

Haringey Civic Centre

Drainage Strategy

HCC-BHE-XX-XX-RP-C-000001

0044501

15 March 2023

Revision P02

PLANNING ISSUE

Revision	Description	Issued by	Date	Checked
P01	Draft Stage 3	JBC	03.02.2023	NP
P01	Stage 3 Issue	NA	03.03.2023	NP
P02	Planning Issue	NA	15.03.2023	NP

https://burohappold.sharepoint.com/sites/044501/05_Discipline/08_Civils - Infrastructure/03 Reports/STAGE 3 ISSUE (FOR PLANNING)/ISSUE FOR SUBMITION/HCC-BHE-ZZ-ZZ-RP-C-000001.docx

Report Disclaimer

This Report was prepared by Buro Happold Limited ("BH") for the sole benefit, use and information of London Borough of Haringey for Purpose of Report. BH assumes no liability or responsibility for any reliance placed on this Report by any third party for any actions taken by any third party in reliance of the information contained herein. BH’s responsibility regarding the contents of the Report shall be limited to the purpose for which the Report was produced and shall be subject to the express contract terms with London Borough of Haringey. The Report shall not be construed as investment or financial advice. The findings of this Report are based on the available information as set out in this Report.

author

Nikolajs Anosovs

date

8th March 2023

approved

Nichole Pau

signature



date

15th March 2023

..

Contents

1 Executive Summary	6
2 Introduction	7
2.1.1 Background	7
2.1.2 Site Description	7
2.1.3 Proposed Development	7
2.1.4 Flood Risk Scoping	7
3 Planning Context	8
3.1.1 Overview	8
3.1.2 National Planning Policy Framework	8
3.1.3 Climate Change	8
3.1.4 Regional Policy	8
3.1.5 Local Policy	8
3.1.6 Consultation	9
4 Existing Surface Water Drainage	10
5 Sustainable Drainage Systems (SuDS)	11
5.1.1 Infiltration	11
5.1.2 Rainwater harvesting	11
5.2 Green, Blue, Brown Roofs	11
5.2.1 Filter strips / drains	11
5.2.2 Bioretention / rain gardens	12
5.2.3 Permeable Surfaces	12
5.2.4 Swales	12
5.2.5 Ponds / basins	12
5.2.6 Underground tanks / cellular crates	12
5.2.7 Maintenance and Management of SuDS	13
5.2.8 Overland flow routes	13
6 Proposed Surface Water Drainage	14
6.1.1 Abandonments	14
6.1.2 Surface Water Runoff Rate	14

6.1.3	Climate Change	14	Figure 4-1 Thames Water Asset Records (April 2020).	10
6.1.4	Surface Water Attenuation	14	Figure 4-2 Existing Site area characteristics within the Proposed Development boundary.	10
7 Existing Foul Water Drainage		16	Figure 5-1 Example of a green roof system (left) and biodiverse roof with PV panels (right).	11
7.1.1	Basement manholes and sump	16	Figure 5-2 Examples of swales in residential developments.	12
8 Proposed Foul Water Drainage		17	Figure 5-3 Examples of bioretention systems/raingardens.	12
8.1.1	General	17	Figure 5-4 Examples of permeable surfacing.	12
8.1.2	Estimated Foul Loading	17	Figure 5-5 Example of a geocellular product (left) and an underground attenuation tank (right).	13
8.1.3	Thames Water Consultation	17	Figure 6-1 Catchment areas for proposed development (Churchman Thornhill Finch drawing 556-CTF-ZZ-ZZ-DR-L-100000 P3).	15
8.2	Summary	17	Figure 7-1 Haringey Civic Centre historical drawing 'General Arrangement Basement Plan' drawing number C.511/21 dated 18.01.56	16
Appendix A Thames Water Asset Records		18	Figure 7-2 Thames Water Asset Records (April 2020).	16
Appendix B CCTV Survey Report		19	Figure 7-3 Existing manholes in the Civic Centre basement. Left: Manhole 1 (ref MH7/FL in CCTV survey) and Right: Manhole 2 (ref MH6/FL in CCTV survey).	16
Appendix C Run-off calculations		20		
Appendix D Underground services survey		21		
Appendix E Historical basement general arrangement drawing		22		
Appendix F SuDS Proforma		23		
Appendix G Correspondence with LLFA		24		
Appendix H Correspondence with Thames Water		25		
Appendix H Proposed Drainage Strategy		26		
Table of Tables				
Table 3-1 Climate change allowanced for 3.3% and 1% annual exceedance rainfall events.		8		
Table 4-1 Existing developed site run-off rate		10		
Table 5-1 Summary of SuDS features and their feasibility		13		
Table 6-1 Proposed surface water discharge rates		14		
Table 6-2 Proposed restricted runoff and corresponding attenuation requirement		14		
Table 6-3 Breakdown of restricted runoff and attenuation requirements.		14		
Table 8-1 Foul Load Estimates		17		
Table 9-1 Comparison of peak discharge between existing and proposed development.		17		
Table of Figures				
Figure 2-1 Haringey Civic Centre site location.		7		
Figure 2-2 Proposed Development plan (Churchman Thornhill Finch drawing 556-CTF-ZZ-ZZ-DR-L-100000 P4)		7		

Glossary

Term	Definition
AEP	Annual Exceedance Probability
Attenuation	Water storage features
Catchment	The area contributing surface water to a point on a drainage system which may be divided into sub-catchments
Design storm	A synthetic rainfall event of a given duration and return period, which is derived by statistically analysing an historical series of rainfall events for a specific location.
Greenfield land	Land never previously developed
Greywater	Wastewater from sinks, baths, showers and domestic appliances.
Local council	London Borough of Haringey
Outfall	The point, location or structure where wastewater or drainage discharges from a pipe, channel, weir, drain or other conduit.
Peak discharge	The maximum flow rate at a point in time at a specific location resulting from a given storm condition.
SuDS	Sustainable Drainage Systems
TW	Thames Water
Runoff	Water from precipitation that flows off a surface to reach a drain, sewer or receiving water.
Runoff coefficient	The proportion of total rainfall that appears as total runoff volume after subtracting depression storage, infiltration and interception.
Wallingford procedure	A design and analysis procedure for urban drainage networks (HR Wallingford and Institute of Hydrology, 1981a).

1 Executive Summary

1. This drainage strategy has been prepared by Buro Happold to accompany the detailed planning application for the Proposed Development.
2. The site is located in North London and is currently occupied by a grade II listed building, Haringey Civic Centre. The Site is 1.038ha and is bounded by High Road (A105) on the east, Trinity Road to the north, Bounds Green Road (A109) to the south and Trinity Primary Academy to the west
3. The Proposed Development is a refurbishment of the existing Haringey Civic Centre and a new build office Annexe to the north west of the existing building, to be located on an at-grade car park.
4. The strategy for surface water management follows the guidance contained in the National Planning Framework, The London Plan and the London Borough of Haringey Local Plan.
5. Based on the policies and guidance a limited discharge rate (equivalent to greenfield 1:100-year event) of 5.68 l/s/ha was determined.
6. A preliminary assessment of the volume storage to be provided has been made and is estimated at 472m³ based on 62% of the total site being impermeable.
7. To accommodate this volume of storage it is proposed to attenuate surface water run-off within Sustainable Drainage Systems (SuDS). These include: green roofs, permeable surfaces, rain gardens and underground cellular tanks.
8. A pre-development enquiry has been submitted to Thames Water to confirm there is sufficient capacity in the existing combined sewer system. Thames Water confirmed that there will be sufficient sewerage capacity to serve the proposed development. Also, if surface water discharge flow is restricted to 5.9l/s then Thames Water would not have any objections to the proposal.
9. The surface water betterment provided is a reduction in peak run-off from approximately 144.10 l/s to 5.9 l/s or 96% less than the previously undeveloped site.
10. The calculated peak foul discharge from the site is 6.06l/s.

2 Introduction

2.1.1 Background

This Drainage Strategy report has been prepared by Buro Happold as part of the detailed planning application for the Proposed Development.

This report presents the surface water and foul water drainage strategy for the Proposed Development.

2.1.2 Site Description

The Proposed Development is a grade II listed Haringey Civic Centre building and new build office annexe located in Wood Green, London. The Site is 1.038ha and is bounded by High Road (A105) on the east, Trinity Road to the north, Bounds Green Road (A109) to the south and Trinity Primary Academy to the west.

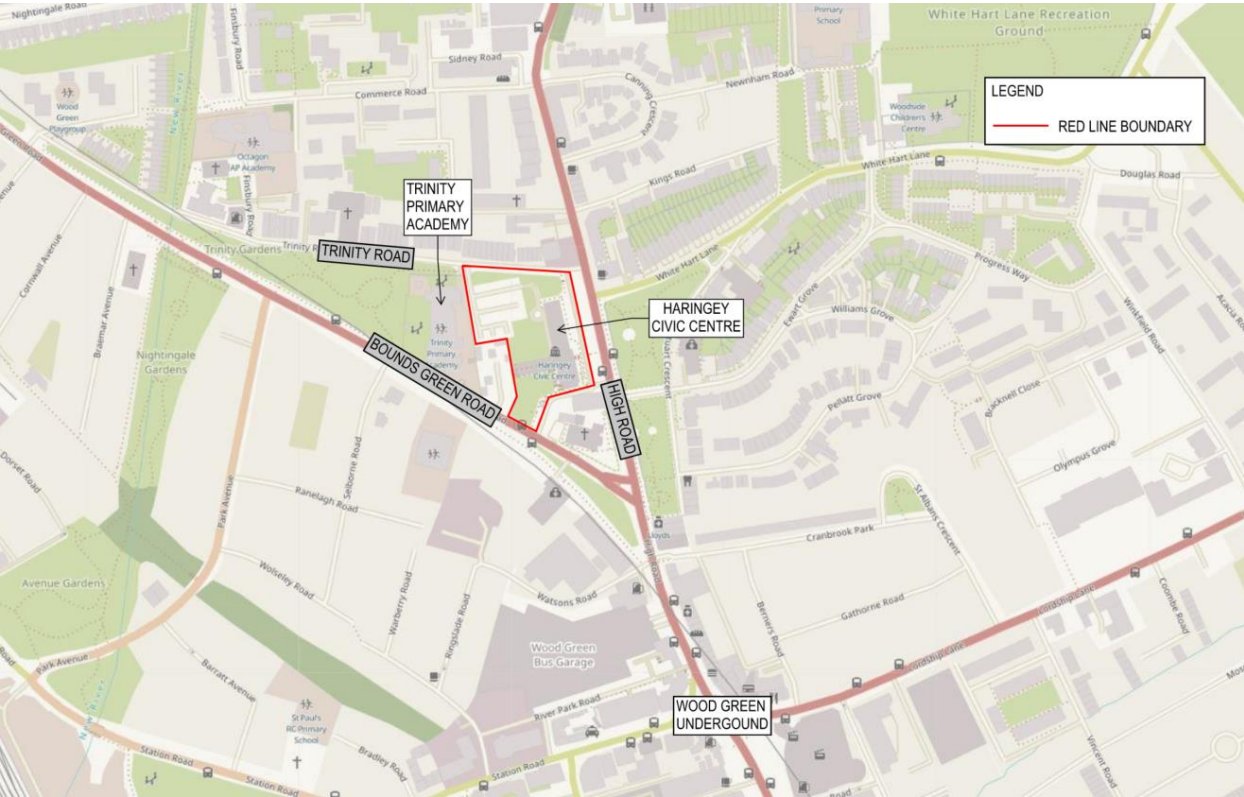


Figure 2-1 Haringey Civic Centre site location.

The Site is currently occupied by the grade II listed Haringey Civic Centre building, 98 space capacity at-grade car park, an open grass area and mature tree’s to the north and south. Existing ground levels on Site range from approximately +35.60 at the north, +36.90 along the south east and +37.50m in the centre and south of the site. The Site generally slopes from the south to the north along Trinity Road and east along High Road.

The Asset Location Search of Thames Water (TW) sewers indicated that there are a number of existing TW surface water and foul water sewers within the Site. Refer to Section 4 of the report for the existing drainage information.

According to the online GeoIndex tool provided by the British Geological Survey, the underlying bedrock geology is the London Clay Formation which has low / poor permeability for infiltration. There is approximately 1m of Made Ground which is a mixture of Sand and Clay. The implications of these ground conditions on the drainage strategy are discussed further in Section 5.1.1.

