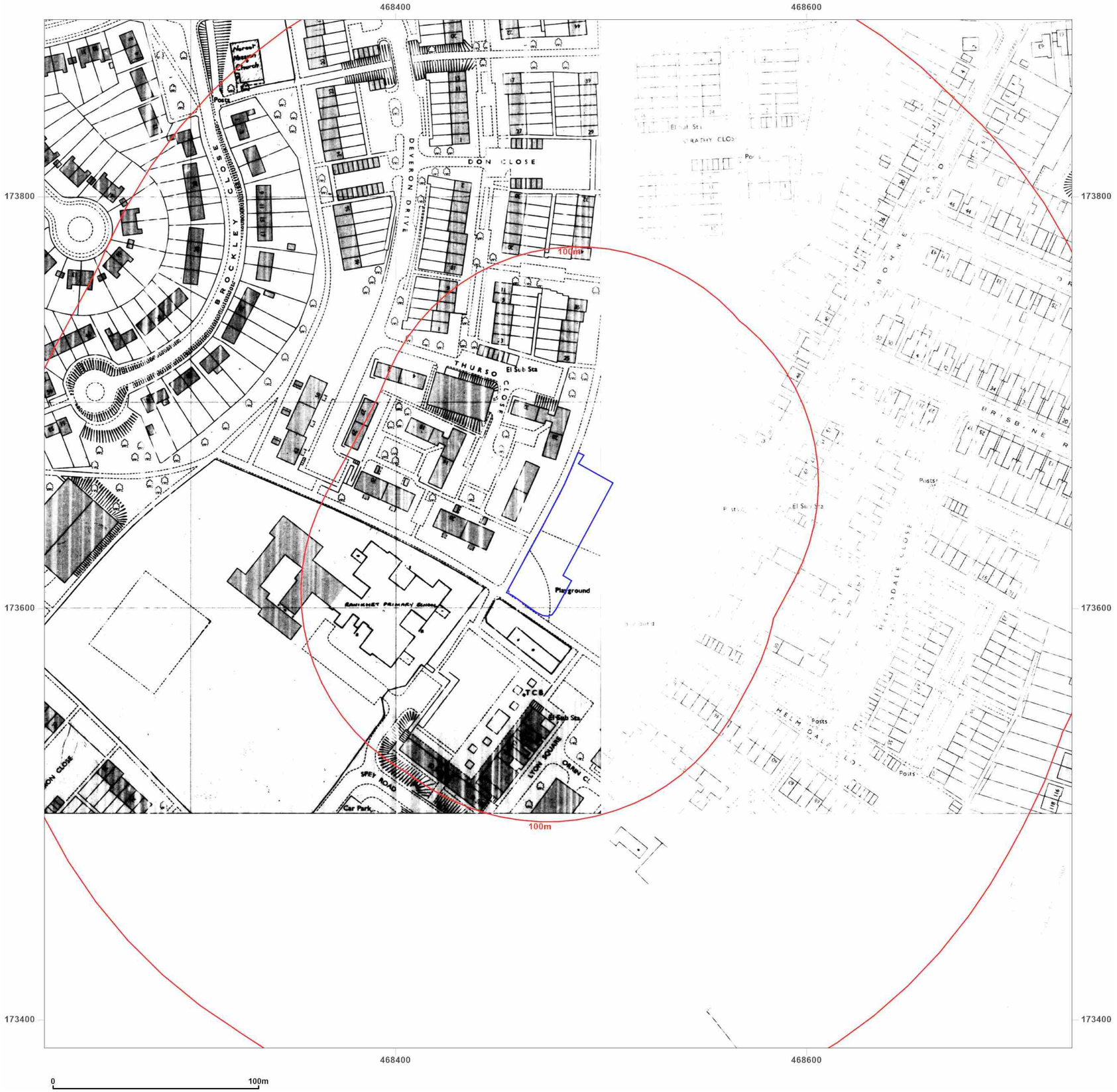
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Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1974-1977**

Scale: 1:1,250

Printed at: 1:2,000

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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

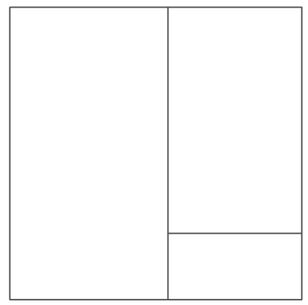
Map Name: National Grid

Map date: **1978-1981**

Scale: 1:1,250

Printed at: 1:2,000

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Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1987-1990**

Scale: 1:1,250

Printed at: 1:2,000

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Revised 1987		Revised 1990
Edition N/A		Edition N/A
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Levelled 1972		Levelled 1972

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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

Map Name: National Grid

Map date: **1991-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

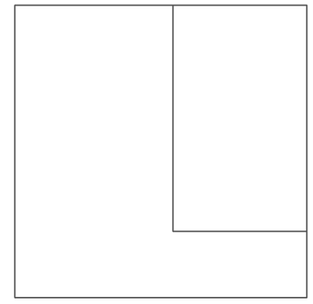
Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

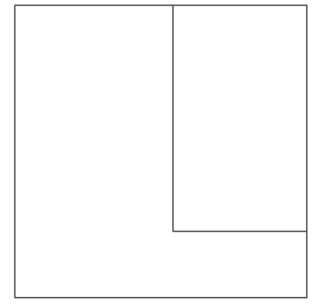
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

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Groundsure INSIGHTS

Site Details:

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Reading, RG30 4EP

Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

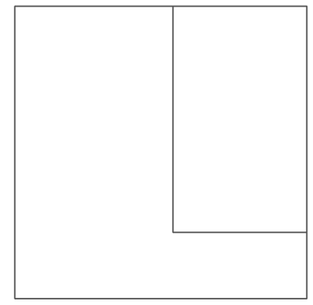
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

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Client Ref: GWPR6235
Report Ref: GS-YK9-WWZ-FM6-QEQ
Grid Ref: 468479, 173636

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

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2003

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APPENDIX D:
Trial Hole Logs

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Percussion Drilling Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS1	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20						MADE GROUND: Brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint (60%) brick (30%) and concrete (10%).
		0.50						
		0.80						
		1.00			1.00			
		1.00	SPT	N=12 (2,3/2,3,3,4)				Dark brown soft to firm gravelly CLAY. Gravel is fine to medium, angular to sub angular, of flint. (LAMBETH GROUP).
		1.50						
		2.00			2.00			
		2.00	SPT	N=5 (2,1/1,1,2,1)				Orange brown slightly gravelly CLAY. Gravel is fine to medium, angular, of flint. (LAMBETH GROUP).
		2.50						
		3.00						
		3.00	SPT	N=14 (2,2/4,4,4,2)				
		3.50						
		4.00			4.00			
		4.00	SPT	N=7 (1,1/1,1,1,4)				Structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white and rounded. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). Grade (Dm)
		4.50						
		5.00			5.00			
		5.00	SPT	N=5 (1,1/1,1,1,2)				End of Borehole at 5.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.80m bgl. No groundwater encountered.

Percussion Drilling Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS2	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20			0.30			MADE GROUND: Dark brown very sandy SILT with occasional fine brick fragments.
		0.50						MADE GROUND: Light brown slightly clayey, gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse, angular to sub angular of flint (60%), brick (20%) and concrete (20%).
		0.80			0.90			MADE GROUND: Brown slightly gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint (50%) and brick (50%).
		1.00						
		1.00	SPT	N=11 (2,3/3,2,3,3)	1.30			MADE GROUND: Dark brown greenish sandy, slightly gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint and occasional brick.
		1.50						
		2.00			2.10			
		2.00	SPT	N=6 (3,1/1,1,2,2)				Pale brown gravelly CLAY. Gravel is fine to medium, angular to sub angular, of chalk. (LAMBETH GROUP).
		2.50						
		3.00						
		3.00	SPT	N=14 (2,3/3,3,4,4)				
		3.50						
		4.00			4.00			
		4.00	SPT	N=12 (3,2/2,3,3,4)				Structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white and rounded. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). (Grade Dm)
		4.50						
		5.00			5.00			End of Borehole at 5.000m
		5.00	SPT	N=8 (3,2/2,2,2,2)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots to 0.3m.
No groundwater encountered.

Percussion Drilling Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS3	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20						TOPSOIL: Orange brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint and chalk.
		0.50			0.50			Structureless CHALK composed of cream slightly gravelly SILT. Gravel is grey, fine to coarse and of angular to sub angular flint. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). (Grade Dm)
		0.80						
		1.00			1.00			
		1.00	SPT	N=9 (4,3/2,3,2,2)				
		1.50						Structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white and rounded. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). (Grade Dm)
		2.00						
		2.00	SPT	N=9 (3,4/2,2,3,2)				
		2.50						
		3.00						
		3.00	SPT	N=8 (2,2/1,2,2,3)				
		3.50						
		4.00						
		4.00	SPT	N=9 (2,3/3,2,2,2)				
		4.50						
		5.00			5.00			End of Borehole at 5.000m
		5.00	SPT	N=10 (5,4/2,3,2,3)				

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.50m bgl. No groundwater encountered.

