



Shurgard Tottenham

45-47 Garman Road, Tottenham, N17 0UL

Drainage Strategy

For Shurgard UK Ltd

Date: 27 January 2023

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Issued by	Hydrock Consultants Limited 5-7 Tanner Street London SE1 3LE United Kingdom	T +44 (0)20 3846 8456 E london@hydrock.com www.hydrock.com
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Checked by	C Mac Hugh	
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1. INTRODUCTION

Hydrock have been appointed by Shurgard UK Ltd to provide a Drainage Strategy report for the approval of Haringey Council Lead Local Flood Authority.

The proposed drainage strategy will be in accordance with both 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 damaged caused by flooding.

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 Ltd accepts no responsibility for any direct and/or consequential loss that may occur as a result.

Appendices

Appendix A: Proposed Site Layout

Appendix B: Topographic Survey

Appendix C: Thames Water Sewer Records

Appendix D: Existing Utilities Survey

Appendix E: Greenfield Runoff Calculation

Appendix F: BGS Borehole Record

Appendix G: Geo-Environmental Assessment

Appendix H: Proposed Drainage Strategy

Appendix I: Supporting Calculations

References / Design Codes

- BS EN 752 - Drain and Sewer Systems Outside Buildings.
- Building Regulations Approved Document Part H - Drainage and waste disposals.
- 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 located within the Tottenham area of the London Borough of Haringey and the red line planning boundary covers an area of approximately 0.25 hectares.

Table 2.1: Site Referencing Information

Site Address	Shurgard Tottenham 45-47 Garman Rd Tottenham Haringey Borough Greater London Postcode: N17 0UL
Grid Reference	TQ 35098 91299 E535098 N191299



Figure 1: Site Location

The site is bounded by Sedge Road to the North, industrial units to the South, Watermead Way to the East, and Garman Road to the West.

The site is currently in use as an industrial unit and as such is considered to be a brownfield site.



Figure 2: Site Red Line Boundary

2.2 Topography

A topographical survey of the site was undertaken in February 2022. The majority of the site consists of the existing industrial unit with a strip of dense vegetation in the north and east separating the site from the highway, and a footpath opening directing on the highway along the western boundary.

Levels generally fall back into the site boundary both within the site and from the surrounding area. A 1-in-3 gradient along the eastern boundary supported by a retaining wall outside the site boundary.

The highest level recorded was 11.57m AOD along the eastern boundary.

The lowest level recorded was 9.27m AOD along the northern boundary.

See **Appendix A** for Topographical Survey.

2.3 Development Proposal

The proposed involves the construction of a new self-storage facility (Use Class B8) with associated landscaping, car and cycle parking, and refuse storage. Vehicle and pedestrian access would be via Garman Road.

See **Appendix A** for Architect's Layout.

2.4 Geology

British Geological Survey (BGS) mapping indicates that the site is underlain by superficial layers of Enfield Silt with London Clay bedrock.

BGS borehole record TQ39SE900, taken within Marigold Road 300m to the south of the site, indicates that the site has a layer of gravel from 2.50m bgl to 7.20m bgl. This layer is overlain by clays and made ground and underlain by London Clay.

A site specific ground investigation was undertaken in April 2022. The report identified that the site consisted of a surface layer of made ground to 1.20m bgl below which are layers of clay and gravel.

See Appendix F for the Borehole Record and Appendix G for the ground investigation report.

2.5 Hydrology & Hydrogeology

The EA Main River Map identifies the nearest main river as Pymes Brook located 250m east of the site.

The BGS borehole struck groundwater at 3.00m bgl and was noted to have the odour of hydrocarbons.

Ground investigation works struck water at 2.60m bgl in the south western corner of the site only. This would suggest that there is potential for the site to infiltrate runoff. However, specific testing to BRE 365 will be required to confirm the site specific infiltration rate and suitability.

The DEFRA Magic Map identifies that the site is within Source Protection Zone 2.

2.6 Flood Risk

The Environment Agency (EA) Updated Flood Map for Planning indicates that the site lies entirely within Flood Zone 2, i.e., land identified as having a 1 in 100 to 1 in 1,000 annual probability of river flooding in any one year.

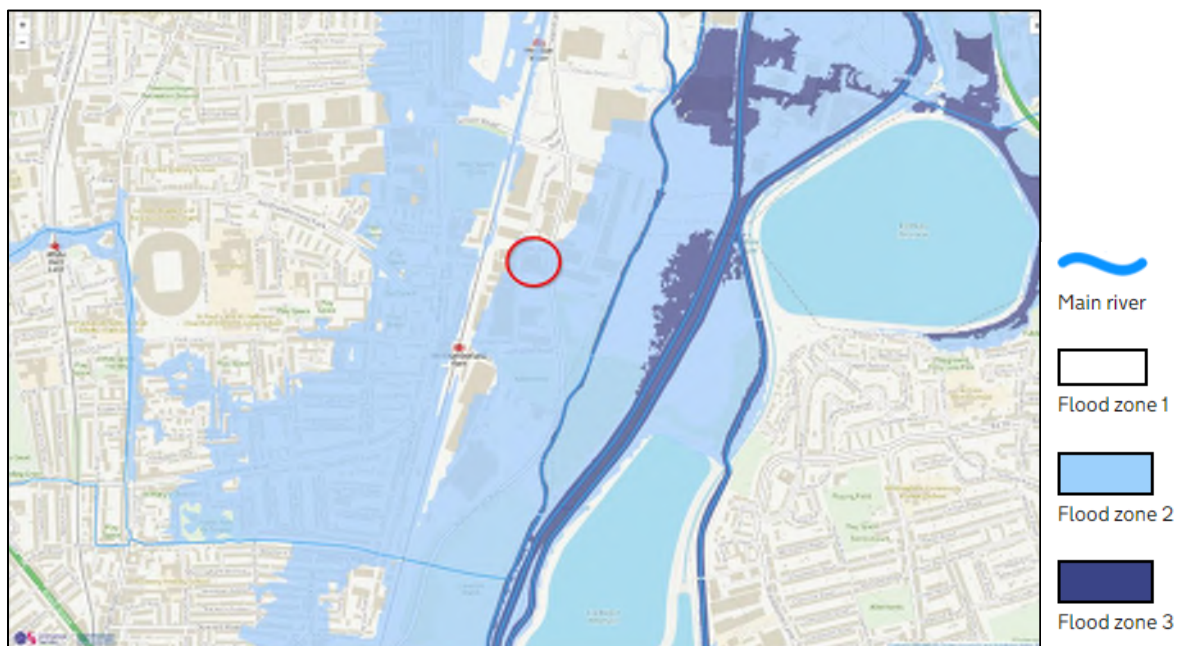


Figure 3 Extract from the Updated Flood Map for Planning (June '22)

The EA Updated Surface Water Flood Map for Planning identifies that the site is at low risk of flooding from overland flows. The mapping indicates that flows would be directed south along Garman Road.

The EA Risk of Flooding from Reservoirs map identifies that the site is at risk of flooding from reservoirs. However, whilst the consequences of a reservoir failure would be severe, the probability of a catastrophic dam failure are considered to be extremely low.