The Site is located in a groundwater Source Protection Zone. This drainage strategy considers this receptor in the proposal. There are mature tree’s with root protection areas, which have been considered in the proposals. Refer to the Treework Environmental Practice Tree Constraints Plan 210301-1.1-HCC-TCP-NC.

2.1.3 Proposed Development

The Proposed Development is an outline planning application for the listed building and redevelopment of the surround land. Include planning specific wording.

The proposed layout and levels of the building and external landscaping of the Proposed Development are shown in Figure 2-1.

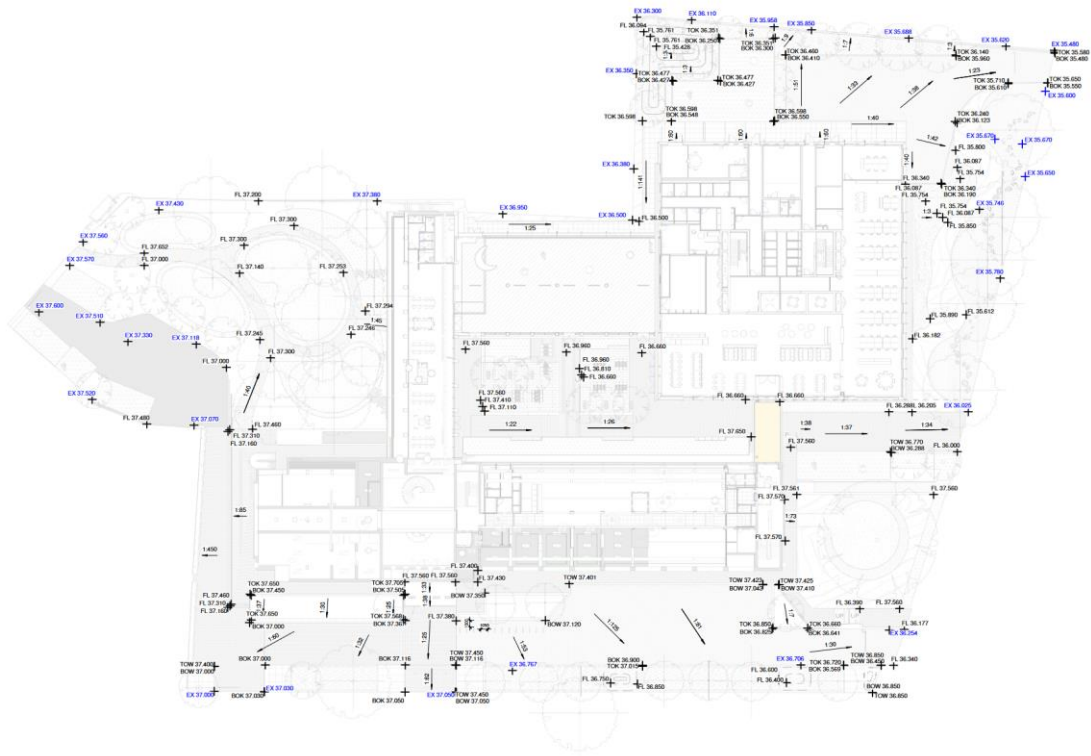


Figure 2-2 Proposed Development plan (Churchman Thornhill Finch drawing 556-CTF-ZZ-ZZ-DR-L-100002)

2.1.4 Flood Risk Scoping

Refer to the Flood Risk Assessment 0044501-BHE-XX-XX-RP-CW-0001 by Buro Happold for more details.

3 Planning Context

3.1.1 Overview

The Drainage Strategy has been prepared in accordance with the policies and guidance application to the Proposed Development, outline within the following publications:

- National Planning Policy Framework (Ministry of Housing, Communities and Local Government (MHCLG), 2021)
- National Planning Policy Framework Practice Guidance website (Updated June 2021)
- The London Plan (March 2021)
- The London Plan: Sustainable Design and Construction, Supplementary Planning Guidance (April 2014)
- London Borough of Haringey Local Plan
- The Haringey Sustainable Drainage Evaluation Guide
- The Haringey Sustainable Drainage Planning Guide

3.1.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) provides national policy for dealing with surface water, with a focus on sustainable development. The NPPF requires that developments incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate and to include mitigation for the anticipated impacts of climate change where necessary.

The Planning Practice Guidance to the NPPF states that the aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain, or another drainage system;
- To a combined sewer.

The drainage strategy contained within this report has been developed in accordance with this drainage hierarchy. To control surface water runoff as close to where it falls and mimic natural drainage as closely as possible, the NPPF places an importance on sustainable drainage systems. In particular, they provide an opportunity to reduce the causes and impacts of flooding, remove pollutants from urban runoff at source and combine water management with green space with benefits for amenity, recreation and wildlife.

3.1.3 Climate Change

The climate change guidance published by the Environment Agency (EA) in February 2016 and last updated in May 2022 to support the NPPF, contains sensitivity ranges that are recommended to be applied to peak rainfall intensities, peak river flows, sea level rise, offshore wind speeds and extreme wave heights. The general trend is for each parameter to increase in the future, which in turn increases the risk of flooding to any site. The recommended allowances for peak rainfall intensity are given in Table 3-1.

Table 3-1 Climate change allowed for 3.3% and 1% annual exceedance rainfall events.

	Lifetime Up To	Central Allowance	Upper End Allowance
3.3% Annual Exceedance Rainfall Event	2050s	20%	35%
	2070s	20%	35%
1% Annual Exceedance Rainfall Event	2050s	20%	40%
	2070s	25%	40%

The surface water drainage strategy contained within this report has made an allowance for a 40% increase in peak rainfall intensity, based on a minimum of 50-year design life for the Proposed Development.

3.1.4 Regional Policy

The London Plan

The Greater London Authority (GLA) produced a new and revised London Plan in 2021, which is a strategic overview of development across London until 2041, including frameworks relating to economic, environmental, social and transport factors. It contains specific policies on flood risk management and the use of sustainable drainage.

Policy SI 13 of the London Plan states that developments should aim to achieve greenfield runoff rates and ensure surface water runoff is managed as close to its source as possible in line with the following drainage hierarchy:

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

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity, and recreation.

The drainage strategy contained within this report has been developed in accordance with this drainage hierarchy.

In paragraph 3.4.10 within Section 3.4 of the Sustainable Design and Construction, Supplementary Planning Guidance to the London Plan, it is clarified that for previously developed sites, runoff should not be greater than three times the calculated greenfield rate. Greater discharge rates may be acceptable where a pumped discharge would be required to meet the lower runoff standards.

3.1.5 Local Policy

London Borough of Haringey Local Plan

The London Borough of Haringey Local Plan is formed of Strategic Policies, Development Management Policies and Site Allocations alongside the London Plan. There are three development management policies on SuDS that the Proposed Development is required to comply with:

- Policy DM24: Managing and Reducing Flood Risk
Proposals must be informed by a site specific Flood Risk Assessment (FRA) and preserve overland flood and flow routes, ensuring adequate flood storage and compensation should be provided on site, or if this is not possible, provided off site where circumstances allow. All proposals for new development will be required to manage and reduce surface water run-off and manage water and waste water discharges.
- Policy DM25: Sustainable Drainage Systems
All proposals for new development must seek to manage surface water as close to its source as possible in line with the London Plan drainage hierarchy. The Council will require SuDS to be sensitively incorporated into new development with the requirements to reduce surface water flows to a greenfield run-off rate for a 1 in 100 year critical storm for major developments. For minor developments proposals should aim to achieve a greenfield run-off rate and at a minimum achieve a 50 per cent reduction on existing site run-off areas. All other development should seek to achieve a greenfield run-off rate and include at least one ‘at source’ SuDS measure resulting in a net improvement in water quantity or quality discharging to a sewer. SuDS are expected to be designed to maximise biodiversity and local amenity benefits, and where appropriate, improve water quality and function effectively over the lifespan of the development. Where SuDS cannot be implemented due to site

constraints robust justification must be provided along with proposed alternative sustainable approaches to surface water management.

- Policy DM27: Protecting and Improving Groundwater Quality and Quantity
All proposals must ensure that there is no adverse impact on groundwater quality and where located in Source Protection Zones the Proposed Development must not result in an unacceptable risk to groundwater quality.

London Borough of Haringey SuDS Design Evaluation

The design guide outlines the objective of SuDS to be an integral part of the urban fabric that should be developed using the available landscape spaces. The guide states the urban nature of Haringey and the density synonymous with proposed developments typically results in green and blue roofs, porous paving and rain gardens integrated into landscaping as the most sustainable solutions. Tank and crate solutions are discouraged as maintenance and lifetime costs can be prohibitive.

3.1.6 Consultation

Environment Agency

The project team have consulted with the Environment Agency (EA) to discuss key aspects of the Proposed Development throughout the masterplan design. The pre-application advise notice regarding the proposed flood risk management is included within the Flood Risk Assessment (FRA) prepared by Buro Happold.

Lead Local Flood Authority

A request has been sent to the LLFA via email (drainageandflooding@haringey.gov.uk) to set-up meeting and discuss the drainage concept strategy. LLFA sent the formal response on 14.02.2023 where they confirmed that proposed restricted flow rate of 5.9l/s is acceptable.

Thames Water

A pre-development enquiry was submitted to Thames Water to ascertain the capacity of the existing network and to establish if any reinforcement of the network is required. Thames Water confirmed with the email confirmation on 13.02.2023 that the existing sewer had sufficient capacity to serve new development. Also, if surface water flow is restricted to 5.9l/s, Thames Water would not have any objections on the proposal.

4 Existing Surface Water Drainage

The Site currently comprises of the existing Civic Centre building roof, asphalt access roads and car parking and areas of lawn grass, mature trees, and planting.

The existing 1.038ha Site has approximately 75% impermeable surfaces which includes building roofs, hard paving, and roads.

Existing ground levels on Site range from approximately +35.60 at the north, +36.90 along the south east and +37.5m in the centre and south of the site. The Site generally slopes from the south to the north along Trinity Road and east along High Road.

Details of the existing drainage networks have been sourced from Thames Water's public sewer records, included in the Appendix.

Thames Water's sewer records indicate the following drainage network around the Site:

- To the north along Trinity Road, there is a 305mmØ surface water sewer gravitating west.
- To the east along High Road there is a 152mmØ surface water sewer gravitating south. There is also a 102mmØ and surface water sewer, running alongside the existing Civic Centre building. The surface water flows west, with an undefined end.
- To the south along Bounds Green Road, there is a 305mmØ surface water sewer which flows South-East and connect to the sewers in High Road.



Figure 4-1 Thames Water Asset Records (April 2020).

There is existing private drainage within the Site boundary along the west site of the building which collects surface water run-off from the asphalt walkway via gullies. Pipes are directed to a manhole within an area of mature tree's. This appears to discharge to the Thames Water drainage network in Bounds Green Road.

A GPR survey was conducted in May 2020 by Amethyst Survey is included in Appendix E. The 150mm diameter surface water discharge pipe to Bounds Green Road was not identified on the survey. It is recommended the contractor survey this pipe to confirm the status and condition.

Existing surface water peak discharge rates from this developed land, based on the Wallingford Procedure's Modified Rational Method, are tabulated in Table 4-1 for storm events ranging from 1:1, 1:30 and a 1:100 year return period. Softscape catchment areas have not been included in the existing runoff rate estimation as it is not considered these areas contribute to the brownfield runoff that discharges into the public sewer.

Table 4-1 Existing developed site run-off rate

Area	Existing brownfield run-off rate		
	Q ₁	Q ₃₀	Q ₁₀₀
Total (building roof, hardstanding, roads, carparking) * 0.69ha	69.3 l/s	169.2 l/s	216.9 l/s

*The roof and hardscape drainage area of the existing site was considered using the following run-off coefficients based on the catchment characteristics: building/roof $c=1.0$; hardstanding $c=0.9$.



Figure 4-2 Existing Site area characteristics within the Proposed Development boundary.

5 Sustainable Drainage Systems (SuDS)

In accordance with the National Planning Policy Framework (NPPF) considerations of sustainable drainage systems (SuDS) and surface water attenuation methodologies are obligatory.

SuDS are a natural approach to managing drainage and aim to provide a more sustainable solution that traditional piped drainage systems. They are design to both manage environmental risks from the impact of urbanisation on flooding and contribute to environmental enhancement. SuDS objectives include:

- Reduction in the quantity of urban runoff;
- Minimisation of the developments impact on the quality of runoff; and
- Maximisation of amenity and biodiversity values.

