

Omega Works A FRA and SUDS Strategy

Issue P02

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Document History

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1 Introduction

This Flood Risk Assessment has been prepared by Eckersley O'Callaghan (EOC) on behalf of vPPR ARCHITECTS in support of the planning application for the proposed works at Omega Works A, 167 Hermitage Road, London, N4 1NA, in the London Borough of Haringey.

The proposed development includes the demolition of the existing buildings on site, with the exception of the façade to Hermitage Road and the construction of a mixed use development with blocks varying up to seven storeys with a single storey basement.

Need for Study

The purpose of this assessment is to demonstrate that the development proposal outlined above can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding, as per National guidance provided within the National Planning Policy Framework document (NPPF).

Scope of Study

- i. Accordingly, this study has been prepared to:
- ii. assess flood risk to the development from fluvial sources;
- iii. assess flood risk to the development from other potential sources, including ditches, sewers, groundwater and overland flows;
- iv. ensure that the proposed development will fully comply with the requirements of the Environment Agency's (EA's) policy on the safeguarding of floodplains; and
- v. assess a surface and foul water drainage strategy for the proposed development.

The following resources have been used for this study:

- Flood Map for Surface Water – Environment Agency (EA, accessed October 2020);
- Flood Zone Map – Environment Agency (EA, accessed October 2020);
- Geological Map - British Geological Survey (BGS, Accessed October 2020);
- Groundwater Source Protection Zones Map - Environment Agency (EA, accessed October 2020);
- Thames Water Sewer Records (September 2020).

The following publicly available documents have also been reviewed as part of this assessment:

- Haringey Council SFRA (February 2015);
- Haringey Council Surface Water Management Plan (August 2011)
- Haringey Council SuDS Design Requirements for LLFA Technical Assessment (Version 1.0)
- Building Regulations 2010 – Approved Document H (Drainage and Waste Disposal);
- C753 The SuDS Manual (CIRIA, November 2015);
- Draft New London Plan (December 2017);
- National Planning Policy Framework (NPPF) (2019);
- Non-Statutory Technical Standards for Sustainable Drainage Systems (Defra, March 2015);

- Planning Practice Guidance (PPG) (March 2014);
- Rainfall Runoff Management for Developments (R&D Technical Report W5-074/A/TR/1 Revision E, Defra, June 2012); and
- Sewers for Adoption, 8th Edition – A Design and Construction Guide for Developers (SFA 8) (April 2020).

The following abbreviations are used in this Report:

- AOD – Above Ordnance Datum;
- BGS – British Geological Survey;
- EA – Environment Agency;
- FZM – Flood Zone Map prepared by the EA;
- LBH – London Borough of Haringey;
- NPPF – National Planning Policy Framework;
- QBAR - Annual flood flow (return period of approximately 1:2.3 years);
- SFRA – Strategic Flood Risk Assessment;
- SuDS – Sustainable Urban Drainage Systems;
- SWMP – Surface Water Management Plan; and
- TW –Thames Water.

2 The Existing Site

The proposed development site comprises a 0.378 ha parcel of brownfield land located on the north side of Hermitage Road. The site is bound east, west and north by industrial buildings with residential buildings on the south side of Hermitage Road.

Land use within the vicinity of the site is industrial, commercial and residential.

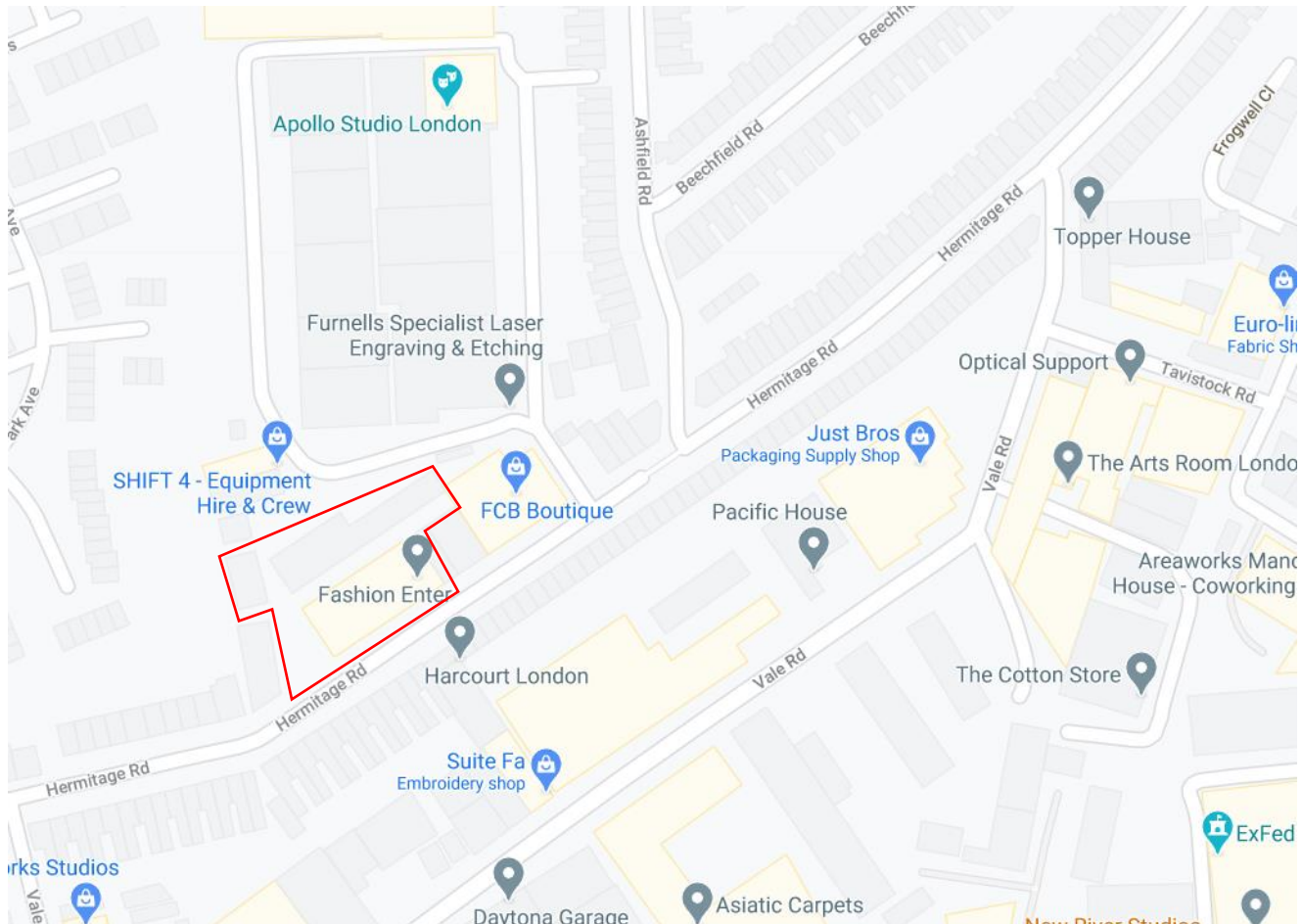


Figure 1 Google Map Image Showing the Site location

2.1 Nearby Watercourses/Drainage Features

The New River is located 200m to the south of the site and feeds into the East Reservoir and Stoke Newington, approximate 550m to the south east of the site

2.2 Existing Sewers

Asset records provided by Thames Water show there is a 914mm diameter trunk surface water sewer crossing from west to east at the north of the site. The sewer is located approximately 2m below existing ground level.

Separate 305mm diameter surface water and 381mm diameter foul water sewers run under Hermitage Road, to the south of the site in a north easterly direction.

A 180mm diameter distribution main also runs under Hermitage Road to the south of the site.



Figure 2 Extract from Thames Water Asset Search

Refer to Appendix 2 for full public sewer records.

2.4 Existing Site Drainage

A CCTV survey has been completed and indicates that the current drainage system is a gravity fed combined system, connecting into the sewer on Hermitage Road between Omega Works A and Omega Works B sites and a connection at the southwest of the site. There appears to be no connection from the site to the surface water sewer at the north of the site.

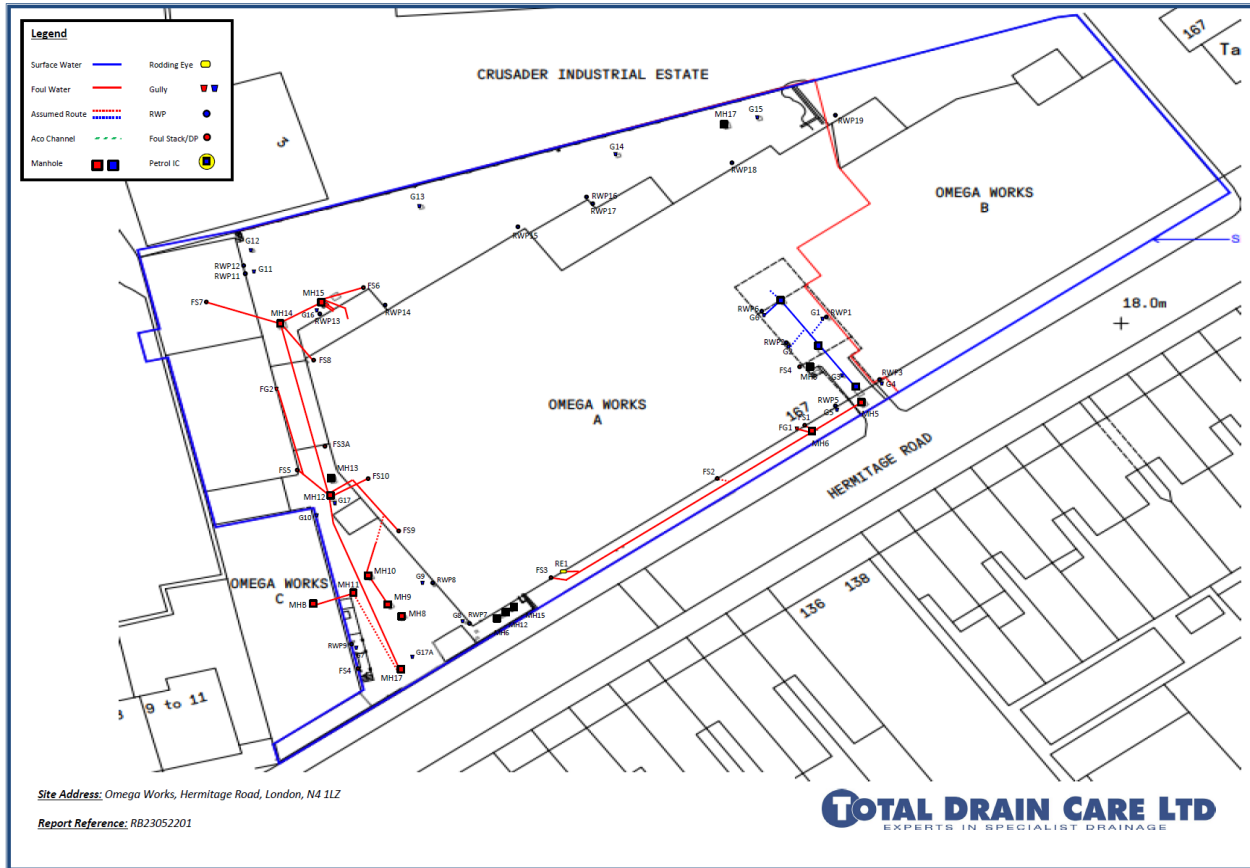


Figure 3 Below Ground Drainage Survey

EOC have consulted Thames Water regarding the existing surface water sewer running across the site and their preference is to divert the sewer around the proposed building, rather than retaining it and applying for a build-over agreement. Due to the location of the existing manholes, a build-over agreement will be required for one building and the sewer will be diverted around another. Refer to Appendix 1 for the proposed surface water strategy layout drawing, indicating the proposed diversion.

The following catchment areas have been estimated from Architect's drawings:



Figure 4 Existing layout plan

Brownfield runoff rates for the existing hard area (0.3783ha) on the site have been calculated using the modified rational method and are summarised below:

Hard Area (ha)	Calculated Brownfield Runoff Rates (l/s)		
	1:1yr	1:30yr	1:100yr
0.3783	33.5	82.2	106.4

Table 1 Assessment of Brownfield Runoff Rates

2.5 Existing Topography

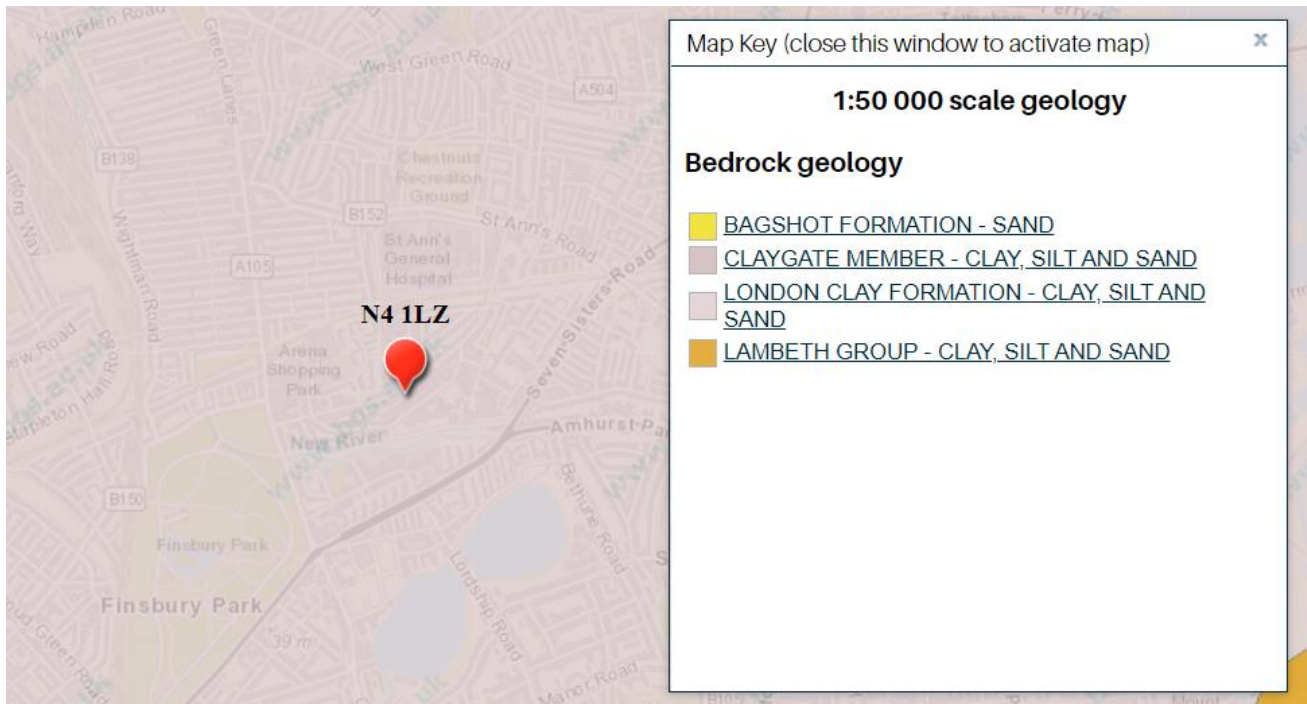
A topographical survey shows the site is relatively flat with slight falls from west to east.