As noted above, the site is underlain by a superficial layer of clay with the water table at 3m bgl. Therefore, the site is considered to be at low risk of groundwater flooding.

The risk of flooding from sewers is considered to be low.

Refer to **Hydrock Flood Risk Assessment** for further information.

3. SURFACE WATER MANAGEMENT STRATEGY

3.1 Pre-Development Surface Water Drainage

Thames Water:

Sewer records and a utilities survey identify that a 1350mm diameter surface water sewer intrudes into the site's northern area flowing west to east. A manhole for this sewer was identified within the vegetation in the north eastern corner of the site. There is a defined easement over this sewer that cannot be built in.

An additional 225mm diameter surface water sewer at the head of the network is within Garmin Road off the site's north-western corner.

For the purpose of this report the drainage has been taken from the sewer asset map information only. It is recommended a full drainage CCTV survey is undertaken to determine accurate routes of the existing drainage so the proposed network can be suitably coordinated.

Private:

The utilities survey identified that the site currently drains via gravity towards the west and has been taken that the this connects into the Thames Water (TW) public sewer network in Garman Road via an existing 150m diameter pipe.

The private drainage serving the site will largely be removed and replaced to enable the re-development of the site. However, it is proposed that the existing connection into the TW public sewer is reused.

See **Appendix D** for the Utilities Survey.

3.2 Pre-Development Surface Water Catchments

The table below indicates each catchment type area, pre-development as taken from the topographic survey:

Table 3.1: Pre-Development Catchment Areas

Pre-Development Catchment	Area (m2)
<u>Impermeable</u>	
Building / Roof	1603
Roads / Hardstanding	604
<u>Permeable</u>	
Soft Landscaping	0000
Total Area	2207

3.3 Pre-Development Surface Water Run-Off

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:

3.3.1 Run-Off Rates

In line with the DEFRA Non-Statutory Technical Standard for Sustainable Drainage Systems (SuDS) and London Plan policy 5.13, it is a requirement that on new developments that consideration be given to limit discharge as close as reasonably practical to the equivalent 'Greenfield' rate for the corresponding storm event. The following table considers what the maximum surface water discharge from the site would be if the site was 'Greenfield' i.e., not developed:

Table 3.2: Pre-Development Greenfield Run-Off Rates

Storm Event	Maximum discharge rate (l/s) Greenfield
1 in 1 year	0.29
1 in 30 year	0.80
1 in 100 year	1.10
QBAR	0.35

In line with the London Plan Sustainable Design and Construction Supplementary Planning Guidance, if the 'Greenfield' run off rate cannot be achieved on a previously developed site, the run off rate should be no more than three times the calculated 'Greenfield' rate.

3.3.2 Run-Off Volumes

The existing drainage network connects into the TW surface water sewer in Garman Road via a 150mm diameter drain located adjacent to the existing site entrance. The utilities survey did not identify any form of flow control restriction limiting discharge to the sewer

It has been calculated that during the 1 in 100-year rainfall event approximately 32m³ of runoff will be discharged into the public sewer at a rate of 36.3 l/s and 24.5m³ of flooding will occur within the site following exceedance flow routes to pool around the site perimeter.

3.4 Pre-Development Flood Exceedance Flows

Topographical survey information indicates that prior to demolition exceedance flows will pool around the site boundary. With no positive drainage identified in these areas it has been taken that this water would pond within areas of existing hardstanding.

3.5 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 3.3: SuDS Hierarchy

Method	Reasoning	
Interception / Re-use	Development is for a self-storage facility with minimum water requirements	X
Infiltration	Unable to recommend in the absence of site specific infiltration testing	X
Surface water body	No watercourses within or adjacent to the site	X
To dedicated surface water sewer (public, highways or otherwise)	Existing connection to public sewer in Garman Road	✓
To a combined sewer	N/A	X
To a foul sewer	N/A	X

3.6 Suitability of SuDS Components

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 3.4: Suitability of SuDS Components

Hierarchy	Description	Setting	Required area	
Green roofs 	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	Building	Building integrated.	✓
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. Water could be used for toilet flushing and irrigation.	Building	Water storage (Underground or above ground).	X

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.	Open space	Dependent on runoff volumes, water table and soils.	X
Filter strip 	Filter strips are grassed or planted areas that runoff is allowed to run across to promote infiltration and cleansing.	Open space	Minimum length 5m.	X
Permeable paving 	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	Street / open space	Can typically drain double its area.	X
Bioretention area 	A vegetated area with gravel and sand layers below designated to channel, filter and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	Street / open space	Typically, surface area is 5-10% of drained area with storage below.	X
Swale 	Swales are shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.	Street / open space	Account for width to allow safe maintenance typically 2–3 metres wide.	X

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.	Street / open space	Could be above or below ground and sized to storage need.	X
Pond / Basin 	Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period of time before discharge.	Open space	Dependent on runoff volumes and soils.	X
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.	Open space	Typically, 5–15% drainage area to provide good treatment.	X
Underground storage 	Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.	Open space	Dependent on runoff volumes and soils.	✓

3.7 Post-Development Surface Water Drainage

It is proposed that the new below ground surface water drainage system will positively drain the site via gravity and discharge at a restricted rate to the TW 225mm diameter surface water sewer in Garman Road via an existing 150mm diameter connection. On-site attenuation will be provided by a geocellular attenuation tank located beneath the proposed car park.

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

3.8 Post-Development Surface Water Catchments

The table below indicates each catchment type area, post-development:

Table 3.5: Post-Development Catchment Areas

Post-Development Catchment	Area (m ²)
Building / Roof	1753*
Roads / Hardstanding - Impermeable	290
Roads / Hardstanding – Permeable	0000
Soft Landscaping	164
Total Area	2207

*As the roof is proposed as a green/brown roof, the drained impermeable area has had a reduction to 85% applied during design calculations. This reduction is not included here.

3.9 Post-Development Surface Water Run-Off

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

3.9.1 Run-Off Rates

The Greenfield runoff rate from the site has been identified as 0.35 l/s. In line with paragraph 3.4.10 of the London Plan Sustainable Design and Construction Supplementary Planning Guidance, three times this rate is 1.05 l/s. It is considered unfeasible to reduce to this rate as this rate would present a significant risk of blockage at the flow control unit. It is also considered that, due to the age of the existing development, that no flow restriction is currently implemented. Therefore, it is proposed that the site discharges at a restricted rate of 5.0 l/s in line with paragraph 3.4.9 of the Supplementary Planning Guidance.

3.10 Urban Creep

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.

3.11 Post-Development Surface Water Storage

For the purposes of design, it has been considered that the development's green roof will be used for treatment and conveyance only and any potential attenuation provided has not been included in the calculations. As such, flows within the site will be attenuated using a geocellular storage tank providing 90.8 m³ of storage. This tank will be positioned within the proposed undercroft car parking area.

The distribution of attenuation flood storage has been calculated for the development below:

Table 6 Attenuation Volume Required

Impermeable Area (m ²)	Discharge Rate (ltrs/sec)	Volume Provided (m ³)
1780	5.0	90.8

3.12 Post-Development Flood Exceedance Flows

In the event that flows from rainfall exceed the 1 in 100-year rainfall event plus allowance for climate change or system failure through lack of maintenance, surface water run-off will be directed via exceedance routes away from buildings and/or critical infrastructure.

