

Sir Fredrick Messer Estate

Seven Sisters Rd/St Ann's Rd

Flood Risk Assessment & Drainage Strategy Report

Prepared for
London Borough of Haringey

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1 Executive Summary

London Borough of Haringey propose to develop an area of land adjacent to Seven Sisters Road, St Ann's Road and Bushey Road within the London Borough of Haringey.

This Flood Risk Assessment and Drainage Strategy details the assessment carried out on the current flood risk to the development and sets out a preliminary sustainable drainage strategy in accordance with the provisions of the current National Planning Policy Framework (NPPF) updated July 2021, the London Plan 2021 and references other regional and local policies including Haringey's Local and Surface Water Management Plans.

The assessment concludes that:

- The site is wholly located in Flood Zone 1, the lowest probability of flooding from tidal and fluvial sources.
- The site is within one of Haringey's designated Critical Drainage Areas but is not shown to be adversely impacted by surface water flows during times of heavy rainfall.
- Risk of flooding from ground water, sewers and artificial sources has been found to be low.
- A new sustainable drainage system (SuDS) will be implemented as part of the Development. This will restrict surface water run off to equivalent "greenfield" run off rates in accordance with current national and local policies will include permeable paving and on-site attenuation which will be provided in underground geocellular storage tanks. These will be underneath the proposed landscape and access/parking areas within the development. In accordance with current policy the drainage strategy includes for a 40% additional allowance for climate change.
- Discharge at restricted rate from these SuDS features will be to adjacent public surface water sewers.
- Foul drainage from the development will discharge to adjacent public foul/combined sewers in accordance with Section 106 of the Water Industry Act 1991.

The information provided within the report satisfies the requirements of the NPPF, London Plan and local policies and the assessment concludes that there is no restriction on the types of development which can be constructed on the site. Additionally, the report demonstrates that the surface water run-off from the development can be managed sustainably to ensure that flood risk is not increased elsewhere.

2 Introduction

2.1 Background

CRE8 Structures have been appointed by Haringey Council to prepare a Flood Risk Assessment (FRA) in respect of development proposals for a site known as the Sir Fredrick Messer Estate, London N15 6HX in the Borough of Haringey. This FRA is submitted to accompany a full planning application for the development of the site to provide additional residential accommodation.

The Site is currently public green space see Figure 2.1 below.

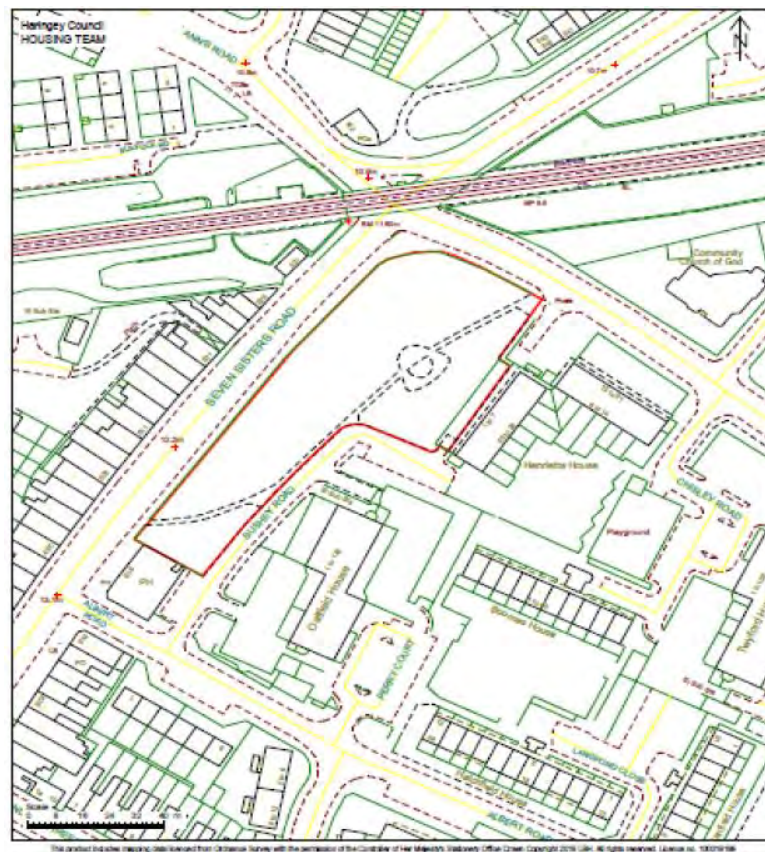


Figure 2.1 Site Location

2.2 Scope of FRA

The objective of the FRA is to assess the current flood risk to the development and to demonstrate that the risks will be managed both now and over the lifetime of the development. This assessment will take future climate change into account and will have regard to the vulnerability of its users.

The assessment has been undertaken in accordance with the provisions of the National Planning Policy Framework (NPPF), The London Plan and references other regional and local policies as described in Section 5. This has included a review of hydrology, flood risk and existing drainage, as well as topographic data, online regulatory flood mapping and the Local Authority's Strategic Flood Risk Assessment.

3 Site Location & Environmental Setting

3.1 Site Location

The site known as Sir Fredrick Messer Estate is in the London Borough of Haringey, N15 6HX (Grid Reference: TQ 533081 188410).

It is bounded by Seven Sisters Road to the west, St Ann's Road to the North, Bushey Road and the existing residential block Henrietta house to the east (Figure 2.1). An existing public house and hostel sits to the south of the site, 618 Seven Sisters Road. The total area of the site is 5988m²

The site is currently undeveloped and comprises an area of grass adjacent to existing residential blocks.

3.2 Topography & Existing Drainage

The topographical survey in **Appendix A** shows that the site has a gentle overall slope from south to north. The Seven Sisters road level varies from +12.6m AOD in the south down to +10.8m AOD in the north (Figure 3). The site itself has a series of undulating man-made mounds with trees planted in amongst the mounds which up to 2.0m high in places.

Sewer records were acquired from Thames Water and are included in **Appendix B**. These show a number of sewers adjacent to the site. These include a large trunk sewer in Seven Sisters Road adjacent to the site with smaller diameter foul and surface water sewers to the south and east of the site. See Figure 3.1.



Figure 3.1 Existing Sewers

There are no surface water features close to the site. The nearest being the New River, which is an artificial watercourse. It flows in a southerly direction towards Stoke Newington and is approximately 510 m to the south of the site.

The River Lea is approximately 1.5 kilometres to the east of the site at its nearest point.

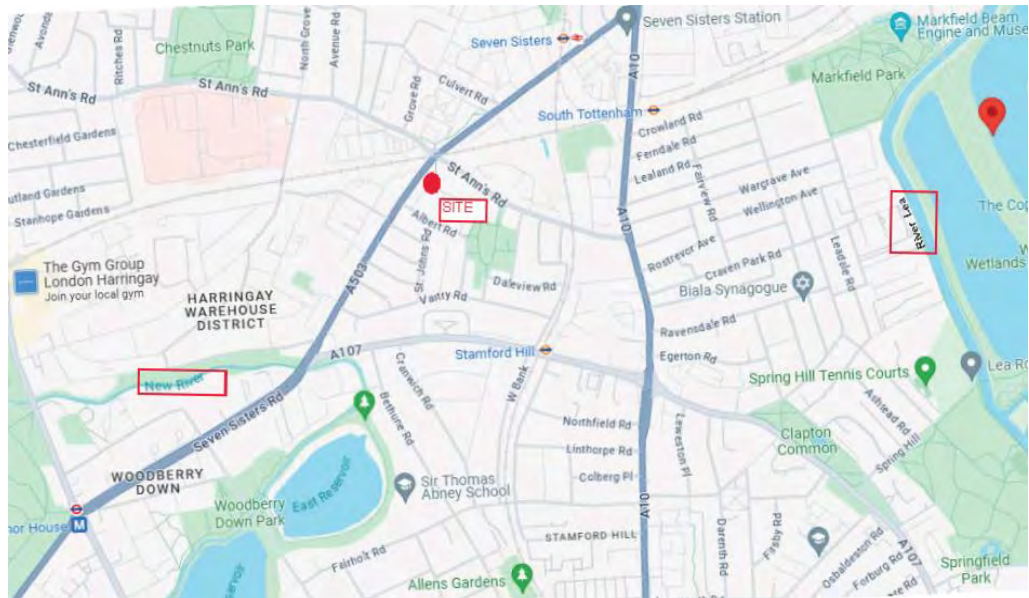


Figure 3.2 Adjacent Rivers

The published British Geological Survey (BGS) mapping identifies the site to be wholly underlain by the London Clay Formation, see Figure 3.3 b