2.6 Existing Ground Conditions

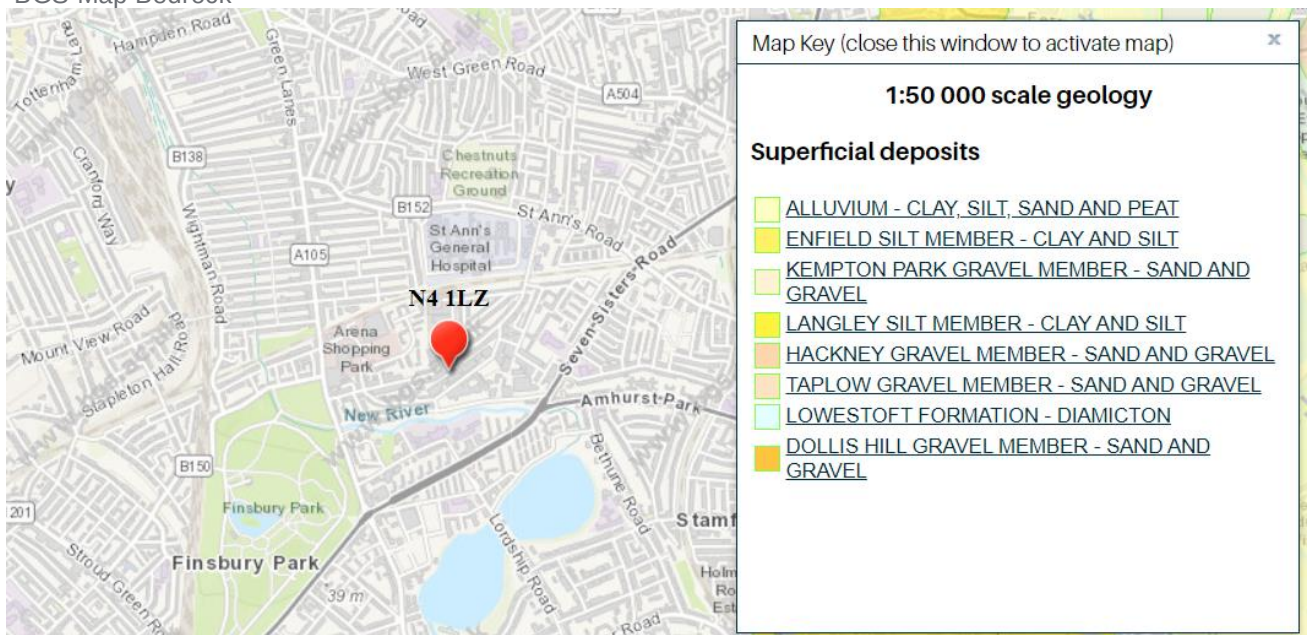
Records acquired from the British Geological Survey (BGS) indicate the site is underlain by London Clay Formation – Clay, Silt and Sand. No superficial deposits are recorded but due to the site being brownfield the superficial deposits are likely to also consist of made ground.

The EA's aquifer destination map shows that the site is not located within an aquifer and the soil is classed as unproductive. The EA groundwater vulnerability map designates the site as unproductive.

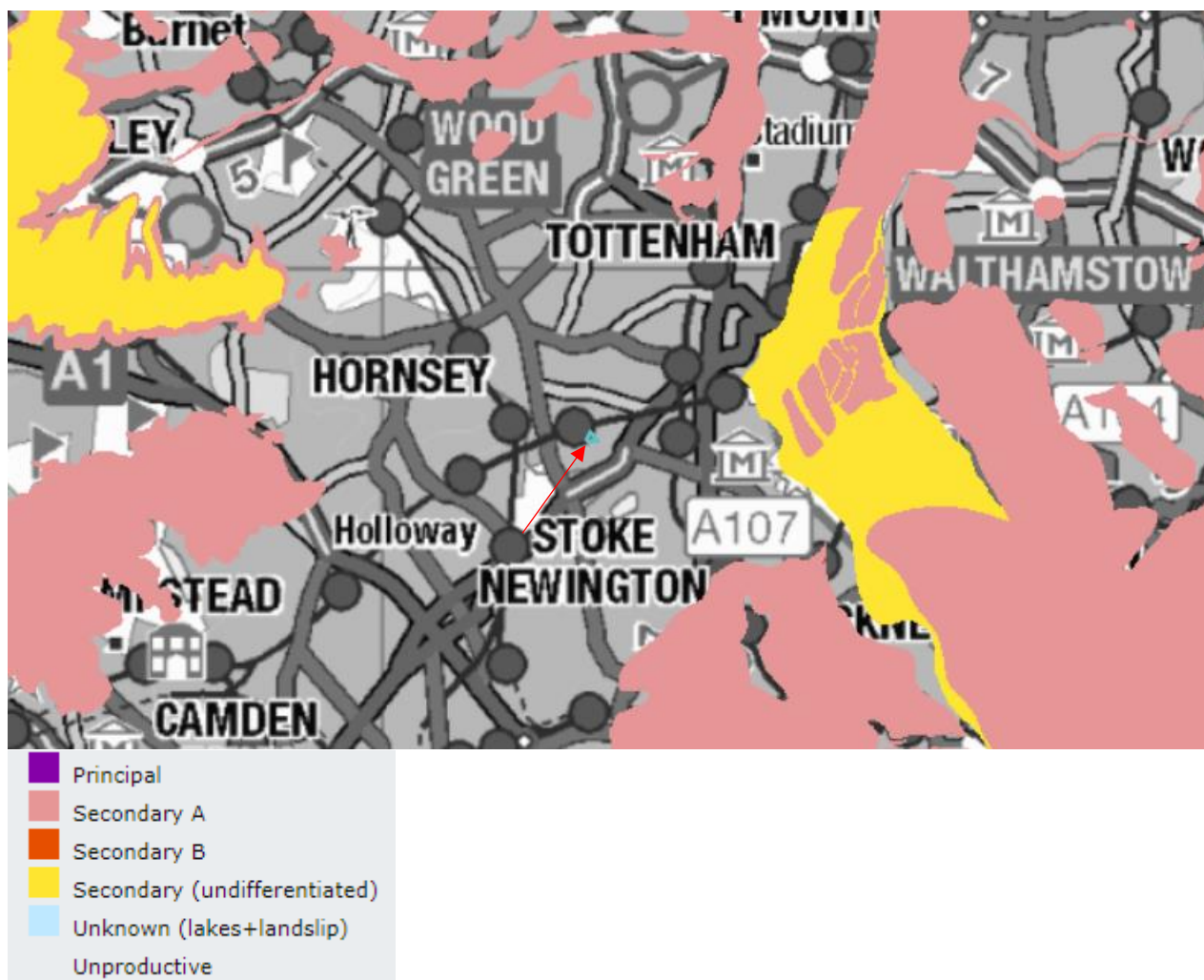
EA mapping shows the site is not located within Groundwater Source Protection Zone 1.



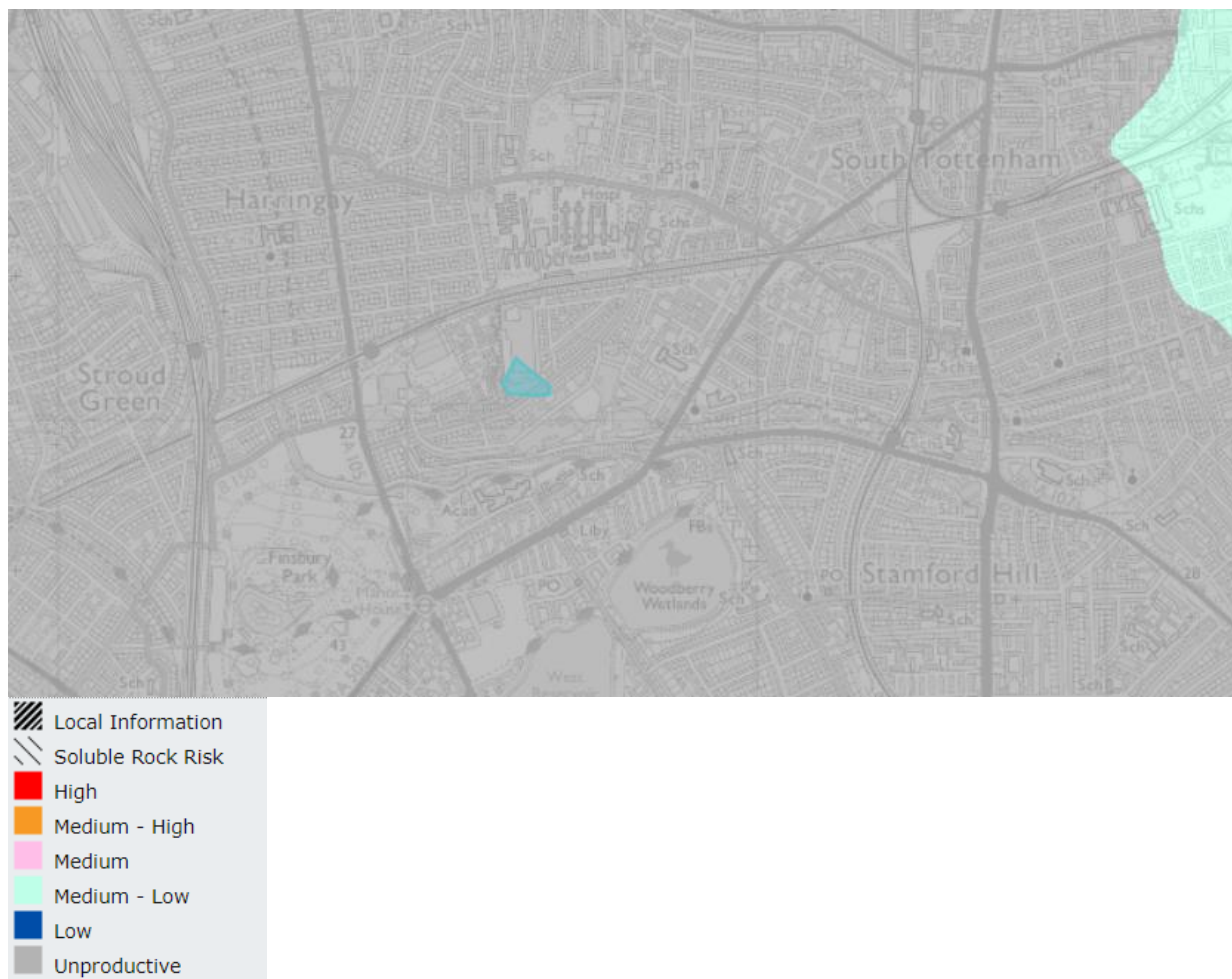
BGS Map Bedrock



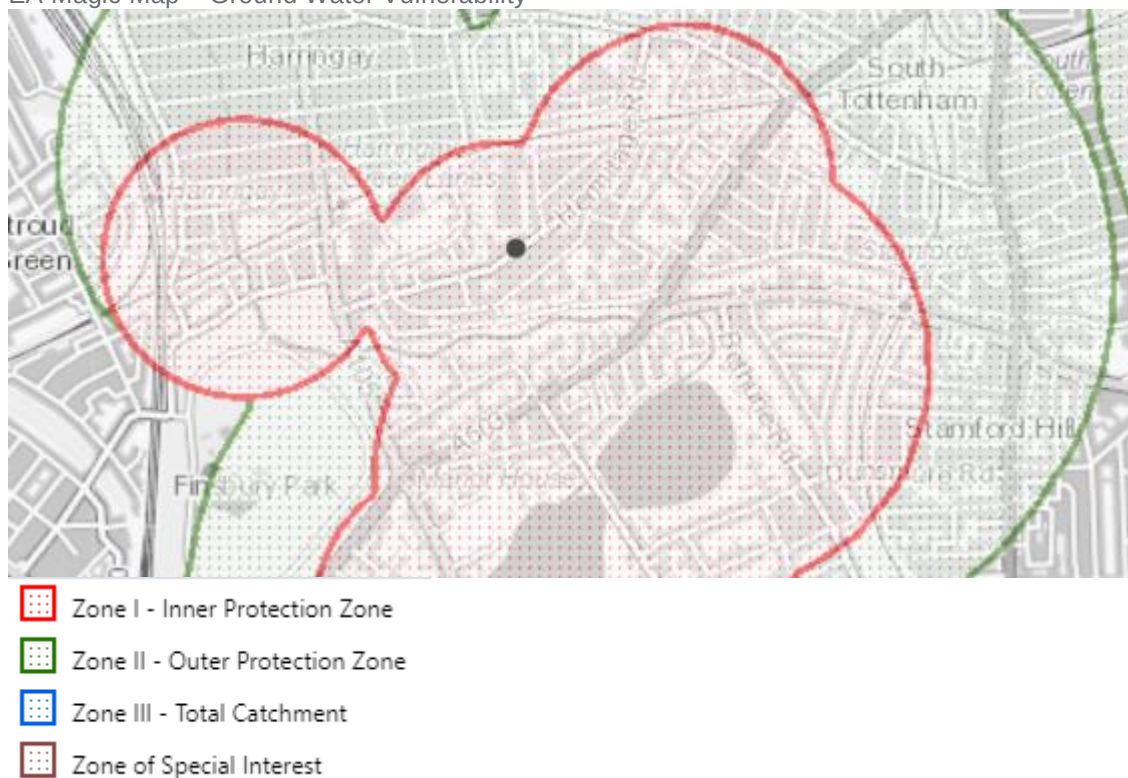
BGS Superficial Formations



EA Magic Map – Aquifer Designation



EA Magic Map – Ground Water Vulnerability



EA mapping Ground water source protection

Figure 5 Ground Conditions

3 Flood Risk Issues

This Section presents an assessment of flood risk to the development from various sources. Recommended flood risk mitigation measures appropriate to the level of perceived risk are included in the assessment. Flood risk and mitigation measures are summarised in Table 2 Summary of Flood Risk to the Development Site.

3.1 Assessment of Flood Risk

The Flood Zone Map (FZM) for the locality as produced by the EA is shown below. According to the FZM it can be seen that the site lies within Flood Zone 1 (Low risk).