3.13 Water Quality Treatment

Pollution hazard indices for land use classifications (as identified in Table 26.2 of CIRIA C753 - The SuDS Manual) are as follows;

Table 3.7: Pollution hazard indices

Pollution hazard indices for different land use classifications in accordance with CIRIA C753 - The SuDS Manual. Table 26.2				
Land Usage	Level	TSS	Metals	Hydrocarbons
Other roofs (typically commercial / industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g., cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., <300 traffic movements/day	Low	0.5	0.4	0.4

The indicative SuDS mitigation indices for discharges to surface waters (as identified in Table 26.3 of The SuDS Manual), are as follows;

Table 3.8: SuDS pollution mitigation for discharge to surface waters

Indicative SuDS mitigation indices for discharge of surface water			
Type of SuDS component	Mitigation indices		
	TSS	Metals	Hydrocarbons
Green Roof	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately 1 in 1 year return period event, for inflow concentration relevant to the contributing drainage area		

It should be noted that the car park is covered by the development's green roof and as such will only be taking minimal runoff from outside the site. It is proposed that a Class-1 bypass separator is provided to treat these flows.

Consideration will be given to both during construction and post-development water quality treatment to ensure that water quality is not impacted during the construction works:

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

In accordance with Environment Agency Document PPG3 (now withdrawn but considered best practice guidance) as the car park is less than 50 spaces or 800m², the proposal considered to be 'low risk' in terms of pollution to the surface water network and as such an oil interceptor is deemed to be required. Additionally, it is proposed that the car parking area is located in an undercroft space beneath the building and will not receive direct run-off.

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

3.13.2 *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.

3.14 Design Standards

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:

- | | |
|---|--|
| Pipes running under full conditions with no surcharge | - 1 in 2-year storm return period |
| No flooding | - 1 in 30-year storm return period |
| Extreme flooding to be retained on site | - 1 in 100-year storm return period plus allowance for climate change (40%). |

See **Appendix H** for Drainage Strategy.

4. FOUL WATER MANAGEMENT STRATEGY

4.1 Pre-Development Foul Water Drainage

Thames Water:

A foul water sewer of 150mm diameter flows across Sedge Road from east to west. At the junction of Sedge Road and Garman Road it increases to a 225mm diameter and flows southwards within Garman Road.

For the purpose of this report the drainage has been taken from the sewer asset map information only. It is recommended a full drainage CCTV survey is undertaken to determine accurate routes of the existing drainage so the proposed network can be suitably coordinated.

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

Private:

The utilities survey identified that the site currently drains via gravity towards the west and has been taken that this connects into the TW public sewer network in Garman Road via an existing 150mm diameter pipe.

The private drainage serving the site will largely be removed and replaced to enable the re-development of the site. However, it is proposed that the existing connection into the TW public sewer is reused.

See **Appendix D** for the Utilities Survey.

4.2 Post-Development Foul Water Drainage

It is proposed that the new below ground foul water drainage system will positively drain the site via gravity and discharge into the TW 225mm diameter foul water sewer in Garman Road via an existing 150mm diameter connection.

It is considered that the site will be discharging only domestic waste into the system. Should it be decided to discharge trade effluent, permission must be sought from TW.

The design of all foul sewers and lateral drains must conform to BS EN 752, BS EN 16933, Building Regulations 2010 Part H, planning policy and best practice guidelines wherever applicable. Sanitary systems within the building should be designed in accordance with BS EN 12056-2.

4.3 Post-Development Foul Water Flow Rates

Using BS12056 and the proposed site plan, the foul water flows have been calculated based upon:

- 1 no. wash basin
- 2 no. sinks
- 1 no. WC with 6.0l cistern

Based upon the above, the peak flow rate from the development has been calculated as 1.50 l/s.

5. OWNERSHIP AND MAINTENANCE

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

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

The maintenance requirements will be the responsibility of a Shurgard UK Ltd.

Table 5.1: Proposed Schedule of Maintenance for Below Ground Drainage

Underground Cellular Tanks - Operation and maintenance requirements in accordance with CIRIA C753 - The SuDS Manual		
<u>Maintenance Schedule</u>	<u>Required Action</u>	<u>Frequency</u>
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly.
	For systems where rainfall infiltrates into the tank from above, check surface or filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually.
	Remove sediment from pre-treatment structures and / or internal forebays.	Annually, or as required.
Remedial actions	Repair / rehabilitate inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually.
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.
Other Drainage Items - Ownership & Maintenance Responsibility Matrix		
<u>Feature</u>	<u>Maintenance</u>	<u>Frequency</u>
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.
Discharge orifice manholes/flow control devices	Inspection	Quarterly
	Regular Maintenance	Remove silt and debris as necessary to prevent build up.
Gully / Drainage Channels	Inspection	Quarterly
	Regular Maintenance	Remove silt and debris as necessary to prevent build up.

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

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

Table 5.2: Proposed Operational Schedule for Below Ground Drainage

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

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.

6. CONSENT / PLANNING

Summary of expected consents required:

Any works within the easement of or to divert the existing 1350mm surface water sewer in the northern part of the site will require consent from Thames Water.

An initial pre-development enquiry to TW has confirmed that there is sufficient capacity within the foul water sewer in Garman Road to accommodate foul water discharge from the site. Consent to discharge surface water first requires approval from the LLFA before being considered by TW.

In addition to the above it is anticipated that details of the drainage scheme will need to be approved by Haringey Borough Council as Lead Local Flood Authority (LLFA) through a formal planning application. At the time of writing initial enquiries have been made to the LLFA but no response has been received.

7. CONCLUSION

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

- The foul and surface water drainage systems for the new development will be designed to accommodate the required flows for the lifetime of the development.
- It has been determined that the post-development surface water flow rates have been restricted to 5.0 l/s so as to not adversely impact downstream flooding of the site as a result of the new development.
- All surface water run-off from storm events up to and including the 100-year plus 40% climate change will be retained within the overall site.
- Ownership and maintenance liabilities for the foul and surface water drainage system will be clearly defined so that in the event of failure the drainage system appropriate action can be taken to ensure that the drainage system continues to work efficiently.
- In the event that flows from rainfall exceed the 1 in 100-year rainfall event or system failure through lack of maintenance, surface water run-off will be directed via exceedance routes away buildings and/or critical infrastructure.

Appendix A

Proposed Site Layout



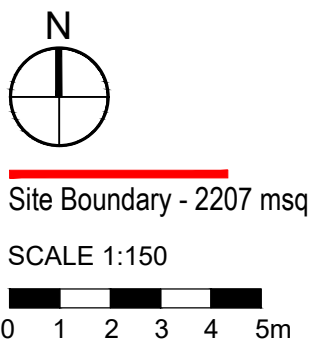
All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately. Do not scale dimensions from this drawings. This drawing is copyright protected.