A surface water ‘management train’ approach which replicates as closely as possible the natural runoff will be used to incorporate various SuDS controls into the drainage system. The ‘management train’ will include both source controls and downstream site (catchment) controls. Typical SuDS components that have been considered for the Site include:

Source Controls:

- Rainwater harvesting
- Green roof
- Filter trenches
- Raingardens
- Permeable surfaces
- Underground tanks / cellular crates

Catchment Controls:

- End of line oil separators to treat runoff where necessary
- End of line gross pollutant traps which will intercept rubbish and silt from the main drainage system, eg catchpits with sediment sumps and / or hydrodynamic vortex separators.

The SuDS which have been assess and considered for installation on the Site are discussed in the following sections. Their suitability and viability have been assessed against several parameters include: site conditions, tree root protection areas, spatial land-take, adoptability and architectural and landscaping proposals.

5.1.1 Infiltration

Infiltration is a means of disposing of surface water run-off into the ground by percolation / soakage, thereby reducing and controlling the quantity of run-off into a sewer network.

According to the online GeoIndex tool provided by the British Geological Survey, the underlying bedrock geology is the London Clay Formation which has low / poor permeability for infiltration. There is approximately 1m of Made Ground which is a mixture of Sand and Clay.

Intrusive ground investigation will be required in the detailed drainage design stage to understand the level of contamination in the Made Ground and London Clay Formation, resting groundwater levels and feasibility of infiltration.

As a result of the above, infiltration into the ground has not been proposed as a viable means of disposing of surface water run-off. In the absence of detailed site investigation for the Proposed Development on contamination, all SuDS

features employing percolation are to be lined with an impermeable membrane to ensure potential existing ground contaminants are not mobilised.

5.1.2 Rainwater harvesting

Rainwater harvesting can reduce the total surface water discharge from Site, and it involves the collection, filtration and storage of rainwater from roof areas for non-potable use. It reduces the demand on the potable water supply as it provides an alternative water source for irrigation of landscaped areas. On the other side, the key design considerations is the space take up to accommodate rainwater harvesting system and tanks. In combination with green roofs as rainwater capture areas, the amount of water harvested will be reduced which results in a less cost-efficient system and difficult to gauge water collection which is for these reasons rainwater harvesting is not proposed.

5.2 Green, Blue, Brown Roofs

Green roofs have a vegetated surface which provides retention, attenuation and treatment of rainwater as well as contributing to local biodiversity. Green roofs function as a source control and reduce storm water runoff with a good removal capability of atmospherically deposited urban pollutants. Their water storage capacity increases with substrate depth, 60-200mm for and extensive green roof and 150-400mm for an intensive green roof, imposing a greater load on the roof structure.

A biodiverse roof and brown roof have substrate depths of 80-150mm and 80mm respectively, are low maintenance and can contribute to the management of run-off. Furthermore, the biodiverse roof enhances local habitat. Blue roofs involve additional storage capacity within a drainage geocomposite system below the substrate and roof surface finish. The blue roof system includes flow restrictions from restrictor chamber outlets to fully utilise voids within the drainage layer as an element of attenuation at roof level.

The Proposed Development contains large areas of flat roof providing an ideal basis for the aforementioned roof system/s. It is proposed to incorporate green roof on the new link building. A green or blue roof is not considered feasible on the existing Civic Centre building due to heritage concerns and extensive structural reinforcement that would be required. The utilisation ratio of each roof should be assessed to consider plant space that restrict green roof capacity of the roof.



Figure 5-1 Example of a green roof system (left) and biodiverse roof with PV panels (right).

5.2.1 Filter strips / drains

Filter strips are sections of gently sloping areas of grass and vegetation that provide treatment to run-off from adjacent impermeable areas. They are easily integrated into the landscaping of the site and designed to provide aesthetic benefits to positively impact human wellbeing. The quality of run-off is improved through vegetative filtering and settlement of particulate pollutants through the filter medium.

Filter drains, also referred to as filter trenches are filled with granular, free-draining material which collect, treat and store surface water run-off. They are suitable for sites where the ground has limited permeability, therefore conveying surface water to downstream networks. Filter strips have not been proposed for the development and where space is limited, due to congested service corridors or excavation of site material is considered high risk due to contamination, a modular void former system (with increased void ratio) has been considered to provide attenuation alongside other SuDS.

5.2.2 Bioretention / rain gardens

Bioretention areas are landscaped depressions to manage and treat run-off from frequent rainfall events and are suitable for larger scale sites. They remove urban pollutants from surface water run-off as they are typically under-drained and promote filtration through varying media. Bioretention requires landscaping and management and are susceptible to clogging if poor management is not in place. Due to their unsuitability to high density sites, it is not considered viable to include large bioretention areas within the Proposed Development.

Raingardens are smaller depressions in the ground planted with native vegetation to support local biodiversity. Non-engineered soil is typically used and their impact on run-off reduction can be limited. Since raingardens are suitable for high-density, urban sites, they could be incorporated into the Proposed Development as a viable means of dealing with surface water flows and enhancing biodiversity.

The root protection area of existing tree’s is extensive which limits the areas in which raingardens can be installed. However, proposed soft landscaping at the entrance to the Civic Centre poses an opportunity for installation of a raingarden.



Figure 5-3 Examples of bioretention systems/raingardens.

5.2.3 Permeable Surfaces

Permeable surfaces allow infiltration of surface water flows into the underlying layers of a pavement build-up. Peak flows are reduced, minimising the risk of flooding downstream and run-off quality is improved through the percolating and filtering process

Installation of permeable surfacing has been proposed for site. Due to the unknown ground contamination, the permeable surface will be lined with an impermeable membrane to contain surface water flows.



Figure 5-4 Examples of permeable surfacing.

5.2.4 Swales

Swales are shallow, wide and typically vegetated to store and convey surface water run-off. They provide effective removal of urban pollutants, reduce run-off rates and have the potential to reduce volumes, depending on ground conditions. Swales are a natural conveyance system which provide pre-treatment with the opportunity for aesthetic, amenity and ecology environmental benefits. There is the opportunity to incorporate a swale to the north of the Annex building, between the building line and existing mature trees and adjacent to the cycle storage.



Figure 5-2 Examples of swales in residential developments.

5.2.5 Ponds / basins

Retention ponds attenuate stormwater water from each rain event which is temporarily collected and treated by sedimentation of silts following which the surface water run-off filters through the vegetation, removing urban pollutants. Ponds can cater for all storm events, however given the nature of the Proposed Development (high density) opportunities in providing space for retention ponds is limited due to restricted land take.

Detention basins function in a similar manner to ponds by providing surface water attenuation and settling of particulate pollutants. The basins are typically dry where the land has dual use and can function as a recreational facility, however like ponds they provide little reduction in run-off volume. There are better solutions for dealing with the disposal of surface water ie. filter drains that work with the streetscape urban environment.

5.2.6 Underground tanks / cellular crates

Geocellular and modular plastic systems are used to control and manage run-off, similar to a reinforced concrete storage tank. They have a high void ratio, modular construction, are lightweight and easy to install with a structural design to relevant standards for appropriate surface loading.

Underground storage tanks will contribute towards attenuation of surface water from building plots during the 1:100 year storm event, in conjunction with the green roofs systems. Underground tanks are similarly proposed to contribute towards the attenuation of the external public realm areas.

Where spatial constraints are present, storage tanks have been proposed to provide large storage capacity. Tanks will be situated at least 1m from building plot boundaries and, unless stated otherwise, tanks will range up to 0.5m in depth.

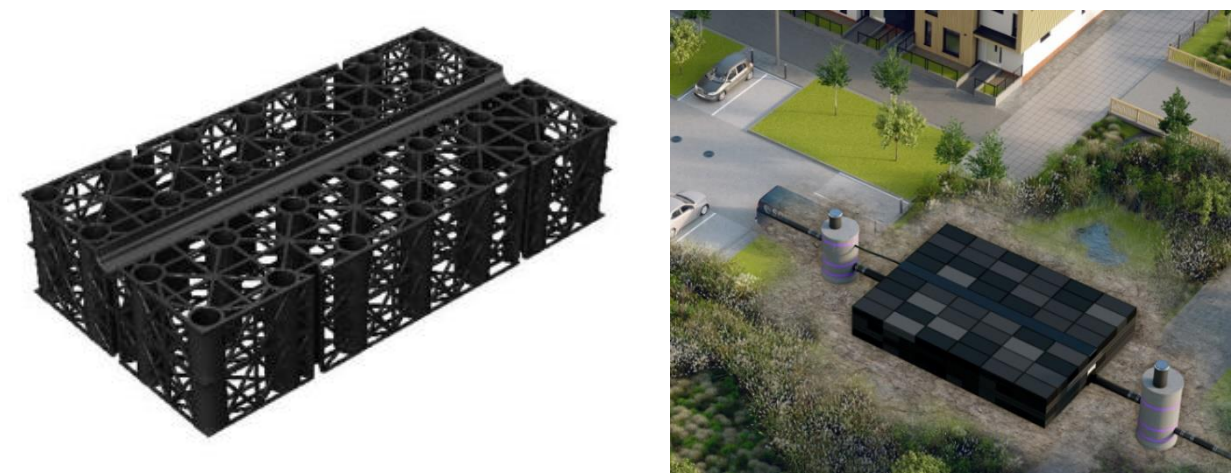


Figure 5-5 Example of a geocellular product (left) and an underground attenuation tank (right).

Table 5-1 summarised the feasibility of SuDS for the masterplan.

Table 5-1 Summary of SuDS features and their feasibility

	SuDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	Suitability for the Proposed Development
Most Sustainable ↑ ↓ Least Sustainable	Living Roofs	√	√	√	Yes
	Basins & Ponds	√	√	√	No
	Constructed Wetlands				No
	Balancing Ponds				No
	Detention Basins				No
	Retention Ponds				No
	Filter Strips & Swales	√	√	√	Yes
	Infiltration devices	√	√	√	No
	Soakaways				No
	Infiltration Trenches & Basins				No
	Permeable Surfaces	√	√		Yes
	Gravelled Areas				Yes
	Solid Paving Blocks				Yes
	Porous Pavers				Yes
	Tanked Systems	√			Yes
	Over-sized Pipes/ Tanks				Yes
	Storm Cells				Yes

5.2.7 Maintenance and Management of SuDS

A site-specific maintenance and management plan of the proposed drainage system will need to be produced for the management company/site owner prior to the occupation of the site, subject to SuDS manufacturer’s guidance.

Regular maintenance of the sustainable drainage systems is essential for their operation and performance. The maintenance strategy for specific SUDS structures will also be dependent upon the products used within the installation and will therefore be subject to the manufacturer’s guidance.

The SuDS will require maintenance of the upstream network to ensure that the transportation of silt and debris is minimised. This will involve periodic inspection and cleaning of catchpit chambers, trapped gullies/channels and rainwater outlets. To avoid failure of the mechanical/electrical components contained within the drainage systems, flow control devices will also require inspection and cleaning to prevent blockages.

5.2.8 Overland flow routes

Overland flow routes have been considered in the proposed drainage strategy and location of proposed SuDS features, in particular the swales. Overland flow routes will be further considered in the next design stage in combination with the detailed design of the external level’s strategy.

6 Proposed Surface Water Drainage

The proposed surface water drainage strategy has been developed in line with the planning policies outlined in Section 3 of this report.

The proposed surface water drainage systems comprise a new, dedicated network within the planning boundary, separate to the foul water flows. The Proposed Development will gravitate into the public surface water sewer system at 1No. new connection point and 1No. existing connection point. To allow future adoption, the drainage designs will be in accordance with ‘Sewerage Sector Guidance Appendix C’.

The proposed surface water drainage system is shown on the concept drainage plans attached in the Appendix and indicates:

- The surface water drainage strategy within the planning application boundary serving the existing Civic Centre office building, proposed Annex office building and public realm;
- Use of sustainable drainage systems (SuDS) where possible on site; and
- The proposed new connections to the public surface water sewer.
- The proposed surface water drainage system will collect surface water runoff from building roofs and the surrounding public realm.

Runoff from each roof area will be attenuated within the public realm. Providing attenuation at high-level was considered, however there are concerns about the heritage of the existing building and reinforcing the existing structure that would not make this option feasible. The basement of the existing building is to be retained and there is limited scope to include an attenuation structure within the building footprint. The proposed office Annex building runoff will also be attenuated within the public realm as the basement level is below the proposed connection invert level and a pump would be require. An area of green roof is proposed which will manage and reduce surface run off entering the drainage system. Attenuation for the buildings will consist of green roofs and a rainwater harvesting break tank which is located in the in break tank room on the ground floor of the proposed Annexe building.