Percussion Drilling Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS4	WS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20						MADE GROUND: Dark brown sandy, gravelly CLAY. Gravel is fine to coarse, angular to sub angular, of brick (40%), flint (40%) and concrete (20%).
		0.50						
		0.80						
		1.00						
		1.00	SPT	N=9 (2,2/2,3,2,2)	1.20			
		1.50						Dark brown sandy, gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint. (LAMBETH GROUP).
		2.00			2.00			
		2.00	SPT	N=11 (3,3/3,2,3,3)				Structureless CHALK composed of cream slightly gravelly SILT. Gravel is very weak, low density white and rounded. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). (Grade Dm)
		2.50						
		3.00						
		3.00	SPT	N=13 (3,3/3,3,4,3)				
		3.50						
		4.00						
		4.00	SPT	N=8 (2,1/1,2,3,2)				
		4.50						
		5.00			5.00			
		5.00	SPT	N=7 (7,4/2,1,1,3)				End of Borehole at 5.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No roots noted.
No groundwater encountered.

Trial Pit Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
SA1	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint (60%) brick (30%) and concrete (10%).
					0.40			Dark brown soft to firm gravelly CLAY. Gravel is fine to medium, angular to sub angular, of flint. (LAMBETH GROUP).
					1.50			End of Borehole at 1.500m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No groundwater encountered.

Trial Pit Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
SA2	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint (60%) brick (30%) and concrete (10%).
					0.40			Dark brown soft to firm gravelly CLAY. Gravel is fine to medium, angular to sub angular, of flint. (LAMBETH GROUP).
					1.50			End of Borehole at 1.500m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No groundwater encountered.

Trial Pit Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
SA3	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint (60%) brick (30%) and concrete (10%).
					0.70			Dark brown sandy, gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint. (LAMBETH GROUP).
					1.50			End of Borehole at 1.500m

1
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5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No groundwater encountered.

Trial Pit Log

Project Name: Dee Park Sports	Client: Reading Borough Council	Date:
Location: Reading, RG30 4EP	Contractor:	
Project No. : GWPR6479	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
SA4	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								TOPSOIL: Orange brown sandy gravelly CLAY. Gravel is fine to medium, angular to sub angular of flint and chalk.
					0.50			Structureless CHALK composed of cream slightly gravelly SILT. Gravel is grey, fine to coarse and of angular to sub angular flint. (UNDIFFERENTIATED SEAFORD AND NEWHAVEN CHALK FORMATIONS). (Grade Dm)
					1.50			End of Borehole at 1.500m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No groundwater encountered.

APPENDIX E: Geotechnical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

Contract Number: 77609

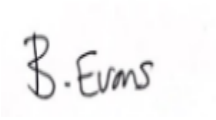
Client Ref: **GWPR6479**
Client PO: **GWPR6479**

Client: **Ground and Water Limited**

Contract Title: **GWPR6479**
For the attention of: **Libby Bennett**

Date Received: **14-03-2025**
Date Completed:
Report Date:

This report has been checked and approved by:



Brendan Evans
Senior Office Administrator

Description	Qty
Determination of water content BS EN ISO 17892-1:2014	2
1 point Liquid & Plastic Limit.. BS EN ISO 17892-12 - * UKAS	2
Saturated Moisture Content of chalk (SMC) BS 1377:1990 - Part 2 : 3.3 - * UKAS	2

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
- denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:
Brendan Evans (Senior Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd
Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX** **BS EN ISO 17892-12:2018+A2:2022 1 Point Liquid Limit** **BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content**	
Contract Number	77609	
Project Name	GWPR6479	
Date Tested	18/03/2025	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS1		D	1.50	-		Brown fine to medium gravelly silty sandy CLAY
WS4		D	2.00	-		Brown fine to medium gravelly silty CLAY
				-		
				-		
				-		
				-		
				-		
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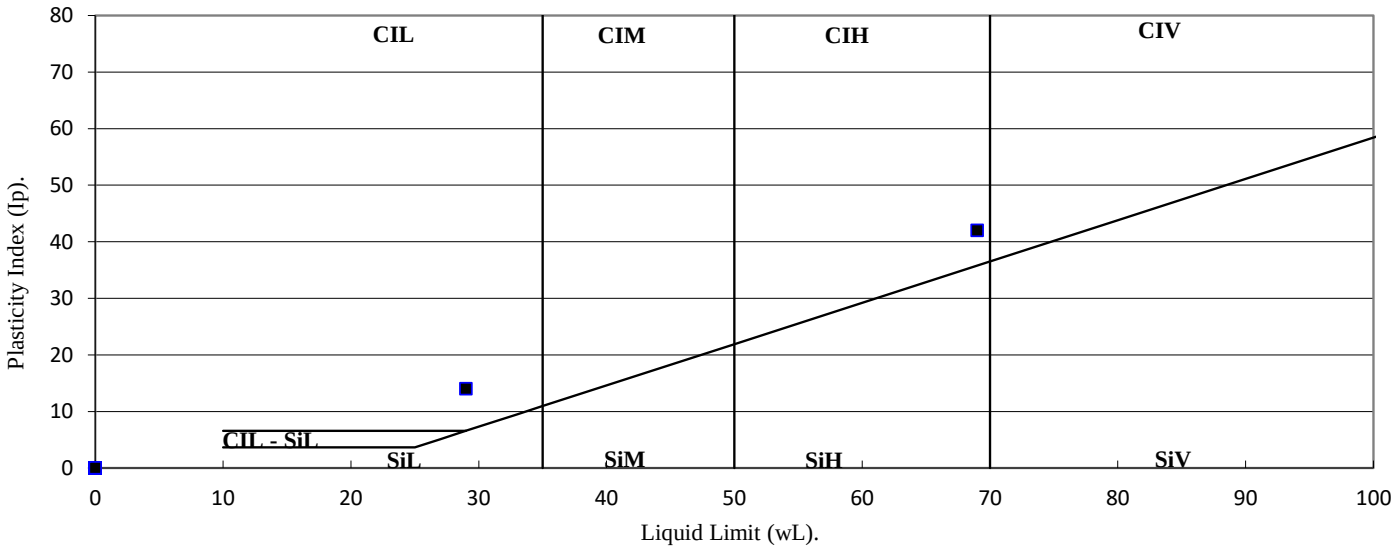
Operator
Owain Davies

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX** **BS EN ISO 17892-12:2018+A2:2022 1 Point Liquid Limit** **BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content**	
Contract Number	77609	
Project Name	GWPR6479	
Date Tested	18/03/2025	
Test Comments	80g/30° Fall cone used	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Water Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Factor Applied	Remarks
WS1		D	1.50	-		16.7	29	15	14	92	1.000	CL Low Plasticity
WS4		D	2.00	-		30.4	69	27	42	87	1.018	CH High Plasticity
				-								
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SYMBOLS : NP = Non Plastic **NB: All liquid limits are 4 point and wet sieved**

PLASTICITY CHART
BS EN ISO 14688-2:2018 Clause 4.4



***For sample descriptions please see sample descriptions sheet**

Operator
Owain Davies

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

Saturation Moisture Content of Chalk

BS 1377 : Part 2 : 1990 Section 3.3

Contract Number	77609
Project Name	GWPR6479
Date Tested	17/03/2025

Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content	Bulk Density	Dry Density	Saturated Moisture Content	Remarks
WS2		B	5.00	-		32	1.86	1.41	34	
WS3		B	3.00	-		26	1.88	1.49	30	NON-TANDARD
				-						
				-						
				-						
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Key	Reported As	Clause
Moisture Content	%	3.2
Bulk Density	Mg/m^3	7.2
Dry Density	Mg/m^3	7.2
SMC	%	3.3.6

If there is a NON-STANDARD in the remarks next to the reported SMC result this means there was no lump of chalk of sufficient volume (300mL-500mL) present in the samples received to meet the testing requirements of the stated standard.

Operator
Julian Jones

APPENDIX F: Chemical Laboratory Testing

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

Ground and Water Ltd
2 The Long Barn
Norton Farm
Selbourne Road
Alton
Hampshire
GU34 3NB

e: libby.bennett@groundandwater.co.uk

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 : 25-012155

Project / Site name:	Dee Park	**Samples received on:**	11/03/2025
Your job number:	GWPR6479	**Samples instructed on/ Analysis started on:**	12/03/2025
Your order number:	GWPR6479	**Analysis completed by:**	18/03/2025
Report Issue Number:	1	**Report issued on:**	19/03/2025
Samples Analysed:	7 soil samples - 1 leachate sample		