REVISION

- Visitor Parking: 3 x Car space (1 of which is Accessible)
- Customer Parking: 7 x Car space (2 of which are Electrical Charge points)
- Van Parking: 1 x space
- Electrical Car "Twin" charging point
- Bicycle Parking: 4 long stay, 10 short stay, 2 Cargo Bikes
- Refuse Requirement = 0.1 sqm
- Actual Refuse Store = 8m2
- Calculation: Total back of house/shop area = 57m2
- Storage area Req @ 2 m2 / 1000m2
- Sum: 57/1000 x 2 = 0.114m2

LEGEND: Surface Finishes

- Pavement (Highways Land)
- Existing Soft landscaping (Highways Land)
- Proposed Soft Landscaping Area
- Please refer to landscaping drawing for more details



PLANNING

SCALE	DATE	DRAWN	CHECKED
1:150	MAY'22	AF	DA

PROJECT
SHURGARD UK
45-47 GARMAN ROAD
TOTTENHAM: N17 0UR

DRAWING
SITE PLAN
AS PROPOSED

Threesixty Architecture
10 MONTROSE STREET
GLASGOW
G1 1RE
0141 229 7575
www.360architecture.com

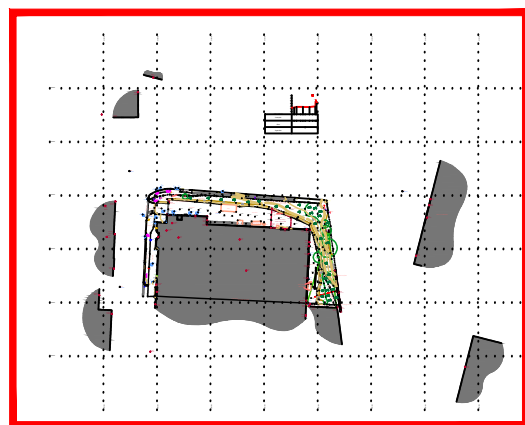
DRAWING No.
22007GA-D-002

Appendix B

Topographic Survey



Sheet Layout



Legend

Topographic			
AV	Air Valve	MAE	Marker post electric
BB	Bellish beacon	MAG	Marker post gas
Bdy	Boundary post/peg	MAOF	Marker post oil/fuel
BH	Benchmark	MAT	Marker post telecom
Bol	Bollard	MAU	Marker unidentified
BT	British Telecom	MAW	Marker post water
Bus	Bus stop	Plev	Pipe invert level
CATV	Cable TV	PR	Pipe riser
CL	Closed circuit tv	RA	Rodding access
CCTV	Cover level	Rd	Rodding access
CP	Column	Rd	Rodding access
CP	Crossing point	RWP	Rainwater pipe
CPS	Concrete paving	Sag	Overhead sag level
CR / DR	Cable rise/duct riser	SB	Softfall bed level
Elec	Electric feature	SP	Sign post
E Cab	Electricity cabinet	ST	Stop tap
EP	Electricity pole	SV	Stop valve
FH	Fire hydrant	SY	Stay
FS	Flag staff	Tap	Water tap
G	Gully	TCB	Telephone call box
Gas	Gas unidentified	Th	Trail hole
GL	Ground light	TL	Traffic light
GM	Gas meter	TP	Telecom pole
GP	Guide post	TS	Traffic signals
GV	Gas valve	TT	Traffic signals
HBed	Hard bed level	TW	Top of wall level
IBol	Illuminated bollard	UCab	Unidentified cabinet
Inv	Invert level	VP	Vent pipe
Sign	Illuminated sign	Whed	Window head level
SP	Illuminated sign post	WL	Water level
KI	Kerb inlet	WM	Water meter
LB	Letter box	WO	Wash out
LC	Lighting column	WS	Window Sample
MDO	Marker post drainage	WS	Window sill level
		WS	Window sill level

Bank top	Footpath or track
Breakline	Kerb or Rail line
Bank bottom	Kerb (dropped)
Bank bottom (water)	Kerb inlet
Building overhead	Miscellaneous
Cable overhead	Roadmarkings
Concrete/Tarmac	Section position
Contour	Street furniture
Gate	Vegetated light/dense
Grass	Wall
Fence (labelled)	Waterline
	OS Data
	© Crown copyright

Station Table

Name	Easting	Northing	Level
RS1	535068.615	191315.775	11.051
T1	535151.642	191321.743	10.674
T2	535049.714	191329.269	9.917
T3	535046.159	191286.025	9.473
T4	535058.315	191313.591	9.602
T5	535083.361	191313.925	9.372
T6	535117.356	191307.468	9.407
T7	535118.455	191286.037	9.429

Drawing Notes

Utility depths and levels shown are in meters.

Pipe sizes and materials which cannot be obtained by visual survey are taken from record drawings or marker plates where available.

Cable routes shown as a single line may actually consist on many cables please refer to annotated configuration details where provided.

Drainage pipe sizes and invert levels have been determined without man entry into chambers. Every effort has been made to correctly obtain this information however accuracy is dependent on the visibility of the manhole.

Coordinates and Levels are derived from Ordnance Survey datum OSG836 through a series of GNSS RTK Observations carried out at survey control station T1 and orientated through station T2.

Client Logo:



Project Address:
45 - 47 Garmen Road
London

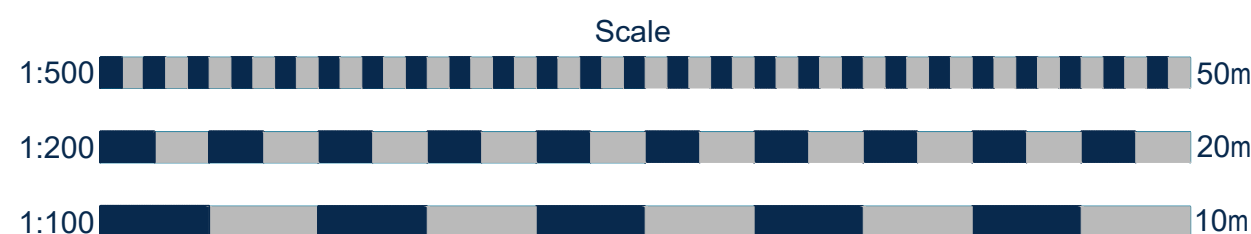
Project Title:
Topographical Survey

Surveyor	Drawn	Checked	Survey Date	Scale
TPO	TPO	DT	23/02/2022	1:200 @ A0
Project Number:	UM22-1202-BSL	Sheet No:	1 OF 1	Revision:
Revision	Revision Notes		Date	

Utility MAPPING

0800 024 UMAP (8627)

www.u-map.co.uk info@u-map.co.uk



Appendix C

Thames Water Sewer Records

SearchFlow Limited
42
Kings Hill Avenue
Kings Hill
West Malling
ME19 4AJKent

Search address supplied	45-49, Garman Road, Tottenham, Haringey, LONDON, N17 0UL
Your reference	SHU001/0035
Our reference	CDWS/CDWS Standard/2022_4581880
Received date	3 February 2022
Search date	8 February 2022

Keeping you up-to-date

Commercial Drainage and Water Enquiry

The Commercial Drainage and Water Enquiry is specifically designed for those purchasing or leasing land or commercial property.