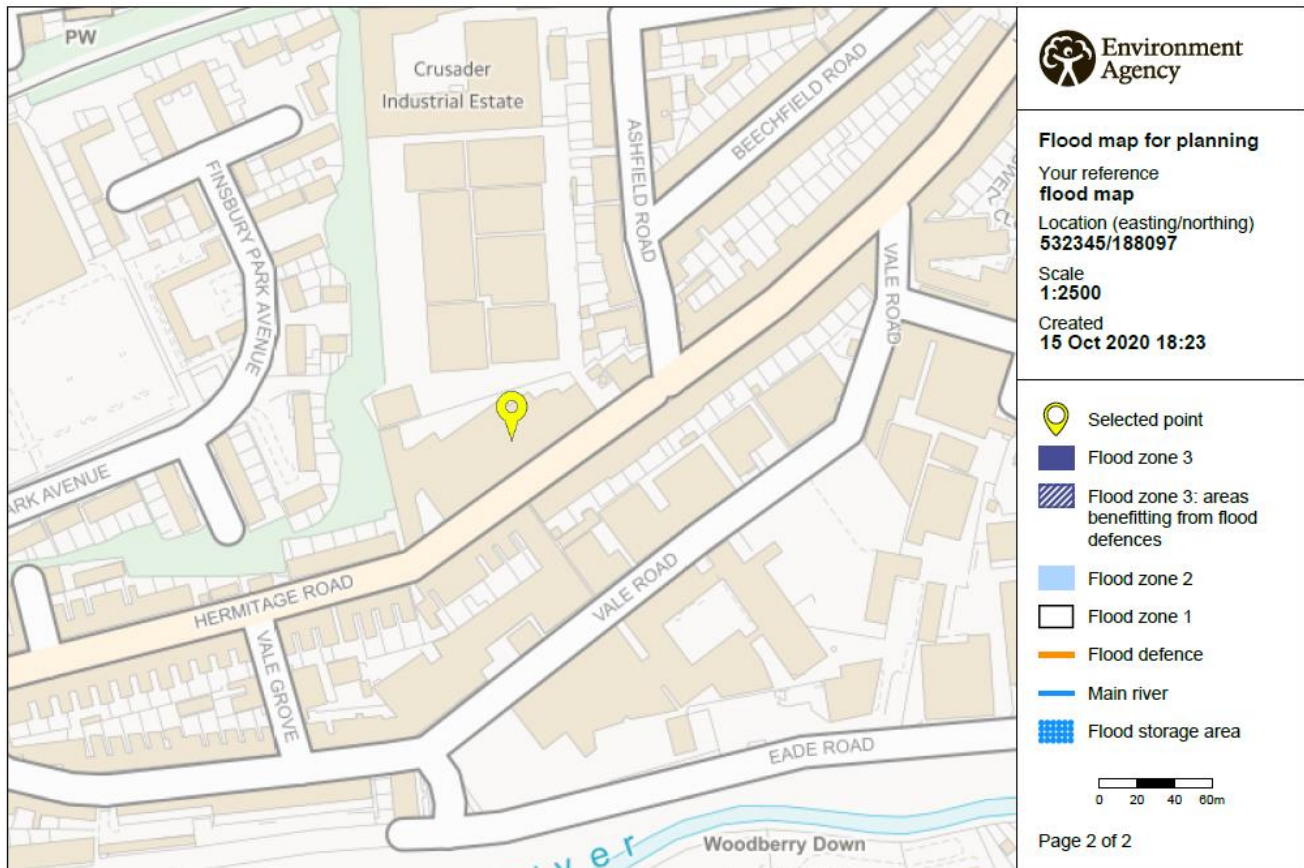


Figure 6 EA Flood Map for Planning

NPPF Practice Guidance (Table 2: Flood Risk Vulnerability Classification) classifies the proposed site usage 'dwelling houses' as 'More Vulnerable'; 'shops, restaurants, cafes, office and general industry' as 'Less Vulnerable' development. In accordance with the NPPF Practice Guidance (Table 3: Flood Risk Vulnerability and Flood Zone Compatibility), More Vulnerable Development is appropriate within Flood Zone 1.

3.2 Assessment of Flood Risk from Fluvial Sources

The SFRA for Haringey maps local watercourses. The new river is located approximately 150m to the south of the site. In this location the river is an open channel.

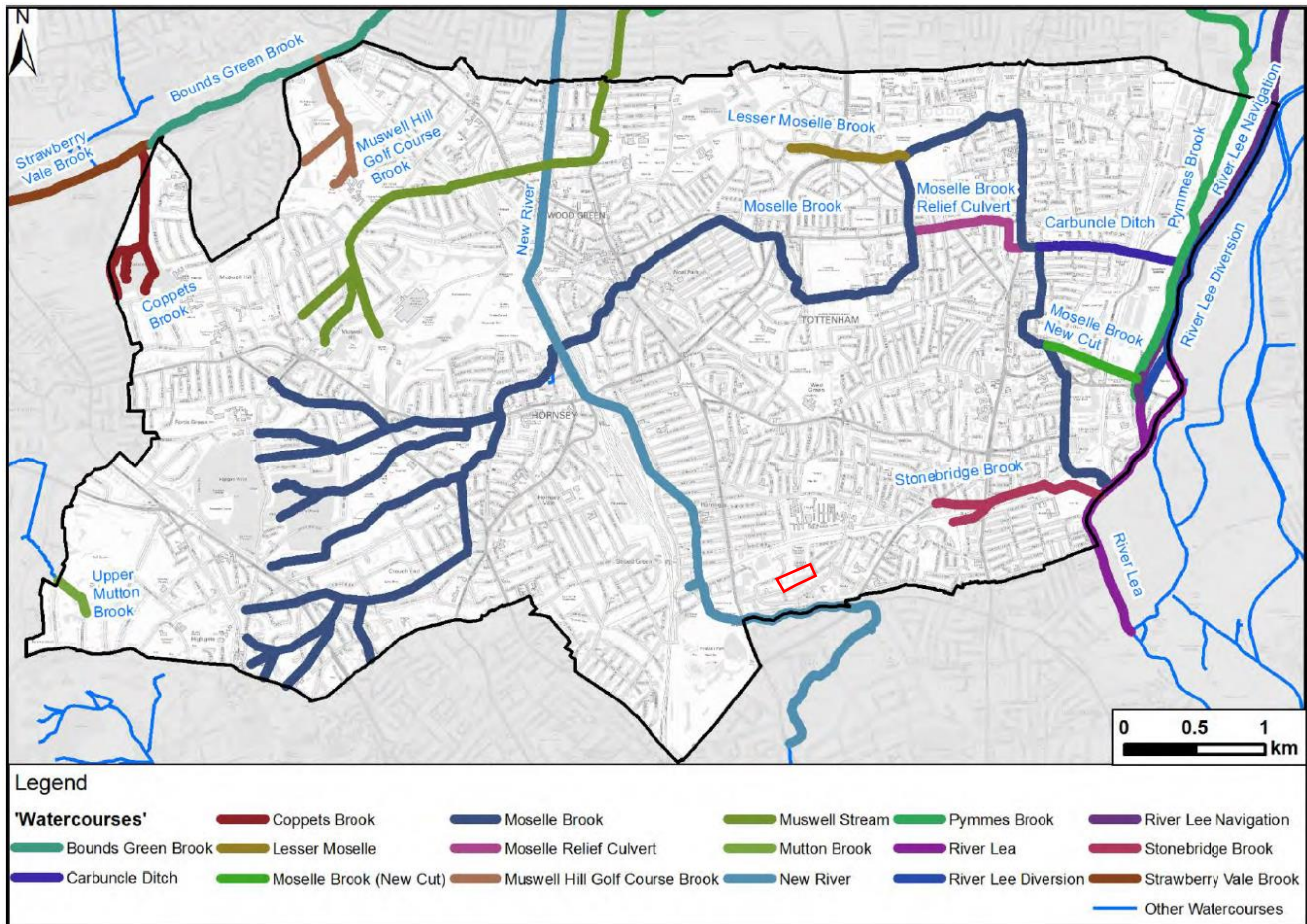


Figure 7 SFRA Map Showing Watercourses

The Fluvial Flood Zone Map for the locality as produced by the EA is shown below. The mapping shows the site to be at very low risk from surface water flooding. A small area located to the east of the existing area is shown to be at low risk from surface water flooding.



Extent of flooding from rivers or the sea

● High
 ● Medium
 ● Low
 ● Very low
 📍 Location you selected

Figure 8 EA Map showing Fluvial Flooding

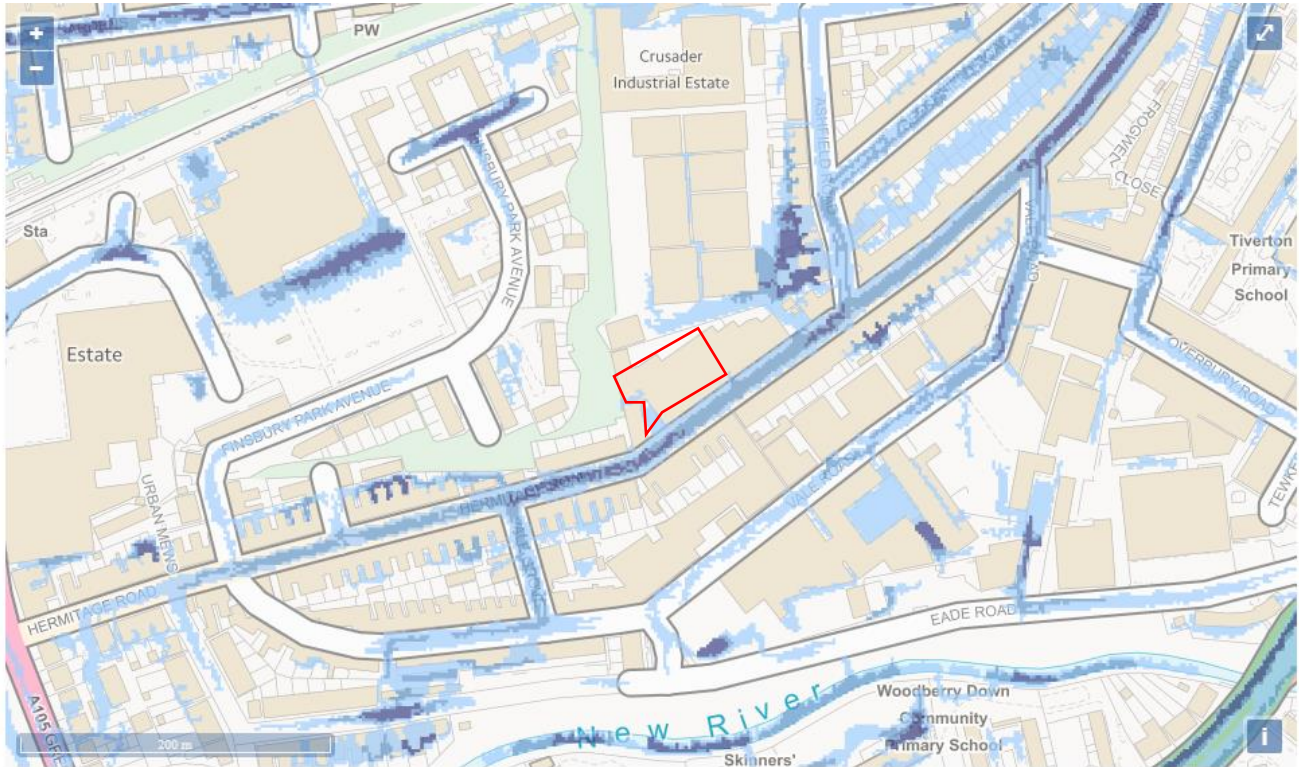
The SFRA for Haringey indicates that the urban areas of Haringey have no history of flooding. Flood risk from fluvial sources can be classed as very low.

3.2.1 Fluvial Flood Risk Mitigation Measures

No mitigation required.

3.3 Assessment of Flood Risk from Overland Flow (Pluvial)

The Surface Water Flood Zone Map for the locality as produced by the EA is shown below. The mapping shows the majority of the site to be at very low risk from surface water flooding, with an area to the south west of the site showing low risk.



Extent of flooding from surface water

● High
 ● Medium
 ● Low
 Very low
 ⊕ Location you selected

Figure 9 EA Mapping Showing Surface Water Flooding

The SFRA for Haringey indicates that across the borough there are multiple surface water “Critical Drainage Areas” which contribute to flooding hot spots. Although the site is within a CDA and the SFRA does not indicate any surface water flooding to have occurred within the vicinity of the proposed development site.

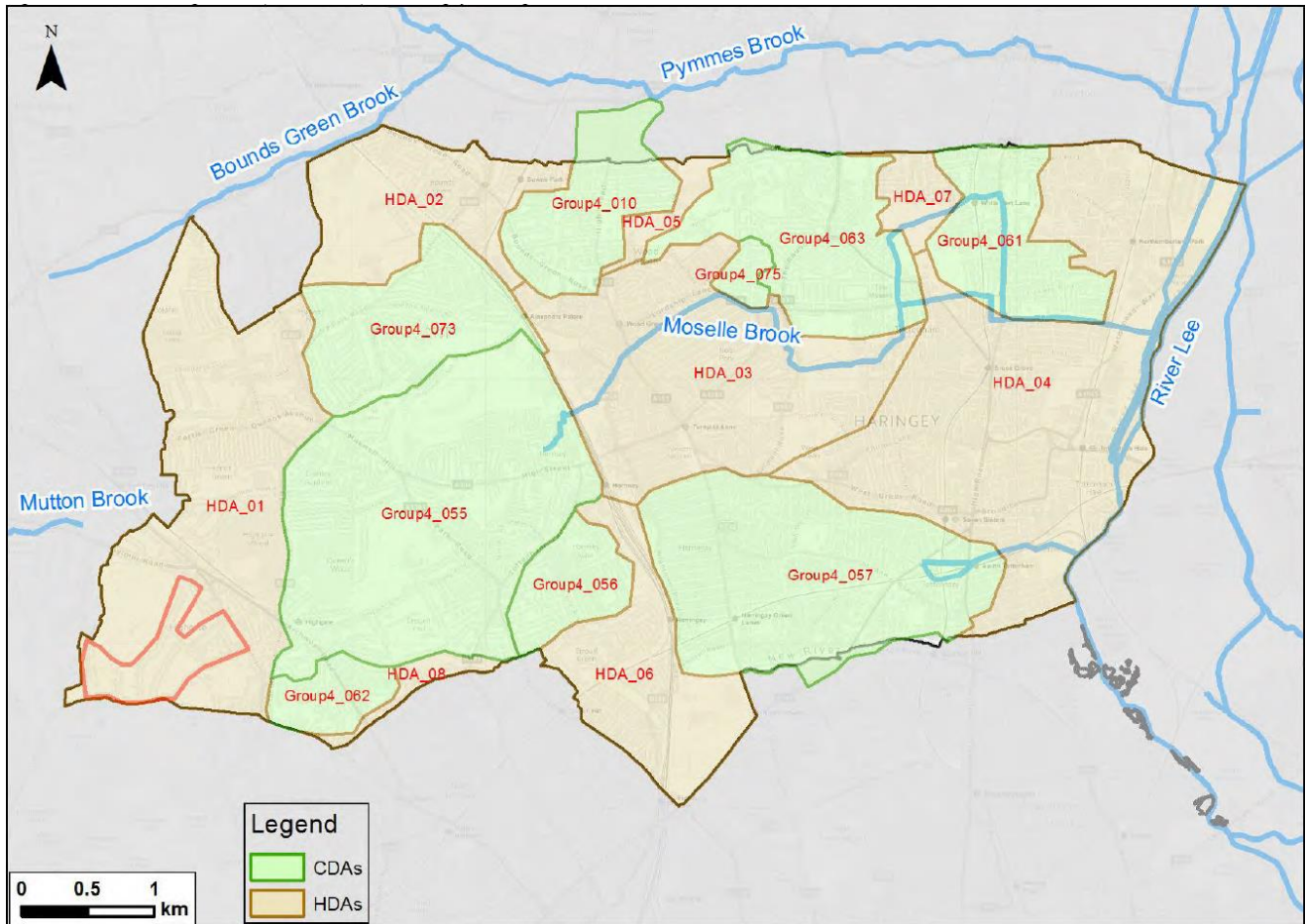


Figure 10 SFRA Mapping Showing Critical Flood Areas

3.3.1 Overland Flow Flood Risk Mitigation Measures

No mitigation required.

3.4 Assessment of Flood Risk from Existing Sewers/ Drains

A 305mm diameter public foul water sewer and a 381mm diameter surface water sewer are located within Hermitage Road to the south of the site. If flooding from the sewers were to occur, flood waters would follow the highway topography and be directed away from the site in an easterly direction.