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478413	478414	478415	478416	478417
Sample Reference				WS1	WS2	WS3	WS4	WS1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.20	0.20	0.20	0.20	5.00
Date Sampled				05/03/2025	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	18	15	12	22
Total mass of sample received	kg	0.1	NONE	1	1	0.8	0.9	0.7
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	-
Analysis completed	N/A	N/A	N/A	14/03/2025	14/03/2025	14/03/2025	14/03/2025	-
General Inorganics								
pH (L005B)	pH Units	N/A	MCERTS	-	7.1	-	-	-
pH (L099)	pH Units	N/A	MCERTS	8.2	8.4	8.3	8.7	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	0.049
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	45	13	200	150	68
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	34.2
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	22.3	6.4	102	73.8	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	1.2
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	160
Total Sulphur	%	0.005	MCERTS	-	-	-	-	0.016
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	-	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	3.2	6.1	0.7	2.3	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.8	3.6	0.4	1.3	-
Loss on Ignition @ 450°C	%	0.2	MCERTS	-	7.5	-	-	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	-	4.8
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-	3.1
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	-	1.1	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478413	478414	478415	478416	478417
Sample Reference				WS1	WS2	WS3	WS4	WS1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.20	0.20	0.20	0.20	5.00
Date Sampled				05/03/2025	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.22	< 0.05	< 0.05	0.11	-
Acenaphthene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	0.13	< 0.05	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	0.94	< 0.05	< 0.05	0.61	-
Anthracene	mg/kg	0.05	MCERTS	0.31	< 0.05	< 0.05	0.23	-
Fluoranthene	mg/kg	0.05	MCERTS	2.3	< 0.05	< 0.05	2	-
Pyrene	mg/kg	0.05	MCERTS	2	< 0.05	< 0.05	1.8	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2	< 0.05	< 0.05	1	-
Chrysene	mg/kg	0.05	MCERTS	1.2	< 0.05	< 0.05	0.95	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.5	< 0.05	< 0.05	1.4	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.67	< 0.05	< 0.05	0.48	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	1.1	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.82	< 0.05	< 0.05	0.68	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.19	< 0.05	< 0.05	0.14	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.9	< 0.05	< 0.05	0.78	-
Coronene	mg/kg	0.05	NONE	-	< 0.05	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	13.9	< 0.80	< 0.80	11.2	-
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	< 0.85	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	3.8	19	13	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1.3	1.2	0.5	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	< 0.2	< 0.2	0.4	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	6.8	33	21	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	43	19	17	18	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	19	12	51	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	9.6	39	15	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.8	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	39	15	63	34	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	51	60	87	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	< 5.0

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Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478413	478414	478415	478416	478417
Sample Reference				WS1	WS2	WS3	WS4	WS1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.20	0.20	0.20	0.20	5.00
Date Sampled				05/03/2025	05/03/2025	05/03/2025	05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	-	2.5	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10	-	< 10	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	25	< 10	-	11	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	25	< 10	-	13	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	25	< 10	-	13	-
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	25	< 10	-	13	-
Mineral Oil (EC10 - EC40) $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	< 10	-	-	-
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	-
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	-
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	< 5.0	-
Total BTEX	µg/kg	10	MCERTS	-	< 10	-	-	-
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	< 0.007	-	-	-

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Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478418	478419
Sample Reference				WS3	WS4
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				2.50	1.00
Date Sampled				05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	14
Total mass of sample received	kg	0.1	NONE	1.3	1.2

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-
Analysis completed	N/A	N/A	N/A	-	-

General Inorganics

pH (L005B)	pH Units	N/A	MCERTS	-	-
pH (L099)	pH Units	N/A	MCERTS	8.6	8.1
Total Cyanide	mg/kg	1	MCERTS	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	0.032
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	16	56
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	8.17	28
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	1.7
Total Sulphur	mg/kg	50	MCERTS	-	180
Total Sulphur	%	0.005	MCERTS	-	0.018
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-
Loss on Ignition @ 450°C	%	0.2	MCERTS	-	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	< 2.0
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-

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Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478418	478419
Sample Reference				WS3	WS4
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				2.50	1.00
Date Sampled				05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
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	-	-
Coronene	mg/kg	0.05	NONE	-	-
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-
Total WAC-17 PAHs	mg/kg	0.85	NONE	-	-
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	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 (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 (leachate equivalent)	mg/l	2.5	NONE	-	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	-	< 5.0

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Analytical Report Number: 25-012155
Project / Site name: Dee Park
Your Order No: GWPR6479

Lab Sample Number				478418	478419
Sample Reference				WS3	WS4
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				2.50	1.00
Date Sampled				05/03/2025	05/03/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Petroleum Hydrocarbons					
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-	-
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-	-
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-	-
TPHCWG - Aliphatic >EC35 - EC40 EH_CU_1D_AL	mg/kg	10	NONE	-	-
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	-
TPHCWG - Aliphatic >EC5 - EC40 EH_CU+HS_1D_AL	mg/kg	10	NONE	-	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	-	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	-	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-	-
TPHCWG - Aromatic >EC35 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	-	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	-
TPHCWG - Aromatic >EC5 - EC40 EH_CU+HS_1D_AR	mg/kg	10	NONE	-	-
TPH Total >EC5 - EC40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	-	-
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	-	-
VOCs					
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	-	-
Benzene	µg/kg	5	MCERTS	-	-
Toluene	µg/kg	5	MCERTS	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-
p & m-Xylene	µg/kg	8	MCERTS	-	-
o-Xylene	µg/kg	5	MCERTS	-	-
Total BTEX	µg/kg	10	MCERTS	-	-
PCBs by GC-MS					
PCB Congener 28	mg/kg	0.001	MCERTS	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-
Total PCBs	mg/kg	0.007	MCERTS	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-012155
Project / Site name: Dee Park

Your Order No: GWPR6479

Lab Sample Number	478414
Sample Reference	WS2
Sample Number	None Supplied
Water Matrix	N/A
Depth (m)	0.20
Date Sampled	05/03/2025
Time Taken	None Supplied

Analytical Parameter (Leachate Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
10:1 WAC Leachate				
Arsenic	mg/l	0.001	ISO 17025	0.0035
Barium	mg/l	0.00005	ISO 17025	0.00466
Cadmium	mg/l	0.0001	ISO 17025	< 0.000100
Chromium	mg/l	0.0004	ISO 17025	< 0.00040
Copper	mg/l	0.0007	ISO 17025	0.0045
Mercury	mg/l	0.0005	ISO 17025	< 0.000500
Molybdenum	mg/l	0.0004	ISO 17025	0.00331
Nickel	mg/l	0.0003	ISO 17025	0.002
Lead	mg/l	0.001	ISO 17025	0.0034
Antimony	mg/l	0.0017	ISO 17025	< 0.0017
Selenium	mg/l	0.004	ISO 17025	< 0.0040
Zinc	mg/l	0.0004	ISO 17025	0.0067
Chloride	mg/l	0.15	ISO 17025	1.2
Fluoride	mg/l	0.05	ISO 17025	< 0.050
Sulphate	mg/l	0.045	ISO 17025	1.2
Total dissolved solids	mg/l	6	ISO 17025	170
Total monohydric phenols	mg/l	0.01	ISO 17025	< 0.010
Dissolved organic carbon	mg/l	0.1	NONE	9.8
10:1 WAC Leachate				
Arsenic	mg/kg	0.01	NONE	0.035
Barium	mg/kg	0.0005	NONE	0.0466
Cadmium	mg/kg	0.001	NONE	< 0.00100
Chromium	mg/kg	0.004	NONE	< 0.0040
Copper	mg/kg	0.007	NONE	0.045
Mercury	mg/kg	0.005	NONE	< 0.00500
Molybdenum	mg/kg	0.004	NONE	0.0331
Nickel	mg/kg	0.003	NONE	0.02
Lead	mg/kg	0.01	NONE	0.034
Antimony	mg/kg	0.017	NONE	< 0.017
Selenium	mg/kg	0.04	NONE	< 0.040
Zinc	mg/kg	0.004	NONE	0.067
Chloride	mg/kg	1.5	NONE	12
Fluoride	mg/kg	0.5	NONE	< 0.50
Sulphate	mg/kg	0.45	NONE	12
Total dissolved solids	mg/kg	60	NONE	1700
Total monohydric phenols	mg/kg	0.1	NONE	< 0.10
Dissolved organic carbon	mg/kg	1	NONE	98

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Waste Acceptance Criteria Analytical Results

Report No:	**25-012155**						
					Client:	**GANDW**	
Location	**Dee Park**						
Lab Reference (Sample Number)	478414				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	05/03/2025				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS2						
Depth (m)	0.20						
Solid Waste Analysis							
TOC (%)**	3.6				3%	5%	6%
Loss on Ignition (%) **	7.5				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	7.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.1				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00350			0.0350	0.5	2	25
Barium *	0.00466			0.0466	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.0045			0.045	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00331			0.0331	0.5	10	30
Nickel *	0.0020			0.020	0.4	10	40
Lead *	0.0034			0.034	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0067			0.067	4	50	200
Chloride *	1.2			12	800	15000	25000
Fluoride*	< 0.050			< 0.50	10	150	500
Sulphate *	1.2			12	1000	20000	50000
TDS*	170			1700	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	9.80			98.0	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.0						
Dry Matter (%)	82						
Moisture (%)	18						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3. This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Where colour coding is used on this report, this is for guidance purposes only. This does not constitute a statement of conformity of pass or fail.

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 are representative of the samples submitted for analysis.

Analytical Report Number : 25-012155
Project / Site name: Dee Park

* 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 *
478413	WS1	None Supplied	0.2	Brown loam and sand with vegetation
478414	WS2	None Supplied	0.2	Brown loam and sand with vegetation
478415	WS3	None Supplied	0.2	Brown clay
478416	WS4	None Supplied	0.2	Brown clay and sand
478417	WS1	None Supplied	5	Beige clay with chalk
478418	WS3	None Supplied	2.5	Beige clay with chalk
478419	WS4	None Supplied	1	Brown clay and sand with vegetation

Analytical Report Number : 25-012155
Project / Site name: Dee Park

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos 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, 2021	A001B	D	ISO 17025
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
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	L038B	D	MCERTS
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	L038B	D	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	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS

Analytical Report Number : 25-012155
Project / Site name: Dee Park

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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	L038B	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Water Soluble Nitrate (2:1) as N 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	W	NONE
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
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
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	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025

Analytical Report Number : 25-012155
Project / Site name: Dee Park

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	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	L082B	W	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

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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

APPENDIX G:
Soil Assessment Criteria

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Ground and Water Limited

Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
3) EA CLEA Bulletin (2009).
4) CLEA software version 1.07 (2015)
5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;
- Do not cover risks to the environment, such as groundwater, ecosystems or buildings;
- Do not provide a definitive test for telling when human health risks are significant; and
- Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., *The LQM/CIEH S4UL's for Human Health Risk Assessment*. **Land Quality Press**. 2015

2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2nd edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

- Public Open Spaces near Residential Housing (POSresi).
- Public Park (POSpark).