With comprehensive information regarding water and sewerage services and infrastructure assets, combined with an appropriate guarantee for commercial property and land transactions, the Commercial Drainage and Water Enquiry mitigates risk and provides peace of mind for commercial property professionals and their advisers.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



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



0800 009 4540

Question

Summary Answer

Maps

1.1	Where relevant, please include a copy of an extract from the public sewer map.	Map Provided
1.2	Where relevant, please include a copy of an extract from the map of waterworks.	Map Provided

Drainage

2.1	Does foul water from the property drain to a public sewer?	Connected
2.2	Does surface water from the property drain to a public sewer?	Connected
2.3	Is a surface water drainage charge payable?	See Details
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	Yes
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	Yes
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the 50metres of any buildings within the property?	No
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is the building, which is or forms part of the property, at risk of internal flooding due to overloaded public sewers?	Not At Risk
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	2.429 Kilometres

Water

3.1	Is the property connected to mains water supply?	Connected
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	Yes
3.3	Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4	Is the property at risk of receiving low water pressure or flow?	No
3.5	What is the classification of the water supply for the property?	Hard
3.6	Is there a meter installed at this property?	Yes
3.7	Please include details of the location of any water meter serving the property.	See Details

Question

Summary Answer

Charging

4.1.1	Who is responsible for providing the sewerage services for the property?	Thames Water
4.1.2	Who is responsible for providing the water services for the property?	Thames Water
4.2	Who bills the property for sewerage services?	See Details
4.3	Who bills the property for water services?	See Details

Trade Effluent

5.1	Is there a consent, on this property, to discharge Trade Effluent under S118 of the Water Industry Act(1991) into the public sewerage system?	No
------------	---	----

Wayleaves, Easements, Manhole Cover and Invert levels

6.1	Is there a wayleave/easement agreement giving Thames Water the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?	No
6.2	On the copy extract from the public sewer map, please show manhole cover, depth and invert levels where the information is available .	See Details

Search address supplied: 45-49, Garman Road, Tottenham, Haringey, LONDON, N17 0UL

Any new owner or occupier will need to contact Thames Water on 0800 316 9800 or log onto our website www.thameswater.co.uk and complete our online form to change the water and drainage services bills to their name.

The following records were searched in compiling this report: - the map of public sewers, the map of waterworks, water and sewer billing records, adoption of public sewer records, building over public sewer records, the register of properties subject to internal foul flooding, the register of properties subject to poor water pressure and the drinking water register.

Thames Water Utilities Ltd (TWUL) holds all of these.

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched
- (ii) any negligent or incorrect interpretation of the records searched
- (iii) any negligent or incorrect recording of that interpretation in the search report
- (iv) and compensation payments

Maps

1.1 Where relevant, please include a copy of an extract from the public sewer map.

A copy of an extract of the public sewer map is included, showing the public sewers, disposal mains and lateral drains in the vicinity of the property.

1.2 Where relevant, please include a copy of an extract from the map of waterworks.

A copy of an extract of the map of waterworks is included, showing water mains, resource mains or discharge pipes in the vicinity of the property.

Drainage

2.1 Does foul water from the property drain to a public sewer?

Records indicate that foul water from the property drains to a public sewer.

2.2 Does surface water from the property drain to a public sewer?

Records indicate that surface water from the property drains to a public sewer.

2.3 Is a surface water drainage charge payable?

Records indicate that a surface water charge is applicable at this property.

2.4 Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundary of the property?

The public sewer map included indicates that there is a public sewer, disposal main or lateral drain within the boundaries of the property. However, from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map but which may further prevent or restrict development of the property.

2.4.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?

The public sewer map included indicates that there is no public pumping station within the boundaries of the property.

2.5 Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

The public sewer map included indicates that there is a public sewer within 30.48 metres (100 feet) of a building within the property.

2.5.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

The public sewer map included indicates that there is no public pumping station within 50 metres of any buildings within the property.

2.6 Are any sewers or lateral drains serving, or which are proposed to serve, the property the subject of an existing adoption agreement or an application for such an agreement?

Records confirm that Foul sewers serving the development, of which the property forms part are not the subject of an existing adoption agreement or an application for such an agreement.

The Surface Water sewer(s) and/or Surface Water lateral drain(s) are not the subject of an adoption agreement.

2.7 Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

2.8 Is the building which is or forms part of the property, at risk of internal flooding due to overloaded public sewers?

The property is not recorded as being at risk of internal flooding due to overloaded public sewers.

From the 1st October 2011 most private sewers, disposal mains and lateral drains were transferred into public ownership. It is therefore possible that a property may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.

2.9 Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

The nearest sewage treatment works is Deephams STW which is 2.429 kilometres to the north of the property.

Water

3.1 Is the property connected to mains water supply?

Records indicate that the property is connected to mains water supply.

3.2 Are there any water mains, resource mains or discharge pipes within the boundary of the property?

The map of waterworks indicates that there are water mains, resource mains or discharge pipes within the boundaries of the property.

3.3 Is any water main or service pipe serving, or which is proposed to serve, the property the subject of an existing adoption agreement or an application for such an agreement?

Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

3.4 Is the property at risk of receiving low water pressure or flow?

Records confirm that the property is not recorded on a register kept by the water undertaker as being at risk of receiving low water pressure or flow.

3.5 What is the classification of the water supply for the property?

The water supplied to the property has an average water hardness of 108.9mg/l calcium which is defined as HARD by ThamesWater.

3.6 Is there a meter installed at this property?

Records indicate that there is a meter installed at this property.

3.7 Please include details of the location of any water meter serving the property.

Records indicate that the property is served by a water meter, which is located within the property.

Charging

4.1.1 – Who is responsible for providing the sewerage services for the property?

Thames Water Utilities Limited, Clearwater Court, Reading, RG1 8DB is the sewerage undertaker for the area.

4.1.2 – Who is responsible for providing the water services for the property?

Thames Water Utilities Limited, Clearwater Court, Reading, RG1 8DB is the water undertaker for the area.

4.2 Who bills the property for sewerage services?

If you wish to know who bills the sewerage services for this property then you will need to contact the current owner. For a list of all potential retailers of sewerage services for the property please visit www.open-water.org.uk

4.3 Who bills the property for water services?

If you wish to know who bills the water services for this property then you will need to contact the current owner. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk

Trade Effluent

5.1 Is there a consent, on this property, to discharge Trade Effluent under S118 of the water Industry act (1991) into the public sewerage systems?

No.