The SFRA for Haringey indicates that 1-5 recorded sewer flooding incidents have occurred within the Manor House area. The existing sewers are located on the highway which is lower than ground floor level. If flooding from the sewer occurred, flood waters would follow the highway which fall to the east.

Flood risk from existing sewers is therefore low.

3.4.1 Sewer/Drain Flood Risk Mitigation Measures

No mitigation is required.

3.5 Assessment of Flood Risk from Existing Ditches

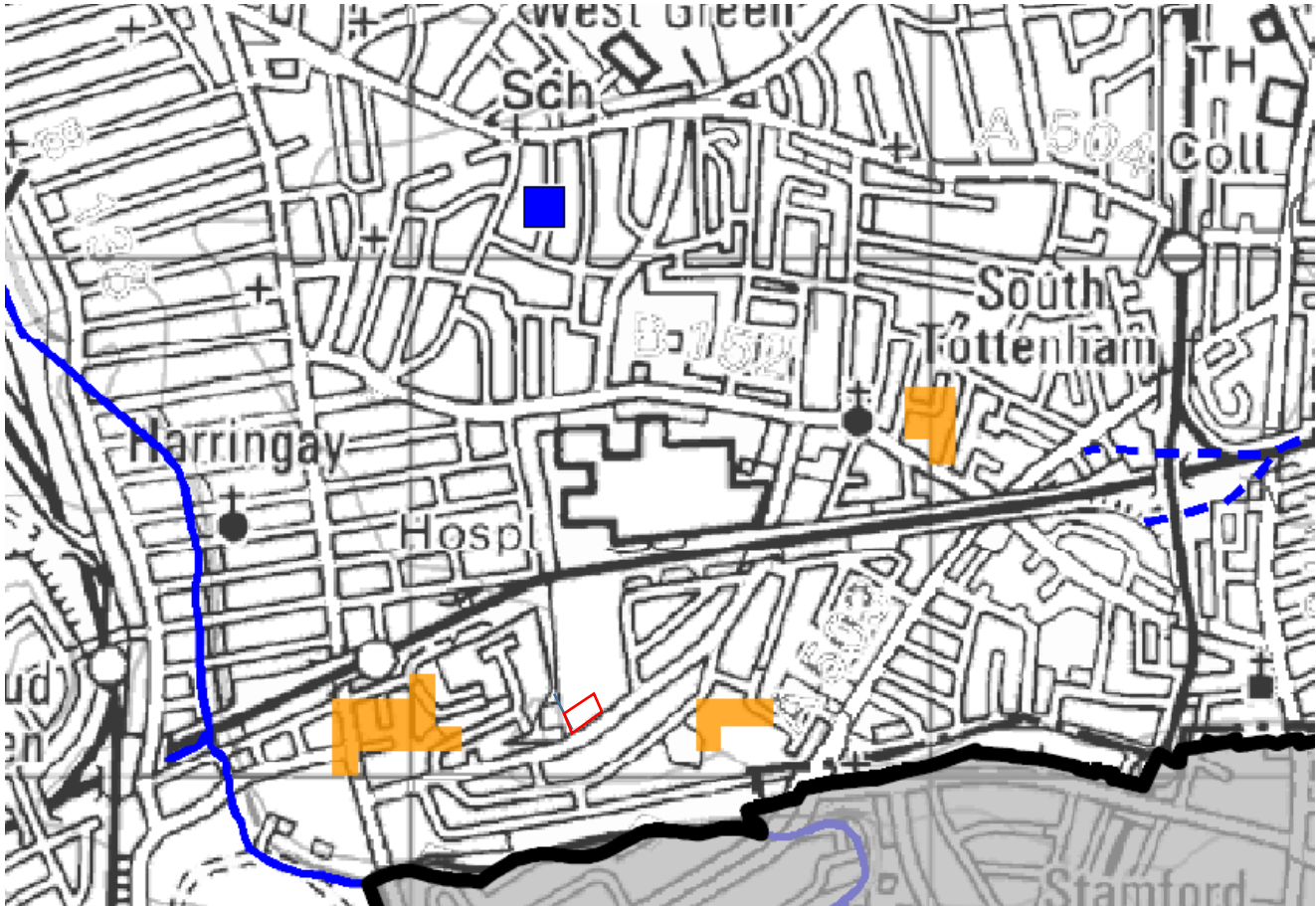
A review of OS mapping and topographical surveys shows there to be no ditches within the vicinity of the site. Therefore, flood risk from ditches can be considered low.

3.5.1 Existing ditches Flood Risk Mitigation Measures

No mitigation required.

3.6 Assessment of Flood Risk from Groundwater

The Increased Potential for Elevated Groundwater Map for the locality is shown below. The SFRA for Haringey indicates the site to be at is not at risk from groundwater flooding and there are no flood incidents recorded on the site.



The risk of groundwater flooding is considered to be low.

3.6.1 Groundwater Flood Risk Mitigation Measures

No mitigation is required.

3.7 Assessment of Flood Risk from Artificial Sources

The EA Risk of Flooding from Reservoirs Map shows the site is not at risk of flooding from reservoirs. Flood risk from this source is very low.



Extent of flooding from reservoirs

● Maximum extent of flooding ⊕ Location you selected

Figure 11 EA Mapping Showing Risk of Flooding from Reservoirs

3.7.1 Artificial Sources Flood Risk Mitigation Measures

No mitigation is required.

Source of Potential Flooding to the Development Site	Flood Risk	Mitigation/Comments
Fluvial	Very Low	No mitigation required
Overland Flow	Low	
Public Sewer/ Drain	Low	
Groundwater	Low	
Ditches	Very Low	
Reservoirs	Very Low	

Table 2 Summary of Flood Risk to the Development Site

3.8 Assessment of Flood Risk Arising from Surface Water Discharge from the Proposed Development

The proposals total an impermeable catchment measuring 0.378ha. There is no increase in impermeable areas from the existing situation. In order to mitigate flood risk posed by post development runoff from this catchment, adequate control measures will be included within the development.

4 Surface Water Drainage Strategy

4.1 Drainage Hierarchy

The drainage strategy for the site has been prepared according to the drainage discharge hierarchy set out in CIRIA C753 The SuDS Manual, as follows:

1. Store rainwater for re-use
2. Infiltration to the maximum extent that is practical
3. Discharge to surface waters
4. Discharge to surface water sewer
5. Discharge to combined sewer

4.2 Infiltration Potential

The site is underlain by London Clay is encountered. Due to the impermeable nature of the superficial geology, the proximity to existing buildings an attenuation-based strategy is proposed.

All attenuation facilities have been designed to accommodate and dispose of runoff from storms up to the 1:100 year + 40% climate change event, without flooding, in accordance with NPPF guidance.

All drainage design calculations are preliminary and have been undertaken using Tedds in accordance with CIRIA C753.

4.3 Proposed Surface Water Drainage Strategy

It is proposed to discharge surface water from the site into the existing public surface water sewer within Hermitage Road via new on-site chambers. The CCTV Survey has confirmed an existing connection in this location but it will require replacement to suit new site levels. Refer to CCTV Survey located within Appendix 2.

4.4 Proposed Flow Control

Post development discharge will be restricted to the rate of 5.0l/s via a pump. This is providing significant betterment over the existing brownfield runoff rates. A betterment of 75% is achieved from the existing 1yr brownfield rate.

4.5 Attenuation Calculations

The proposed development comprises 3783m² of impermeable surfacing (roofs and hard landscaping). Preliminary calculations indicate that 220.4m³ of storage will be required to attenuate and dispose of runoff from the proposed impermeable areas arising from the critical 1:100 year + 40% climate change storm event.

Surface water from the proposed building will be discharged to a proposed cellular attenuation tank. As the attenuation system requires a pumped discharge, the attenuation tank has been designed to be able to accommodate the volume of rainwater produced during an 8-hour 1:100yr + 40% climate change event with no outfall to simulate pump failure over an 8 hour period. Sufficient storage can be achieved by providing a cellular storage tank of dimensions 20m long, 10m wide and 1.2m deep and assuming a 95% void ratio. Refer to calculations within Appendix 3.

4.6 Calculated Existing and Proposed Discharge Rates (without SuDS)

The proposed impermeable areas total approximately 3783m². Thus, the proposed development will not change the impermeable area.

The permeability layout areas for the existing and proposed developments are summarised in the table below:

Area (ha)		Discharge Point	Calculation Method	Discharge Rate (l/s)				Attenuation Volume Required (m ³)
				QBA R	1:30yr	1:100yr	1:100yr +40%	
Brownfield	0.3783	Unattenuated to surface water sewer	Modified Rational Method	33.5	82.2	106.4	-	-
Proposed	0.3783	Attenuated to surface water sewer	CIRIA C753	5.0	5.0	5.0	5.0	220.4

Table 3 Summary of Existing & Proposed Surface Water Discharge Rates

There is no increase in permeable areas of the proposed scheme in relation to the existing. Thus, the discharge rate stays the same. The additional climate change allowance results in a higher discharge rate than the existing condition.

4.7 SuDs Assessment

In accordance with The London Plan (Policy 5.13), the proposed minor development should seek to achieve a discharge flow rate between 2 – 8 litres per sec per hectare.

$$Q_{\text{TARGET}} = 2\text{--}8 \text{ l/s}$$

With the proposed works, there is an opportunity to implement SuDs on the site. Due to the relative density of the development and the site constraints, the available options for SuDs are limited. The London Plan (Policy 5.13) provides a hierarchy for surface water run-off, as outlined in the following table:

SuDs Hierarchy	Suitability	Comments
Store rainwater for later use	Yes	Can be used for grey water loops. It can reduce the water demand, but it does not provide attenuation benefits if it is full prior to a storm event.
Use infiltration techniques	No	Not suitable - all surface areas are impermeable.
Attenuate rainwater in ponds or open water features for gradual release to a watercourse	No	Not Suitable - the site layout confirms there is no space for ponds or open water features of significant size on the site.
Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse	Yes	There is scope to attenuate the water on the site into one tank and/or a blue roof as there is large areas of flat roof, and discharge to the watercourses via the local drainage network.
Discharge rainwater direct to a watercourse	No	There is no watercourse within a suitable distance to the site.
Discharge rainwater to a surface water drain	No	There is no surface water drain within a suitable distance to the site.
Discharge rainwater to the combined sewer	Yes	This is the current situation

An attenuation tank and/or a blue roof is considered the most suitable solution to limit the main discharge of surface water into the public sewer. 100% of the impermeable areas on site can drain through it.

It is proposed that all surface water run-off from site will travel via gravity through an attenuation tank and then discharged into the combined sewer located on-site.

With the above SuDS measures in place, 100% of the site area discharges directly to the sewer. The amount of surface water run-off has remained the same, however an attenuation tank and/or blue roof has been included to reduce the load on the combined sewer.

Depending on how surface water is managed, there are two main types of catchments: green/blue roof and impermeable roof.

4.8 Design Exceedance

Should the onsite drainage system fail due to extreme rainfall events or blockage; flooding may occur within the site. Any flood waters from the ground floor drainage would flow in a southerly direction onto Hermitage Road where it will be contained within the highway and not affect any of the surrounding buildings.

4.9 Water Quality

Roof water does not contain significant pollutant loadings and does not require water quality treatment.

Water quality treatment will be provided for post development runoff from the car park. Oil interceptors will be provided at the attenuation tank inlet, for treatment of car park runoff.

4.10 Adoption & Maintenance

All onsite drainage features will be maintained by the site operator as part of the site's overall maintenance programme.

Maintenance measures are discussed below and summarised in a draft Maintenance Schedule in Table 4 Draft Maintenance Schedule for Cellular Attenuation Storage Drainage Element below.

4.10.1 Cellular Attenuation Storage

It is not envisaged that silt build up within the cellular crate systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits and inspection chambers on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection and silt removal (as necessary). Inspection should be undertaken using CCTV equipment offered up the inspection tunnels located within the crate system. Camera access can be gained via inspection chambers and inlet pipework located at each end of the tunnels.

Silt removal can be achieved by jetting the inspection tunnels. Jetting should be undertaken in accordance with current jetting guidelines, in particular the Code of Practice for Sewer Jetting published by The Water Research Centre. Jetting at 150bar at 300l/min should be more than adequate in removing any build-up of material within the tunnel. The crate system will take higher pressures. However, unlike regular jetting which relies heavily on high pressure to remove hardened deposits on the inner bore of pipes, effective cleansing of a crate system relies more on the delivery flow rate to flush solids back through the system.

A standard jet head with rear facing nozzles should be used. The head should be fed to the far end of the crate tunnel via the nearest inspection chamber, activated and retracted. As the nozzle is removed, debris will be swept back into the inspection chamber where it can then be removed with the use of a standard gully sucker. This method will ensure the effective removal of gross solids (carrier bags, cans, leaf litter etc.) from the system. Whilst 100% removal cannot be guaranteed, it has been shown that this jetting method will also remove an element of finer material which would otherwise be 'lost' within the system.

4.10.2 Pipework and Catchpits

It is not envisaged that silt build up within the pipework systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection (every six months) and silt removal (as necessary).

4.10.3 Pump

The pump system will comprise a duty/standby arrangement with a backup generator housed on site in the event of power failure. The pumps will be maintained under contract by the pump supplier.

4.10.4 Oil Separators

Oil separators should be maintained in strict accordance with the manufacturer's instructions

Element	Schedule	Maintenance Requirement	Frequency
Cellular Attenuation Tank	Regular	Inspect and identify any areas that are not operating correctly	Monthly for 3 months, then annually
		Remove debris from catchment surface	Monthly
		Remove sediment from pre-treatment structures and internal forebays	Annually or as required
	Remedial	Repair and rehabilitate inlets, outlets, overflows and vents	As required
	Monitoring	Inspect inlets, outlets, overflows and vents to ensure they are operating as designed	Annually
		Survey inside of tank for sediment build-up and remove as necessary	Every 5 years or as required
Pipework & catchpits	Regular	- Inspect for accumulation of silt - Inspect for debris and litter - Inspect inlets and outlets for blockages	Every 6 months
	Occasional	- Remove debris and litter - Remove silt	As required
HydroBrake Flow Control	Regular	- Inspect for accumulation of silt - Inspect inlets, outlets and overflows for blockages - Inspect for debris and litter	Every 6 months
	Occasional	- Remove debris and litter - Remove silt	As required
Pump	To be maintained under contract with pump supplier		As required by the maintenance contract

Table 4 Draft Maintenance Schedule for Cellular Attenuation Storage Drainage Element

5 Foul Water Drainage Strategy

Asset records obtained from TW and a drainage survey carried out at the site indicate that the site is served by existing foul drains which connects into the foul water sewer located within Hermitage Road. The existing drainage on the site will be removed and replaced with a new gravity system. A pumped system will be utilised in the proposed basement.

A pre-planning enquiry application has been made with Thames Water, who have confirmed the existing system has capacity for surface water discharge, foul water discharge and clean water for the proposed development.

6 Discussion and Conclusions

6.1 Assessment of Flood Risk from External Sources

Flood risk to the proposed development from various sources has been considered in this study. Flood risk from all sources is considered to be low, therefore, no mitigation is required.

Post development runoff will be discharged to the existing public sewer in Tanner Street. Flows will be restricted to 4.0l/s providing significant betterment over the existing site brownfield rates.