2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visists and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4Uls (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.07 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

> *"4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:*
> *(a) Land where no relevant contaminant linkage has been established.*
> *(b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.*
> *(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.*
> *(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).*
>
> *4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low."*

The C4SLs are intended as "relevant technical tools" (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land."*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."*

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

> *"4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a "Category 4: Human Health" case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages."*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological "minimal risk" interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on "other considerations" (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

> CL:AIRE, *The Soil Generic Assessment Criteria for Human Health Risk Assessment.* **Contaminated Land: Applications in the Real Environment**. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

- Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses;
- Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

- Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.
- Developing more accurate parameters using site data.

7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- BS3882:2015 – *Specification for Topsoil*

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, *Guidance in comparing soil contamination data with a critical concentration,* superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

- Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;
- The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;
- The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;
- The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;
- The sample locations are all taken from one population (i.e. the same material);
- Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and
- The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

Treatment of Hot-Spots

- A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
- Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

9.1. Inorganics

SoBRA – Acute Generic Assessment Criteria						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Cyanide	24	24	24	1400	24	24

9.2. Metals

C4SL Low Level of Toxicological Concern						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Lead	< 200	< 310	< 80	< 2300	< 630	< 1300

LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Arsenic	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11000	45	240000	21000	46000
Cadmium	11	85	1.9	190	120	532
Chromium (III)	910	910	18000	8600	1500	33000
Chromium (VI)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	68000	12000	44000
Elemental Mercury	1.2	1.2	21	58	16	30
Inorganic Mercury	40	56	19	1100	120	240
Methylmercury	11	15	6	320	40	68
Nickel	130	180	53	980	230	800
Selenium	250	430	88	12000	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	40000	620	730000	81000	170000

Phytotoxicity (Harmful to Plants) Threshold Trigger Values			
Determinand	**Soil pH < 6.0 (mg/kg)**	**Soil pH 6.0 – 7.0 (mg/kg)**	**Soil pH > 7.0 (mg/kg)**
Copper	100	135	200
Nickel	60	75	110
Zinc	200	200	300
Notes: BS3882:2015 – *Specification for Topsoil*. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils. Site observation of plant vitality may give additional guidance.			

CL:AIRE Soil Generic Assessment Criteria				
Determinand	**Residential (mg/kg)**	**Residential without plant uptake (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Antimony	ND	550	ND	7500
Barium	ND	1300	ND	22000
Molybdenum	ND	670	ND	17000
ND – Not derived				

9.3. Total Petroleum Hydrocarbons (TPHs)

9.3.1. BTEX Compounds

LQM/CIEH Suitable 4 Use Levels – BTEX Compounds							
Determinand	**Soil Organic Matter**	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Benzene	1.0% SOM	0.087	0.38	0.017	27	72	90
	2.5% SOM	0.170	0.70	0.034	47	72	100
	6.0% SOM	0.370	1.40	0.075	90	73	110
Toluene	1.0% SOM	130	880	22	56000	56000	87000
	2.5% SOM	290	1900	51	110000	56000	95000
	6.0% SOM	660	3900	120	180000	56000	100000
Ethylbenzene	1.0% SOM	47	83	16	5700	24000	17000
	2.5% SOM	110	190	39	13000	24000	22000
	6.0% SOM	260	440	91	27000	25000	27000
o-Xylene	1.0% SOM	60	88	28	6600	41000	17000
	2.5% SOM	140	210	67	15000	42000	24000
	6.0% SOM	330	480	160	33000	43000	33000
m-Xylene	1.0% SOM	59	82	31	6200	41000	17000
	2.5% SOM	140	190	74	14000	42000	24000
	6.0% SOM	320	450	170	31000	43000	33000
p-Xylene	1.0% SOM	56	79	29	5900	41000	17000
	2.5% SOM	130	180	69	14000	42000	23000
	6.0% SOM	310	430	160	30000	43000	31000
SOM = Soil Organic Matter Content (%)							

9.3.2. Total Petroleum Hydrocarbons – Aliphatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aliphatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-6	1.0% SOM	42	42	730	3,200 (304) [sol]	570,000 (304) [sol]	95,000 (304) [sol]
	2.5% SOM	78	78	1,700	5,900 (558) [sol]	590,000	130,000 (558) [sol]
	6.0% SOM	160	160	3,900	12,000 (1150) [sol]	600,000 (1150)[sol]	180,000 (1150) [sol]
EC >6-8	1.0% SOM	100	100	2,300	7,800 (144) [sol]	600,000	150,000 (144) [sol]
	2.5% SOM	230	230	5,600	17,000 (322) [sol]	610,000	220,000 (322) [sol]
	6.0% SOM	530	530	13,000	40,000 (736) [sol]	620,000	320,000 (736) [sol]
EC >8-10	1.0% SOM	27	27	320	2,000 (78) [sol]	13,000	14,000 (78) [sol]
	2.5% SOM	65	65	770	4,800 (118) [vap]	13,000	18,000 (118) [vap]
	6.0% SOM	150	150	1,700	11,000 (451) [vap]	13,000	21,000 (451) [vap]
EC >10-12	1.0% SOM	130 (48) [vap]	130 (48) [vap]	2,200	9,700 (48) [sol]	13,000	21,000 (48) [sol]
	2.5% SOM	330 (118) [vap]	330 (118) [vap]	4,400	23,000 (118) [vap]	13,000	23,000 (118) [vap]
	6.0% SOM	760 (283) [vap]	760 (283) [vap]	7,300	47,000 (283) [vap]	13,000	24,000 (283) [vap]
EC >12-16	1.0% SOM	1,100 (24) [sol]	1,100 (24) [sol]	11,000	59,000 (24) [sol]	13,000	25,000 (24) [sol]
	2.5% SOM	2,400 (59) [sol]	2,400 (59) [sol]	13,000	82,000 (59) [sol]	13,000	25,000 (59) [sol]
	6.0% SOM	4,300 (142) [sol]	4,400 (142) [sol]	13,000	90,000 (142) [sol]	13,000	26,000 (142) [sol]
EC >16-35	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000
EC >35-44	1.0% SOM	65,000 (8.48) [sol]	65,000 (8.48) [sol]	260,000	1,600,000	250,000	450,000
	2.5% SOM	92,000 (21) [sol]	92,000 (21) [sol]	270,000	1,700,000	250,000	480,000
	6.0% SOM	110,000	110,000	270,000	1,800,000	250,000	490,000

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.3.3. Total Petroleum Hydrocarbons – Aromatic

LQM/CIEH Suitable 4 Use Levels For TPH							
Aromatic		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
EC 5-7 (Benzene)	1.0% SOM	70	370	13	26,000 (1220) [sol]	56,000	76,000 (1220 [sol]
	2.5% SOM	140	690	27	46,000 (2260) [sol]	56,000	84,000 (2260) [sol]
	6.0% SOM	300	1,400	57	86,000 (4710) [sol]	56,000	92,000 (4710) [sol]
EC >7-8 (Toluene)	1.0% SOM	130	860	22	56,000 (869) [vap]	56,000	87,000 (869) [sol]
	2.5% SOM	290	1,800	51	110,000 (1920) [sol]	56,000	95,000 (1920) [sol]
	6.0% SOM	660	3,900	120	180,000 (4360) [vap]	56,000	100,000 (4360) [vap]
EC >8-10	1.0% SOM	34	47	8.6	3,500 (613) [vap]	5,000	7,200 (613) [vap]
	2.5% SOM	83	110	21	8,100 (1500) [vap]	5,000	8,500 (1500) [vap]
	6.0% SOM	190	270	51	17,000 (3850) [vap]	5,000	9,300 (3580) [vap]
EC >10-12	1.0% SOM	74	250	13	16,000 (364) [sol]	5,000	9,200 (364) [sol]
	2.5% SOM	180	590	31	28,000 (899) [sol]	5,000	9,700 (889) [sol]
	6.0% SOM	380	1,200	74	34,000 (2150) [sol]	5,000	10,000
EC >12-16	1.0% SOM	140	1,800	23	36,000 (169) [sol]	5,100	10,000
	2.5% SOM	330	2,300 (419) [sol]	57	37,000	5,100	10,000
	6.0% SOM	660	2,500	130	38,000	5,000	10,000
EC >16-21	1.0% SOM	260	1,900	46	28,000	3,800	7,600
	2.5% SOM	540	1,900	110	28,000	3,800	7,700
	6.0% SOM	930	1,900	260	28,000	3,800	7,800
EC >21-35	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >35-44	1.0% SOM	1,100	1,900	370	28,000	3,800	7,800
	2.5% SOM	1,500	1,900	820	28,000	3,800	7,800
	6.0% SOM	1,700	1,900	1,600	28,000	3,800	7,900
EC >44-70	1.0% SOM	1,600	1,900	1,200	28,000	3,800	7,800
	2.5% SOM	1,800	1,900	2,100	28,000	3,800	7,800
	6.0% SOM	1,900	1,900	3,000	28,000	3,800	7,900