Collection of external surface water runoff will be via overland flow routes, gullies, linear drains and pipes that connect into the external below ground drainage system. Prior to entering the below ground drainage, the streetscape runoff with pass through catchpits for settling of sediments. Gullies and drainage channels will have trapped channel outlets with silt buckets to prevent silt and other contaminants from entering the downstream SuDS features. Attenuation and further treatment of surface water flows from the private external public realm will be provided by the following SuDS features: filter trenches, rain gardens, swale, permeable paving and underground attenuation.

6.1.1 Abandonments

A section of private drainage network serving the west side of the existing Civic Centre office building will need to be abandoned and removed from site as part of the initial site clearance works in accordance with the proposed build-out.

6.1.2 Surface Water Runoff Rate

Surface water runoff has been estimated using the MicroDrainage ICP SUDS Input (FSR) Method. The surface water is proposed to be restricted to greenfield runoff rate for the Site as summarized in Table 6-1.

Table 6-1 Proposed surface water discharge rates

Return Period	Greenfield runoff rate per hectare	Proposed greenfield runoff rate
1 in 1 year	4.82 l/s/ha	5.0 l/s
QBAR	5.68 l/s/ha	5.9 l/s
1 in 30 years	9.83 l/s/ha	10.2 l/s
1 in 100 years	11.37 l/s/ha	11.8 l/s

The restriction of the surface water flows from the Proposed Development into the public sewer system will be achieved by installing flow controls on the private drainage network. This will be regulated storm water discharge across the Site by controlling the flows and minimising flood risk on the downstream drainage network. The detailed design of these systems could include: vortex flow controls, orifice plates and restrictor chambers.

6.1.3 Climate Change

An allowance of 40% for climate change will be employed in accordance with Environment Agency advise for rainfall intensities in small and urban catchments to be assessed at both the central (25%) and upper end (40%) allowances.

6.1.4 Surface Water Attenuation

The strategy for the Site is to store and attenuate surface water at source before discharging into the surface water public sewer network. Attenuation has been calculated based on proposed runoff rates presented in Table 6-2. The proposed restricted runoff is the greenfield rate (QBAR). This provides a betterment of 96% compared with existing brownfield runoff rates.

Table 6-2 Proposed restricted runoff and corresponding attenuation requirement

Total Site Area (ha)	Effective Site Area (ha)	Greenfield (QBAR) proposed runoff rate (l/s)	1:100 year + 40% CC Attenuation Requirement (m³)
1.038	0.65	5.9	472

The building plots and public realm will be designed to attenuate the 1 in 100 year plus 40% climate change storm event and discharge surface water at greenfield restricted runoff rate. Attenuation will be provided in the public realm. Refer to Table 6-3 for the breakdown of attenuation volumes. Attenuation volumes have been determined using the quick storage estimate calculated on MicroDrainage software.

Table 6-3 Breakdown of restricted runoff and attenuation requirements.

Catchment area	Plot roof / public realm area	Effective area*	Restricted greenfield rate	1:100 year + 40% CC attenuation	SuDS
1	2,345 m²	1,580 m²	1.3 l/s	116 m³	Green roof, swale, permeable paving
2	2,540 m²	2,106 m²	1.4 l/s	139 m³	Green roof, rain garden, permeable paving, cellular tank
3	5,495 m²	2,815 m²	3.2 l/s	193 m³	Green roof, rain garden, permeable paving, cellular tank
Total	10,380 m²	6,500 m²	5.9 l/s	472 m³	

* The roof and hardscape drainage area of the existing site was considered using the following run-off coefficients based on the catchment characteristics: building/roof c=1.0; hardstanding c=0.9, proposed softscape c = 0.3.

**Existing softscape with mature trees with minimal to no change have not been included in the attenuation calculation estimation as it is not considered these areas contribute to the brownfield runoff that discharges into the public sewer.

The public realm will attenuate runoff from the plot at 1:100 year + 40% climate change. The storage required to be attenuated equates to a volume of 472m³ for the 1:100 year + 40%CC event. This volume can be further refined and optimised during detailed design.

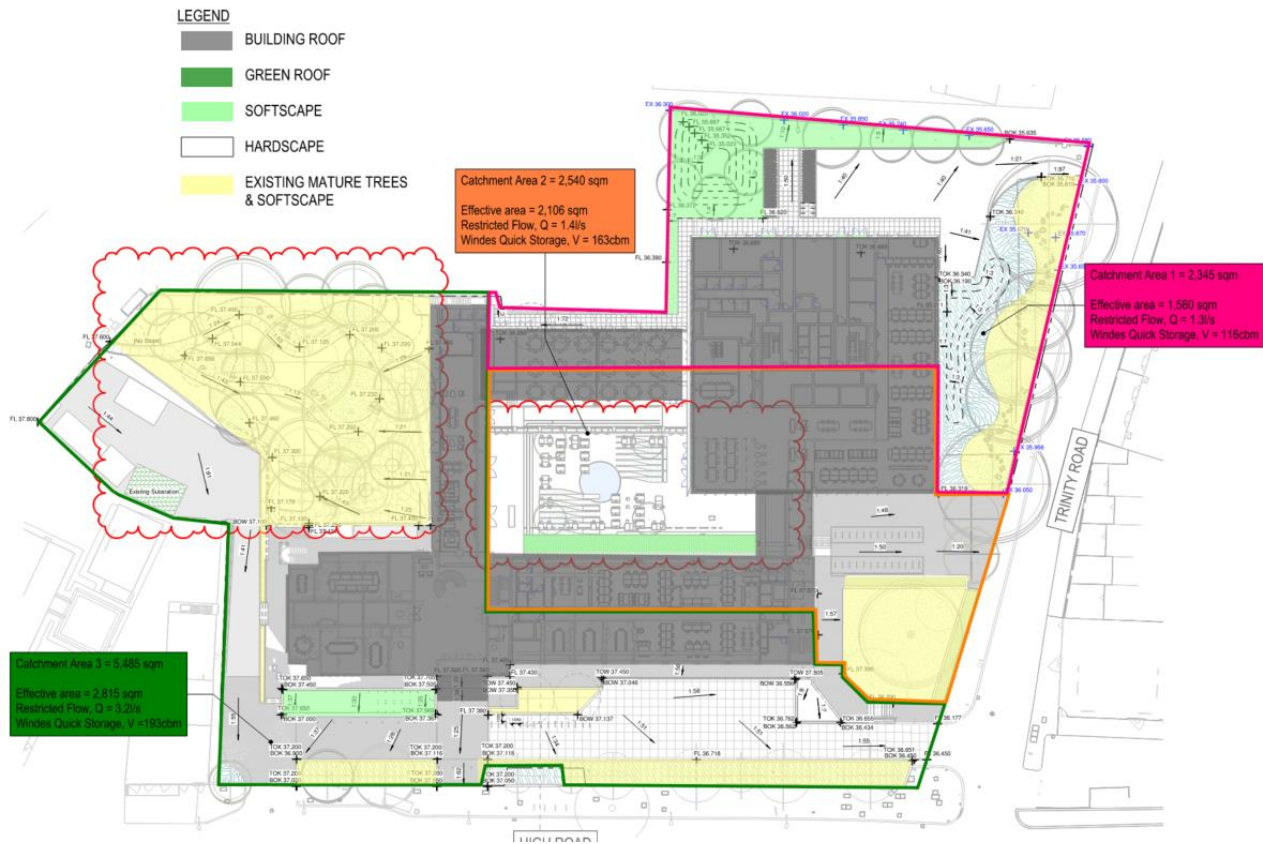


Figure 6-1 Catchment areas for proposed development (Churchman Thornhill Finch drawing 556-CTF-ZZ-ZZ-DR-L-100000 P3).

7 Existing Foul Water Drainage

Thames Water's sewer records indicate the following foul drainage network around the Site:

- To the north along Trinity Road, there is a 305mmØ foul sewer gravitating west.
- To the east along High Road there is a 381mmØ foul water sewer gravitating south. There is also a 152mmØ foul water sewer, running alongside the existing Civic Centre building. The foul connects eastwards to the sewer in High Road.
- To the south along Bounds Green Road, there is are two foul water sewers of size 610mmØ and 152mmØ. Both sewers flow south east and connect to the sewers in High Road

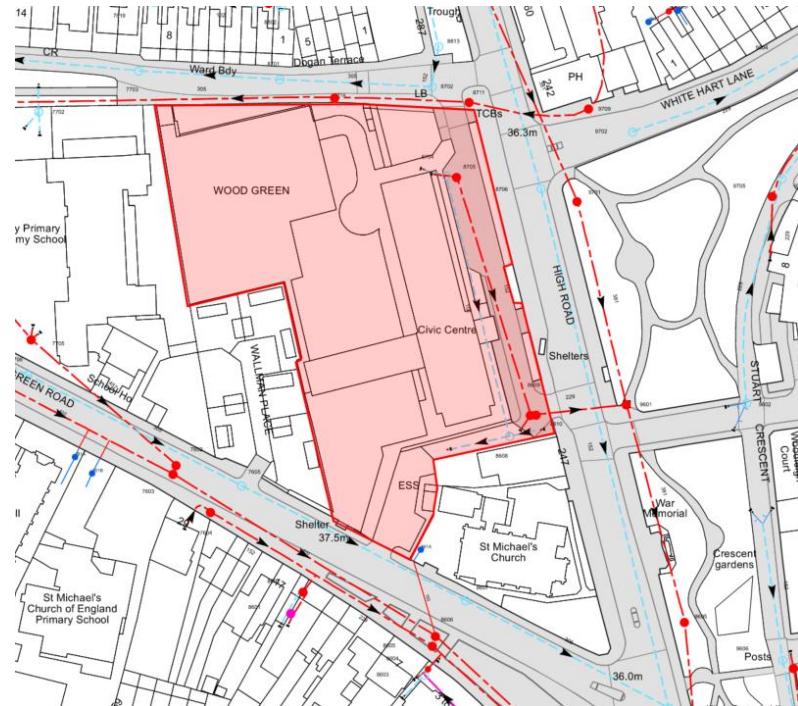


Figure 7-2 Thames Water Asset Records (April 2020).

7.1.1 Basement manholes and sump

Historical drawings show two existing manholes and one existing sump within the basement. The sizes are summarized below and indicated on Figure 7-1.

1. 6'2" x 1'10½" x 2" deep manhole to the north of the basement (gridline 18)
2. 3'0" x 2'0" x 2" deep manhole to the east of the basement (gridline 7a)
3. 3'0" x 3'0" x 4" deep sump to the south and at the lower level of the basement (gridline 3)

A CCTV drain survey was conducted in June 2016 of the private drainage system within the site which concluded the drainage system consisted of a material of Vitrified Clay and diameter of the pipework is between 100mm and 150mm. The survey included the two manholes in the basement of the existing Civic Centre and stated the pipework is in reasonable condition with a recommendation to carry out intense de-scaling to remove the encrustation in the pipework to bring it back to 100% free flowing condition. See Figure 7-3 for images from the CCTV report of the existing manholes within the basement and Appendix C for the full CCTV report.

The existing sump was not surveyed as part of the CCTV report and it is recommended an inspection as to the condition of the sump is undertaken.