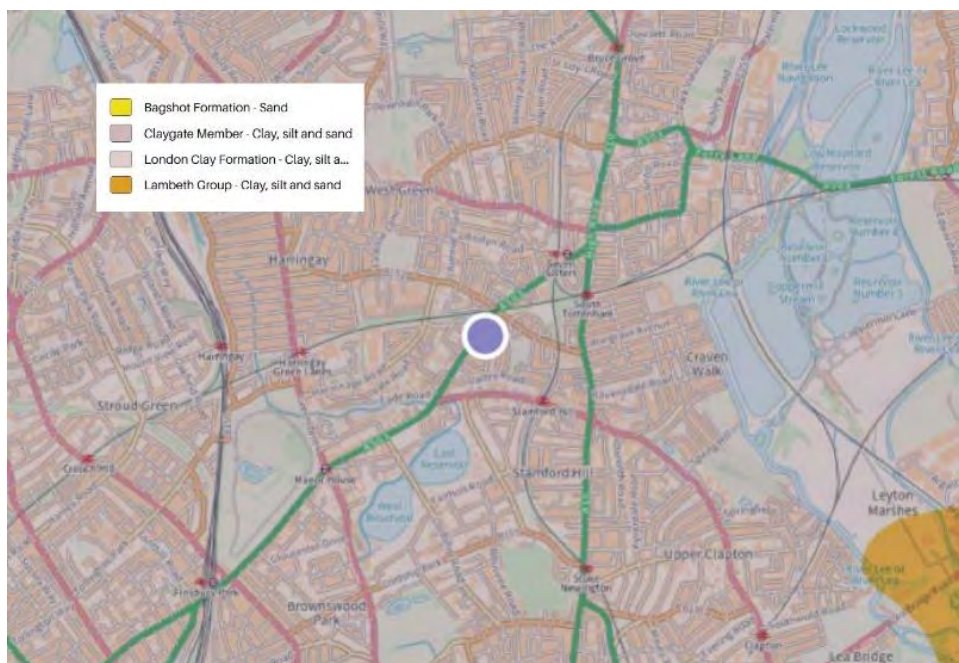


Figure 3.3 Bedrock Geology

This soil type clearly predominates the area and is close to the surface as Figure 3.4 below shows lack of superficial deposits on or adjacent to the site

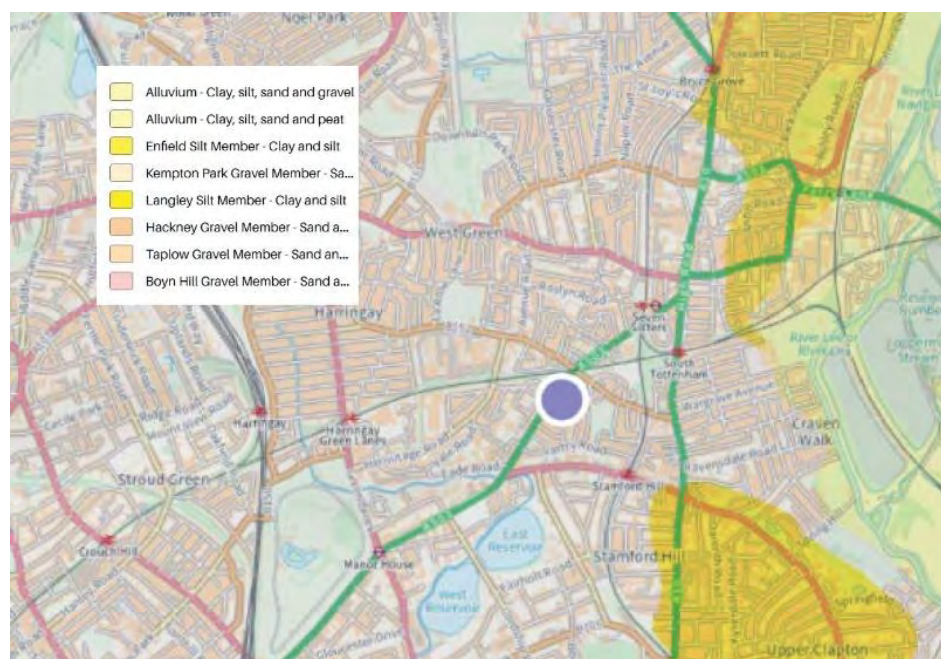


Figure 3.4 Superficial Geology

These ground conditions have been confirmed through site investigations undertaken by Concept Site Investigations (CSI). The factual report produced by CSI advises that the site has areas of made ground (the mounds referenced above) underlain by London Clay.

3.3 EA Flood Data

The EA's flood mapping website provides flood risk information in respect of River and Sea and Surface Water flooding to inform FRAs for planning applications. In the case of this site the potential flood risks associated with each of these flood sources is shown on **Figures 3.5 and 3.6** below.

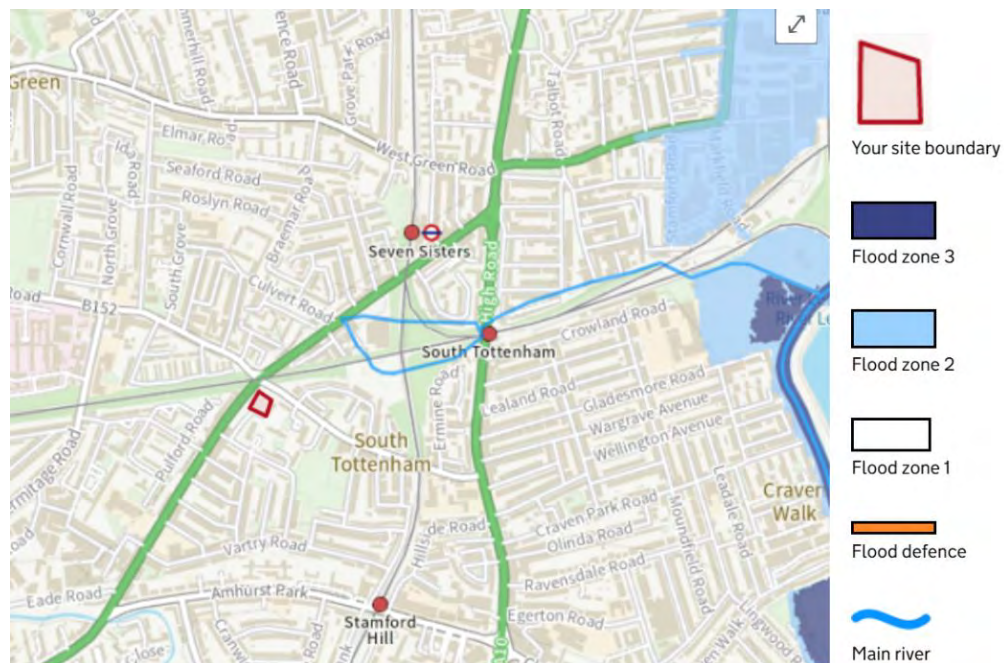


Figure 3.5 River and Sea Flood Risk

This map shows that the site is at very low risk of flooding from Rivers or Sea, i.e. it is located within Flood Zone 1 which is the lowest flood risk category and is suitable therefore for all types of development.