A cellular attenuation tank Sustainable Urban Drainage System (SUDS) is proposed to provide on site storage for runoff from the buildings and car park from all storm events up to and including the 1 in 100 year event including a 40% allowance for future climate change, in accordance with NPPF guidance.

Water quality treatment will be provided by an oil interceptor for the car parking area.

All surface water drainage infrastructure will be maintained by the site operator as part of the site's overall maintenance program.

It is proposed to discharge the foul water from the site by utilising the existing onsite foul drains.

This document and its appendices demonstrate that the proposed development can be accommodated in accordance with NPPF requirements.

Appendix 1 – Drawings

Appendix 2 - Thames Water Asset Search & CCTV Survey

Eckersley O'Callaghan
9th Floor Grays Inn Rd
LONDON
WC1X 8HB

Search address supplied Omega Works

Your reference Omega Works A+B

Our reference ALS/ALS Standard/2020_4258958

Search date 21 September 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



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



0845 070 9148

Search address supplied: Omega Works,

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 0845 070 9148, 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

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

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
4002	18.33	17.02
4001	18.44	16.36
4109	16.76	14.29
4108	16.54	15.27
4107	16.48	14.01
3102	16.72	14.89
31ZQ	n/a	n/a
41TV	n/a	n/a
41TR	n/a	n/a
41TT	n/a	n/a
41YV	n/a	n/a
41YT	n/a	n/a
31ZR	n/a	n/a
41TZ	n/a	n/a
4103	16.38	14.25
4102	16.4	13.6
4101	16.41	14.53
41SY	n/a	n/a
41SV	n/a	n/a
31ZT	n/a	n/a
31ZW	n/a	n/a
201A	n/a	n/a
201C	n/a	n/a
2001	19.37	17.68
201B	n/a	n/a
3001	18.36	16.47
3002	18.34	16.73
301A	n/a	n/a
301B	n/a	n/a
2102	18.28	16.17
2103	18.12	16.06
3101	17.81	15.6
2101	18.04	16.87
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.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate 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 level indicates that data is unavailable.

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
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

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

	Control Valve
	Drop Pipe
	Ancillary
	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.

	Outfall
	Undefined End
	Inlet

Other Symbols

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

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

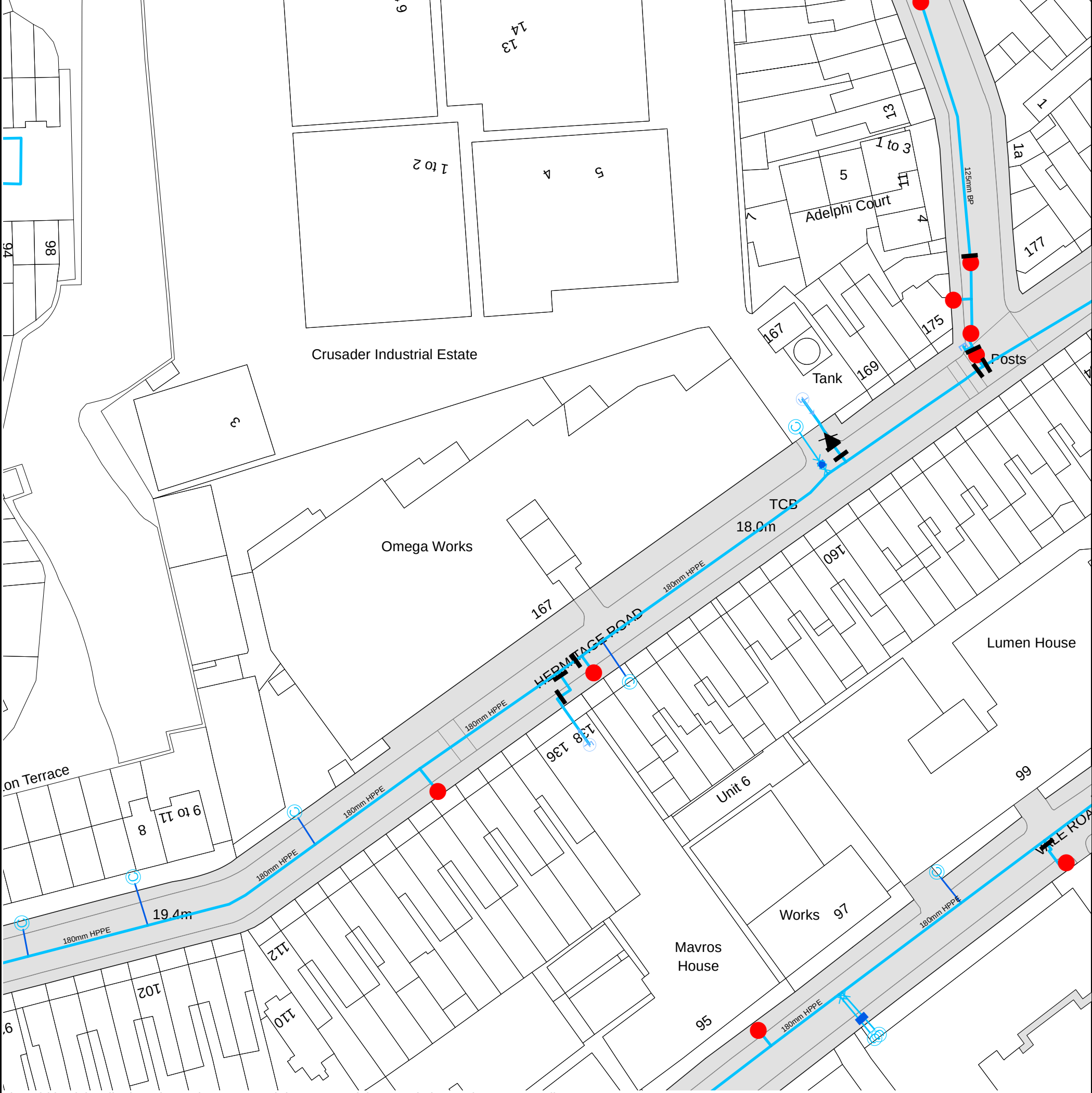
Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Surface Water Sewer
	Combined Sewer
	Gully
	Culverted Watercourse
	Proposed
	Abandoned Sewer

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. 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 present on the plan, please contact a member of Property Insight on 0845 070 9148.



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 532346, 188094.
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 with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



ALS Water Map 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.

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')

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
--	-------------

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: 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.

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 14 days from due 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. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. 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'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. 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 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

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 0121 345 1000 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	Cheque
Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS	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	Made payable to ' Thames Water Utilities Ltd ' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Miss Megan Tulloch

Eckersley O'Callaghan
236 Grays's Inn Road,
London,
WC1X 8HB



29 July 2022

Pre-planning enquiry: Confirmation of sufficient capacity

Site: Omega Works A, 167 Hermitage Road, London, N4 1LZ

Dear Megan,

Thank you for providing information on your development.

Existing site: Flat (1 unit) + Commercial unit (570m²).

Proposed site: Flats (76 units) + Commercial unit (1,041m²).

Proposed foul water discharge by gravity for residential units and by pumped at 2.0 l/s (assumed) for commercial unit into Thames Water foul sewer network within Hermitage Road or via gravity into manhole TQ32883101.

Proposed surface water discharge by pump at 5.0 l/s for all storm event up to and including 1:100yr+40%CC into manhole TQ32883002.

We have completed the assessment of the foul water flows and surface water flows based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in our network to serve foul flows from your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.



When developing a site, policy SI 13 of the London Plan states “Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:”

The disposal hierarchy being:

1. rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer

Where connection to the public sewerage network is still required to manage surface water flows, we will accept these flows at a discharge rate in line with CIRIA’s best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to 5.0 l/s for all storm events into existing Thames Water surface sewer network, then Thames Water would not have any objections to the proposal.

Please see the attached ‘Planning your wastewater’ leaflet for additional information.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days’ notice of the date you wish to make your new connection/s.

If you have any further questions, please contact me on 07747647155.

Kind Regards,

Zaid Kazi

Developer Services – Project Engineer, Major Projects

zaid.kazi@thameswater.co.uk

Get advice on making your sewer connection correctly at connectright.org.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at developers.thameswater.co.uk



Planning your wastewater

We've put together some information on sewerage to help you plan your new development.

How long does it take to get consent to connect to a sewer?

If you're applying for consent to connect to a sewer under Section 106 of the Water Industry Act 1991, you'll need to give us 21 days' notice.

I think I'll need to connect to a trunk sewer – is that possible?

Connecting directly to trunk sewers can be complex and dangerous, and we won't permit this at all in London. If you're considering a trunk sewer as a point of connection, please contact us as soon as possible to discuss.

How do I handle trade effluent and groundwater discharges?

You mustn't discharge non-domestic waste to our sewers without a valid trade effluent consent - doing this is an offence under Section 109(1) of the Water Industry Act 1991. You can call our trade effluent team on 0203 577 9200 to get help with trade effluent consents and ground water discharge permits.

Where can I discharge surface water?

The Lead Local Flood Authority, or if you are in a London Borough, 'The London Plan', advises that your development should utilise sustainable drainage systems (SuDS) unless there are practical reasons for not doing so. You should aim to achieve greenfield run-off rates and ensure you manage surface water run-off as close to its source as possible in line with the following drainage hierarchy:

- 1 Store rainwater for later use.
- 2 Use infiltration techniques, such as porous surfaces in non-clay areas.
- 3 Attenuate rainwater in ponds or open water features for gradual release.
- 4 Attenuate rainwater by storing in tanks or sealed water features for gradual release.
- 5 Discharge rainwater direct to a watercourse.
- 6 Discharge rainwater to a surface water sewer or drain.
- 7 Discharge rainwater to a combined sewer.

Please note that if you're discharging surface water anywhere other than to a public sewer – such as to a watercourse – you'll need approval from the relevant authority, for example the Environment Agency, the local authority or the Canals and Rivers Trust.

If you don't follow the surface water hierarchy you may not be granted planning permission, and Thames Water may seek to put conditions on the planning application.

There's no right of discharge of highway drainage into the public sewerage system, and we'd need to agree this with the relevant highway authority under Section 115 of the Water Industry Act 1991. You can contact us to discuss this further.

What can I do about redundant sewers and rising mains on my site?

On brownfield sites where existing sewers or rising mains need to be made redundant or diverted, the developer will need to fund the work, as set out in Section 185 of the Water Industry Act. If there's no practical way of making a diversion, we'll apply the standoff distances in Sewers for Adoption 7th edition to assess the width of easement required.



Your reference: DS6097012

Your site address: Omega Works A, 167 Hermitage Road, London, N4 1LZ

Customer: Eckersley O'Callaghan

Clean water capacity report

Status: Capacity confirmed

Date: 15.07.2022

Validity: Valid until 14.07.2023 or for the duration of your Local Authority planning permission when this report is used to support your application.

We confirm that there will be sufficient capacity in our clean water network to serve all properties of your development: 76 flats and 1041 sqm commercial space.

Please be aware that this report is based upon the details and drawings provided. If there are any subsequent changes to these, then the contents of this report will become invalid and a new assessment will be needed.

Please note that the below POC is based on desktop study and it might change after capacity check study or site-specific survey.

Nearest point of connection / Your preferred point of connection



Point of connection - 180mm HPPE Main
in HERMITAGE ROAD



Contaminated land

If your site is on contaminated land, any new water pipes laid should be barrier pipe which is more expensive. If you think this is not the case you will need to provide a soil report when applying for new mains and services.

Development located within Source Protection Zone

The applicant is advised that their development boundary falls within a Source Protection Zone for groundwater abstraction. These zones may be at particular risk from polluting activities on or below the land surface. To prevent pollution, the Environment Agency and Thames Water (or other local water undertaker) will use a tiered, risk-based approach to regulate activities that may impact groundwater resources. The applicant is encouraged to read the Environment Agency's approach to groundwater protection (available at <https://www.gov.uk/government/publications/groundwater-protection-position-statements>) and may wish to discuss the implication for their development with a suitably qualified environmental consultant.

Building near our assets

Please [read our guide](#) 'working near our assets' to ensure your workings will be in line with the necessary processes you need to follow if you're considering working above or near our pipes or other structures. Should you require further information please contact [us](#).

Diversions

From our records we don't anticipate that any clean water assets need to be diverted to accommodate your proposals.

Building water

It's important that you apply for a building water supply before you start using water on site even if you believe your supply is already metered. We need to ensure your account is properly set up and you have the correct meter for your supply or fines may be imposed. Apply [here](#).

Fire hydrant and sprinkler demand

Please note that we cannot confirm whether a fire hydrant or sprinkler demand can be accommodated on a new connection. You'll need to contact an independent consultant or specialist company for hydrant testing for fire-fighting purposes. Valve operations must be carried out by our Network Service Technician which can be booked on 0800 316 9800.

Asset location search

If you need help in identifying the location of existing water mains and sewers, you can get this information from any property search provider. We have a Property Searches team who will carry out an asset location search, which provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth (for which a fee is payable). You can find out more [online](#) or by calling us on 0845 070 9148.

Quotation process

Please use links below to find out more information about water main and services connections, including application process.

Click [here](#) for our home improvements website, or click [here](#) to apply for clean water services.

Clean water capacity confirmed – DS6097012

Your reference: DS6097012

Your site address: Omega Works A, 167 Hermitage Road, London, N4 1LZ

Date: 15.07.2022

Our clean water network has capacity

Dear Megan Tulloch,

We've completed the clean water capacity check on our network and we're happy to say that we have sufficient capacity for all properties of your development, 76 flats and 1041 sqm commercial space.

What do I need to do?

We've attached your **capacity report**. You can include this when making your local authority (LA) planning application to reduce the likelihood of planning conditions being applied.

Please note the validity period indicated on your capacity report. Don't forget to let us know if your plan changes, such as an increase in the number of properties, as we'll need to check that our network still has the necessary capacity.

What happens next?