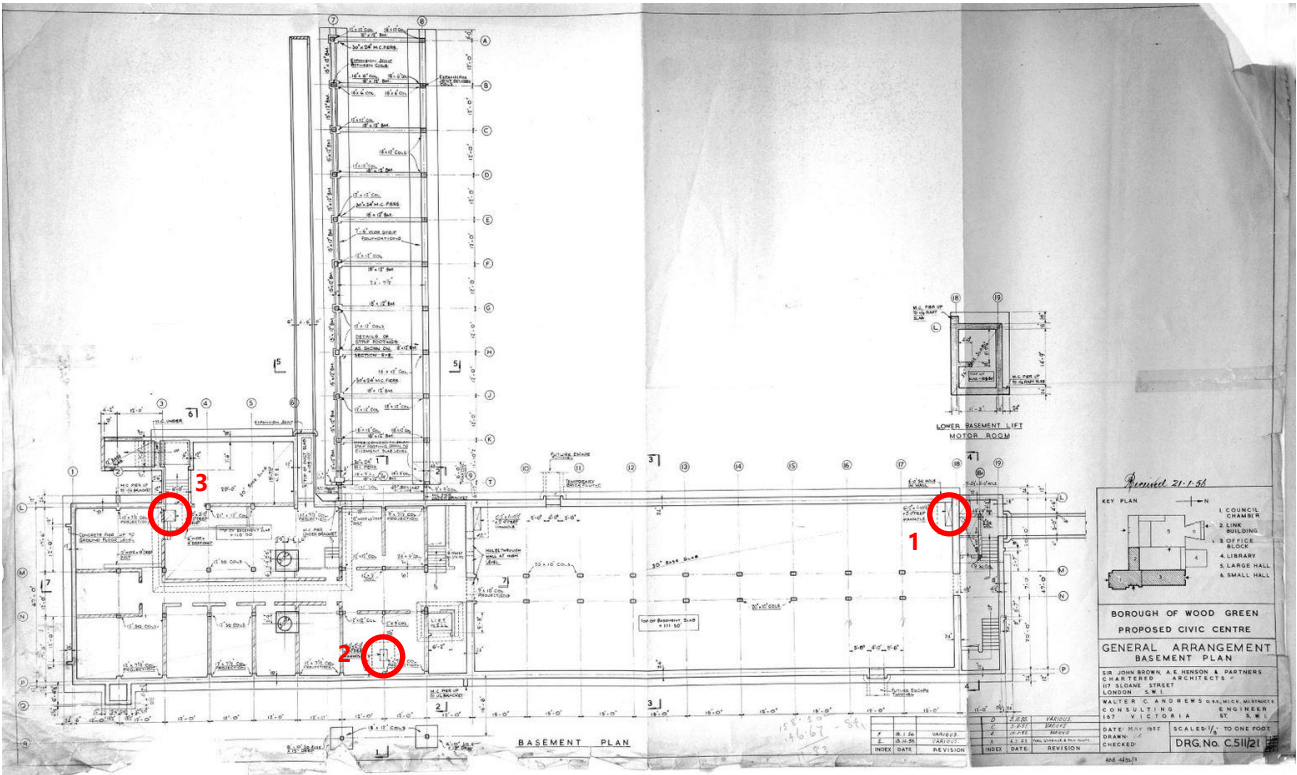


Figure 7-1 Haringey Civic Centre historical drawing 'General Arrangement Basement Plan' drawing number C.511/21 dated 18.01.56



Figure 7-3 Existing manholes in the Civic Centre basement. Left: Manhole 1 (ref MH7/FL in CCTV survey) and Right: Manhole 2 (ref MH6/FL in CCTV survey).

8 Proposed Foul Water Drainage

8.1.1 General

A separated foul drainage system will be provided to collect all foul water generated from the Proposed Development. This will be via gravitational flow and discharge to the existing public sewers. All foul water drainage above ground slab will be design by building services engineering. All foul water ground slab installations, slab penetrations, under slab drainage and the external foul drainage system is considered a civil infrastructure. Close coordination is required with the building services engineer, structural engineer and architect to connect the above and below ground slab drainage systems.

The foul water ground slab installations will include floor gullies, access chambers, soil stacks and a sump pump.

Under slab foul water drainage will be provided to collect foul water discharges from ground slab installations, and sewer vent pipes (SVPs) and convey it by gravity to an external below ground foul drainage system. Floor gullies are required in the basement and the flow will be collected within the basement slab and discharged to the existing manholes and sump within the basement. The discharge to the sump will be pumped and discharged at high-level, which will be designed by the building services engineer. The existing manholes and pipework will be re-used as outfalls, for which further inspection is required to identify the location of the pipework from the manholes and connection to the external network. Shallow floor gullies have been specified to minimise the excavation of the existing basement slab and waterproofing concerns.

External foul water drainage will be provided to collect foul water and convey it by gravity to the receiving public sewer. The external foul drainage systems will include pipe sewers, concrete and brick manholes, vent pipes, connector pipes and associated works.

8.1.2 Estimated Foul Loading

Table 8-1 provides an estimate of the total peak foul discharge from the existing Civic Centre building and proposed Annexe. The estimate is based on Urban Drainage 3rd Edition Peak Foul Office Flow allowance of 750 litres per day per 100m².

Table 8-1 Foul Load Estimates

Reference	Existing	Proposed	Total Proposed
	Civic Centre	Annexe office building	Civic Centre + Annexe
GIA (m2)	5,505	5073	
Daily Discharge Rate (l/day/100m2)	750	750	
Daily Foul Discharge (l/day)	41 288	38 048	
Allowable Peak + Infiltration (l/day) (6DWF)	247 725	228 285	
Infiltration Allowance (l/day) (10% of 6DWF)	24 773	2 283	
Total flow (l/s)	3.15	2.91	6.06

8.1.3 Thames Water Consultation

A pre-development enquiry was submitted to Thames Water during Stage 2. An updated set of plans and flows as per Table 8-1 has been shared with Thames Water for Stage 3. Thames Water confirmed that existing sewer has sufficient capacity on 14.02.2023.

A consent to connect to a public sewer will be put forward in the next detailed stage.

8.2 Summary

The estimated peak discharge into the sewerage system from the existing and proposed development is shown in the table below.

Table 8-2 Comparison of peak discharge between existing and proposed development.

	Flow from Existing Development (l/s)	Flow from the New Development (l/s) Unrestricted	Flow from New Development with Restriction (l/s)
Foul Water	2.99	6.06	6.06
Surface Water	144.10*	144.1	5.90
Total Flow (L/s)	147.09	150.16	11.96

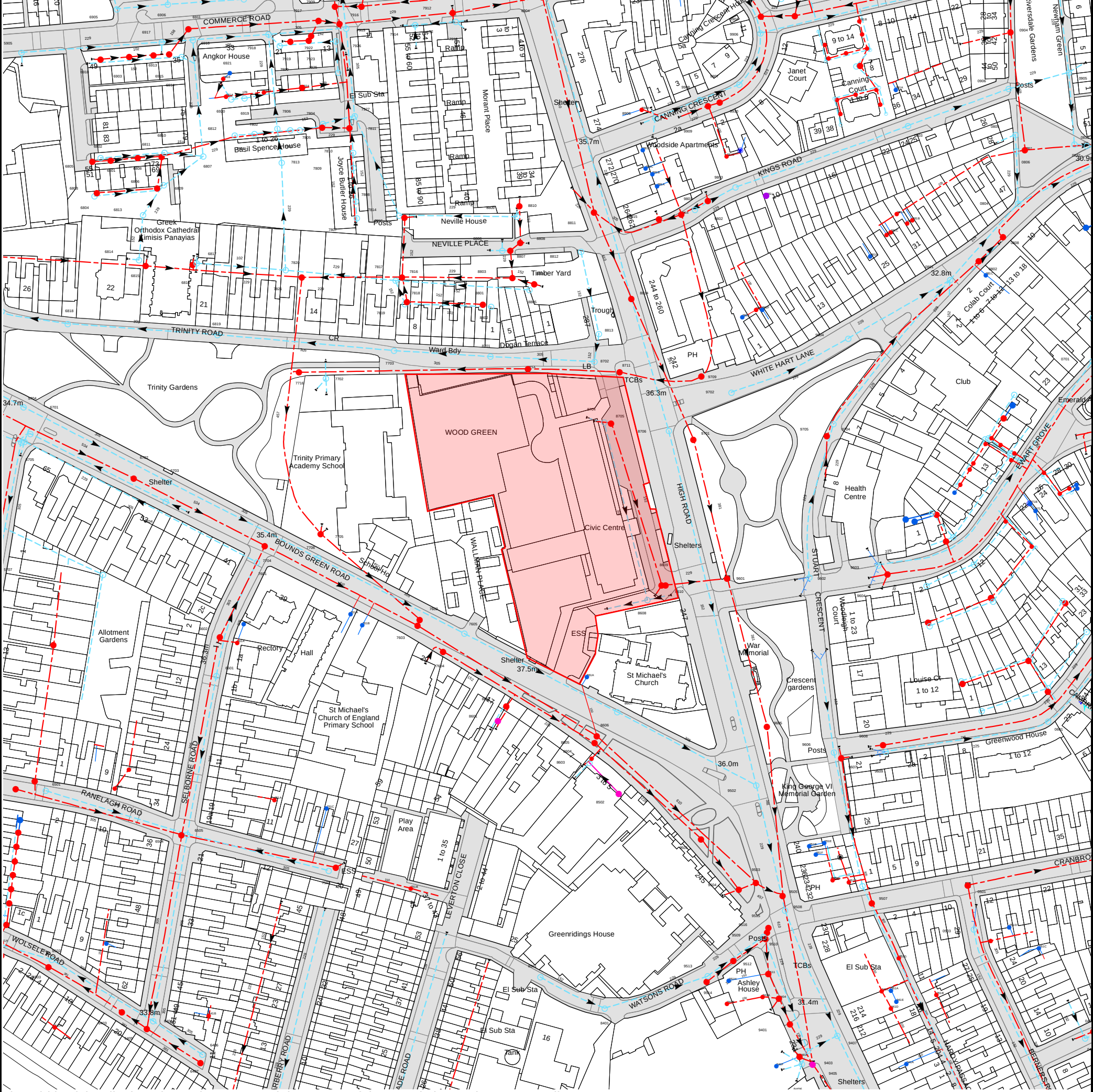
*Existing discharge = 2.78 x 50mm/hr x 1.037ha = 144.14 l/s

The proposed development will increase the foul water discharge into the sewer compared to the existing development by 51%. However, the surface water discharge into the surface water sewer compared to the existing development will be reduced by 96%.

The cumulative reduced in the total discharge into the sewers is 92% compared to the existing development.

Appendix A Thames Water Asset Records

Asset Location Search Sewer Map - ALS/ALS Standard/2020 4180799



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 530839,190707
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.

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
06ZQ	n/a	n/a
07ZP	n/a	n/a
07ZS	n/a	n/a
07YZ	n/a	n/a
07ZR	n/a	n/a
071A	n/a	n/a
071B	n/a	n/a
07YP	n/a	n/a
07YV	n/a	n/a
07XW	n/a	n/a
07YQ	n/a	n/a
07YR	n/a	n/a
07YW	n/a	n/a
07YX	n/a	n/a
07WQ	n/a	n/a
07XV	n/a	n/a
07XZ	n/a	n/a
07YT	n/a	n/a
07XT	n/a	n/a
07XS	n/a	n/a
07XQ	n/a	n/a
07VZ	n/a	n/a
07TX	n/a	n/a
07VR	n/a	n/a
051C	n/a	n/a
0511	n/a	n/a
0503	30.64	28.99
051D	n/a	n/a
0501	31.71	29.45
0601	33.72	32.58
06YR	n/a	n/a
06YY	n/a	n/a
06YT	n/a	n/a
06ZP	n/a	n/a
06YW	n/a	n/a
06YZ	n/a	n/a
06YV	n/a	n/a
06XZ	n/a	n/a
06YQ	n/a	n/a
06ZT	n/a	n/a
06YP	n/a	n/a
06ZW	n/a	n/a
8501	35.67	34.47
9514	n/a	n/a
9513	33.59	32.32
941B	n/a	n/a
951H	n/a	n/a
9512	33.29	31.3
9504	33.72	30.31
9503	33.63	28.02
941A	n/a	n/a
9509	33.04	31.59
9510	33	30.9
9516	n/a	n/a
9511	32.47	30.34
9515	n/a	n/a
9404	31.96	29.38
9505	33.37	21.19
9508	33.17	30.04
951F	n/a	n/a
951D	n/a	n/a
951C	n/a	n/a
9506	32.91	30.22
9507	32.57	29.29
941C	n/a	n/a
951A	n/a	n/a
941E	n/a	n/a
951G	n/a	n/a
051B	n/a	n/a
041A	n/a	n/a
0401	26.88	24.64
0402	26.87	24.15
941F	n/a	n/a
9405	30.33	n/a
9406	30.63	28.77
9402	30.64	27.01
9403	30.53	28.58
9407	30.51	28.55
9401	31.37	27.43
941D	n/a	n/a
8401	34.75	33.66
9906	35.27	n/a
9904	35.4	30.06
99WW	n/a	n/a
9905	34.92	30.27
99WZ	n/a	n/a
99TT	n/a	n/a
991B	n/a	n/a
99VY	n/a	n/a
7917	33.66	29.7
7909	33.64	30.01