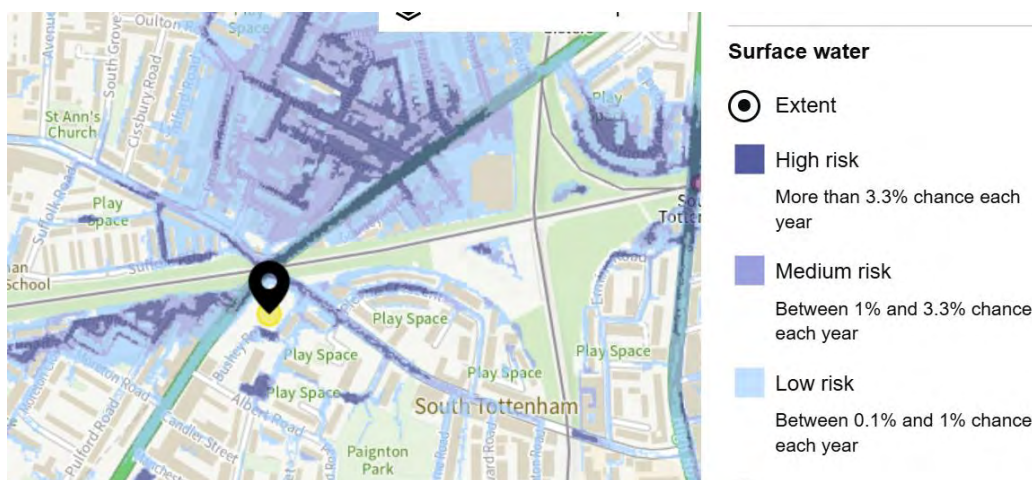


Figure 3.6 Surface Water Flooding

This map shows that the site is at very low risk of surface water flooding and therefore development will not impact the existing surface water drainage networks.

4 Development Proposals

The site is located along Bushey Road London N15 6HZ, close to the junction of Seven Sisters Road and St Ann's Road in the London Borough of Haringey. It comprises banked open space on the edge of the Sir Fredrick Messer Estate.

Development proposals are for a total of 66 residential units in two blocks each six storeys high see Figure 4.1 below. The development is essentially car free with the exception of seven Blue Badge parking spaces for new residents.



Figure 4.1 Development Layout

Proposed Development plans are included in **Appendix C**.

5 National Policy, Local Planning Policy & SuDS Guidance

5.1 National Planning Policy

The National Planning Policy Framework (NPPF) which was first published in 2012 was last updated in December 2023. Flood risk is primarily regulated through planning policy and key requirements with respect to flooding are outlined in the latest NPPF. The NPPF requires that an FRA should be submitted with planning applications for all development sites within Flood Zones 2 and 3; and all development sites with an area greater than one hectare to determine the risks of flooding from all sources including rivers, the sea, sewers and groundwater.

The NPPF sets out that flood risk should be defined according to Flood Zone 3 (High Probability), Flood Zone 2 (Medium Probability) and Flood Zone 1 (Low Probability). Flood Zone 3 represents land that the Environment Agency (EA) consider could be affected by flooding:

In terms of flood risk, the NPPF classifies land uses according to vulnerability as follows:

- Essential infrastructure;
- Highly vulnerable
- More vulnerable
- Less vulnerable
- Water compatible development;

The proposed development is for residential use which is designated as a 'More Vulnerable' land use in accordance with the NPPF.

NPPF is supported by Planning Practice Guidance, the latest PPG flood risk update being published in February 2024

This guidance provides further information on the requirements for flood risk assessments including sustainable drainage systems (SuDS) which should be included in FRAs. The PPG also includes advice on flood risk vulnerability and flood zone compatibility.

5.2 Regional Policy

The London Plan, 2021

The latest version of the London Plan was published in March 2021.

With regard to surface water drainage, the London Plan notes in **Policy SI 13**

“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.

rainwater use as a resource (for example rainwater harvesting, and 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.”

5.3 Local Policy

Haringey's development plan is currently made up of the Strategic Policies, Development Management Policies, Site Allocations and Tottenham Area Action Plan, alongside the London Plan. The council is currently preparing 2 additional plans, the Wood Green Area Action Plan, and the North London Waste Plan. Once adopted, these will form part of the development plan.

Haringey's Local Plan – Strategic Policies

Haringey's current Local Plan was published in March 2013 (and updated in July 2017) and sets out the vision and key policies for the future development of the borough up to the year 2026.

Policy SP5 (Water Management and Flooding) sets out that all development within the borough will need to be water efficient during construction and operation and reduce all forms of flooding. The requirements relevant to this Site are summarised below;

Improve the water environment, water quality and drainage systems;

Minimise water use and illustrate how development would contribute to general and flash flooding;

Take account of flood risk vulnerability classification as set out in paragraph 100 of the NPPF, and will apply the NPPF Sequential Test and Exception Test;

Implement measures to prevent (or mitigate as last resort) local surface water and downstream flooding;

Implement SuDS from strategic to individual site level to improve water attenuation, quality and amenity; and

Require higher resilience and levels of flood protection for critical infrastructure to ensure the protection of essential services such as water and power.

Haringey Development Management DPD

Haringey's Development Management DPD was adopted in July 2017 and gives effect to Haringey's spatial strategy and the key objectives of the Strategic Local Plan by supporting proposals that contribute to the delivery of sustainable development. The Development Management DPD sets out criteria against which planning applications are assessed. The following policies relating to flood risk and drainage are considered relevant to the proposed development.

Policy DM24 – Managing and Reducing Flood Risk

- ☐ All proposals for new development must avoid and reduce the risk of flooding to future occupants and not result in an increased risk of flooding;
- ☒ Sufficient evidence for the council to assess whether the requirements of the Sequential Test and Exception test (where required) have been satisfied; and
- ☒ All proposals for new development must manage and reduce surface water runoff and manage water and wastewater discharges.

Policy DM25 – Sustainable Drainage Systems

- ☒ All new development must seek to manage surface water as close to its sources as soon as possible in line with the London Plan drainage hierarchy;
- ☒ The councils will require SuDS to be sensitively incorporated into new development;
- ☐ Major development proposals will be required to reduce surface water flows to greenfield runoff rate for a 1 in 100 year critical storm, where this cannot be achieved justification must be provided to demonstrate that the runoff rate has been reduced as much as possible; and

- ☐ All development should include at least one 'at source' SuDS measure resulting in a net improvement in water quantity or quality.

Policy DM29 – On Site Management of Waste Water and Water Supply

- ☐ All new development must demonstrate that the local public sewer network has adequate capacity to serve the existing and proposed development. Where such capacity does not exist suitable alternatives for the discharge of surface or foul water must be made.

Haringey's Surface Water Management Plan

Haringey's Surface Water Management Plan (SWMP) outlines the preferred surface water management strategy for LBH in the context of flooding from surface water flooding from sewers, drains, groundwater, and runoff from land, small watercourses and ditches which occurs due to heavy rainfall. The SWMP establishes a long-term action plan to manage surface water, will have an influence over future capital investment, maintenance, public engagement and understanding, emergency planning and future developments.

Haringey Council Level 2 Strategic Flood Risk Assessment

The Haringey Council Level 2 Strategic Flood Risk Assessment (SFRA) was published in March 2013 and looks exclusively at flood risk within LBH. The primary objective of the SFRA is to be part of the evidence base support the Local Plan in order to inform the allocation of development within the borough.

Haringey SuDS Design Requirements.

Haringey, as Lead Local Flood Authority (LLFA) have produced a document setting out SuDS design requirements for Technical Assessment of planning submissions. This has been referenced in producing this FRA and Drainage Strategy for the proposed Development.

6 Flood Risk Assessment

6.1 Sources of Flooding

NPPF identifies six potential sources of flooding which should be assessed;

Flooding from rivers or fluvial flooding;

Flooding from the sea or tidal flooding;

Flooding from land;

Flooding from groundwater;

Flooding from sewers; and

Flooding from reservoirs, canals, and other artificial sources.

6.2 Flooding from Rivers or Sea

The Planning Practice Guidance (PPG) which supports NPPF includes advice on flood risk vulnerability and flood zone compatibility. Table 1 of the PPG defines the following flood zones relating to the probability of river and sea flooding, without the presence of defences:

Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;

Zone 2 - medium probability: between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% to 0.1%) in any year;

Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and

Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme 1 in 1,000 (0.1%) flood.

As noted in Section 3 (Figure 3.5) the site is shown on the EA's Flood Map for Planning to be wholly located within Flood Zone 1, the lowest flood risk level.

Tables 2 and 3 of the PPG, provide a matrix of vulnerabilities for different types of development against compatibility within each Flood Zone as follows;

Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines;

Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings;

More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments;

Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and

Water-Compatible Development, e.g. docks, marinas, wharves.

The NPPF includes a requirement for a Sequential Test the aim of which is to steer development away from areas of greatest flood risk. As this site is wholly within Flood Zone 1 then NPPF and PPG do not require a Sequential Test.