Wayleaves, Easements, Manhole Cover and Invert levels

6.1 Is there a wayleave/easement agreement giving Thames water the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?

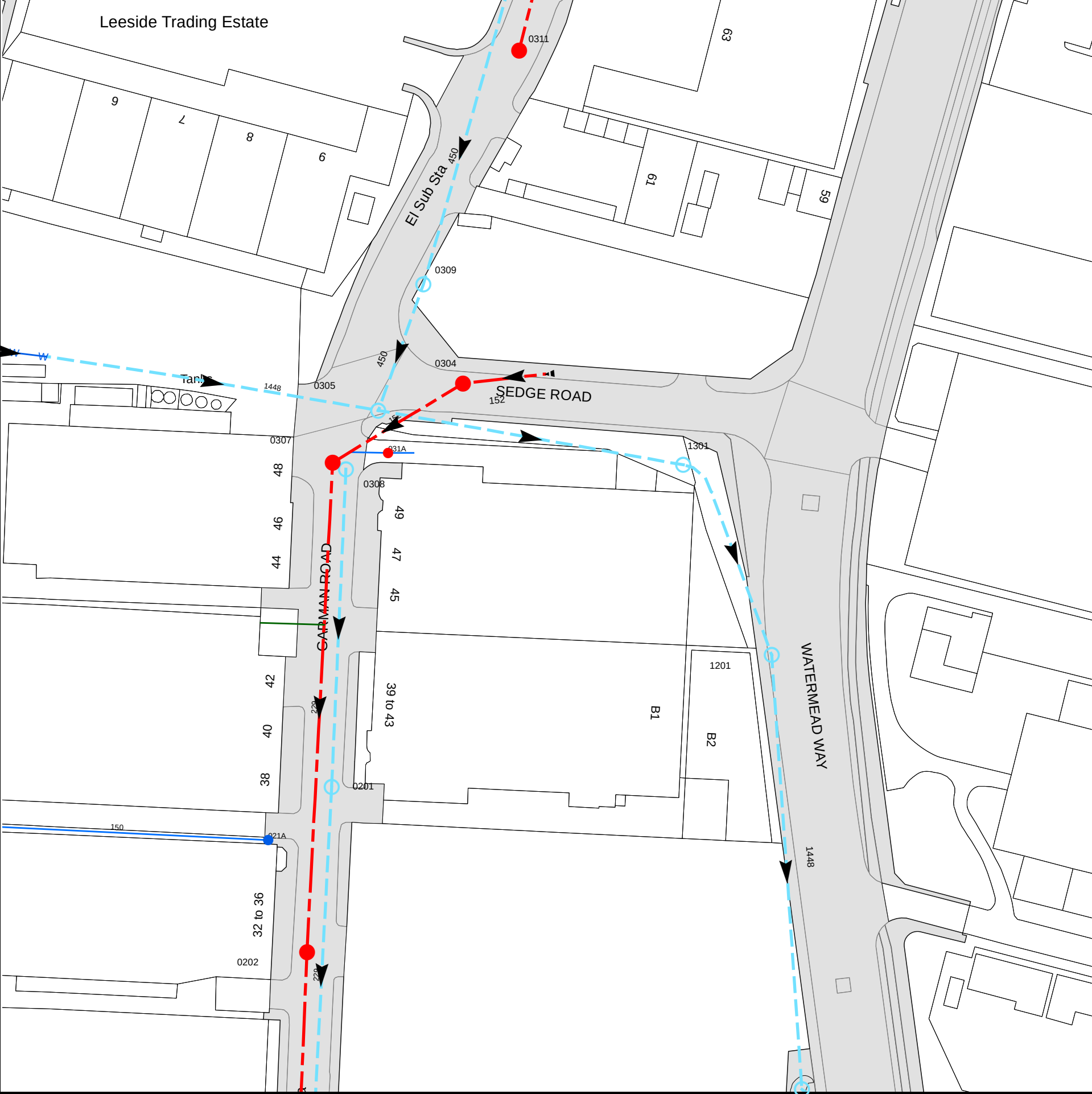
No.

6.2 On the copy extract from the public sewer map, please show manhole cover, depth, and invert levels where the information is available.

Details of any manhole cover and invert levels applicable to this site are enclosed.

Payment for this Search

The charge will be added to the NLIS Account. This search was ordered through National Land Information Services, Russell Square House, 10-12 Russell Square, London WC1B 5LF.



The width of the displayed area is 200m

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 no survey information is available.

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0307	9.5	7.98
0308	9.51	8.09
0305	9.26	7.16
031A	n/a	n/a
0309	9.7	7.88
0304	n/a	n/a
0311	10.75	9.26
1301	n/a	n/a
1105	8.54	7.04
0202	9.31	7.84
021A	n/a	n/a
0201	9.37	8.43
1201	8.51	7.08

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.



Con29DW Commercial Drainage and Water 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, paths 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
	Four 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

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.

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
	Gull 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 Characteristics Indicator
	Public / Private Pumping Station
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Chamber
	Operational Site

Ducts or Crossings

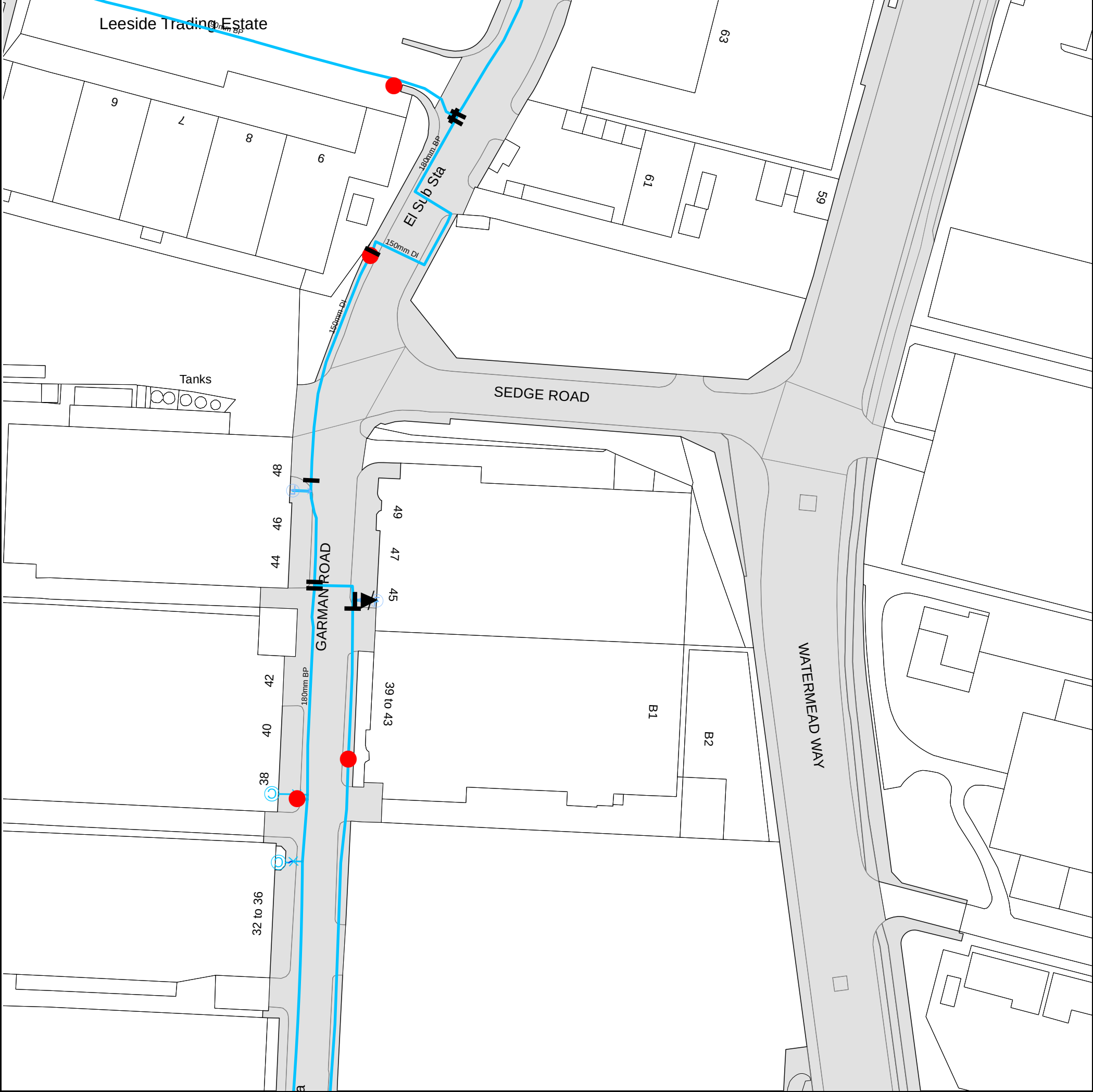
	Casement
	Conduit Bridge
	Subway
	Tunnel

Ducts may contain high voltage cables. Please check with Thames Water.