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Acenapthene	1.0% SOM	210	3,000 (57.0) [sol]	34	84,000(57.0) [sol]	15,000	29,000
	2.5% SOM	510	4,700(141) [sol]	85	97,000(141) [sol]	15,000	30,000
	6.0% SOM	1100	6,000(336) [sol]	200	100,000	15,000	30,000
Acenapthylene	1.0% SOM	170	2,900(86.1) [sol]	28	83,000(86.1) [sol]	15,000	29,000
	2.5% SOM	420	4,600(212) [sol]	69	97,000(212) [sol]	15,000	30,000
	6.0% SOM	920	6,000(506) [sol]	160	100,000	15,000	30,000
Anthracene	1.0% SOM	2,400	31,000(1.17) [vap]	380	520,000	74,000	150,000
	2.5% SOM	5,400	35,000	950	540,000	74,000	150,000
	6.0% SOM	11,000	37,000	2,200	540,000	74,000	150,000
Benzo(a)anthracene	1.0% SOM	7.20	11	2.90	170	29	49
	2.5% SOM	11	14	6.50	170	29	56
	6.0% SOM	13	15	13	180	29	62
Benzo(a)pyrene	1.0% SOM	2.20	3.20	0.97	35	5.70	11
	2.5% SOM	2.70	3.20	2.00	35	5.70	12
	6.0% SOM	3.00	3.20	3.50	36	5.70	13
Benzo(b)flouranthene	1.0% SOM	2.60	3.90	0.99	44	7.10	13
	2.5% SOM	3.30	4.00	2.10	44	7.20	15
	6.0% SOM	3.70	4.00	3.90	45	7.20	16
Benzo(ghi)perylene	1.0% SOM	320	360	290	3,900	640	1,400
	2.5% SOM	340	360	470	4,000	640	1,500
	6.0% SOM	350	360	640	4,000	640	1,600
Benzo(k)flouranthene	1.0% SOM	77	110	37	1,200	190	370
	2.5% SOM	93	110	75	1,200	190	410
	6.0% SOM	100	110	130	1,200	190	440
Chrysene	1.0% SOM	15	30	4.10	350	57	93
	2.5% SOM	22	31	9.40	350	57	110
	6.0% SOM	27	32	19	350	57	120
Dibenzo(ah)anthracene	1.0% SOM	0.24	0.31	0.14	3.50	0.57	1.10
	2.5% SOM	0.28	0.32	0.27	3.50	0.57	1.30
	6.0% SOM	0.30	0.32	0.43	3.60	0.58	1.40
Flouranthene	1.0% SOM	280	1,500	52	23,000	3,100	6,300
	2.5% SOM	560	1,600	130	23,000	3,100	6,300
	6.0% SOM	890	1,600	290	23,000	3,100	6,300
Flourene	1.0% SOM	170	2,800 (30.9) [sol]	27	63,000(30.9) [sol]	9,900	20,000
	2.5% SOM	400	3,800(76.5) [sol]	67	68,000	9,900	20,000
	6.0% SOM	860	4,500(183) [sol]	160	71,000	9,900	20,000
Indeno(123-cd)pyrene	1.0% SOM	27	45	9.50	500	82	150
	2.5% SOM	36	46	21	510	82	170
	6.0% SOM	41	46	39	510	82	180
Napthalene	1.0% SOM	15	36	65	1,600	11,000	800
	2.5% SOM	36	36	130	3,700	15,000	1,200
	6.0% SOM	85	85	200	8,400	17,000	1,900
Phenanthrene	1.0% SOM	95	1,300(183) [sol]	15	22,000	3,100	6,200
	2.5% SOM	220	1,500	38	22,000	3,100	6,200
	6.0% SOM	440	1,500	90	23,000	3,100	6,300
Pyrene	1.0% SOM	620	3,700	110	54,000	7,400	15,000
	2.5% SOM	1200	3,800	270	54,000	7,400	15,000
	6.0% SOM	2000	3,800	620	54,000	7,400	15,000
Coal Tar (Benzo(a)pyrene used as marker compound)	1.0% SOM	0.79	1.2	0.32	15	2.20	4.40
	2.5% SOM	0.98	1.2	0.67	15	2.20	4.70
	6.0% SOM	1.10	1.2	1.20	15	2.20	4.80

SOM = Soil Organic Matter Content (%)

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

9.5. Volatile and Semi-volatile Organic Compounds

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chloroalkanes & alkenes							
1,2 Dichloroethane	1.0% SOM	0.0071	0.0092	0.0046	0.67	29	21
	2.5% SOM	0.011	0.013	0.0083	0.97	29	24
	6.0% SOM	0.019	0.023	0.016	1.70	29	28
1,1,2,2 Tetrachloroethane	1.0% SOM	1.60	3.90	0.41	270	1,400	1,800
	2.5% SOM	3.40	8.00	0.89	550	1,400	2,100
	6.0% SOM	7.50	17	2.00	1,100	1,400	2,300
1,1,1,2 Tetrachloroethane	1.0% SOM	1.20	1.50	0.79	110	1,400	1,500
	2.5% SOM	2.80	3.50	1.90	250	1,400	1,800
	6.0% SOM	6.40	8.20	4.40	560	1,400	2,100
Tetrachloroethene	1.0% SOM	0.18	0.18	0.65	19	1,400	810 [sol](424)
	2.5% SOM	0.39	0.40	1.50	42	1,400	1,100 [sol](951)
	6.0% SOM	0.90	0.92	3.60	95	1,400	1,500
1,1,1 Trichloroethane	1.0% SOM	8.80	9.00	48	660	140,000	57,000 [vap](1425)
	2.5% SOM	18	18	110	1,300	140,000	76,000 [vap](2915)
	6.0% SOM	39	40	240	3,000	140,000	100,000 [vap] (6392)
Tetrachloromethene	1.0% SOM	0.026	0.026	0.45	2.90	890	190
	2.5% SOM	0.056	0.056	1.00	6.30	920	270
	6.0% SOM	0.130	0.130	2.40	14	950	400
Trichloroethene	1.0% SOM	0.016	0.017	0.041	1.20	120	70
	2.5% SOM	0.034	0.036	0.091	2.60	120	91
	6.0% SOM	0.075	0.080	0.210	5.70	120	120
Trichloromethane	1.0% SOM	0.91	1.20	0.42	99	2,500	2,600
	2.5% SOM	1.70	2.10	0.83	170	2,500	2,800
	6.0% SOM	3.40	4.20	1.70	350	2,500	3,100
Vinyl Chloride	1.0% SOM	0.00064	0.00077	0.00055	0.059	3.50	4.80
	2.5% SOM	0.00087	0.00100	0.00100	0.077	3.50	5.00
	6.0% SOM	0.00014	0.00150	0.00180	0.120	3.50	5.40
Explosives							
2,4,6 Trinitrotoluene	1.0% SOM	1.60	65	0.24	1,000	130	260
	2.5% SOM	3.70	66	0.58	1,000	130	270
	6.0% SOM	8.10	66	1.40	1,000	130	270
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)	1.0% SOM	120	13,000	17	210,000	26,000	49,000(18.7)[sol]
	2.5% SOM	250	13,000	38	210,000	26,000	51,000
	6.0% SOM	540	13,000	85	210,000	27,000	53,000
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)	1.0% SOM	5.70	67,00	0.86	110,000	13,000	23,000(0.35)[vap]
	2.5% SOM	13	67,00	1.90	110,000	13,000	23,000(0.39)[vap]
	6.0% SOM	26	67,00	3.90	110,000	13,000	24,000(0.48)[vap]
Atrazine	1.0% SOM	3.30	610	0.50	9,300	1,200	2,300
	2.5% SOM	7.60	620	1.20	9,400	1,200	2,400
	6.0% SOM	17.40	620	2.70	9,400	1,200	2,400