6.3 Flooding from Land (Local Surface Water Flooding)

Surface water and sewer flooding (Pluvial Flooding) occurs when natural and engineered systems have insufficient capacity to deal with the volume of rainfall in a catchment. Pluvial flooding tends to occur in urban areas during extreme, high intensity, rainfall events which overwhelm the local surface water drainage systems. This flood water is then conveyed via overland flow routes dictated by the local topography.

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. Increased run-off from developed areas consisting of impermeable surfaces can increase overland flows. If the flow paths of these overland flows are not carefully considered during the detail design and planning stages, flooding from overland flows could occur.

The EA's surface water flood mapping for the site, see Figure 3.6 shows the site to be at low risk of flooding from surface water so will have no impact on the development.

It is recommended to have the finished floor levels designed above the surrounding ground levels to ensure there are no significant flood risk on the site from overland flow or blocked sewers or drains. Appropriate SuDS measures will be implemented to ensure the amount of surface water entering the sewer system is managed. This is described in Section 7.0 below.

The Site falls within Haringey's Critical Drainage Area CDA 057, as noted in the Council's Surface Water Management Plan. The preferred mitigation option for proposed developments within this CDA is to apply local improvements to the surface water run-off. A suitable surface water flow route to direct surface water flows around the edge of the proposed buildings should be provided within the detailed drainage design for the scheme.

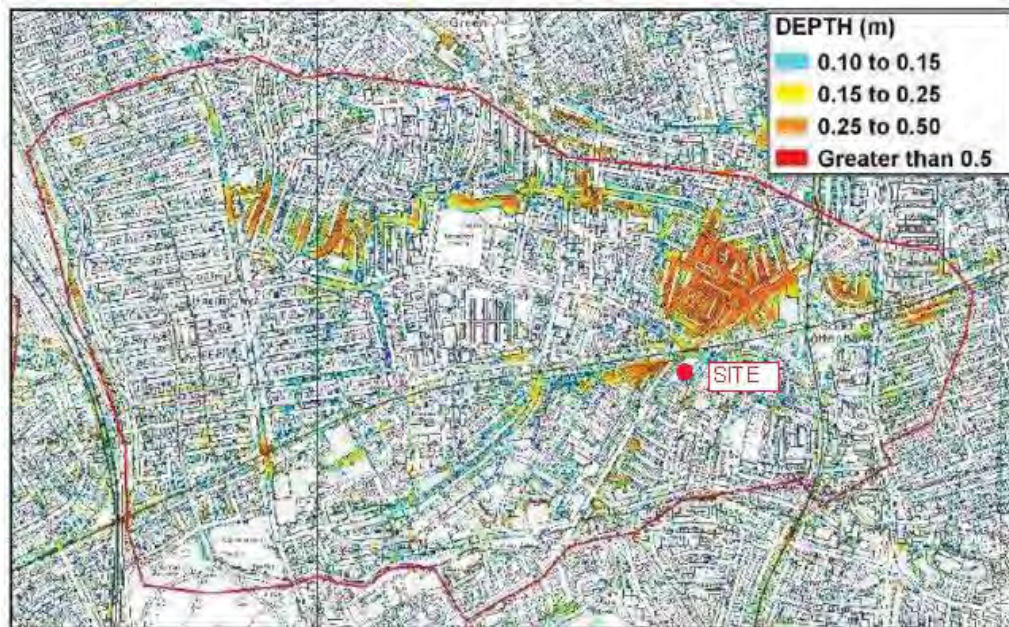


Figure 6.1 Critical Drainage Area 057

An existing public surface water sewer network serves the site and the surrounding area. A new sustainable surface water drainage network will be designed and installed to serve the proposed development. This will include on site attenuation with a restricted discharge rate, in accordance with Haringey's SuDS Design Requirements and the London Plan. It will also include a climate change adjustment such that a future 1 in 100 annual probability storm event would be accommodated without causing flooding of internal or vulnerable areas of the site. This drainage strategy is described in Section 7.

This new drainage network and sustainable drainage systems will also help reduce the existing surface water flood risk as peak surface water flows from the development will be controlled to greenfield run off through on site attenuation.

6.4 Flooding from Sewers

Haringey's draft Surface Water Management Plan (SWMP) includes mapping (**See Appendix D**) showing recorded instances of sewer flooding within the Borough, listed by postcode.

The postcode for this site N15-6 records no properties sufferings from this flooding.

6.5 Flooding from Groundwater

The bedrock geology under the site, London Clay Formation, is unlikely to support a significant groundwater body.

This is confirmed in the SFRA which notes that "*Haringey was at risk from fluvial, sewer and pluvial flooding but not **groundwater** or tidal flooding*". Mapping included in the SWMP (see **Appendix E**) shows areas within the Borough which have increased potential for elevated groundwater. None of these are in the vicinity of this site.

6.6 Flooding from Reservoirs, Canals, and other Artificial Sources

The EA website states "Flooding from reservoirs is unlikely in this area." This is therefore not a risk to the development of the site.

7 Outline Drainage Proposals

7.1 Surface Water Drainage

The existing site is currently public open space and is therefore mostly permeable apart from existing paths through the site.

The construction of the proposed development will increase the impermeable surfaces at the site which will lead to an increase in the volume of surface water run-off generated by the site. Surface water run-off will however be managed in accordance with current sustainable practices, in order to mitigate the risk of any future flooding.

The London Plan Policy SI 13, see para 5.23 above, states that there should be a preference for green over grey SuDS features for proposed developments, in line with the drainage hierarchy set out in Table 7.1 below. This Table discusses how the development complies with this hierarchy.

Table 7.1 Sustainable Drainage Hierarchy Selection	
Method	Suitability
1 Rainwater used as a resource (for example rainwater harvesting, blue roofs for irrigation)	This is normally done by having a blue-green roof system. Given that the relatively small roof area of the two separate buildings it isn't considered viable to use this in this situation.
2 Rainwater infiltration to ground at or close to source	The underlying ground comprises the London Clay Formation which is not compatible with infiltration techniques. Also given the constrained nature of the site it would not be possible to achieve required set back of features from foundations.
3 Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)	Not considered practical for this site, see above.
4 rainwater discharge direct to a watercourse (unless not appropriate)	There are no adjacent watercourses so this option isn't practical in this instance.
5 controlled rainwater discharge to a surface water sewer or drain	Surface water from this development will discharge at a controlled rate to the adjacent Thames water surface water network. The preliminary drainage strategy is shown on drawing 2021008-CRE-XX-00-DR-C-000001 in Appendix F

6. controlled rainwater discharge to a combined sewer.	Not applicable as surface water sewer available
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The London Plan and Haringey's SuDS design requirements state that development proposals should aim to achieve greenfield run off rates.

7.2 Greenfield Run Off Rates

Greenfield runoff rates have been calculated for this area using the FEH method. The results of these calculations are shown in Table 7.2 and in **Appendix G**.

Table 7.2 Greenfield Run Off Rates					
Return Period (years)	Qbar	1 in 1	1 in 30	1 in 100	1 in 200
Greenfield Run Off (l/s)	0.96	0.82	2.21	3.07	3.59

7.3 Proposed Discharge Rate

As the lower return period run off rates, Qbar and 1 in 1 year, are very low, less than 1.0l/s they are considered too small to allow for practical flow control.

It is proposed therefore to restrict flows from the development to the 1 in 100 year return period rate of 3.07l/s. This is still below the 5.0l/s rate recommended in the Environment Agency's Report – SC030219.

7.4 Sustainable Drainage Systems

In line with Policy SI 13 of the London Plan and Haringey's SuDS Design Requirements for Technical Assessment. The drainage system for the development has been designed in accordance with Sustainable Urban Drainage principles. These were developed with reference to the hierarchy as set out in the London Plan, and Haringey's Guidance Document.

From the above selection assessment it is considered that the most suitable solution for this development is to provide for below ground attenuation under landscaped and parking areas.

The site has been split into two catchments as shown on drawing 2021008-CRE-XX-00-DR-C-000002 in **Appendix F**.

In order to achieve a discharge rate of 3.07l/s, it is estimated that a total attenuation volume of approximately 208 m³ would be required in order to accommodate the 1 in 100 year critical storm event including an additional allowance of 40 % to account for climate change.

This attenuation will be provided within two underground geocellular tanks located underneath the central landscaping area and the small parking area off St Ann's Road respectively. This parking area will be constructed using permeable paving materials which will discharge to the attenuation tank underneath.