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7926	33.89	32.45
7916	33.65	29.59
7915	33.63	31.7
7910	33.69	29.95
7914	33.95	32.73
7912	34.34	28.43
7913	34.37	32.73
8904	35.35	23.08
0906	31.26	30.12
0905	30.55	30.05
0904	31.32	30.19
981G	n/a	n/a
881D	n/a	n/a
0803	32.63	30.78
98YP	n/a	n/a
8906	35.72	34.44
99VV	n/a	n/a
99TV	n/a	n/a
891A	n/a	n/a
9909	35.63	31.96
99VQ	n/a	n/a
9910	35.62	31.73
9908	35.57	34.15
99VT	n/a	n/a
99VP	n/a	n/a
99VS	n/a	n/a
99VR	n/a	n/a
991A	n/a	n/a
99TZ	n/a	n/a
9907	35.5	34.05
99TY	n/a	n/a
99VW	n/a	n/a
99TS	n/a	n/a
99WQ	n/a	n/a
99WP	n/a	n/a
99TX	n/a	n/a
99VZ	n/a	n/a
99WR	n/a	n/a
081C	n/a	n/a
0802	32.37	30.61
0808	32.02	30.37
08WV	n/a	n/a
0804	31.66	29.73
0823	n/a	n/a
0806	31.37	30.05
0807	31.39	29.62
0822	n/a	n/a
0810	30.98	29.28
0805	31.32	30.31
8801	n/a	n/a
8701	35.46	34.19
8802	n/a	n/a
8806	n/a	n/a
8807	35.29	33.56
8803	35.39	33.41
8809	35.24	33.56
8810	35.19	33.84
8808	35.34	33.64
871A	n/a	n/a
8805	n/a	n/a
8804	n/a	n/a
8812	35.94	34.94
8811	35.95	22.67
8702	36.09	34.31
8813	36.07	34.45
8704	36.27	35.39
8705	36.32	33.83
8711	n/a	n/a
8814	36.19	22.58
881C	n/a	n/a
881B	n/a	n/a
881A	n/a	n/a
8815	36.03	34.33
8706	36.36	35.5
8816	35.91	34.38
9701	36.29	22.19
07VS	n/a	n/a
07XR	n/a	n/a
07WP	n/a	n/a
07TY	n/a	n/a
07VT	n/a	n/a
07VV	n/a	n/a
07VW	n/a	n/a
07VP	n/a	n/a
0701	33.1	31.68
08VR	n/a	n/a
08VX	n/a	n/a
9801	35.86	34.56
9709	n/a	n/a
9802	35.66	34.81
9702	35.86	34.48
9803	35.38	34
981J	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
981E	n/a	n/a
981F	n/a	n/a
981I	n/a	n/a
9705	34.5	33
9704	34.97	33.43
9804	34.61	33.31
981H	n/a	n/a
9603	35.44	33.99
981B	n/a	n/a
9604	35.33	33.32
981C	n/a	n/a
981A	n/a	n/a
07WV	n/a	n/a
081A	n/a	n/a
081B	n/a	n/a
07WZ	n/a	n/a
07WT	n/a	n/a
07WY	n/a	n/a
07WX	n/a	n/a
0801	32.97	30.9
07WS	n/a	n/a
6810	n/a	n/a
7810	n/a	n/a
6812	n/a	n/a
7801	n/a	n/a
7803	n/a	n/a
7806	n/a	n/a
7802	33.8	32.02
7811	33.69	29.52
7805	33.69	29.57
7804	n/a	n/a
7927	33.8	32.33
6920	n/a	n/a
6919	n/a	n/a
691A	n/a	n/a
7921	33.88	31.87
7924	33.81	30.02
6918	n/a	n/a
6921	n/a	n/a
7925	n/a	n/a
6910	n/a	n/a
6903	n/a	n/a
6914	34.12	32.62
6913	n/a	n/a
6915	n/a	n/a
7920	n/a	n/a
6917	33.83	32.17
7919	n/a	n/a
6905	34.02	32.4
6906	33.66	32.2
6911	33.74	30.41
6916	33.67	32.07
6909	33.43	31.91
7918	33.57	31.8
7923	n/a	n/a
7922	n/a	n/a
7819	35.19	33.46
7818	35.12	34
7817	34.93	33.15
7821	34.52	29.3
7816	35.04	33
7820	34.44	32.71
6815	34.33	31.16
6816	34.48	31.94
6817	34.5	33.81
6814	33.89	32.85
7807	n/a	n/a
7815	n/a	n/a
7814	34.33	33.11
6813	34.2	32.81
7808	n/a	n/a
6804	n/a	n/a
6803	n/a	n/a
6806	n/a	n/a
6809	34.14	32.68
7809	n/a	n/a
7813	34.34	n/a
6805	n/a	n/a
6801	n/a	n/a
6802	n/a	n/a
6808	n/a	n/a
6811	n/a	n/a
6807	34.06	32.51
6606	n/a	n/a
661A	n/a	n/a
6602	36.26	31.23
7603	36.59	28.31
761B	n/a	n/a
661B	n/a	n/a
7602	36.63	28.81
761A	n/a	n/a
66ZR	n/a	n/a
7601	35.77	34.68

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7706	35.83	32.85
7704	35.6	29.05
7705	35.96	29.48
6704	35.04	33.52
6703	34.98	33.29
6702	34.98	29.36
5706	34.78	32.72
5705	34.75	32.67
6701	34.81	32.94
5704	34.8	33.87
7702	n/a	n/a
7716	n/a	n/a
7703	35.17	34.01
6819	34.32	33.43
6818	34.56	33.56
5809	34.89	33.44
5905	34.58	32.65
951B	n/a	n/a
951E	n/a	n/a
9501	35.29	34.23
8502	n/a	n/a
9502	35.41	31.55
8603	n/a	n/a
8604	n/a	n/a
9607	34.95	32.76
9606	35.13	34.04
9609	34.58	33.16
9608	34.6	32.23
8605	37.47	35.47
8606	37.53	28.08
9605	36.12	21.72
8601	n/a	n/a
8607	37.42	31.98
8602	n/a	n/a
861A	n/a	n/a
7605	36.83	32.42
06ZV	n/a	n/a
06ZX	n/a	n/a
8608	36.87	n/a
06ZS	n/a	n/a
8609	36.87	34.18
8610	36.89	29.66
9601	36.58	22.58
9602	35.93	34.48
6407	33.82	31.41
6406	33.84	32.47
641B	n/a	n/a
6503	33.9	31.08
6502	34.03	31.39
651A	n/a	n/a
55YV	n/a	n/a
55WX	n/a	n/a
55WY	n/a	n/a
751B	n/a	n/a
55WZ	n/a	n/a
7501	36.86	35.14
7502	37.16	34.41
55XP	n/a	n/a
55XQ	n/a	n/a
6504	35.96	32.1
6505	35.99	34.65
55YW	n/a	n/a
55YX	n/a	n/a
751C	n/a	n/a
751A	n/a	n/a
6501	35.46	34.56
5505	35.01	32.95
651B	n/a	n/a
6506	n/a	n/a
661C	n/a	n/a
6601	36.25	34.94
7604	36.96	35.79
6405	34.01	31.35
641A	n/a	n/a
6404	34.03	32.05
6403	33.97	31.18
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.

Appendix B CCTV Survey Report



SITE ADDRESS:

Haringey Council Civic Centre

Civic Centre, 255 High Road

London

N22 8LE

**CCTV Drain survey carried out by
Drain 247 (a brand name of RWB
GROUP UK LTD)**

Email: info@drain247.co.uk

Telephone: 0800 612 8038

**OTHER TYPES OF CCTV
SURVEYS CAN UNDERTAKEN
BY DRAIN 247.**

1. DRAIN SURVEY
2. SEWER INSPECTION
3. CULVERT INSPECTION
4. HOME BUYERS SURVEY
5. PRE PURCHASE SURVEY
6. PIPE LINE INSPECTION
7. COMMERCIAL DRAIN SURVEY
8. BUILDING INSPECTION SURVEYS
9. STRUCTURAL DRAIN SURVEYS
10. PARTY WALL DRAIN SURVEYS
11. MANHOLE INSPECTION
12. DRAIN & SEWER PIPE INSPECTION
13. SONAR TRACING & CONCEALED
MANHOLE DETECTION
14. DRAIN MAPPING & CHARTING

Date of Quotation: 01/06/2021

Ms H Horton
Buro Happold, Camden Mill
Lower Bristol Road
Bath
BA2 3DQ

Ref: Site Address: Haringey Civic Centre

Further to your recent instructions, our engineers attended site and carried out CCTV Drain Inspection of the underground drainage system condition at the above site address.

It was evident that the drainage system in site is private drainage system and consist a material of Vitrified Clay and the diameter of drainage pipework is from 100MM to 150MM

Furthermore, our engineers also carried out CCTV Drain survey of a manhole that is in the basement area in between of men and women's toilet. It was apparent that the condition of the pipework is in reasonable condition, although, we can recommend carrying out intensive de-scaling to remove the encrustation in the pipework. This will bring back the pipework to 100% free flowing condition.

Please see image below:



Please note that the defects found on site the responsibility of the property owner and until it passes into the boundary this becomes public which is the responsibility of the local water authority.

In our opinion, the drainage system is in good condition and class as serviceable. Although, the CCTV evidence did highlight some minor defects such as:

- Displaced Joints
- Open Joints
- Settled Deposits
- Fractures

Therefore, we can recommend carrying intensive de-scaling to ensure that the drainage system is free flowing and structural patch lining to seal any open, displaced and fractures in the line. This will ensure that the pipework is in watertight condition. Should you require for the rain water system to be confirmed where it discharges to, excavation would be required.

Please refer to the condition report & drainage plan for more information on the defected areas. **Please note that due to unseen section due to the current condition of the pipework, further recommendation may be required.**

We hope that the above is acceptable and should you have any questions, please do not hesitate to contact us.

PLEASE NOTE: THE MEASUREMENTS IN OUR REPORTS OR ON OUR RECORDINGS ARE TO BE USED AS A GUIDELINE ONLY.

Yours faithfully,

George Wright
Office Supervisor



Drain 247 is a brand trading name of RWB Group UK Ltd a Registered company in England and Wales. Reg No. 11974853



MH	DEFECT	RECOMMENDATION	QUANTITY	PRICE
<u>MH1 - BC1</u>	Observation [2]: Circumferential fracture from/at 6 o'clock to 3 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [3]: Medium displaced joint	To install 1x 100mm Structural Patch	1	£250.00
	Observation [4]: Circumferential fracture from/at 6 o'clock to 6 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [5]: Hole in drain or sewer from/at 11 o'clock to 12 o'clock	To install 1x 100mm Structural Patch	1	£250.00
		To install 1x 100mm Structural Patch	1	£250.00
<u>MH1 - DOWNSTREAM</u>	Observation [2]: Medium displaced joint	To install 1x 100mm Structural Patch	1	£250.00
	Observation [4]: Medium displaced joint	To install 1x 100mm Structural Patch	1	£250.00
	Observation [5]: Circumferential fracture from/at 6 o'clock to 12 o'clock	To install 1x 100mm Structural Patch		£250.00
	Observation [6]: Circumferential fracture from/at 6 o'clock to 12 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [7]: Circumferential fracture from/at 1 o'clock to 5 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [8]: Circumferential fracture from/at 6 o'clock to 6 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [10]: Circumferential crack from/at 12 o'clock to 12 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [11]: Circumferential crack at joint from/at 9 o'clock to 3 o'clock	To install 1x 100mm Structural Patch	1	£250.00
		To install 1x 100mm Structural Patch		
	Observation [12]: Medium displaced joint	To install 1x 100mm Structural Patch	1	£250.00

	Observation [13]: Circumferential crack at joint from/at 9 o'clock to 3 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [14]: Circumferential crack from/at 9 o'clock to 3 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [19]: Circumferential fracture from/at 6 o'clock to 8 o'clock	To install 1x 100mm Structural Patch	1	£250.00
	Observation [20]: Circumferential fracture from/at 6 o'clock to 12 o'clock	To install 1x 100mm Structural Patch	1	£250.00
<u>MH2/FL - BC1</u>	Observation [2]: Medium displaced joint	To install 1x 100mm Structural Patch	1	£250.00
	Observation [5]: Encrustation from/at 12 o'clock to 12 o'clock 90 % area loss	De-scaling	1	£520.00
<u>MH2 - DOWN TO MH4</u>	Observation [2]: Fine settled deposits 10 % area loss	De-scaling	1	
	Observation [3]: Fine settled deposits 5 % area loss	De-scaling	1	
	Observation [4]: Encrustation from/at 9 o'clock to 3 o'clock 10 % area loss	De-scaling	1	£650.00
	Observation [5]: Encrustation from/at 12 o'clock to 12 o'clock 10 % area loss	De-scaling	1	
	Observation [6]: Encrustation from/at 12 o'clock to 6 o'clock 10 % area loss	De-scaling	1	
	Observation [7]: Fine settled deposits 10 % area loss	De-scaling	1	
<u>MH3 - BC1</u>	Observation [2]: Large displaced joint	To install 1x 100mm Structural Patch	1	£300.00
<u>MH3 - DOWSNTREAM</u>	Observation [3]: Circumferential fracture from/at 6 o'clock to 5 o'clock	To install 1x 150mm Structural Patch	1	£300.00