When you're ready to move ahead with a water supply for your new development you can:

1. Engage an independent installer or supplier, known as a [self-lay provider](#) or [NAV](#)
2. [Apply to us](#)

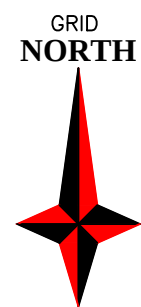
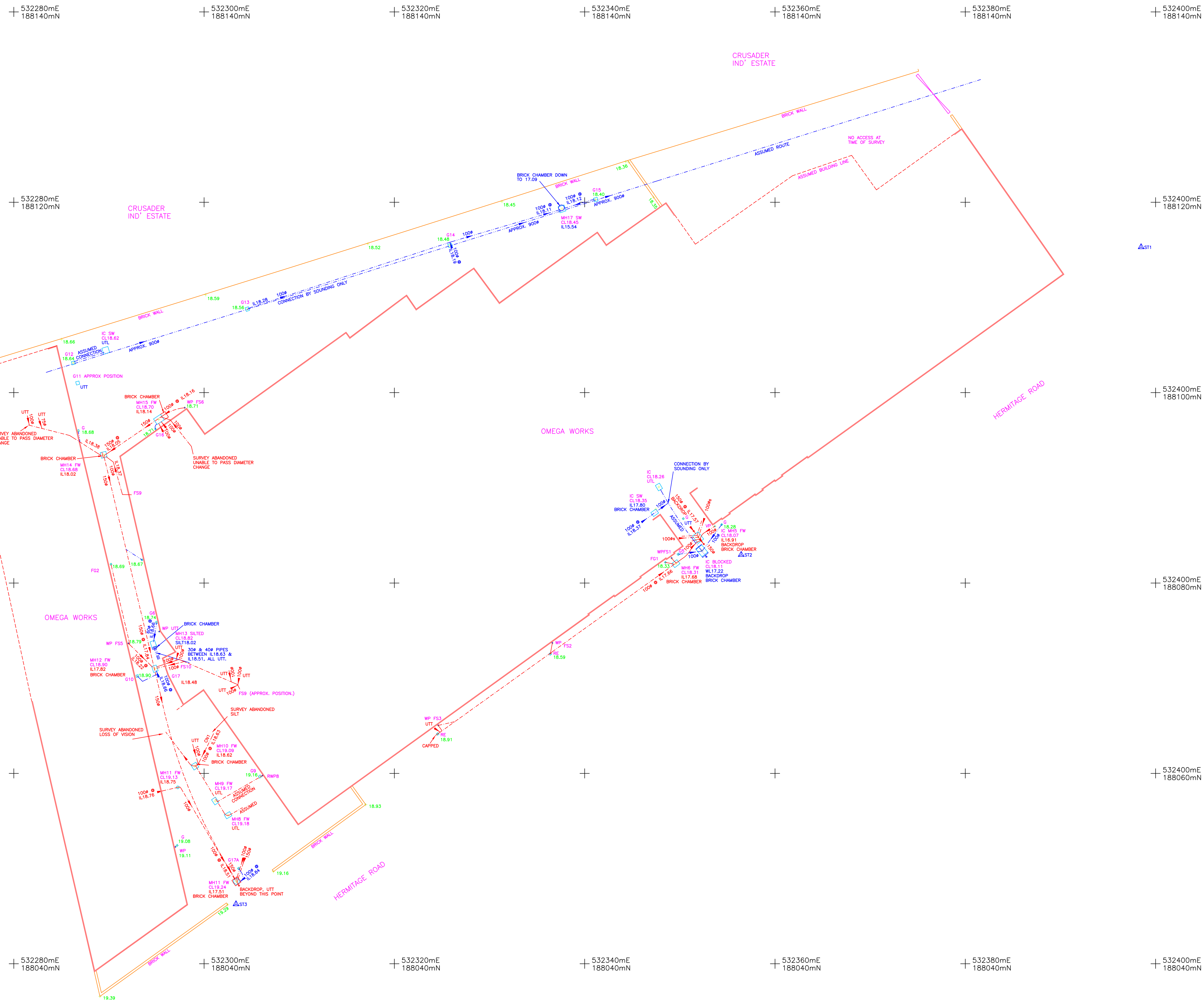
Can I speak to someone?

As your dedicated contact for your clean water pre-planning enquiry, I'm here if you need a hand.

Just call me on the number below.

Yours sincerely,

Chris Seaman
Network Coordinator, Thames Water
07747 645341
Christopher.seaman@thameswater.co.uk



Original Drawing Size: A1

NOTES:—

The accuracy and content of this drawing are dependent on the original specification and EDI should be consulted before use at other scales.

Where underground services are shown, all reasonable care has been taken within the limits of the information available to ensure that the drawing is a true and correct representation. EDI and its staff satisfy themselves of the completeness and accuracy of such detail before undertaking any work. Due to the nature of this work and limitations on the amount of detail that can be shown, EDI cannot guarantee that the drawing will give that all services have been recorded. Trial holes should be dug at critical locations.

All reasonable care has been taken in the survey detail represented on this drawing to ensure that it is a true and correct representation of the information available.

Our aim is to produce the best possible results within the specification and cost constraints of our clients. Any comments are most welcome.

Levels shown at kerbs are channel level unless stated.

LEGEND

Features:

[illegible]

Outline

Services:		
-C	CATV cables	Survey Station
-CCTV	CCTV cables	Fence
-D	Data cables	Gate
-E	Electric cables	Painted Road Markings
-F	Foul water	Edge of Vegetation
-G	Gas pipes	Kerb/Drop Kerb
-H	Heating duct	
-SD	Service ducts	Tree
-S	Storm water	
-T	Telecom cab.	
-U	Unidentified	
-W	Water pipes	Top
-P	Pipe Diameter/Flow	Bottom
-L	Overhead Lines	Banks
		Building
		Overhead Building Detail
		Wall

Control: All levels and co-ordinates are related to the datums described.

The horizontal control of this survey is based on Ordnance Survey grid as translated from GPS coordinates using Leica's SmartNet service. We have applied a reverse scale factor to maintain true ground distances, based on station ST2. The vertical control of this survey is based on OS datum as translated from GPS coordinates using the OSGM15 transformation or supplied by the OS. This may differ from the existing OS benchmarks in the area which should be disregarded; all levels should be taken from EDI survey stations.

Station		Schedule		
Station	Easting	Northing	Level	Type
1	532398.479	188115.296	17.131	Hilti Nail
2	532356.448	188082.967	18.125	Hilti Nail
3	532303.354	188046.267	19.220	Hilti Nail

A.	20547	06/22	CCTV Drainage Survey	TDC	TA
Rev.	Job No.	Date	Revision Detail	Surveyor	Chk'd

CLIENT

Israel Gold
Topfling House
Unit 14 Grosvenor Way
London
E5 9ND

PROJECT

Drainage Survey
Omega Works
Hermitage Road
Haringey
London, N4 1LZ

Job No. 18670	Surveyor T.Cosgrove	Checked R.J.A	Date March 2020	Scale 1:200
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EDI SURVEYS LTD

163-165 Ranelagh Road, Ipswich, Suffolk IP2 0AH
Telephone | 01473 211222 **Fax** | 01473 221660
Email | enquiries@edisurveys.co.uk

Our Services:- Topographic Surveys, Measured Building Surveys, GPS Surveying and Control, 30 laser Scanning, Utility Surveying and Drainage Investigation.

Click the link below to visit our website and find out more.

www.edisurveys.co.uk



DRAWING No. 18670/D/01-01	REV. A
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TOTAL DRAIN CARE LTD

EXPERTS IN SPECIALIST DRAINAGE

CCTV Inspection Report

Omega Works

Hermitage Road

London

N4 1LZ

Dated: 23/05/2022

Ref: RB23052201

Client Details

Client Contact:	Luke Warvill
Client Name:	EDI Surveys
Address:	163 Ranelagh Road Ipswich IP2 0AH
Telephone:	01473 211222
Email:	LukeW@edisurveys.co.uk

Site Details

Site Contact:	Luke Warvill
Site Address:	Omega Works Hermitage Road London N4 1LZ
Site Job Ref:	RB23052201

Company:

Company:	Total Drain Care Ltd
Address:	Unit 6 Sharose Court Hicks Road Markyate AL3 8JH
Tel:	01582 841270
Email:	reports@totaldraincare.co.uk
Survey Crew:	Shane Ashcroft

Miscellaneous Observations

MH1: Existing manhole cover is broken in the bottom right corner in the below image. To prevent further damage to the cover we would recommend this to be broken out and replaced with a medium duty manhole cover measuring at 600mmx450mm.



MH2: We were unable to survey this manhole as it was seized shut. We recommend that this manhole cover is replaced with a new medium duty 600x450mm medium duty cover and frame.



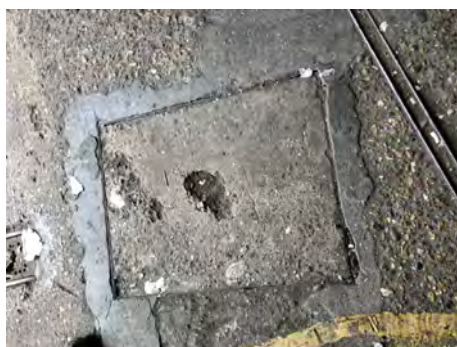
MH3: This manhole could not be surveyed due to a very heavy build up of silt within the chamber, blocking all connections. We would recommend the chamber to be cleaned in order to carry out this survey.



MH4: We could not lift this manhole to survey due to a large crack across the entire cover; raising this cover posed a risk of causing further damage and leaving the chamber completely exposed. We recommend a new D400 1000x700mm cover and frame.



MH5: We were unable to lift this manhole due to defective keyholes filled with concrete. We recommend a replacement D400 1000x750mm cover and frame.



MH7: We were unable to survey this manhole due to the cover being seized. We recommend a replacement D400 500mm circular cover and frame in order to carry out the survey and gain access in future if required.



MH8 & MH9: We were unable to survey this manhole due to the cover being seized. In order to carry out CCTV inspection we would require access. We recommend a replacement D400 600x450mm cover and frame in order to carry out the survey and gain access in future if required.

MH10: Upon gaining entry to this manhole we discovered that a large amount of the pipework within the chamber is broken. This can cause blockages and further damage to the pipework if not repaired. We recommend this to be removed and replaced to prevent any further damage.



MH11: The cover is broken leaving a hole dropping into the chamber. We recommend this to be replaced with a 270x270mm circular medium duty cover and frame to prevent a trip hazard and potential blockages if debris were to fall in.

MH12: This manhole cover has no handles in which to lift as they have broken away, either from corrosion or general wear and tear. We would recommend this to be removed and replaced with a 600x450mm medium duty cover and frame.

MH13: We were not able to lift this manhole to carry out CCTV survey as the cover was seized. In order to gain access, we recommend breaking out the manhole and replacing with a 600x450mm medium duty manhole and cover.

MH18: We have not been able to gain access to this manhole, however, we do not believe this to be any form of drainage due to where the manhole is located in correlation to all manholes and pipe directions we have surveyed.

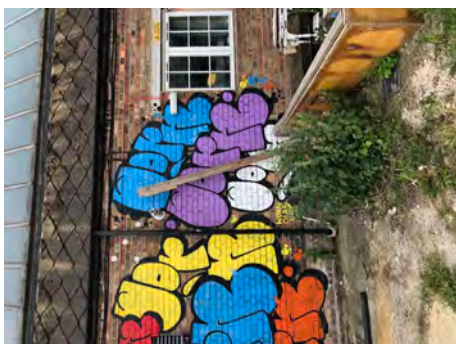
MH11 CNX: Upon our survey of MH11 CNX, we cannot tell whether this run leads to a buried manhole or falls directly into MH7, as we are unable to access MH7. We would recommend tracing the location of the manhole by use of a sonde and trace system to determine whether there is a buried manhole or if it leads to MH7.

G1, G2 & G6: We could not survey these gullies due to the grates being seized shut. In order to survey and gain future access we recommend these to be replaced. 100mm squared grates.



FG2: We were unable to survey this gulley due to the gulley being inaccessible. We would recommend this to be broken out and replaced.

RWP1,2,3,4,7,8,9,10,11,12,14,15,16,17,18 & 19: All of these rainwater pipes are unable to be surveyed as they discharge above ground and spill on the floor into nearby gullies.



Survey Report

23/05/2022

Start:	MH1 CN1	Finish:	Capped
Depth Start (mm):	880mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Cast iron
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH1	1	
0m	OB	Other obstacles 45% height/diameter loss.	2	 MH1 CN1__003.JPG
0.35m	ES	Attached deposits, scale from 12 to 12 o'clock 15 % cross-sectional area loss.	2	 MH1 CN1__004.JPG
0.94m	FH	Finish Survey. Capped	1	 MH1 CN1__005.JPG

Survey Report**23/05/2022**

Start:	MH1 CN2	Finish:	G6
Depth Start (mm):	880mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Cast iron
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH1	1	
0.11m	OB	Other obstacles 25% height/diameter loss.	2	 MH1 CN2__003.JPG
0.23m	JN	Junction at 12 o'clock, diameter 100mm.	1	 MH1 CN2__001.MP4_005.JPG
1.18m	DES	Settled deposits fine 50% cross-sectional area loss.	2	 MH1 CN2__001.MP4_006.JPG
1.53m	SA	Survey abandoned. Unable To Pass Due to Silt	1	 MH1 CN2__004.JPG

Survey Report**23/05/2022**

Start:	MH1 CN3	Finish:	Capped
Depth Start (mm):	880mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Cast iron
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH1	1	
0.47m	ES	Attached deposits, scale from 12 to 12 o'clock 15 % cross-sectional area loss.	2	 MH1 CN3__003.JPG
0.59m	LU	Line of sewer/drain deviates up.	1	 MH1 CN3__001.MP4_005.JPG
0.94m	FH	Finish Survey. Capped	1	 MH1 CN3__004.JPG

Survey Report**23/05/2022**

Start:	MH1 CNX	Finish:	MH4
Depth Start (mm):	880mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Cast iron
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH1	1	
0.47m	DES	Settled deposits fine 15% cross-sectional area loss.	1	 MH1 CNX__003.JPG
0.7m	ES	Attached deposits, scale from 12 to 12 o'clock 15 % cross-sectional area loss.	2	 MH1 CNX__004.JPG
5.79m	GP	General Condition Photograph.	1	 MH1 CNX__005.JPG
9.81m	GP	General Condition Photograph.	1	 MH1 CNX__001.MP4_006.JPG
11.35m	DEE	Attached deposits, encrustation at 6 o'clock 5% cross-sectional area loss.	2	 MH1 CNX__001.MP4_007.JPG

13.6m MHF Finish node type, manhole, reference
number MH4

1



MH1 CNX__001.MP4_008.JPG

Survey Report**23/05/2022**

Start:	MH10 CN1	Finish:	DP
Depth Start (mm):	500mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH10	1	
0.11m	JN	Junction at 9 o'clock, diameter 100mm.	1	 MH10 CN1__002.JPG
0.82m	DEG	Attached deposits, grease from 5 to 7 o'clock 15% cross-sectional area loss.	2	 MH10 CN1__001.MP4_004.JPG
2.95m	DES	Settled deposits fine 45% cross-sectional area loss. Build up Of silt	2	 MH10 CN1__003.JPG
3.66m	SA	Survey abandoned. Loss of vision due to silt	1	

Survey Report**23/05/2022**

Start:	MH10 CN2	Finish:	MH9
Depth Start (mm):	500mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

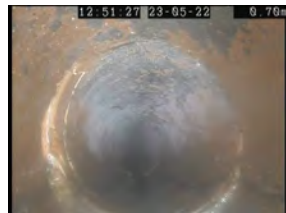
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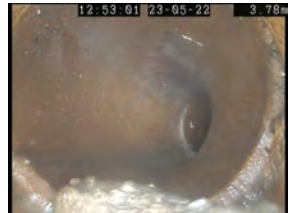
Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH10	1	
1.18m	JD	Joint displaced Medium.	2	 MH10 CN1__001.MP4_005.JPG
1.89m	OB	Other obstacles 30% height/diameter loss.	2	 MH10 CN1__003.JPG
3.19m	JD	Joint displaced Medium.	2	 MH10 CN1__004.JPG
3.66m	MHF	Finish node type, manhole, reference number MH9	1	 MH10 CN1__001.MP4_006.JPG

Survey Report**23/05/2022**

Start:	MH10 CNX	Finish:	Outfall
Depth Start (mm):	500mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