These proposed SuDS techniques, permeable paving and geocellular attenuation will improve the quality of the surface water run off from the current situation by reducing the rate of discharge, thus allowing settlement and retention of solids and filtration of silt and attached pollutants

Attenuated surface water at the controlled rate noted above will discharge to an existing 300mm diameter Thames Water surface water sewer in St Ann's Road. Connection to this sewer will be made via a Section 106 Agreement in accordance with the Water Industry Act 1991. A pre development enquiry has been sent to Thames Water in this respect. A response is currently awaited.

The proposed drainage strategy for this development is illustrated on drawing 2021008-CRE-XX-00-DR-C-000001 in **Appendix F** and summarised in the Haringey pro-forma document in **Appendix H**.

7.5 Surface Water Treatment

Surface water drainage systems are required to provide an adequate level of pollution treatment depending on the pollution hazard indices for the land uses as set out in the SuDS Manual C753 published by CIRIA. The proposed pollution mitigation indices must exceed the required pollution hazard indices in accordance with the above document.

Table 26.2 from C753, see below sets out the pollution indices for different land use classifications.

Table 26.2 **Pollution hazard indices for different land use classifications**

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non- residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

As the site is designated for residential use, the appropriate hazard indices are highlighted in the above Table. The maximum hazard indices for each potential pollution type are as follows

Total Suspended Solids (TSS)	0.5
Metals	0.4
Hydro-carbons	0.4

Mitigation will be provided through the use of SuDS, the final selection of which will be made at detailed design stage.

The majority of hard paved areas on the development will be constructed of permeable materials which through which run off will permeate prior to discharging to geocellular attenuation areas.

Table 26.3 from the SuDS manual, see below provides indicative mitigation indices for different SuDS components.

Table 26.3			
Indicative SuDS mitigation indices for discharges to surface waters			
Mitigation indices			
Type of SuDS component	TSS	Metals	Hydrocarbons
Fliter Strip	0.4	0.4	0.5
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types for separate events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area		

The mitigation indices for permeable pavements are;

TSS	0.4
Metals	0.6
Hydrocarbons	0.7

The proposed mitigation therefore provides a sufficient level of mitigation against the sources identified.

7.6 Foul Drainage

There are existing public sewers in St Ann's Road and Seven Sisters Road adjacent to the site. There is also a public foul sewer to the south east of the site adjacent to Henrietta House.

The sewer adjacent to Henrietta House is not sufficiently deep to allow for a gravity connection from the development. The preferred connection point on the public system is the 450mm diameter sewer in St Anns Road. This is shown on the Drainage Strategy Drawing 2021008-CRE-XX-00-DR-C-000001 in **Appendix F**

The overall peak design flow from the development has been assessed at 10.65l/s. Confirmation of capacity for these flows within the adjacent public sewerage network has been requested from Thames Water. This confirmation is currently awaited.

Flows from the development will be collected on site by a new on site sewerage network and subject to confirmation of capacity discharge to the sewer in St Anns Road. The connection to the sewer will be made via a Section 106 application to Thames Water under the provisions of the Water Industry Act 1991.

8 Drainage Management Strategy

The PPG sets out the requirement for developers to consider the operation, management and maintenance of all SuDS features. The on-Site drainage networks and SuDS will be privately managed and maintained for the lifetime of the development, ensuring that they remain fit for purpose and function satisfactorily.

The on-site management team for the development will be responsible for the maintenance of the SuDS included within the Scheme. Table 8.1 sets out an indicative maintenance schedule of the anticipated maintenance and repairs, in line with guidance from the CIRIA SuDS Manual.

Table 8.1: Sustainable Drainage Maintenance Regime	
Suds Feature/Task	Frequency
Underground Attenuation	
Inspection of silt traps and removal of any sediment/debris	Quarterly or as required
Jetting of main structure to remove any sediment build up	Annually or as required
Permeable Pavements	
Inspection and clearing of debris, leaves etc.	Monthly or as required
Sweeping and removal of silt and other sediments to maintain infiltration quality	Annually or as required
Discharge Control (Hydrobrake)	
Removal of sediment	As required
Inspect for damage and blockages	Monthly for first three months after installation then at six monthly intervals

9 Conclusions & Recommendations

The site is wholly located within Flood Zone 1, which has the lowest probability of flooding from tidal and fluvial sources. There is therefore no restriction on the types of development which can be on the site.

The EA's website indicates that the site is at low risk from surface water flooding during extreme storm events so no special flood protection measures will be required. External levels will be designed to direct any overland flow during excessive rainfall away from proposed or existing buildings.

The risk of flooding from groundwater, sewers and artificial sources has also been assessed and found to be low.

Greenfield runoff rates from the site have been calculated for a series of return period storms and in compliance with both the London Borough of Haringey and London Plan's recommendations flows from the development have been restricted to this rate, including an additional allowance of 40% for climate change, prior to discharging to the adjacent culverted watercourse.

Restricting the surface water run off from the development to this reduced rate requires a total attenuation volume of approximately 200m³. This will be provided in underground geocellular storage tanks located underneath landscaping and parking areas. Surface water flows to the restricted discharge rates will connect to off site public sewer network.

The on-site drainage network and Sustainable Drainage Systems would be privately managed and maintained for the lifetime of the development, ensuring that they remain fit for purpose and function appropriately. The management company/operator would be appointed post-planning.

Foul drainage will be collected on site via a new piped sewerage system and discharged to the adjacent public foul sewer network.

This report demonstrates that the proposed Development has a low probability of flooding from fluvial, tidal, groundwater and artificial sources and confirms that the pluvial flood risk can be managed appropriately in line with local and national policy. It also confirms that surface water runoff from the site can be managed sustainably to ensure that flood risk is not increased elsewhere. It is considered that the information provided within this report satisfies the requirements of the National Planning Policy Framework, London Plan and local policy.

Appendix A **Topographical Survey**

Appendix BThames Water Sewer Records



Appendix C **Proposed Development Plans**

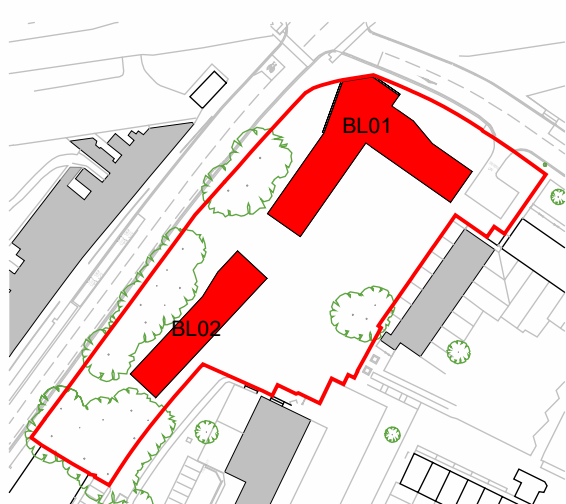
This drawing and design is for use solely in connection with the project described below. The drawing and design is the copyright of Avanti Architects Ltd. and must not be re-issued, loaned or copied without written consent. Avanti Architects accepts no responsibility for any fire related aspect of the design. Responsibility for fire performance and fire safety reside with the fire specialist and this document is only valid for use in connection with fire if endorsed by them. All dimensions and setting out to be checked on site before construction. This drawing is to be read in conjunction with all other information relevant to the project. Any apparent discrepancy is to be brought to the attention of Avanti Architects Ltd. Do not scale from this drawing.

Notes:

Unit Type Key

- 1B2P
- 2B3P
- 2B4P
- 3B5P
- Circulation
- Support/Plant

Key Plan



For Landscape information and finishes, please refer to Landscape Architect's information.