5) 'In' or 'W' 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 309 4540.



The width of the displayed area is 200m

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.



Con29DW Commercial Drainage and Water Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

-  **Distribution Main:** The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
-  **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.
-  **Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.
-  **Fire Main:** Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
-  **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.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 6")
600mm and bigger (24" plus)	1200mm (4')

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.

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 name of the pipe displayed along them.
-  **Private Main:** Indicates 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.

Appendix D

Existing Utilities Survey

Appendix E

Greenfield Runoff Calculation

Calculated by:

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm):	617	617
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.35	0.35
1 in 1 year (l/s):	0.29	0.29
1 in 30 years (l/s):	0.8	0.8
1 in 100 year (l/s):	1.1	1.1
1 in 200 years (l/s):	1.29	1.29

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

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Ok, I agree

More

Appendix F

BGS Borehole Record

Appendix G

Geo-Environmental Assessment



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

SHURGARD UK

Garman Road, Tottenham

Phase II Geo-Environmental Assessment Report

SRP/M4993/10981

April 2022

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site is located off Garman Road, Tottenham, N17 0UR. It is situated approximately 12 km north-east of London City Centre, centred on National Grid Reference 535091, 191308. The site is occupied by a factory unit and small yard area.
Ground Conditions	Generalised ground conditions from the ground investigation comprise (top down): • Made ground generally comprising gravelly clay from ground level to between 0.90m and 1.20m bgl. • Natural superficial deposits comprising clay and gravel proven to depths between 2.00m and 3.60m bgl. • Groundwater recorded in WS04 at 2.60m bgl.
Human Health - Soils Contamination	• No exceedances of heavy metals, PAHs, TPHs, BTEX or MTBE compounds. • Chrysotile fibres (loose fibres) detected in one sample of made ground. • Risk to human health is considered to be low.
Controlled Waters – Surface and Groundwater Contamination	• Risk to controlled waters is considered to be low.
Ground Gas	Ground gas monitoring is ongoing, and a full assessment will be undertaken on completion of the scheduled monitoring. This site is currently categorised as CS-1.
Outline Remedial Strategy	No specific remedial measures are considered necessary at the site at this stage.
Foundations and Floor Slabs	For the anticipated point loads from an assumed steel frame, shallow pad foundations are considered to be the most suitable foundation solution, with a 1m² pad at a depth of 2.0m within the gravel strata providing a safe bearing capacity of 500kN/m², keeping total and differential settlement within acceptable limits. Strip foundations may be utilised to support external masonry placed within the natural gravel strata at a minimum depth of 2.00m bgl, for a 0.6m wide foundation an allowable bearing capacity not exceeding 500kN/m² should be assumed for the gravel. If the proposed loads are higher, or if the undercroft parking is proposed at basement level, then deeper exploratory holes from further site investigation will be required to inform a deep foundation solution. Suspended floor slabs may be adopted however, ground bearing floor slabs may be considered more suitable.
Concrete Classification	DS-1 AC-1s conditions prevail in made ground and clay. DS-1 AC-2z conditions prevail in gravel.
Highways Design	Made Ground CBR – <2% Superficial Strata CBR – cohesive/fine soils– 2% Superficial Strata CBR – granular/coarse soils– 20-60% The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Sustainable Drainage Systems (SUDS)	Drainage to soakaways is considered potentially suitable for this site. However, it is likely to require constructing within deeper more permeable strata or siting away from areas where the low permeability clays are present at shallow depth.
Further Work	The following further works will be required to progress to the construction phase: • Completion of ground gas monitoring programme. • Issue gas assessment / update gas assessment within this report. • If higher structural loads are anticipated than discussed in 7.3, or if basement excavation is considered, then deeper exploratory holes will be required to confirm foundation design. ○ Comprising: Cable Percussive boreholes to increase coverage, allow deeper piled foundation design and increase confidence of potential shallow design. • Demolition Asbestos survey. • Detailed foundation design by a structural engineer, including foundation zonation plan and depth schedule.

This executive summary should be read in conjunction with the full report, reference SRP/M4993/10981 and not as a standalone document.

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	Garman Road, Tottenham		
Document Name:	Phase II Geo-Environmental Assessment Report		
Reference:	SRP/M4993/10981		
Status:	-	28/04/2022	Interim.

Issued By:	Client:	Engineer:
Brownfield Solutions Ltd Unit 5 Alfred Court Saxon Business Park Stoke Prior Bromsgrove Worcestershire B60 4AD Tel: 01215 729014 brownfield-solutions.com	Shurgard UK Ground Floor Egerton House Baker Street Weybridge KT7 0SR	
	Contact: Mr D Ross	Contact:

Written by:



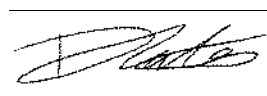
S Piercy
BSc (Hons) MSc
Graduate Project Engineer

Checked by:



J Wheaton
BSc (Hons) FGS
Senior Project Engineer

Approved by:



D M Gates
MGeoscience FGS
Senior Project Engineer

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DRAWINGS

Drawing Number	Rev	Title
UK00- Tottenham Garman Road- UM Plan- SK02	-	Proposed Development Layout Plan
M4993/01	-	Site Location Plan
M4993/02	-	Site Features Plan
M4993/04	-	Exploratory Hole Location Plan

APPENDICES

Appendix	Title
Photographs	Site Works Photographs
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Chemical Testing Results
Appendix D	Geotechnical Testing Results
Appendix E	Monitoring Results

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Shurgard UK on a site off Garman Road, Tottenham and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1 :2004+A1 :2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2 :2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.

Definitions of terms and acronyms used within this report is presented in Section 10.0.

1.2 Proposed Development

The proposed development is for a commercial end use comprising a six-storey steel framed storage unit building and associated internal/covered car park areas as shown on the proposed development plan, drawing 'UK00-Tottenham Garman road-UM Plan-SK02' provided to BSL by the client.

1.3 Previous Reports

This report should be read in conjunction with the Brownfield Solutions Ltd Phase I Desk Study Assessment Report (SRP/M4993/10841) issued in March 2022.