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Pesticides							
Aldrin	1.0% SOM	5.70	7.30	3.20	170	18	30
	2.5% SOM	6.60	7.40	6.10	170	18	31
	6.0% SOM	7.10	7.50	9.60	170	18	31
Dieldrin	1.0% SOM	0.97	7.00	0.17	170	18	30
	2.5% SOM	2.00	7.30	0.41	170	18	30
	6.0% SOM	3.50	7.40	0.96	170	18	31
Dichlorvos	1.0% SOM	0.032	6.40	0.0049	140	16	26
	2.5% SOM	0.066	6.50	0.0100	140	16	26
	6.0% SOM	0.140	6.60	0.0220	140	16	27
Alpha - Endosulfan	1.0% SOM	7.40	160(0.003)[vap]	1.20	5,600(0.003)[vap]	1,200	2,400
	2.5% SOM	18	280(0.007)[vap]	2.90	7,400(0.007)[vap]	1,200	2,400
	6.0% SOM	41	410(0.016)[vap]	6.80	8,400(0.016)[vap]	1,200	2,400
Beta - Endosulfan	1.0% SOM	7.00	190(0.00007)[vap]	1.10	6,300(0.00007)[vap]	1,200	2,400
	2.5% SOM	17	320(0.0002)[vap]	2.70	7,800(0.0002)[vap]	1,200	2,400
	6.0% SOM	39	440(0.0004)[vap]	6.40	8700	1,200	2,500
Alpha - Hexachlorocyclohexanes	1.0% SOM	0.23	6.90	0.035	170	24	47
	2.5% SOM	0.55	9.20	0.087	180	24	48
	6.0% SOM	1.20	11	0.210	180	24	48
Beta - Hexachlorocyclohexanes	1.0% SOM	0.085	3.70	0.013	65	8.10	15
	2.5% SOM	0.200	3.80	0.032	65	8.10	15
	6.0% SOM	0.460	3.80	0.077	65	8.10	16
Gamma - Hexachlorocyclohexanes	1.0% SOM	0.06	2.90	0.0092	67	8.2	14
	2.5% SOM	0.14	3.30	0.0230	69	8.2	15
	6.0% SOM	0.33	3.50	0.0540	70	8.2	15
Chlorobenzenes							
Chlorobenzene	1.0% SOM	0.46	0.46	5.90	56	11,000	1,300(675)[sol]
	2.5% SOM	1.00	1.00	14	130	13,000	2,000(1520)[sol]
	6.0% SOM	2.40	2.40	32	290	14,000	2,900
1,2-Dichlorobenzene	1.0% SOM	23	24	94	2,000 (571) [sol]	90,000	24,000(571)[sol]
	2.5% SOM	55	57	230	4,800 (1370) [sol]	95,000	36,000(1370)[sol]
	6.0% SOM	130	130	540	11,000 (3240) [sol]	98,000	51,000(3240)[sol]
1,3-Dichlorobenzene	1.0% SOM	0.40	0.44	0.25	30	300	390
	2.5% SOM	1.00	1.10	0.60	73	300	440
	6.0% SOM	2.30	2.50	1.50	170	300	470
1,4-Dichlorobenzene	1.0% SOM	61	61	15	4,400 (224)[vap]	17,000[g]	36,000 (224)[vap]
	2.5% SOM	150	150	37	10,000 (540)[vap]	17,000[g]	36,000 (540)[vap]
	6.0% SOM	350	350	88[g]	25,000 (1280)[vap]	17,000[g]	36,000 (1280)[vap]
1,2,3,-Trichlorobenzene	1.0% SOM	1.50	1.50	4.70	102	1,800	770(134)[vap]
	2.5% SOM	3.60	3.70	12	250	1,800	1,100(330)[vap]
	6.0% SOM	8.60	8.80	28	590	1,800	1,600(789)[vap]
1,2,4,-Trichlorobenzene	1.0% SOM	2.60	2.60	55	220	15,000	1,700(318)[vap]
	2.5% SOM	6.40	6.40	140	530	17,000	2,600(786)[vap]
	6.0% SOM	15	15	320	1,300	19,000	4,000(1880)[vap]
1,3,5,-Trichlorobenzene	1.0% SOM	0.33	0.33	4.70	23	1,700	380(36.7)[vap]
	2.5% SOM	0.81	0.81	12	55	1,700	590(90.8)[vap]
	6.0% SOM	1.90	1.90	140	130	1,800	860(217)[vap]

[vap] – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
[sol] – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
Chlorobenzenes (cont.)							
1,2,3,4,- Tetrachlorobenzene	1.0% SOM	15	24	4.40	1,700(122)^{vap}	830	1,500(122)^{vap}
	2.5% SOM	36	56	11	3,080(304)^{vap}	830	1,600
	6.0% SOM	78	120	26	4,400(728)^{vap}	830	1,600
1,2,3,5,- Tetrachlobenzene	1.0% SOM	0.66	0.75	0.38	49(39.4)^{vap}	78	110(39)^{vap}
	2.5% SOM	1.60	1.90	0.90	120(98.1)^{vap}	79	120
	6.0% SOM	3.70	4.30	2.20	240(235)^{vap}	79	130
1,2,4, 5,- Tetrachlobenzene	1.0% SOM	0.33	0.73	0.06	42(19.7)^{sol}	13	25
	2.5% SOM	0.77	1.70	0.16	72(49.1)^{sol}	13	26
	6.0% SOM	1.60	3.50	0.37	96	13	26
Pentachlrobenzene	1.0% SOM	5.80	19	1.20	640(43.0)^{sol}	100	190
	2.5% SOM	12	30	3.10	770(107)^{sol}	100	190
	6.0% SOM	22	38	7.00	830	100	190
Hexachlorobenzene	1.0% SOM	1.80(0.20)^{vap}	4.10 (0.20)^{vap}	0.47	110(0.20)^{vap}	16	30
	2.5% SOM	3.30(0.50)^{vap}	5.70 (0.50)^{vap}	1.10	120	16	30
	6.0% SOM	4.90	6.70 (1.2)^{vap}	2.50	120	16	30
Phenols & Chlorophenols							
BTEX	1.0% SOM	280	750	66	760^{dir}(31,000)	760^{dir}(11,000)	760^{dir}(8,600)
	2.5% SOM	550	1,300	140	1,500^{dir}(35,000)	1,500^{dir}(11,000)	1,500^{dir}(9,700)
	6.0% SOM	1100	2,300	280	3,200^{dir}(37,000)	3,200^{dir}(11,000)	3,200^{dir}(11,000)
Chlorophenols (4 Congeners)	1.0% SOM	0.87	94	0.13	3,500	620	1,100
	2.5% SOM	2.00	150	0.30	4,000	620	1,100
	6.0% SOM	4.50	210	0.70	4,300	620	1,100
Pentachlorophenols	1.0% SOM	0.22	27(16.4)^{vap}	0.03	400	60	110
	2.5% SOM	0.52	29	0.08	400	60	120
	6.0% SOM	1.20	31	0.19	400	60	120
Others							
Carbon Disulphide	1.0% SOM	0.14	0.14	4.80	11	11,000	1,300
	2.5% SOM	0.29	0.29	10	22	11,000	1,900
	6.0% SOM	0.62	0.62	23	47	12,000	2,700
Hexachloro-1,3-Butadiene	1.0% SOM	0.29	0.32	0.25	31	25	48
	2.5% SOM	0.70	0.78	0.61	68	25	50
	6.0% SOM	1.60	1.80	1.40	120	25	51
^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets. ^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.							

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
1,1,2 Trichloroethane	1.0% SOM	0.60	0.88	0.28	94
	2.5% SOM	1.20	1.8	0.61	190
	6.0% SOM	2.70	3.9	1.40	400
1,1-Dichloroethane	1.0% SOM	2.40	2.50	9.20	280
	2.5% SOM	3.90	4.10	17	450
	6.0% SOM	7.40	7.70	35	850
1,1-Dichloroethene	1.0% SOM	0.23	0.23	2.80	26
	2.5% SOM	0.40	0.41	5.60	46
	6.0% SOM	0.82	0.82	12	92
1,2,4-Trimethylbenzene	1.0% SOM	0.35	0.41	0.38	42
	2.5% SOM	0.85	0.99	0.93	99
	6.0% SOM	2.00	2.30	2.20	220
1,2-Dichloropropane	1.0% SOM	0.024	0.024	0.62	3.3
	2.5% SOM	0.042	0.042	1.20	5.9
	6.0% SOM	0.084	0.085	2.60	12
2,4-Dimethylphenol	1.0% SOM	19	210	3.10	16000*
	2.5% SOM	43	410	7.20	24000*
	6.0% SOM	97	730	17	30000*
2,4-Dinitrotoluene	1.0% SOM	1.50	170*	0.22	3700*
	2.5% SOM	3.20	170	0.49	3700*
	6.0% SOM	7.20	170	1.10	3800*
2,6-Dinitrotoluene	1.0% SOM	0.78	78	0.12	1900*
	2.5% SOM	1.70	84	0.27	1900*
	6.0% SOM	3.90	87	0.61	1900*
2-Chloronapthalene	1.0% SOM	3.70	3.80	40	390*
	2.5% SOM	9.20	9.30	98	960*
	6.0% SOM	22	22	230	2200*
Biphenyl	1.0% SOM	66*	220*	14	18000*
	2.5% SOM	160	500*	35	33000*
	6.0% SOM	360	980*	83	48000*
Bis (2-ethylhexyl) phthalate	1.0% SOM	280*	2700*	47*	85000*
	2.5% SOM	610*	2800*	120*	86000*
	6.0% SOM	1100*	2800*	280*	86000*
Bromobenzene	1.0% SOM	0.87	0.91	3.2	97
	2.5% SOM	2.0	2.1	7.6	220
	6.0% SOM	4.7	4.9	18	520
Bromodichloromethane	1.0% SOM	0.016	0.019	0.016	2.1
	2.5% SOM	0.030	0.034	0.032	3.7
	6.0% SOM	0.061	0.070	0.068	7.6
Bromoform	1.0% SOM	2.8	5.2	0.95	760
	2.5% SOM	5.9	11	2.1	1500
	6.0% SOM	13	23	4.6	3100
Butyl benzyl phthalate	1.0% SOM	1400*	42000*	220*	940000*
	2.5% SOM	3300*	44000*	550*	940000*
	6.0% SOM	7200*	44000*	1300*	950000*