DRAFT

Revision	Date	Drawn by	Checked by	Description
001	XX/07/2024	TI	TI	FIRST ISSUE - GA PLANS

Scale	Size	Date First Issue
As indicated	A1	23/07/24
Drawn By	Checked By	
TI	TI	

Project Name
Sir Frederick Messer Estate

Drawing Name
General Arrangement Plan - Level
00 - Ground Floor

Drawing Number
21014-Z-L00-DR-AVA-AR-201001

Status	Revision
FOR INFORMATION	001

AVANTI
ARCHITECTS

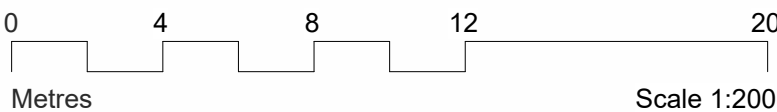
© Avanti Architects Ltd www.avantiarchitects.co.uk
25 Chart Street + 44 (0) 20 7278 3060
London N1 6FA aa@avantiarchitects.co.uk



Unit Schedule						
Number	Type	Typology	Category	Size	Count	Area
BL01.00.01	2 Bed B	Apartment	M4(3)	2B4P	1	91 m ²
BL01.00.02	1 Bed C	Apartment	M4(3)	1B2P	1	64 m ²
BL01.00.03	1 Bed C	Apartment	M4(3)	1B2P	1	64 m ²
BL01.00.04	3 Bed F 0F	Maisonette	M4(2)	3B5P	1	31 m ²
BL01.00.05	2 Bed G 0F	Maisonette	M4(2)	2B3P	1	32 m ²
BL02.00.01	1 Bed A	Apartment	M4(3)	1B2P	1	67 m ²
BL02.00.02	1 Bed B	Apartment	M4(3)	1B2P	1	66 m ²
BL02.00.03	2 Bed A	Apartment	M4(3)	2B4P	1	92 m ²
Grand total: 8						

1: General Arrangement Plan - Level 00 - Ground Floor

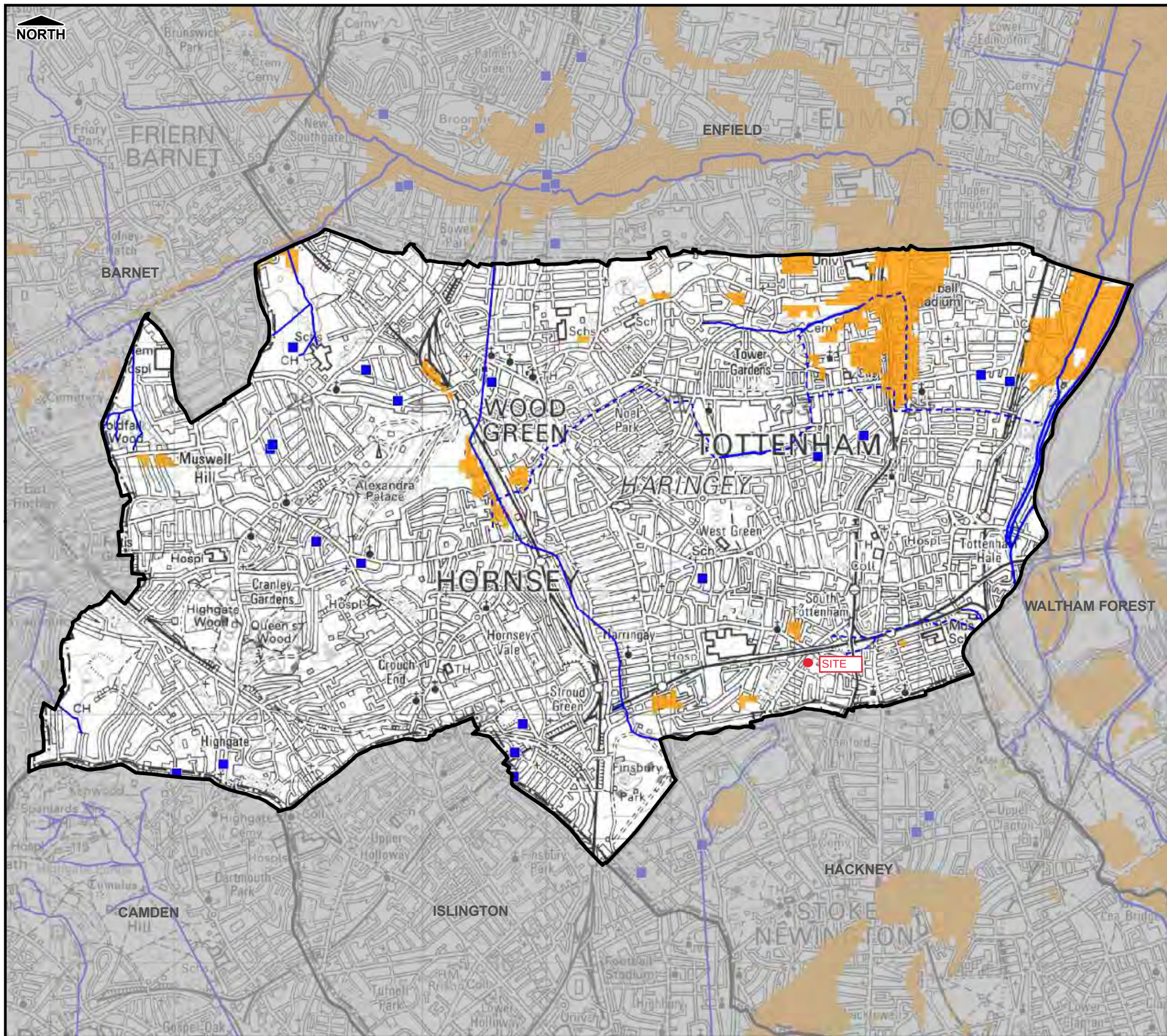
1 : 200



Appendix D Sewer Flood Mapping

Appendix E Groundwater Flood Mapping

Map of London Borough of Haringey showing surface water management plan. The map includes labels for various areas such as FRIERN BARNET, BARNET, WOOD GREEN, TOTTENHAM, HARINGEY, HORNSEY, CAMDEN, ISLINGTON, HACKNEY, and STOKES NEWINGTON. A legend in the top right corner defines symbols for water features, boundaries, and specific sites. A scale bar at the bottom indicates distances in meters (M, MCR, MR, N, NR, O) and a north arrow is present in the top left corner.



Legend

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London Borough of Haringey



Haringey Council

Surface Water Management Plan

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Scale at A3 NÄÇMMM	Date MÜMÜQMMN	Drawn by pKçç ok_r ii	Approved by pKçm
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Increased Potential for Elevated Groundwater Map