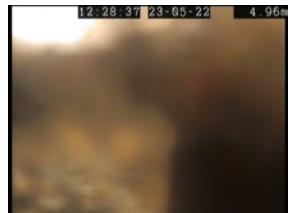
Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH10	1	
0.1m	JD	Joint displaced Medium.	2	 MH10 CNX__004.JPG
0.7m	CC	Crack, circumferential from 6 to 12 o'clock.	2	 MH10 CNX__001.MP4_008.JPG
0.7m	DEE	Attached deposits, encrustation at 6 o'clock 10% cross-sectional area loss.	2	 MH10 CNX__001.MP4_009.JPG
0.7m	JD	Joint displaced Medium.	2	 MH10 CNX__002.JPG
1.18m	JD	Joint displaced Medium.	2	 MH10 CNX__003.JPG

2.6m	JD	Joint displaced Large.	3	 MH10 CNX__005.JPG
3.31m	CC	Crack, circumferential from 4 to 9 o'clock.	2	 MH10 CNX__006.JPG
3.78m	JD	Joint displaced Medium .	2	 MH10 CNX__001.MP4_010.JPG
3.9m	OB	Other obstacles 30% height/diameter loss.	2	 MH10 CNX__007.JPG
4.37m	SA	Survey abandoned. Loss Of Vision	1	

Survey Report**23/05/2022**

Start:	MH11 CN1	Finish:	MHA
Depth Start (mm):	400mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

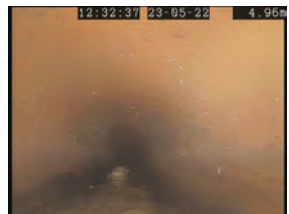
Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH11	1	
1.18m	OB	Other obstacles 70% height/diameter loss. Foul Waste	2	 MH11__002.JPG
4.96m	SA	Survey abandoned. Loss of vision	1	 MH11__001.MP4_003.JPG

Survey Report**23/05/2022**

Start:	MH11 CNX	Finish:	MHB
Depth Start (mm):	400mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

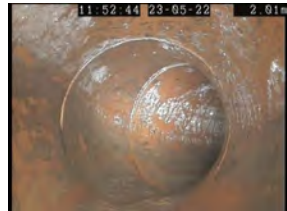
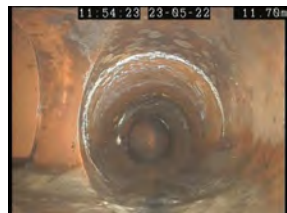
Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH11	1	
0.35m	ES	Attached deposits, scale at 6 o'clock 10 % cross-sectional area loss.	2	 MH11 CNX__001.MP4_004.JPG
2.24m	WL	Water level 15% height/diameter.	1	 MH11 CNX__001.MP4_005.JPG
4.96m	GP	General Condition Photograph.	1	 MH11 CNX__003.JPG
11.23m	MHF	Finish node type, manhole, reference number MHB	1	 MH11 CNX__001.MP4_006.JPG

Survey Report**23/05/2022**

Start:	MH12 CN1	Finish:	DP
Depth Start (mm):	1100mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Polyvinyl chloride
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH12	1	
2.01m	LR	Line of sewer/drain deviates right.	1	 MH12 CN1_FS5_001.MP4_006.JPG
3.43m	JN	Junction at 12 o'clock, diameter 100mm.	1	 MH12 CN1_FS5_001.MP4_007.JPG
5.79m	GP	General Condition Photograph.	1	 MH12 CN1_FS5_003.JPG
10.4m	GP	General Condition Photograph.	1	 MH12 CN1_FS5_004.JPG
11.7m	JN	Junction at 10 o'clock, diameter 100mm.	1	 MH12 CN1_FS5_001.MP4_008.JPG

11.82m	JN	Junction at 10 o'clock, diameter 100mm.	1	
				MH12 CN1_FS5_005.JPG
12.18m	LL	Line of sewer/drain deviates left.	1	
				MH12 CN1_FS5_001.MP4_009.JPG
12.77m	FH	Finish survey. DP	1	
				MH12 CN1_FS5_001.MP4_010.JPG

Survey Report**23/05/2022**

Start:	MH12 CN2	Finish:	FS9
Depth Start (mm):	1100mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Polyvinyl chloride
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH12	1	
0.11m	ES	Attached deposits, scale from 5 to 8 o'clock 35 % cross-sectional area loss.	2	 MH12 CN2__002.JPG
2.12m	JN	Junction at 9 o'clock, diameter 100mm.	1	 MH12 CN2__003.JPG
2.48m	LR	Line of sewer/drain deviates right.	1	 MH12 CN2__004.JPG
4.96m	GP	General Condition Photograph.	1	 MH12 CN2__005.JPG
8.39m	JN	Junction at 9 o'clock, diameter 100mm.	1	 MH12 CN2__006.JPG

9.1m	LR	Line of sewer/drain deviates right.	1	 MH12 CN2__007.JPG
9.22m	JN	Junction at 2 o'clock, diameter 32mm.	1	 MH12 CN2__001.MP4_009.JPG
9.22m	JN	Junction at 9 o'clock, diameter 100mm. 1	1	 MH12 CN2__008.JPG
9.22m	LR	Line of sewer/drain deviates right.	1	 MH12 CN2__001.MP4_010.JPG
9.69m	FH	Finish Survey. FS9	1	

Survey Report**23/05/2022**

Start:	MH12 CN3	Finish:	G6
Depth Start (mm):	1100mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH12	1	
0.35m	FH	Finish survey. G6	1	



MH12 CN3_002.JPG

Survey Report**23/05/2022**

Start:	MH12 CN4	Finish:	FS10
Depth Start (mm):	1100mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:	Live run		

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH12	1	
0.11m	JD	Joint displaced Medium.	2	 MH12 CN4__003.JPG
1.65m	DEG	Attached deposits, grease from 12 to 12 o'clock % cross-sectional area loss.	2	 MH12 CN4__004.JPG
2.01m	LU	Line of sewer/drain deviates up.	1	 MH12 CN4__001.MP4_005.JPG
2.83m	FH	Finish Survey. FS10	1	 MH12 CN4__001.MP4_006.JPG

Survey Report**23/05/2022**

Start:	MH12 CNX	Finish:	MH7
Depth Start (mm):	1100mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	150mm	Shape:	Circular
Water Level %:	5	Use:	Combined
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

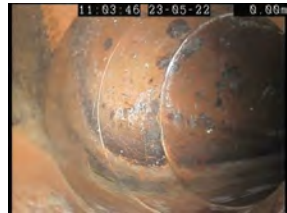
Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH12	1	
2.01m	WL	Water level 10% height/diameter.	1	 MH12 CNX__001.MP4_009.JPG
6.5m	DEG	Attached deposits, grease from 5 to 7 o'clock 25% cross-sectional area loss.	2	 MH12 CNX__003.JPG
9.46m	OB	Other obstacles 15% height/diameter loss. Foul Waste	2	 MH12 CNX__001.MP4_010.JPG
10.52m	GP	General Condition Photograph.	1	 MH12 CNX__004.JPG
16.2m	GP	General Condition Photograph.	1	 MH12 CNX__005.JPG

21.62m	GP	General Condition Photograph.	1	 MH12 CNX__006.JPG
23.08m	MHF	Finish node type, manhole, reference number MH7	1	 MH12 CNX__001.MP4_011.JPG
23.08m	VR	Rat.	1	 MH12 CNX__001.MP4_012.JPG

Survey Report**23/05/2022**

Start:	MH14 CN1	Finish:	FS7
Depth Start (mm):	690mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH14	1	
0.1m	LR	Line of sewer/drain deviates right.	1	 MH14 CN1__001.MP4_003.JPG
2.72m	JN	Junction at 9 o'clock, diameter 100mm.	1	 MH14 CN1__001.MP4_008.JPG
2.83m	GP	General Condition Photograph.	1	 MH14 CN1__002.JPG
3.9m	LL	Line of sewer/drain deviates left.	1	 MH14 CN1__001.MP4_004.JPG
6.86m	JN	Junction at 10 o'clock, diameter 75mm.	1	 MH14 CN1__001.MP4_005.JPG

8.27m JN Junction at 12 o'clock, diameter 100mm.

1



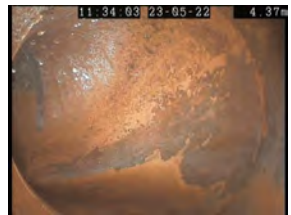
MH14 CN1__001.MP4_007.JPG

8.35m SA Survey abandoned. Unable to pass diameter change

Survey Report**23/05/2022**

Start:	MH14 CN2	Finish:	DP
Depth Start (mm):	690mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:			
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH14	1	
0.82m	LR	Line of sewer/drain deviates right.	1	 MH14 CN2__001.MP4_003.JPG
4.37m	LL	Line of sewer/drain deviates left.	1	 MH14 CN2__001.MP4_004.JPG
4.96m	SA	Survey abandoned. Unable to push due to bends	1	 MH14 CN2__001.MP4_005.JPG

Survey Report**23/05/2022**

Start:	MH14 CNX	Finish:	MH12
Depth Start (mm):	690mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	150mm	Shape:	Circular
Water Level %:	5	Use:	Combined
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

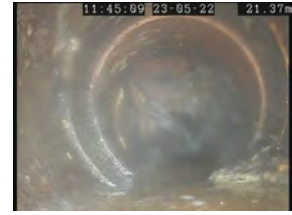
Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH14	1	
0.35m	WL	Water level 50% height/diameter.	1	 MH14 CNX__003.JPG
3.78m	OB	Other obstacles 40% height/diameter loss. Foul Waste	2	 MH14 CNX__004.JPG
8.63m	GP	General Condition Photograph.	1	 MH14 CNX__005.JPG
9.93m	JN	Junction at 12 o'clock, diameter 100mm.	1	 MH14 CNX__006.JPG
10.4m	JD	Joint displaced Medium.	2	 MH14 CNX__007.JPG

12.06m	WL	Water level 5% height/diameter.	1	
				MH14 CNX__001.MP4_015.JPG
15.25m	GP	General Condition Photograph.	1	
				MH14 CNX__008.JPG
15.96m	JD	Joint displaced Medium.	2	
				MH14 CNX__009.JPG
17.03m	JD	Joint displaced Medium.	2	
				MH14 CNX__010.JPG
17.61m	JD	Joint displaced Medium.	2	
				MH14 CNX__011.JPG
18.58m	JD	Joint displaced Medium.	2	
				MH14 CNX__012.JPG
19.55m	JD	Joint displaced Medium.	2	
				MH14 CNX__013.JPG

21.37m JD Joint displaced Medium.

2



MH14 CNX__014.JPG

21.86m MHF Finish node type, manhole, reference number MH12

1



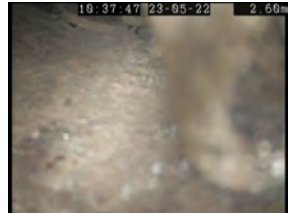
MH14 CNX__001.MP4_016.JPG

Survey Report**23/05/2022**

Start:	MH15 CN1	Finish:	FS6
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Concrete
Diameter (mm):	150mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

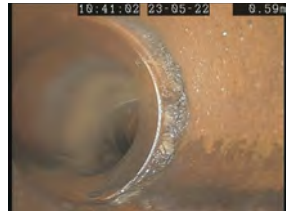
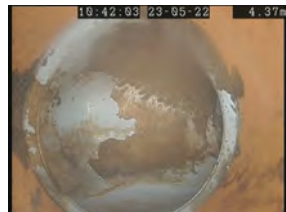
Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH15	1	
0.82m	LR	Line of sewer/drain deviates right. Slight	1	
1.53m	JD	Joint displaced Medium.	2	 MH15 CN1__002.JPG
1.77m	DES	Settled deposits fine 15% cross-sectional area loss. Stones	2	 MH15 CN1__003.JPG
1.89m	JD	Joint displaced Medium.	2	 MH15 CN1__001.MP4_004.JPG
2.36m	CN	Connection at 12 o'clock, diameter 32mm.	1	 MH15 CN1__001.MP4_005.JPG
2.36m	LU	Line of sewer/drain deviates up.	1	 MH15 CN1__001.MP4_007.JPG

2.6m	B	Broken pipe at 10 o'clock.	4	 MH15 CN1__001.MP4_006.JPG
2.6m	SA	Survey abandoned. Unable to push	1	 MH15 CN1__001.MP4_008.JPG

Survey Report**23/05/2022**

Start:	MH15 CN2	Finish:	DP
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH15	1	
0.59m	JD	Joint displaced Medium.	2	 MH15 CN2__002.JPG
0.94m	LR	Line of sewer/drain deviates right.	1	
3.78m	GP	General Condition Photograph.	1	 MH15 CN2__003.JPG
4.37m	JD	Joint displaced Medium.	2	 MH15 CN2__004.JPG
4.49m	LR	Line of sewer/drain deviates right.	1	
4.84m	GO	General Observation: Pipe size Change to 75mm	1	 MH15 CN2__005.JPG
5.32m	SA	Survey abandoned. Unable to pass diameter change.	1	

Survey Report**23/05/2022**

Start:	MH15 CN3	Finish:	DP
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:	Assumed Redundant		

Observations & Photos:

Position	Code	Observation	Grade	Photo
0.1mm	JD	Joint displaced Medium.	2	 MH15 CN3__001.MP4_004.JPG
0.35m	JD	Joint displaced Medium.	2	 MH15 CN3__002.JPG
0.47m	LU	Line of sewer/drain deviates up.	1	 MH15 CN3__003.JPG
1.18m	CN	Connection other than junction at 12 o'clock, diameter 58mm. Poorly installed, potential to cause blockage	1	 MH15 CN3__001.MP4_005.JPG
1.18m	FH	Finish Survey. Redundant run	1	 MH15 CN3__001.MP4_006.JPG

Survey Report**23/05/2022**

Start:	MH15 CN4	Finish:	DP
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:	Assumed Redundant		

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH15	1	
0.35m	JD	Joint displaced Large.	2	
0.82m	LU	Line of sewer/drain deviates up.	1	
1.06m	FH	Finish Survey. DP	1	

MH15 CN4__003.JPG

Survey Report**23/05/2022**

Start:	MH15 CN5	Finish:	G16
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Surface water
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH15	1	
0.11m	LU	Line of sewer/drain deviates up.	1	 MH15 CN5_G16_002.JPG
0.59m	FH	Finish survey. G16	1	 MH15 CN5_G16_001.MP4_003.JPG

Survey Report**23/05/2022**

Start:	MH15 CNX	Finish:	MH14
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	150mm	Shape:	Circular
Water Level %:	5	Use:	Combined
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

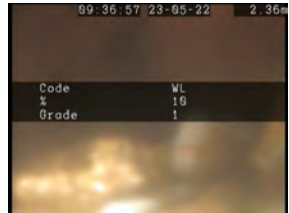
Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH15	1	
1.77m	ES	Attached deposits, scale at 6 o'clock 5 % cross-sectional area loss.	2	 MH15 CNX__001.MP4_003.JPG
1.77m	OB	Other obstacles 25% height/diameter loss. Foul Wsate	2	 MH15 CNX__001.MP4_005.JPG
5.55m	CC	Crack, circumferential from 12 to 12 o'clock.	2	 MH15 CNX__001.MP4_004.JPG
6.74m	MHF	Finish node type, manhole, reference number MH14	1	 MH15 CNX__001.MP4_006.JPG