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

This report has been produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Following the Phase I Desk Study referenced above, an exploratory intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The exploratory investigation was undertaken using window sampling, gas and groundwater monitoring and laboratory chemical and geotechnical testing, with reporting on the findings.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information upon which it has relied.

BSL have used reasonable skill, care, and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, Shurgard UK. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

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

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g., due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g., Japanese knotweed), this report does not constitute a formal survey of these potential issues.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Garman Road, Tottenham, N17 0UR. It is situated approximately 12 Km north-east of London City Centre, centred on National Grid Reference 535091, 191308 as shown on the Site Location Plan, Drawing No. M4993/01.

2.2 Site Description

The main site features and potential issues identified are detailed below and are shown on the Site Features Plan, Drawing No. M4993/02.

Feature	Description
Site Area	Approximately 0.3 hectares.
Site Access	Access to the site is gained off Garman Road to the west of the site.
Current Land Use and Site Features	The site comprises an existing commercial unit with a yard, comprising concrete hardstanding. The building occupies the majority of the site and borders another unit to the south of the site. Within the building, the flooring is concrete. There are multiple manhole covers recorded in the yard area. The toilets and welfare facilities are near the front of the building bordering the road and it appears that the services associated with these run in through the front of the building. The building is no longer used as a furniture works; however, the equipment is still present. The majority of the equipment comprises large pieces of machinery e.g., edge bander, panel saw and CNC machines.
Potential Sources of Gross Contamination	No evidence of gross contamination was observed on site.
Vegetation	There are semi-mature trees with mixed vegetation on the eastern boundary of the site. There is a mix of vegetation along the north boundary. This includes nettles and ivy.
Topography	The site is generally flat. An embankment is present off site to the east and Sedge Road is elevated above current site levels.
Site Boundaries	Chain link fence bounds the site to the north and east. The south of the site is bound by a party wall inside the factory. Garman Road bounds the site to the west. Where the chain link fence has been broken, temporary fencing has been placed behind. Some gaps in these fences do exist.
Surrounding Area	The site is set within a commercial area, bordered by a vehicle repair yard to the north, a large electricity transformer station to the east, an additional commercial unit adjoined to the south and an alcohol works and laundry to the west.

3.0 SUMMARY OF PREVIOUS REPORTS

3.1 BSL Desk Study

A summary of the relevant points from the Desk Study completed by Brownfield Solutions Ltd (reference SRP/M4993/10841) is presented below:

- The site has had previous uses including a paper works and cardboard works.
- The site has been set within a wider industrial area over time. Nearby off-site sources include an alcohol works and laundry.
- Geology comprises superficial Enfield Silt Member (Unproductive) over London Clay (Unproductive). However, nearby deposits of alluvium recorded on BGS mapping may be present beneath the Enfield Silt Member, which are associated with the Secondary (A) Aquifer located 30m to the east of the site.
- No faults are present within an influencing distance of the site.
- The nearest watercourse is the Pymme's Brook circa 230m to the east of the site.
- The site is located in a Zone 2 floodplain.
- The site is indicated to lie within a Source Protection Zone, Zone II, Outer Catchment.
- The risk to human health is considered to be low to moderate. Due to the proposed development, there are not considered to be any pathways for direct contact or ingestion, and therefore only human health risks associated with gases and vapours were assessed.
- The risk from ground gas is considered to be moderate due to potential made ground on-site and the presence of alluvium in close proximity to the site. The site is not located in an area requiring radon protection measures.
- The risk to controlled waters is low.
- The site is located in the UXO high risk zone according to UXO screening mapping provided by Zetica. However, a detailed UXO assessment summarised below for the site concluded that the site is low risk.
- Recommendations were for an appropriate Phase II ground investigation to be carried out to confirm the identified risks and obtain information for preliminary design.

3.2 EOD Detailed UXO Desk Study

A summary of the relevant points from the detailed UXO Desk Study completed by EOD (reference EOD/22/22061/DTS) is presented below:

- The nearest recorded bomb strike is over 300m from the site.
- No bomb damage was recorded.
- No reconstruction was noted.
- No military usage was noted.
- The overall risk is low.
- Site Specific Unexploded Ordnance Awareness Briefings to all personnel conducting intrusive works was recommended.

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken as per the recommendations of the Phase I Desk Study Assessment.

The aim of the fieldwork was to:

- Investigate ground conditions on the site and the potential need for detailed investigation.
- Install standpipes to allow future monitoring.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation on 21st and 22nd March 2022.

Method	No.	Range Depths (m bgl)	Purpose
Window sample boreholes – Modular Tracked WS rig	5	2.00 – 3.60	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination testing. Installation of ground gas monitoring wells.
Hand Excavated Pit	1	1.00	Obtain samples for contamination and geotechnical testing.

The hand dug pit was due to be drilled by window sampling but could not be progressed due to an obstruction of the inspection pit at 1.00m bgl. Samples were obtained from the arisings and the pit was backfilled.

The approximate locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No. M4993/04, which is enclosed. The exploratory holes were positioned to gain the best coverage possible by the BSL engineer on site. Note that the slow concrete coring limited the positions of exploratory holes.

The exploratory hole logs are presented in Appendix B.

The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with the following guidance:

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.

4.3 Sampling

During the drilling of the exploratory holes, representative samples were taken at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental guidance.

The distribution of samples taken across the site is recorded on the exploratory logs and a summary of the samples taken is presented in the table below:

Type	Number
Environmental (ES)	20

4.4 Laboratory Testing

As part of the initial assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

Potential contamination was found on site in the form of made ground and hydrocarbon odours therefore the following suite of determinands were chosen to screen for potential site impacts at a UKAS approved laboratory:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	8
Petroleum Hydrocarbons (TPH CWG) up to C44 inc BTEX and MTBE.	4
Asbestos Screen.	8
Volatile Organic Compounds (VOCs) by GC-MS.	3

The Chemical Laboratory Testing Results are presented in Appendix C.

Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil.'

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
Atterberg Limits including Water Content.	4
SD1 BRE Full Suite.	4

The Geotechnical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in five boreholes and subsequently two monitoring visits have been undertaken out of three proposed as part of the current scope, in line with the recommendations of CIRIA C665. All gas monitoring was undertaken using GA 5000 infrared gas meter with integral electronic flow analyser and a Photo Ionisation Detector (PID). The Desk Study completed by Brownfield Solutions Ltd (reference SRP/M4993/10841) suggested six monitoring visits were to be carried out in accordance with CIRIA C665 guidance however monitoring may be concluded early if the dataset shows consistent data including across periods of falling pressure.

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
WS01	35mm PVC	1.00 – 3.00	MADE GROUND, CLAY, and GRAVEL	Ground Gas
WS02	35mm PVC	0.75 – 2.00	MADE GROUND and GRAVEL	Ground Gas
WS03	35mm PVC	0.75 – 2.00	MADE GROUND, CLAY, and GRAVEL	Ground Gas
WS04	35mm PVC	0.60 – 3.00	MADE GROUND, CLAY, and GRAVEL	Ground Gas
WS05	35mm PVC	0.60 – 3.00	MADE GROUND, CLAY, and GRAVEL	Ground Gas

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Interim ground gas monitoring results are presented in Appendix F of this report.