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CAPITA SYMONDS

Scott Wilson

Flood Risk Management

Environment Agency

Thames Water

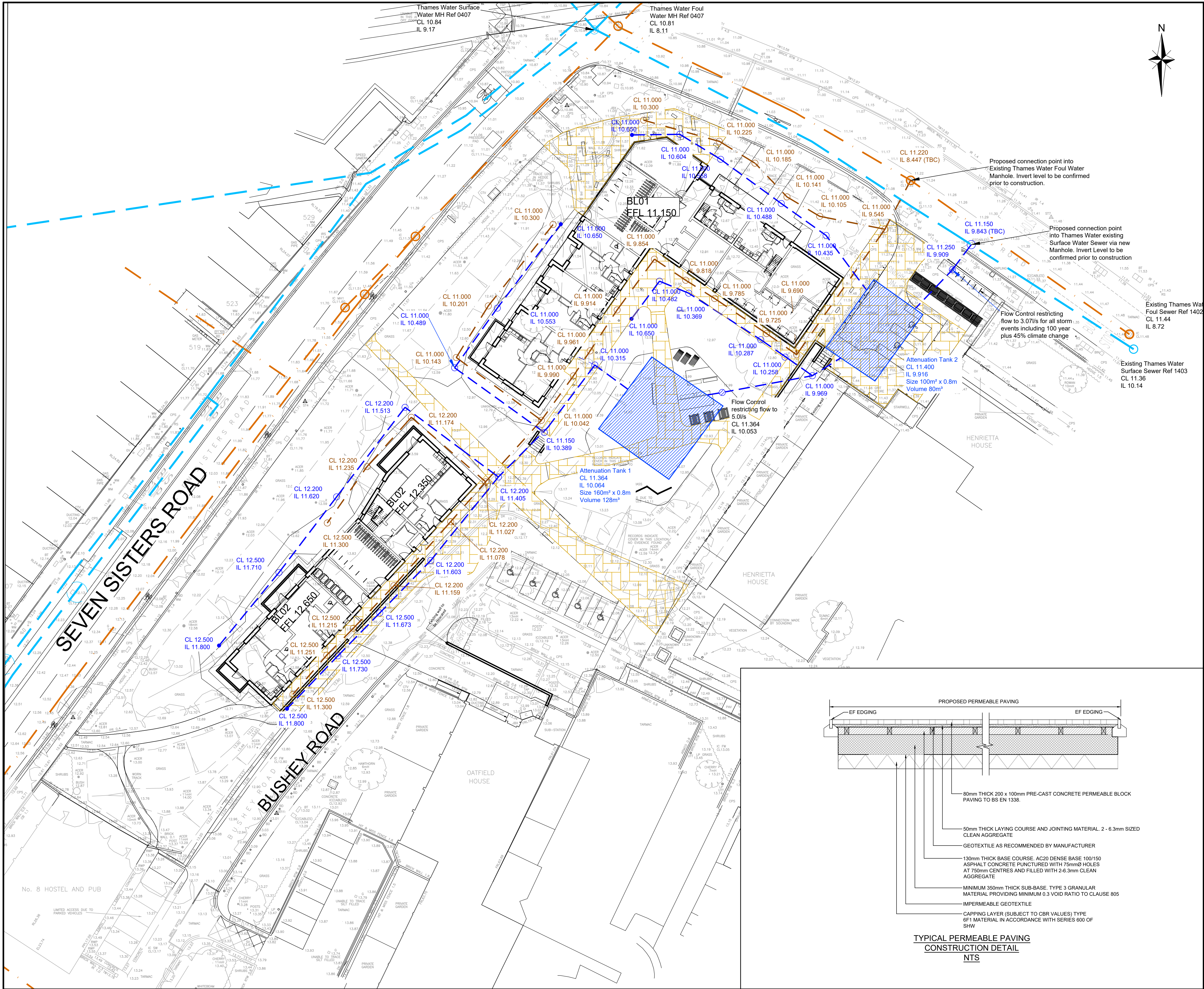
LONDON COUNCILS

GREATERLONDONAUTHORITY

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FIGURE 10

Appendix F **Drainage Strategy Drawings**



- Notes:
1. Do not scale from this drawing.
 2. All measurements are in metres unless stated otherwise.
 3. Topographical Survey provided by others. CRE8 accept no liability for any inaccuracies.
 4. CRE8 cannot guarantee the authenticity or reliability of any data and/or records provided by third parties.
 5. Proposed levels based on finished floor levels provided by Avant Architects
Block 01 - FFL 11.150
Block 02 Split floor levels - FFL 12.350 (Eastern side)
- FFL 12.650 (Western side)
 6. Existing invert levels of public sewers have been taken from Thames Water Records. All levels to be confirmed prior to construction.

- Key
- Indicative Private Surface Water Network
 - Rodding Eye
 - Flow Control
 - Attenuation Tank
 - Private Foul Water Network
 - Existing Thames Water Surface Water Sewer
 - Existing Thames Water Foul Water Sewer
 - Permeable Paving

Rev	By	Chkd	Apprv	Date	Description
-----	----	------	-------	------	-------------