Survey Report**23/05/2022**

Start:	MH6 CN1	Finish:	DP
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH6	1	
2.36m	WL	Water level 10% height/diameter.	1	 MH6 CN1__001.MP4_008.JPG
3.54m	OB	Other obstacles 15% height/diameter loss. Foul waste	2	 MH6 CN1__002.JPG
7.09m	GP	General Condition Photograph.	1	 MH6 CN1__003.JPG
9.34m	CC	Crack, circumferential from 6 to 12 o'clock.	2	 MH6 CN1__004.JPG
12.65m	GO	General Observation: Live run	1	 MH6 CN1__001.MP4_009.JPG

15.02m	JN	Junction at 3 o'clock, diameter 100mm.	1	
				MH6 CN1__001.MP4_010.JPG
15.61m	DES	Settled deposits fine 20% cross-sectional area loss. Foul waste	2	
				MH6 CN1__005.JPG
15.61m	JN	Junction at 12 o'clock, diameter 100mm.	1	
				MH6 CN1__001.MP4_011.JPG
17.5m	CC	Crack, circumferential from 6 to 12 o'clock.	2	
				MH6 CN1__001.MP4_012.JPG
17.5m	JD	Joint displaced Medium.	2	
				MH6 CN1__001.MP4_016.JPG
19.05m	JN	Junction at 3 o'clock, diameter 100mm.	1	
				MH6 CN1__001.MP4_017.JPG
25.6m	JD	Joint displaced Medium.	2	
				MH6 CN1__006.JPG

26.21m	CC	Crack, circumferential from 12 to 12 o'clock.	2	 MH6 CN1__001.MP4_013.JPG
28.27m	JN	Junction at 3 o'clock, diameter 100mm.	1	 MH6 CN1__001.MP4_014.JPG
30.09m	JN	Junction at 3 o'clock, diameter 100mm.	1	 MH6 CN1__001.MP4_015.JPG
30.58m	JN	Junction at 12 o'clock, diameter 100mm.	1	 MH6 CN1__007.JPG
30.7m	FH	Finish Survey. Capped	1	 MH6 CN1__001.MP4_018.JPG

Survey Report**23/05/2022**

Start:	MH6 CN2	Finish:	FG1
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH6	1	
0.23m	FH	Finish Survey. FG1	1	



MH6 CN2_FG1_001.MP4_003.JPG

Survey Report**23/05/2022**

Start:	MH6 CN3	Finish:	Stack1
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Upstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH6	1	
0.35m	DEG	Attached deposits, grease from 12 to 12 o'clock 10% cross-sectional area loss.	2	 MH6 CN3_Stack1_001.MP4_004.JPG
0.35m	JD	Joint displaced Medium.	2	 MH6 CN3_Stack1_003.JPG
0.47m	LU	Line of sewer/drain deviates up.	1	 MH6 CN3_Stack1_001.MP4_005.JPG
0.94m	FH	Finish Survey. Stack1	1	 MH6 CN3_Stack1_001.MP4_006.JPG

Survey Report23/05/2022

Start:	MH6 CNX	Finish:	MH5
Depth Start (mm):	700mm	Depth Finish (mm):	
Direction:	Downstream	Material:	Vitrified clay
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	MH	Start node type, manhole, reference number MH6	1	 MH6 CNX_002.JPG
0.1m	OJ	Open joint Large.	3	 MH6 CNX_001.MP4_006.JPG
0.94m	JD	Joint displaced Medium.	2	 MH6 CNX_003.JPG
1.65m	JD	Joint displaced Medium.	2	 MH6 CNX_004.JPG
2.36m	MHF	Finish node type, manhole, reference number MH5	1	 MH6 CNX_005.JPG

Survey Report**23/05/2022**

Start:	RE1	Finish:	Main Run
Depth Start (mm):		Depth Finish (mm):	
Direction:	Downstream	Material:	Polyvinyl chloride
Diameter (mm):	100mm	Shape:	Circular
Water Level %:	5	Use:	Foul
Lining:		Weather:	No rain or snow
Purpose:	Sample surv. to det. asset cond.		
Comments:			

Observations & Photos:

Position	Code	Observation	Grade	Photo
0m	RE	Start node type, rodding eye, reference number RE1	1	
1.18m	OFF	Finish node type, outfall, reference number Main Run	1	

Legend

Surface Water

Foul Water

Assumed Route

Aco Channel

Manhole

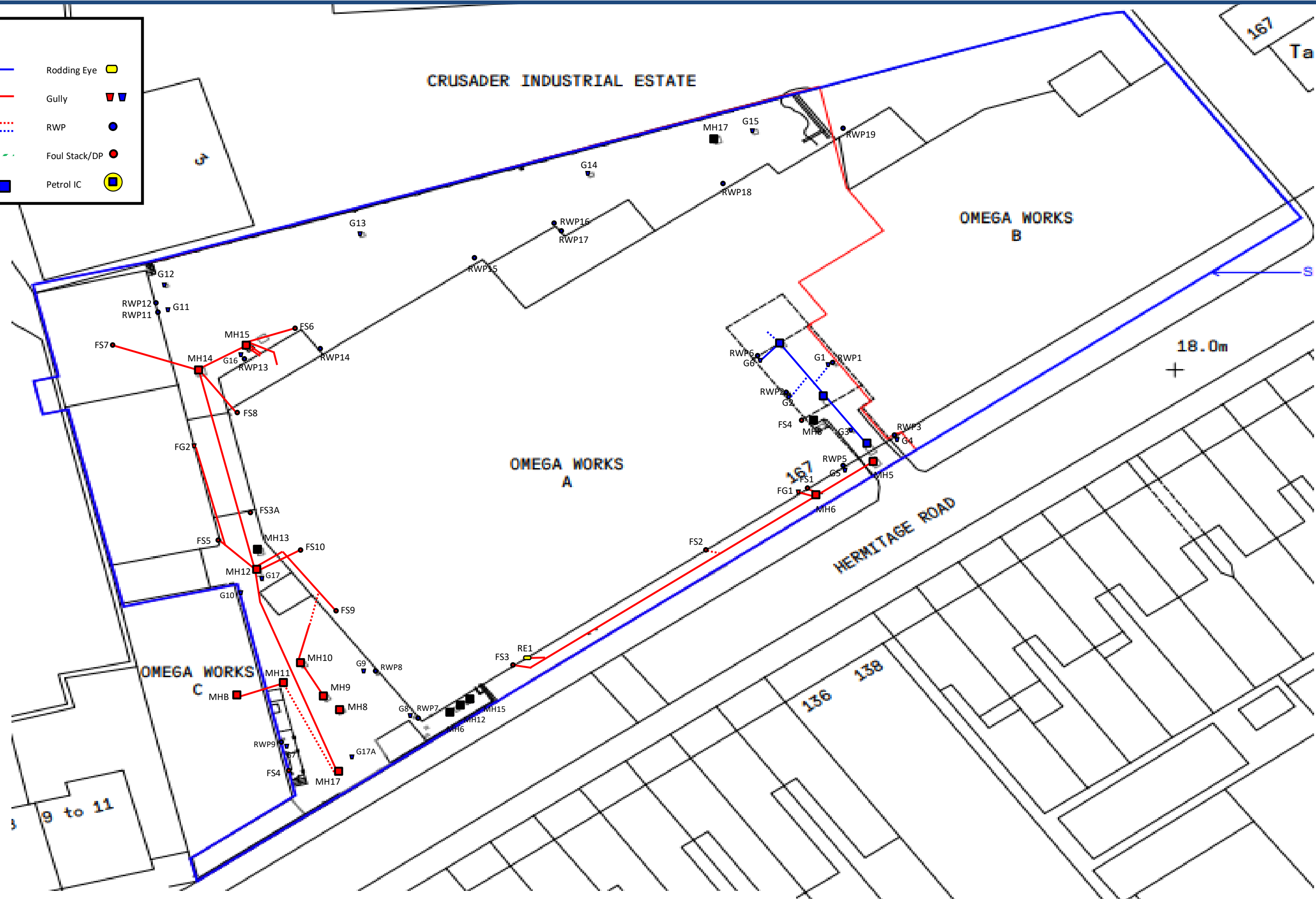
Rodding Eye

Gully

RWP

Foul Stack/DP

Petrol IC



Site Address: Omega Works, Hermitage Road, London, N4 1LZ
Report Reference: RB23052201

This CCTV survey report and the subsequent observations, findings and recommendations are made solely for the use of Total Drain Care Limited and has been carried out at the request of the client, as detailed at the beginning of this report.

If a third-party contractor is instructed to carry out the recommended works identified in the report, it is recommended they undertake a CCTV Survey prior to any works to confirm their own findings.

Furthermore, any comments or suggestions made within this report are only held valid on the day(s) of the inspection due to possible changes occurring within the system at any given time.

Total Drain Care Limited reserve the right to revoke any recommendations, quotations, or findings within or based upon this survey after this time and may request a new survey is completed to re-confirm findings prior to works commencing.

Any quotations for remedial works included within this report will remain valid for a maximum of 30 days from the date of the survey.

Total Drain Care Limited reserves the right to at all times to withdraw any/all quotation(s) if the market conditions change to cause the quotation pricing to become unviable – such as change in material costs, plant hire cost, availability of materials etc.

Total Drain Care Limited will endeavor to always undertake our work to the highest standards. In the event of an error being made, we will not accept liability for errors and omissions greater than the value received for providing the services.

A CCTV survey alone should not be a guarantee of water tightness. The views expressed in this report are based entirely upon a visual examination of the drainage, supported by information obtained from a drainage CCTV inspection and or a water pressure test. The jointing systems of all below ground drainage pipes are always constructed around the outside of pipes, so are not usually visible on CCTV recordings. Hence, a detailed knowledge of past and present drainage construction techniques is usually used to draw conclusions about the integrity of the pipe joints, from the conditions on their inside surfaces.

The drawing contained within or accompanying this report is not a scaled drawing and is for reference purposes only. Unless stated otherwise, all invert depths are measured at the downstream end of the inspection chamber or manhole, vertically from the bottom of the channel to the top of the manhole cover. An approximate pipe diameter of all surveyed pipe runs is given from visual inspection above ground. The exact diameter of the internal pipe wall can only be provided where safe access into the chamber is available and therefore the pipe diameter should always be checked before any remedial works are undertaken as a result of this inspection report.

Where confined space entry is not instructed or possible, reports are only as accurate as the limitations of the visibility of a below ground camera view with no in person inspection. This means all recommendations and report findings are approximations and constrained by the limitations of a remote camera operation.

Therefore, our report findings/recommendations are based on very limited access/view and cannot be relied upon for extensive remedial works/cost appraisals. A more detailed inspection of the chambers/drainage would need to be undertaken prior to any remedial works of value. Total Drain Care Ltd will not be held liable for any failed repairs or financial decision making based on any information contained within this report that may be inaccurate.

The clock reference system is used to indicate where observations are being made, relative to the absolute position of the invert (bottom) of the pipe. That is to say that the soffit (top) of the pipe is at 12 o'clock, the invert of the pipe is 6 o'clock, the right-hand edge is 3 o'clock and the left-hand edge is at 9 o'clock. Where observations are made between points of the clock face, they are done so in a clockwise direction i.e. from 3 to 9 o'clock is the bottom half of the pipe.

The 'master' copy of the recording for this report will be kept at Total Drain Care Ltd for a period of 36 months from the date of the survey, and further copies maybe available to purchase on request. After this time, the master copy may be destroyed.

Appendix 3 – Calculations

1-1 Year Design Rainfall

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area;	London
Storm duration;	D = 15 min
Return period;	Period = 1 yr
Ratio 60 min to 2 day rainfall of 5 yr return period;	r = 0.440
5-year return period rainfall of 60 minutes duration;	M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming;	p _{climate} = 0 %
Factor Z1 (Wallingford procedure);	Z1 = 0.65
Rainfall for 15min storm with 5 year return period;	M5_15min _i = Z1 × M5_60min = 12.9 mm
Factor Z2 (Wallingford procedure);	Z2 = 0.62
Rainfall for 15min storm with 1 year return period;	M1_15min = Z2 × M5_15min _i = 8.0 mm
Design rainfall intensity;	I _{max} = M1_15min / D = 31.9 mm/hr

Maximum surface water runoff

Catchment area;	A _{catch} = 3783 m ²
Percentage of area that is impermeable;	p = 100 %
Maximum surface water runoff;	Q _{max} = A _{catch} × p × I _{max} = 33.5 l/s

1-30 Year Design Rainfall

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area;	London
Storm duration;	D = 15 min
Return period;	Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period;	r = 0.440
5-year return period rainfall of 60 minutes duration;	M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming;	p _{climate} = 0 %
Factor Z1 (Wallingford procedure);	Z1 = 0.65
Rainfall for 15min storm with 5 year return period;	M5_15min _i = Z1 × M5_60min = 12.9 mm
Factor Z2 (Wallingford procedure);	Z2 = 1.51
Rainfall for 15min storm with 30 year return period;	M30_15min = Z2 × M5_15min _i = 19.5 mm
Design rainfall intensity;	I _{max} = M30_15min / D = 78.2 mm/hr

Maximum surface water runoff

Catchment area;	A _{catch} = 3783 m ²
Percentage of area that is impermeable;	p = 100 %
Maximum surface water runoff;	Q _{max} = A _{catch} × p × I _{max} = 82.2 l/s

1-100 Year Design Rainfall

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; London
Storm duration; D = **15** min
Return period; Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period; r = **0.440**
5-year return period rainfall of 60 minutes duration; M5_60min = **20.0** mm
Increase of rainfall intensity due to global warming; p_{climate} = **0** %
Factor Z1 (Wallingford procedure); Z1 = **0.65**
Rainfall for 15min storm with 5 year return period; M5_15min_i = Z1 × M5_60min = **12.9** mm
Factor Z2 (Wallingford procedure); Z2 = **1.96**
Rainfall for 15min storm with 100 year return period; M100_15min = Z2 × M5_15min_i = **25.3** mm
Design rainfall intensity; I_{max} = M100_15min / D = **101.2** mm/hr

Maximum surface water runoff

Catchment area; A_{catch} = **3783** m²
Percentage of area that is impermeable; p = **100** %
Maximum surface water runoff; Q_{max} = A_{catch} × p × I_{max} = **106.4** l/s

Attenuation Tank Design

**Eckersley
O'Callaghan**

Project No: 20063
Project Name: Omega Works A
Title: Attenuation Tank Design
Date: 01/07/2022
By: MT

Return period of 100 year, 40% climate allowance

ATTENUATION TANK DESIGN

Area, Length = 20 m
Width = 10 m
Depth = 1.2 m

Catchment area m²

Pipe outlet L/s L/s
0.005 m³/s

Volume provided 228.0 m³
Volume required 220.4 m³

	Duration of storm			Rainfall, mm	Rainfall, mm/hr	Input		Storage required	Actual outflow
	hours	minutes	seconds			m ³	L/s	m ³	L/s
ESR	0.08	5	300	20	241.1	76	253.3	74.50	5.0
	0.17	10	600	29	173.3	109	182.1	106.28	5.0
	0.25	15	900	35	141.7	134	148.9	129.49	5.0
	0.50	30	1800	46	91.6	173	96.2	164.19	5.0
	1	60	3600	57	56.8	215	59.7	197.03	5.0
	2	120	7200	67	33.6	254	35.3	218.22	5.0
	4	240	14400	77	19.3	292	20.3	220.35	5.0
	6	360	21600	84	14.0	318	14.7	209.77	5.0
	10	600	36000	92	9.2	350	9.7	169.55	5.0
	24	1440	86400	108	4.5	407	4.7	-25.25	4.7