*soil concentration above saturation limit

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds					
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**
Chloroethane	1.0% SOM	8.3	8.4	110	960
	2.5% SOM	11	11	200	1300
	6.0% SOM	18	18	380	2100
Chloromethane	1.0% SOM	0.0083	0.0085	0.066	1.0
	2.5% SOM	0.0098	0.0099	0.13	1.2
	6.0% SOM	0.013	0.013	0.23	1.6
***Cis* 1,2 Dichloroethene**	1.0% SOM	0.11	0.12	0.26	14
	2.5% SOM	0.19	0.20	0.50	24
	6.0% SOM	0.37	0.39	1.0	47
Dichloromethane	1.0% SOM	0.58	2.10	0.10	270
	2.5% SOM	0.98	2.80	0.19	360
	6.0% SOM	1.70	4.50	0.34	560
Diethyl Phthalate	1.0% SOM	120*	1800*	19*	150000*
	2.5% SOM	260*	3500*	41*	220000*
	6.0% SOM	570*	6300*	94*	290000*
Di-*n*-butyl phthalate	1.0% SOM	13*	450*	2.00	15000*
	2.5% SOM	31*	450*	5.00	15000*
	6.0% SOM	67*	450*	12	15000*
Di-*n*-octyl phthalate	1.0% SOM	2300*	3400*	940*	89000*
	2.5% SOM	2800*	3400*	2100*	89000*
	6.0% SOM	3100*	3400*	3900*	89000*
Hexachloroethane	1.0% SOM	0.20	0.22	0.27	22*
	2.5% SOM	0.48	0.54	0.67	53*
	6.0% SOM	1.10	1.30	1.60	120*
Isopropylbenzene	1.0% SOM	11	12	32	1400*
	2.5% SOM	27	28	79	3300*
	6.0% SOM	64	67	190	7700*
Methyl *tert*-butyl ether (MTBE)	1.0% SOM	49	73	23	7900
	2.5% SOM	84	120	44	13000
	6.0% SOM	160	220	90	24000
Propylbenzene	1.0% SOM	34	40	34	4100*
	2.5% SOM	82	97	83	9700*
	6.0% SOM	190	230	200	21000*
Styrene	1.0% SOM	8.10	35	1.60	3300*
	2.5% SOM	19	78	3.70	6500*
	6.0% SOM	43	170	8.70	11000*
Total Cresols (2-, 3-, and 4-methylphenol)	1.0% SOM	80	3700	12	160000
	2.5% SOM	180	5400	27	180000*
	6.0% SOM	400	6900	63	180000*
***Trans* 1,2 Dichloroethene**	1.0% SOM	0.19	0.19	0.93	22
	2.5% SOM	0.34	0.35	1.90	40
	6.0% SOM	0.70	0.71	0.24	81
Tributyl tin oxide	1.0% SOM	0.25	1.40	0.042	130*
	2.5% SOM	0.59	3.10	0.100	180*
	6.0% SOM	1.30	5.70	0.240	200*

*soil concentration above saturation limit

C4SL Low Level of Toxicological Concern							
Determinands		**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
1,2-Dichloroethane (Ethylene Dichloride)	1.0% SOM	0.11	0.16	0.054	12	300	300
	2.5% SOM	0.18	0.24	0.10	17	310	330
	6.0% SOM	0.31	0.41	0.19	29	310	380
Cis-1,2-Dichloroethene	1.0% SOM	0.46	0.50	0.89	38	3,800	2,000
	2.5% SOM	0.78	0.84	1.7	64	3,800	2,400
	6.0% SOM	1.5	1.6	3.6	120	3,900	3,100
Tetrachloroethene (PCE)	1.0% SOM	0.31	0.32	2	24	3,200	1,400
	2.5% SOM	0.70	0.71	4.8	55	3,300	1,900
	6.0% SOM	1.60	1.60	11	130	3,400	2,500
Trans-1,2-Dichloroethene	1.0% SOM	0.90	0.93	3.70	69	13,000	5,600
	2.5% SOM	1.60	1.70	7.50	120	13,000	7,000
	6.0% SOM	3.30	3.40	16	260	13,000	9,100
Trichloroethene (TCE)	1.0% SOM	0.0093	0.0097	0.032	0.73	76	41
	2.5% SOM	0.020	0.020	0.072	1.5	78	54
	6.0% SOM	0.043	0.045	0.16	3.4	79	69
Vinyl Chloride (Chloroethene)	1.0% SOM	0.0064	0.015	0.0017	1.1	7.8	18
	2.5% SOM	0.010	0.019	0.0031	1.4	7.8	19
	6.0% SOM	0.017	0.029	0.0058	2.2	7.8	19

9.6. Per- and Polyfluoroalkyl Substances (PFAS)

Interim C4SLs for PFOA, PFNA, PFHxS and PFOS						
Determinand	**RwHP (mg/kg)**	**RwoHP (mg/kg)**	**Allotment (mg/kg)**	**Commercial (mg/kg)**	**POSresi (mg/kg)**	**POSpark (mg/kg)**
PFOA	0.076	0.041	0.0014	0.60	0.079	0.17
PFOS	0.013	0.041	0.0027	0.60	0.079	0.17
PFHxS	0.0081	0.041	0.0015	0.60	0.079	0.17
PFNA	0.0073	0.041	0.0013	0.60	0.079	0.17

9.7. Asbestos

No asbestos or asbestos containing materials (ACM's) are considered acceptable on-site from a human health perspective. Therefore the GAC for asbestos & ACM's within any imported material should be none detected (ND).

APPENDIX H: Waste Hazard Assessment

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB
0333 600 1221 enquiries@groundandwater.co.uk **groundandwater.co.uk**

Registered Office: Kineton House, 31 Horse Fair, Banbury, Oxfordshire OX16 0AE Registered in England No. 07032001

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.

ACGCV-SCQ99-BHWIU

Report is invalid if pages are removed.

Job name

25-012155_HWOL

Description/Comments

Project

GWPR6479

Site

Dee Park, Reading, RG30 4EP

Classified by

Name:
Libby Bennett
Date:
31 Mar 2025 12:44 GMT
Telephone:
01420 463044

Company:
Ground and Water
2 The Long Barn, Norton Farm, Selborne Road, Alton Hampshire, GU34 3NB

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

Dee Park, Reading, RG30 4EP **Post Code** RG30 4EP

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Redevelopment of site

Description of the specific process, sub-process and/or activity that created the waste

Waste created during redevelopment

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1--05032025-0.20		Non Hazardous		3
2	WS2--05032025-0.20		Non Hazardous		6
3	WS3--05032025-0.20		Non Hazardous		9
4	WS4--05032025-0.20		Non Hazardous		11

Related documents

#	Name	Description
1	25-012155_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Libby Bennett

Created date: 31 Mar 2025 12:44 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	14
Appendix B: Rationale for selection of metal species	16
Appendix C: Version	16

Classification of sample: WS1--05032025-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS1--05032025-0.20
Moisture content:
13%
(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: 13% 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	monohydric phenols			P1186		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
2	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
3	benzene	601-020-00-8	200-753-7	71-43-2		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
6	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<8	µg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
7	toluene	601-021-00-3	203-625-9	108-88-3		<5	µg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
8	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
9	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		0.6	mg/kg	23.173	12.096	mg/kg	0.00121 %	✓	
10	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		13	mg/kg		11.31	mg/kg	0.00113 %	✓	
11	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.8	mg/kg	1.285	0.895	mg/kg	0.0000696 %	✓	
12	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		43	mg/kg	1.126	42.119	mg/kg	0.00421 %	✓	
13	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
14	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		17	mg/kg	1.579	23.361	mg/kg	0.00234 %	✓	

#		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
15		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	110	mg/kg		95.7	mg/kg	0.00957 %	✓	
16		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
17		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		39	mg/kg	1.785	60.571	mg/kg	0.00606 %	✓	
18		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		120	mg/kg	2.469	257.795	mg/kg	0.0258 %	✓	
19		pH			PH		8.2	pH		8.2	pH	8.2 pH		
20		acenaphthylene		205-917-1	208-96-8		0.22	mg/kg		0.191	mg/kg	0.0000191 %	✓	
21		acenaphthene		201-469-6	83-32-9		0.06	mg/kg		0.0522	mg/kg	0.00000522 %	✓	
22		anthracene		204-371-1	120-12-7		0.31	mg/kg		0.27	mg/kg	0.000027 %	✓	
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.4	mg/kg		1.218	mg/kg	0.000122 %	✓	
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.5	mg/kg		1.305	mg/kg	0.000131 %	✓	
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.67	mg/kg		0.583	mg/kg	0.0000583 %	✓	
27		benzo[ghi]perylene		205-883-8	191-24-2		0.9	mg/kg		0.783	mg/kg	0.0000783 %	✓	
28		chrysene	601-048-00-0	205-923-4	218-01-9		1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.19	mg/kg		0.165	mg/kg	0.0000165 %	✓	
30		fluoranthene		205-912-4	206-44-0		2.3	mg/kg		2.001	mg/kg	0.0002 %	✓	
31		fluorene		201-695-5	86-73-7		0.13	mg/kg		0.113	mg/kg	0.0000113 %	✓	
32		indeno[123-cd]pyrene		205-893-2	193-39-5		0.82	mg/kg		0.713	mg/kg	0.0000713 %	✓	
33		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
34		phenanthrene		201-581-5	85-01-8		0.94	mg/kg		0.818	mg/kg	0.0000818 %	✓	
35		pyrene		204-927-3	129-00-0		2	mg/kg		1.74	mg/kg	0.000174 %	✓	
36		TPH (C6 to C40) petroleum group			TPH		25	mg/kg		21.75	mg/kg	0.00217 %	✓	
37		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		28	mg/kg	1.462	40.924	mg/kg	0.00409 %		
											Total:	0.0579 %		