<u>MH4/FL - BC2</u>	Observation [4]: Medium displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [5]: Fine settled deposits 5 % area loss	High Pressure Jetting/ Descaling	1	£120.00
	Observation [6]: Medium displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [7]: Medium displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [9]: Survey abandoned - The camera could not go further due to heavy silted line.	Tanker Unit	1	£1,250.00
	Observation [2]: Fine settled deposits 10 % area loss	High Pressure Jetting/ Descaling	1	£120.00
	Observation [5]: Fine settled deposits 20 % area loss		1	
	Observation [3]: Medium displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [4]: Circumferential fracture from/at 6 o'clock to 5 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [6]: Circumferential fracture from/at 10 o'clock to 3 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [7]: Large displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [8]: Circumferential fracture from/at 9 o'clock to 12 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [9]: Circumferential fracture from/at 6 o'clock to 6 o'clock	To install 1x 150mm Structural Patch	1	£300.00
<u>MH5/FL - DOWNSTREAM</u>	Observation [10]: Circumferential fracture from/at 6 o'clock to 11 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [11]: Circumferential fracture from/at 9 o'clock to 3 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [12]: Circumferential fracture from/at 6 o'clock to 6 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [13]: Large displaced joint	To install 1x 150mm Structural Patch	1	£300.00

MH6/FL - BC1,2,3,4,5,6**& 7**

ENCRUSTATION PIPEWORK BETWEEN 20% TO 50%

De-scaling

1

£520.00

MH7/FL - BC1

Observation [2]: Large displaced joint

To install 1x 150mm Structural

1

£300.00

Observation [6]:

Patch

Fine settled deposits 10 % area loss

To install 1x 150mm Structural

1

£300.00

Observation [7]:

Patch

Fine settled deposits 10 % area loss

To install 1x 150mm Structural

1

£300.00

MH7/FL -**DOWNSTREAM**

Observation [3]: Medium displaced joint

To install 1x 150mm Structural

1

£300.00

Patch

Observation [4]:

To install 1x 150mm Structural

1

£300.00

Circumferential fracture at joint from/at 9 o'clock to 3 o'clock

Patch

Observation [5]: Medium displaced joint

To install 1x 150mm Structural

1

£300.00

Patch

Observation [8]:

To install 1x 150mm Structural

1

£300.00

Circumferential fracture from/at 12 o'clock to 6 o'clock

Patch

Observation [10]:

To install 1x 150mm Structural

1

£300.00

Longitudinal fracture at joint from/at 12 o'clock

Patch

Observation [11]:

To install 1x 150mm Structural

1

£300.00

Circumferential fracture at joint from/at 12 o'clock to 6 o'clock

Patch

Observation [12]:

To install 1x 150mm Structural

1

£300.00

Circumferential fracture from/at 6 o'clock to 6 o'clock

Patch

Observation [13]: Roots at joint

To carry out root cutting and install
1x 150mm Structural Patch

1

£375.00

Observation [14]: Roots at joint

To carry out root cutting and install
1x 150mm Structural Patch

1

£375.00

Observation [4]:

De-scaling

Fine settled deposits 10 % area loss

1

£120.00

MH8/SW-UPSTREAM

Observation [6]: Medium displaced joint

To install 1x 150mm Structural

1

£300.00

Patch

<u>MH8/SW- DOWNSTREAM</u>	Observation [9]: Multiple fractures from/at 12 o'clock to 12 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [10]: Survey abandoned - This is possible due to collapse section	Further Investigation Required		
	Observation [2]: Circumferential fracture from/at 12 o'clock to 12 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [3]: Circumferential fracture at joint from/at 3 o'clock to 11 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [4]: Longitudinal fracture from/at 3 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [5]: Longitudinal fracture from/at 9 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [6]: Longitudinal fracture from/at 10 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [7]: Circumferential crack from/at 9 o'clock to 6 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [8]: Circumferential fracture from/at 9 o'clock to 6 o'clock	To install 1x 150mm Structural Patch	1	£300.00
	Observation [9]: Medium displaced joint	To install 1x 150mm Structural Patch	1	£300.00
	Observation [10]: Large displaced joint	To install 1x 150mm Structural Patch	1	£300.00
			TOTAL	19,650.00

IMPORTANT NOTE:

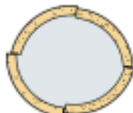
Please refer to the condition report & drainage plan for more information on the defected areas. Please note that due to unseen section due to the current condition of the pipework, further recommendation may be required. ALL PRICES ARE SUBJECT TO VAT BEING ADDED.

A guide to defects and other observations in drainage systems

More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRC).

Use	
Code	Description
C	Combined
F	Foul
S	Surface Water
T	Trade Effluent
W	Culverted Watercourse
Z	Other
Common Materials	
Code	Description
VC	Vitrified Clay
PVC	Polyvinyl Chloride
CO	Concrete
CI	Cast Iron
PF	Pitch Fibre
PE	Polyethylene
DI	Ductile Iron

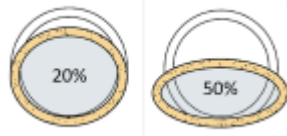
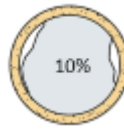
Start Node	Description	Finish Node
MH	Manhole	MHF
IC	Inspection Chamber	ICF
GY	Gulley	GYF
RE	Rodding Eye	REF
SK	Soakaway	SKF
BN	Buchan Trap	BNF
BR	Major Connection without Ref	BRF
CP	Catch Pit	CPF
OC	Other Special Chamber	OCF
OF	Outfall	OFF
OS	Oil Separator	OSF
WR	Major Connection without mh	WRF
LH	Lamphole	LHF

Code	Observation	Description	Attributes	
B	Broken	Pieces pipe have visibly moved	Defined by clock references. Associated with deformity in rigid pipe	
CC CL CM CR	Cracks	Cracks are break lines that are not visibly open	Defined by clock reference position/s. Longitudinal and radiating cracks attract only one clock reference	
CN	Connection	Lateral pipe has been connected after original construction	Described by clock reference position and diameter	

Total Defects for section

DRB Grade for Section

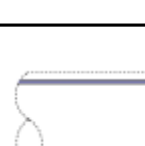
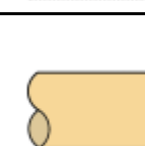
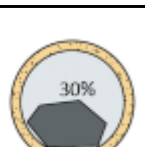
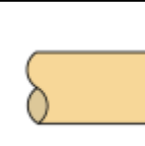
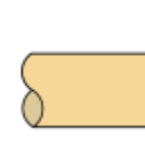
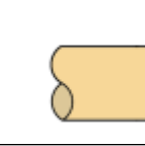


CX(I)	Defective Connection (Intruding)	Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc	Described by clock reference position and diameter (+ % intrusion)	
CU	Loss of Vision	Lens of camera is obscured by debris, water etc. Operator is unable to see drain clearly	'W' can be added if loss of vision is due to water	
D	Deformed	Pipe has lost its structure	Described by percentage loss of height or width. Recorded in 5% increments	
DEE	Deposits Encrustation	Eg. Attached scale deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DEG	Deposits Grease	Attached grease deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DER DES	Deposits Coarse/Fine	Settled deposits on the invert of the pipe.	Described by percentage loss of height or diameter. Recorded in 5% increments.	
FC FL FM FR	Fractures	Fractures are visibly open. Pieces of pipe have not moved	Defined by clock reference position/s. Longitudinal and radiating fractures attract only one clock reference	
H	Holes	Section of pipe fabric is missing	Defined by clock reference location. Normally two clock references	
I	Infiltration	Water is infiltrating the pipe, normally via a joint but could be via another defect	Can be described in Remarks using terms such as Seeper, Dripper and Runner	
JDL	Joint Displaced Large	Pipe has moved at joint, perpendicular to axis of pipe	More than 1.5 times the pipe wall thickness must be visible	

Total Defects for section

DRB Grade for Section



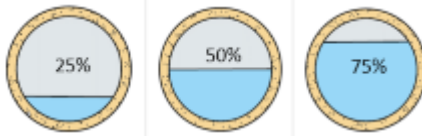

JDM	Joint Displaced Medium	Pipe has moved at joint, perpendicular to axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
JN	Junction	Lateral pipe was installed at construction	Described by clock reference position and diameter	
JX	Defective Junction	Lateral pipe was installed at construction but is defective in some way	Joint can be defective due to factors including: cracks, fractures, obstruction, position etc	
LD LU LL LR	Line Deviation	LD = Line Down, LU = Line Up, LL = Line Left, LR = Line Right. Not related to CIPP lining.	Additional modifiers are added: Q = Quarter (22.5), H = Half (45), F = Full (90). In degrees.	
LC	Lining Changes	If the drain is lined, the lining material has changed	Position of lining material change	
MC	Material Change	The pipe material has changed	Position of change is noted. Type of material change can be defined	
OB	Obstruction/Obstacle	An obstruction or obstacle is affecting the flow through the pipe	Described in percentage loss of cross-sectional area	
OJL	Open Joint Large	Pipe has moved at joint, along the axis of pipe	More than 1.5 times the pipe wall thickness must be visible	
OJM	Open Joint Medium	Pipe has moved at joint, along the axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
PC	Pipe Length Changes	Length of individual pipe changes	New length described at this position	

Total Defects for section

DRB Grade for Section

0 0 0 0 0

A

R	Roots	Evidence of root ingress	Roots will normally infiltrate via bad joints, cracks, fractures, breaks etc	
REM	Remark	General remark	Used for additional information	
S	Surface Damage	This might include corrosion, spalling and chemical attack	Position only. Additional information can be added in Remarks	
SA	Survey Abandoned	Used when a survey cannot continue for any reason	The reason for abandoning a survey should be noted in the remarks area	
SC	Shape Changes	Dimension of drain changes	Diameter dimension change recorded. Second dimension is recorded for no circular pipe changes	
SR	Sealing Ring	Sealing ring intrudes into pipe at joint	Described by clock reference position	
V	Vermin	Evidence of Vermin in pipe	Can also be used for evidence within manhole etc	
WL	Water Level	Used to record changes in water level. Always shown at the beginning of every survey, if dry noted as 00.	Described by percentage of height or diameter. Recorded in 5% increments	
XP	Collapsed	Drain is suffering from complete loss of structural integrity. Always followed by SA - Survey Abandoned	Percentage loss of cross-sectional area is recorded. Other related structural defects are not recorded	

Site Survey Form

Section 1

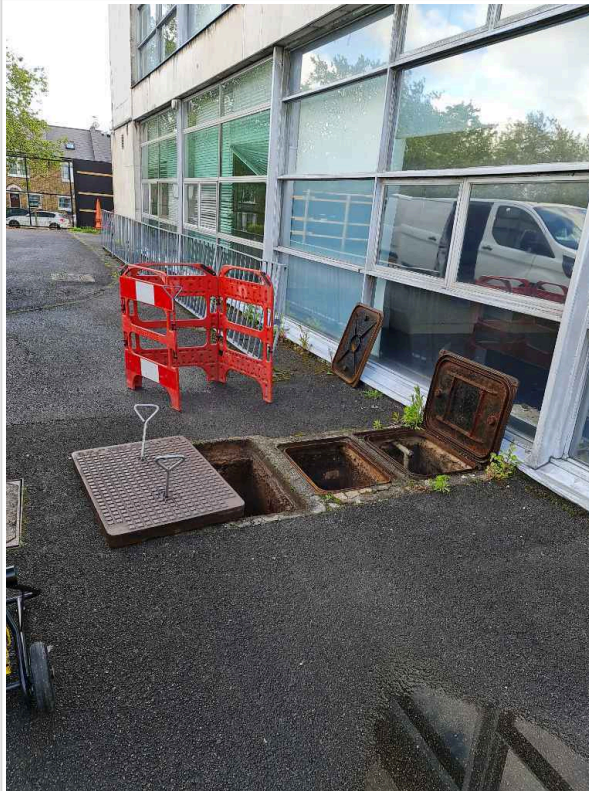
Client's Name	Ms H Horton
Site Address:	Haringey Civic Centre
What is the purpose of the works?	Draib Survey
Please take a picture the front of the property	
Date/Time	24/05/2021
Is there any Manholes?	Yes
Please take a picture	

MH1/SW

Site Survey Form

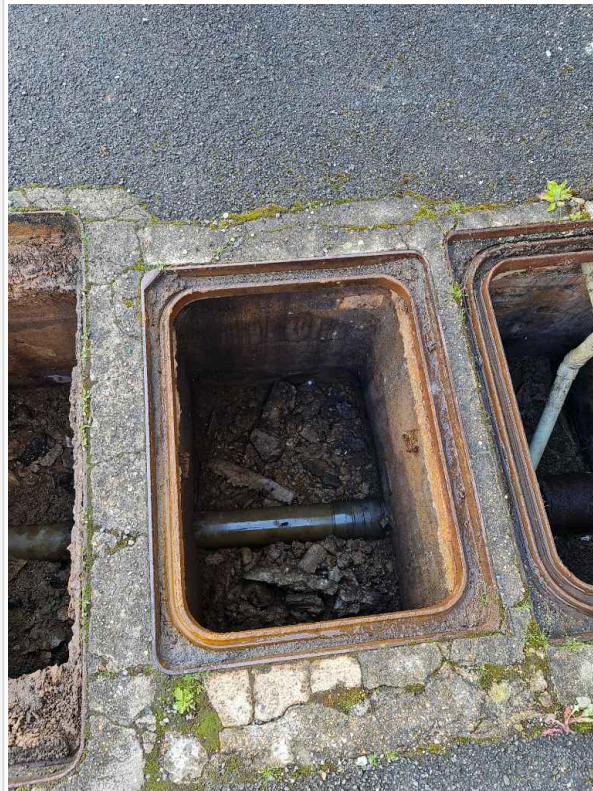
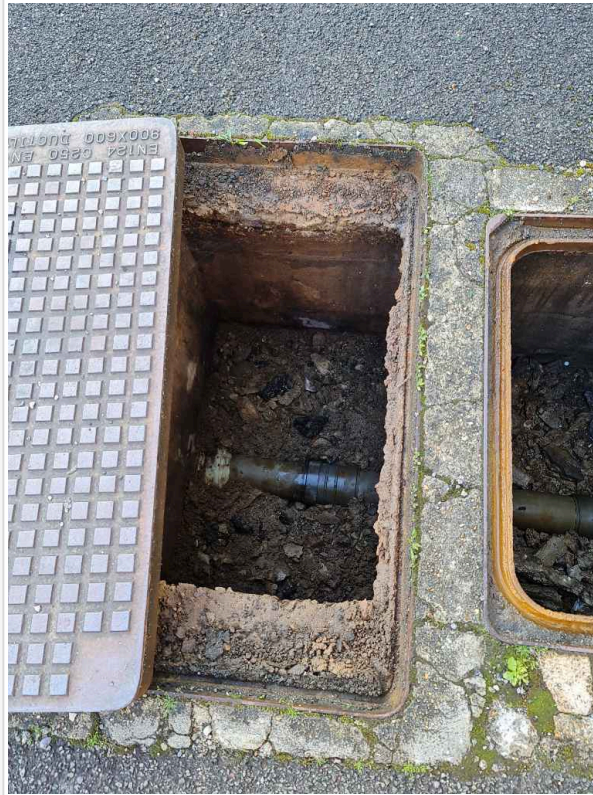


MH1/SW

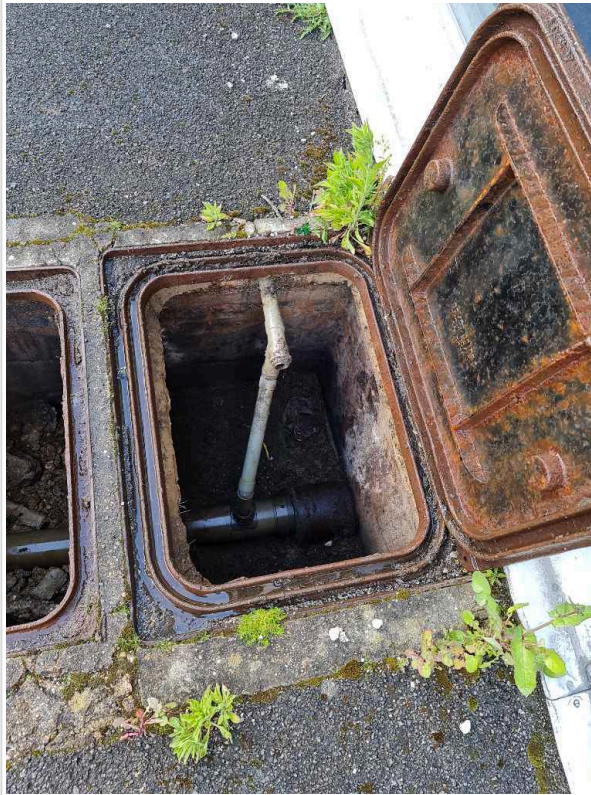


MH2/FL

Site Survey Form



Site Survey Form



Site Survey Form



MH2/FL TOP VIEW

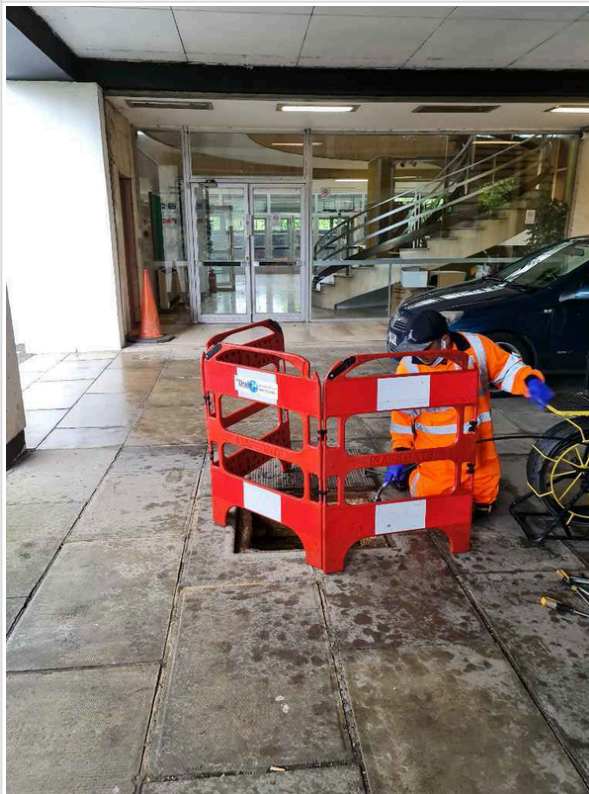


MH3/SW

Site Survey Form



MH3/SW TOP VIEW



MH4/FL



MH4/FL TOP VIEW

Site Survey Form



UTILITY CHAMBER



UTILITY CHAMBER

Site Survey Form



MH5/FL



MH5/FL TOP VIEW

Site Survey Form



MH5/FL TOP VIEW



MH6/FL IN THE
BASEMENT AREA

Site Survey Form



MH7/FL



MH7/FL TOP VIEW

Site Survey Form

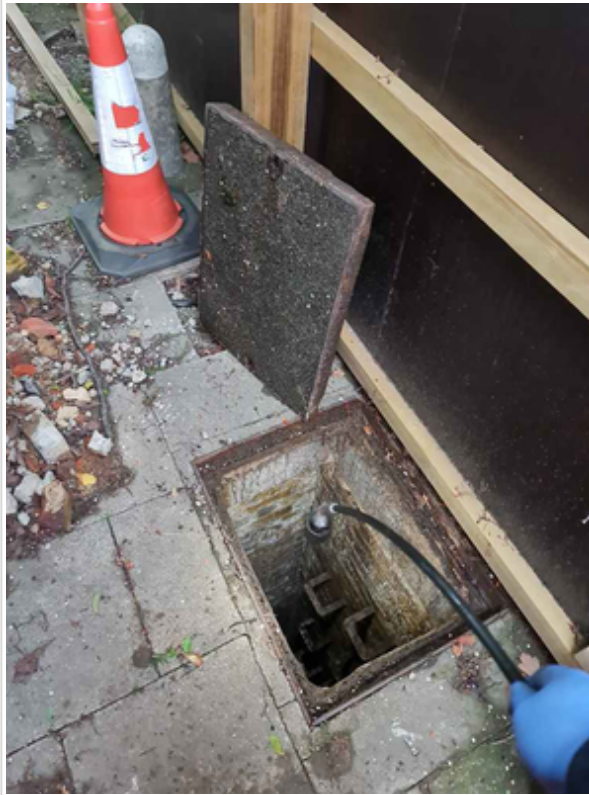


MH/SW - NEXT TO
MH7/FL

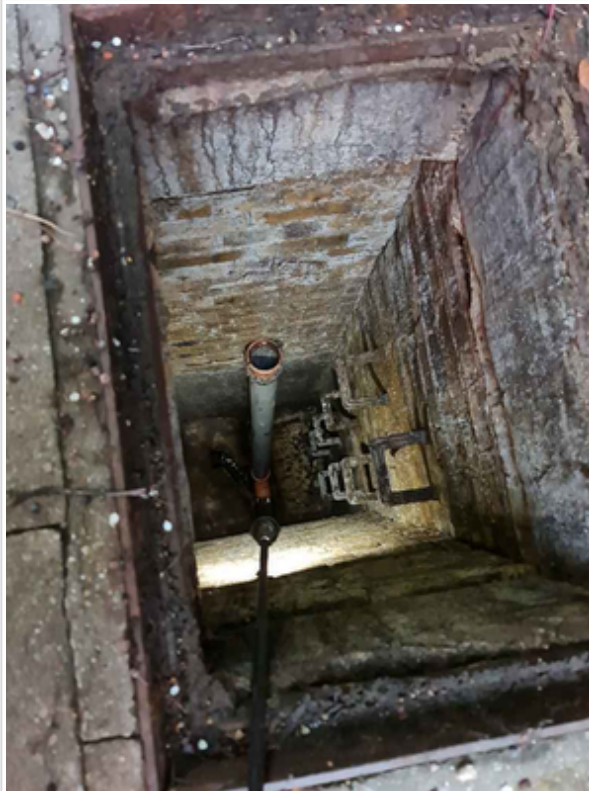


MH/SW - NEXT TO
MH7/FL WHICH IS HEAVY
SILTED. POSSIBLE
COLLAPSE
DOWNSTREAM

Site Survey Form



MH9/FL

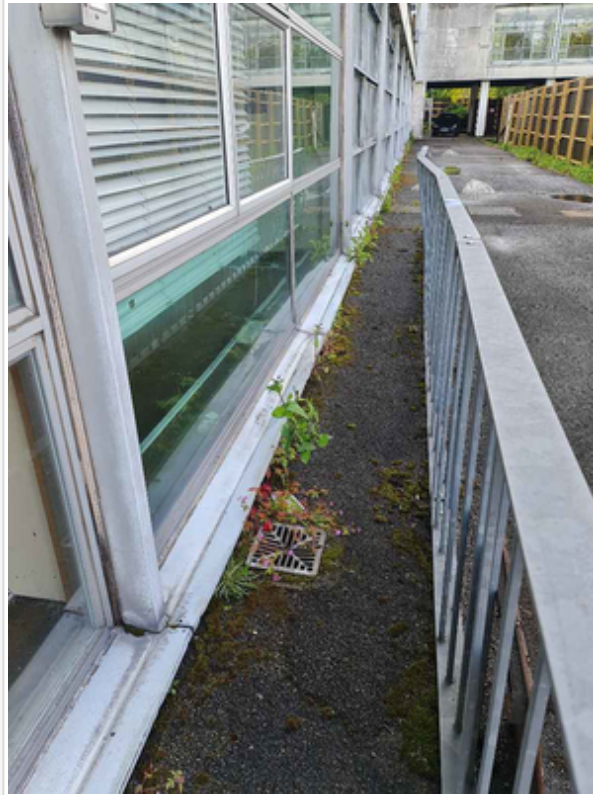


MH9/FL TOP VIEW

Is it Damage?	No
Is it accessible?	Yes
Any RW Gullies?	Yes

Site Survey Form

Please take a picture



Site Survey Form



Site Survey Form



Site Survey Form