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"
Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: worst case

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.00217%)

Classification of sample: WS2--05032025-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS2--05032025-0.20
Moisture content:
18%
(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: 18% 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	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
2	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
3	benzene	601-020-00-8	200-753-7	71-43-2		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
6	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<8 µg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
7	toluene	601-021-00-3	203-625-9	108-88-3		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
8	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
9	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.3 mg/kg	23.173	24.702 mg/kg	0.00247 %	✓	
10	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		3.8 mg/kg		3.116 mg/kg	0.000312 %	✓	
11	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
12	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	17.541 mg/kg	0.00175 %	✓	
13	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
14	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		9.6 mg/kg	1.579	12.434 mg/kg	0.00124 %	✓	

#		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
15		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19	mg/kg		15.58	mg/kg	0.00156 %	✓	
16		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
17		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		15	mg/kg	1.785	21.958	mg/kg	0.0022 %	✓	
18		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		51	mg/kg	2.469	103.266	mg/kg	0.0103 %	✓	
19		pH			PH		8.4	pH		8.4	pH	8.4 pH		
20		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		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**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
27		benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
28		chrysene	601-048-00-0	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
29		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**
30		fluoranthene		205-912-4	206-44-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
31		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
32		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
33		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
34		phenanthrene		201-581-5	85-01-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
35		pyrene		204-927-3	129-00-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
36		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
37		coronene		205-881-7	191-07-1		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
38		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<**LOD**
39		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		6.8	mg/kg	1.462	9.939	mg/kg	0.000994 %		
											Total:	0.0209 %		

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: WS3--05032025-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS3--05032025-0.20
Moisture content:
15%
(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: 15% 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	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
2	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**
3	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**
4	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		1.2 mg/kg	23.173	23.636 mg/kg	0.00236 %	✓	
5	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		19 mg/kg		16.15 mg/kg	0.00161 %	✓	
6	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**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17 mg/kg	1.126	16.269 mg/kg	0.00163 %	✓	
8	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<**LOD**
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		39 mg/kg	1.579	52.36 mg/kg	0.00524 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	12 mg/kg		10.2 mg/kg	0.00102 %	✓	
11	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		1.8 mg/kg		1.53 mg/kg	0.000153 %	✓	
12	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		63 mg/kg	1.785	95.597 mg/kg	0.00956 %	✓	
13	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		60 mg/kg	2.469	125.934 mg/kg	0.0126 %	✓	
14	pH			PH		8.3 pH		8.3 pH	8.3 pH		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-917-1	208-96-8									
16		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-469-6	83-32-9									
17		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
18		benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
19		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
20		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
21		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
22		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
23		chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
24		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									
25		fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-912-4	206-44-0									
26		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
27		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
28		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
29		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
30		pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-927-3	129-00-0									
31		chromium in chromium(III) compounds { chromium(III) oxide }				33	mg/kg	1.462	48.231	mg/kg	0.00482 %		
			215-160-9	1308-38-9									
										Total:	0.039 %		

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: WS4--05032025-0.20

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS4--05032025-0.20
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	monohydric phenols			P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
2	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
3	benzene	601-020-00-8	200-753-7	71-43-2		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
4	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
5	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
6	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<8 µg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
7	toluene	601-021-00-3	203-625-9	108-88-3		<5 µg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
8	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
9	boron { boron tribromide }	005-003-00-0	233-657-9	10294-33-4		0.5 mg/kg	23.173	10.196 mg/kg	0.00102 %	✓	
10	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		13 mg/kg		11.44 mg/kg	0.00114 %	✓	
11	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.4 mg/kg	1.285	0.452 mg/kg	0.0000352 %	✓	
12	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		18 mg/kg	1.126	17.834 mg/kg	0.00178 %	✓	
13	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
14	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		15 mg/kg	1.579	20.849 mg/kg	0.00208 %	✓	

#		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
15		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	51	mg/kg		44.88	mg/kg	0.00449 %	✓	
16		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
17		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		34	mg/kg	1.785	53.413	mg/kg	0.00534 %	✓	
18		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		87	mg/kg	2.469	189.049	mg/kg	0.0189 %	✓	
19		pH			PH		8.7	pH		8.7	pH	8.7 pH		
20		acenaphthylene		205-917-1	208-96-8		0.11	mg/kg		0.0968	mg/kg	0.00000968 %	✓	
21		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		anthracene		204-371-1	120-12-7		0.23	mg/kg		0.202	mg/kg	0.0000202 %	✓	
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1	mg/kg		0.88	mg/kg	0.000088 %	✓	
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.1	mg/kg		0.968	mg/kg	0.0000968 %	✓	
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.4	mg/kg		1.232	mg/kg	0.000123 %	✓	
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.48	mg/kg		0.422	mg/kg	0.0000422 %	✓	
27		benzo[ghi]perylene		205-883-8	191-24-2		0.78	mg/kg		0.686	mg/kg	0.0000686 %	✓	
28		chrysene	601-048-00-0	205-923-4	218-01-9		0.95	mg/kg		0.836	mg/kg	0.0000836 %	✓	
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.14	mg/kg		0.123	mg/kg	0.0000123 %	✓	
30		fluoranthene		205-912-4	206-44-0		2	mg/kg		1.76	mg/kg	0.000176 %	✓	
31		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
32		indeno[123-cd]pyrene		205-893-2	193-39-5		0.68	mg/kg		0.598	mg/kg	0.0000598 %	✓	
33		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
34		phenanthrene		201-581-5	85-01-8		0.61	mg/kg		0.537	mg/kg	0.0000537 %	✓	
35		pyrene		204-927-3	129-00-0		1.8	mg/kg		1.584	mg/kg	0.000158 %	✓	
36		TPH (C6 to C40) petroleum group			TPH		13	mg/kg		11.44	mg/kg	0.00114 %	✓	
37		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		21	mg/kg	1.462	30.693	mg/kg	0.00307 %		
											Total:	0.04 %		

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"
Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: worst case

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.00114%)

Appendix A: Classifier defined and non GB MCL determinands

- **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

- **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

- **arsenic** (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). 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.

- **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

- **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

- **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

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

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

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
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 2B (77) 2000

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2; H371

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal 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}

Most likely worst case.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

boron {boron tribromide}

Most likely worst case.

arsenic {arsenic}

Most likely worst case.

cadmium {cadmium sulfide}

Most likely worst case.

copper {dicopper oxide; copper (I) oxide}

Most likely worst case.

mercury {mercury}

Most likely worst case.

nickel {nickel dihydroxide}

Most likely worst case.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

worst case

selenium {selenium}

Most likely worst case.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst case.

zinc {zinc sulphate}

Most likely worst case.

chromium in chromium(III) compounds {chromium(III) oxide}

Most likely worst case.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2025.86.6540.11894 (27 Mar 2025)
HazWasteOnline Database: 2025.84.6536.11888 (25 Mar 2025)

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
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024

Appendix J Correspondence

Sparks, Ollie

From: DEVELOPER.SERVICES@THAMESWATER.CO. <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 20 April 2026 16:05
To: Miller, Henry
Cc: Neal-Long, Jasmine
Subject: RE: RE: RE: DS6155698 - Dee Park Rannoch St Reading RG30 4EP
Attachments: DS6155698 Confirmation of sufficient capacity.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Henry,

Following the submission of a Pre-Planning application for the proposed development at the above site, please find attached to this email a PDF letter confirming sufficient capacity for the proposed surface water discharge.

Site Address: Dee Park Rannoch St Reading RG30 4EP
Wastewater Pre-Planning Ref: DS6155698

Do find time to read the attached letter to ensure the developments drainage strategy falls in line with this capacity letter.

What happens next?
If not already done so, please submit a S106 Connection Application, giving us at least 21 days' notice of the date you wish to make your new connection(s).

If you've any further questions, please do not hesitate to contact me.

Kind regards,

Durell Chimombo
Adoptions & Pre-Planning Engineer
Developer Services
Mobile: 0774 764 4771
Helpdesk: 0800 009 3921

Get advice – make your sewer connection correctly - Plumbing and drainage misconnections | Water UK
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at Developer services | Thames Water

Hydro International Maintenance and COSHH Statement

This statement covers Hydro International Hydro-Brake® Optimum, Hydro-Brake®, Hydro-Brake® Orifice and Hydro-Brake® Basic-S Vortex Flow Control units (hereafter referred to as “Flow Control”).

Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur, they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced, please do not hesitate to contact the company so that an investigation may be made.

All Flow Control units are typically manufactured from grade 304 Stainless Steel, and if required they can also be manufactured in grade 316 Stainless Steel. Both materials have an estimated life span in excess of the design life of drainage systems.

COSHH

Flow Control units are manufactured from Stainless Steel which is not regarded as hazardous to health and exhibits no chemical hazard when used under normal circumstances for the stated applications.

Manual Handling

The handling of Flow Control units should be in accordance with the current legislation and regulations, all published and printed by the Health and Safety Executive:

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Manual Handling Operations Regulations 1992

Hydro International (UK) Ltd, Unit 2 Rivermead Court, Kenn Business Park, Windmill Road, Kenn, Clevedon, BS21 6FT
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