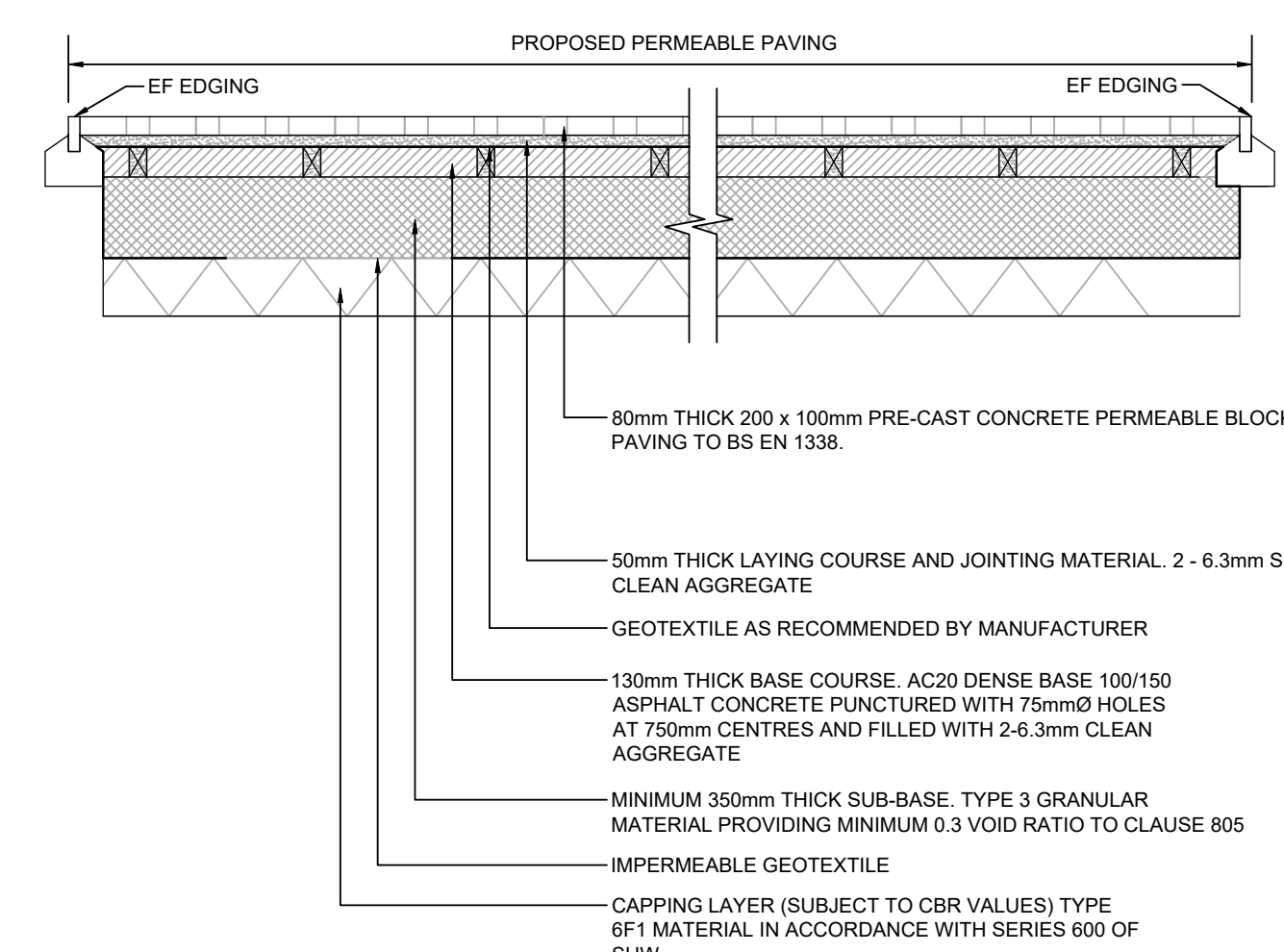
Client

London Borough of Haringey

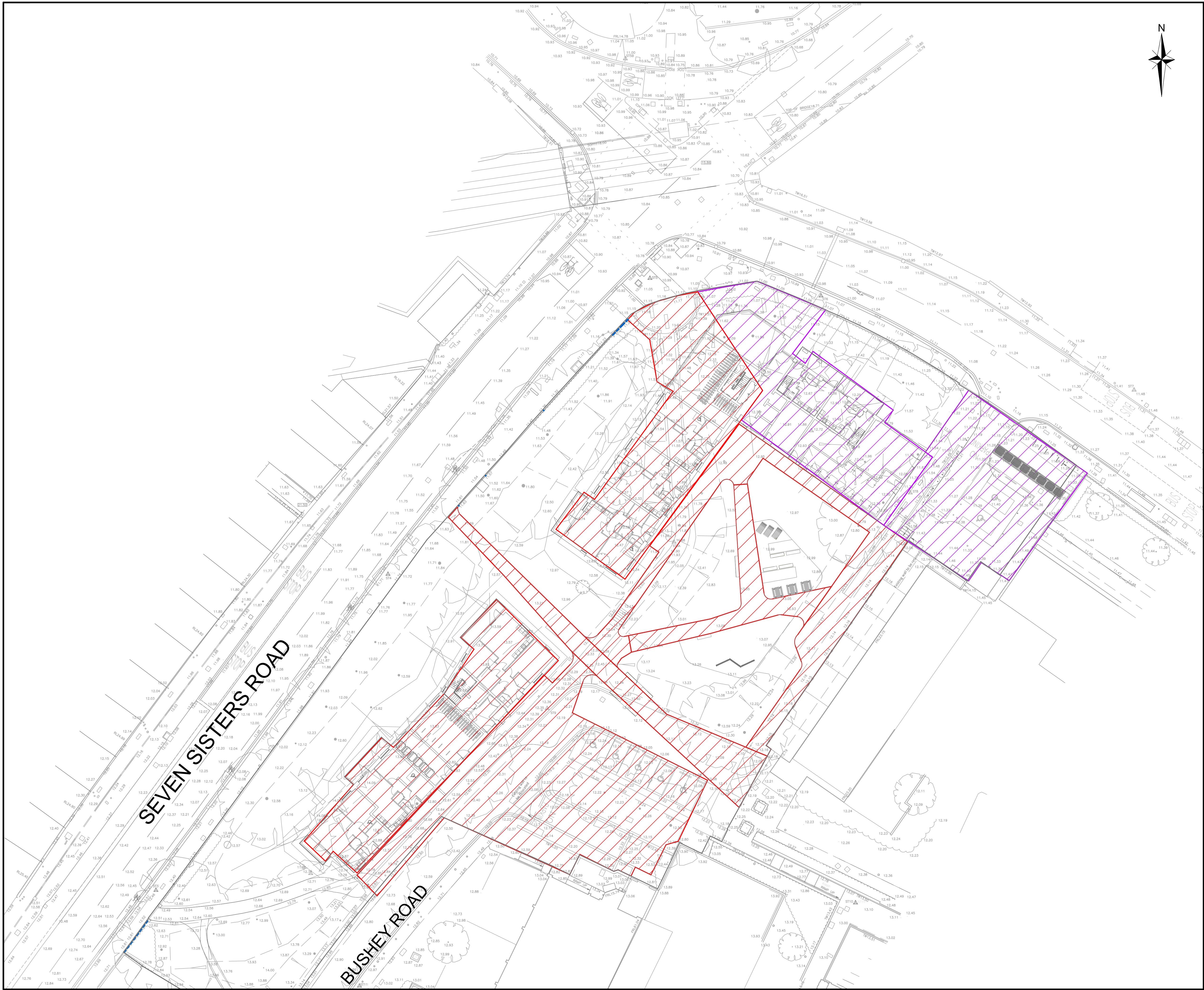
CRE8 structures LLP
Studio 29 Paddington Works
8 Hermitage Street London
W2 1BE
0207 183 3093
www.cre8structures.com

Sir Frederick Messer Estate, Haringey

Drawn by: MT	Date: September 2024
Checked by: TSH	Date: September 2024
Approved by: SAC	Date: September 2024
Drawing No. 2021008-CRE-XX-00-DR-C-000001	Revision P01
Drawing Scale: 1:250 @ A1	



TYPICAL PERMEABLE PAVING
CONSTRUCTION DETAIL
NTS



Notes:

Key

- Catchment 1, 2205m²
- Catchment 2, 900m²

Rev	By	Chkd	Apprv	Date	Description
-----	----	------	-------	------	-------------

Client

London Borough of Haringey

CRE8 structures LLP

Studio 29 Paddington Works
8 Hermitage Street London
W2 1BE

0207 183 3093

www.cre8structures.com

Sir Frederick Messer Estate, Haringey

Drawing

Proposed Catchments

Drawn by: MT	Date: 27/08/2024
Checked by: TSH	Date: 27/08/2024
Approved by: SAC	Date: 27/08/2024
Drawing No. 2021008-CRE-XX-00-DR-C-000002	Revision P01
Drawing Scale: 1:250 @ A1	

Appendix G **Drainage Calculations**

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024			
Report Details: Type: Inflows Storm Phase: Phase	Designed by: MT	Checked by: TSH	Approved By: SAC	
Company Address:				



Catchment Area 2

Type : Catchment Area

Area (ha)	0.09
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area 1

Type : Catchment Area

Area (ha)	0.15
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024		
	Designed by: MT	Checked by: TSH	Approved By: SAC
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		



Attenuation Tank 2

Type : Tank

Dimensions

Exceedance Level (m)	11.400
Depth (m)	1.484
Base Level (m)	9.916
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	80.684

Depth (m)	Area (m²)	Volume (m³)
0.000	100.00	0.000
0.800	100.00	80.000

Inlets

Inlet

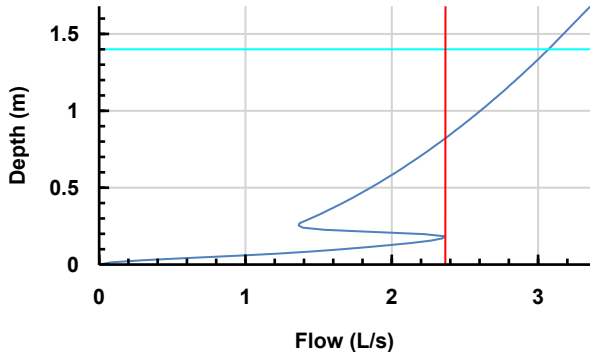
Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 2 Pipe (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	Pipe
Outlet Type	Hydro-Brake®
Invert Level (m)	10.000
Design Depth (m)	1.400
Design Flow (L/s)	3.07
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐

Unit Reference	CHE-0074-3070-1400-3070
----------------	-------------------------



Advanced

Perimeter	Circular
Length (m)	22.866

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024			
Report Details: Type: Stormwater Controls Storm Phase: Phase	Designed by: MT	Checked by: TSH	Approved By: SAC	
Company Address:				



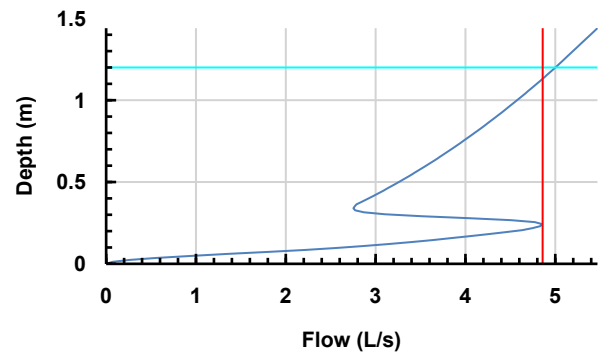
Attenuation Tank 1

Type : Tank

Dimensions		
Exceedance Level (m)	11.364	
Depth (m)	1.300	
Base Level (m)	10.064	
Freeboard (mm)	0	
Initial Depth (m)	0.000	
Porosity (%)	100	
Average Slope (1:X)	0.00	
Total Volume (m³)	128.500	
Depth (m)	Area (m²)	Volume (m³)
0.000	160.00	0.000
0.800	160.00	128.000

Inlets	
Inlet	
Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets	
Outlet	
Outgoing Connection	Pipe (1)
Outlet Type	Hydro-Brake®
Invert Level (m)	10.164
Design Depth (m)	1.200
Design Flow (L/s)	5.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0098-5000-1200-5000



Advanced	
Perimeter	Circular
Length (m)	19.025

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024			
Report Details: Type: Network Design Criteria Storm Phase: Phase	Designed by: MT		Checked by: TSH	Approved By: SAC
Company Address:				

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024			
Report Details:	Designed by:	Checked by:	Approved By:	
Type: Network Design Criteria Storm Phase: Phase	MT	TSH	SAC	
Company Address:				

Manhole Options

Apply Offset

☐

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project: 24-069 Sir Frederick Messer Estate Surface Water Model	Date: 28/08/2024			
Report Title: Rainfall Analysis Criteria	Designed by: MT		Checked by: TSH	Approved By: SAC
Company Address:				

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FEH		Type: FEH
Site Location	GB 533078 188415 TQ 33078 88415	
Rainfall Version	2022	
Summer	☒	
Winter	☒	

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	40.000
100.0	0.000
100.0	45.000

Storm Durations

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

Project: 24-069 Sir Frederick Messer Estate Surface Water Model		Date: 28/08/2024			
		Designed by: MT	Checked by: TSH		Approved By: SAC
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address:			



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max.
 DS Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FEH: 2 years: +0 %: 600 mins: Winter	10.111	10.111	0.195	0.195	2.2	0.000	1.6	37.031	75.852	OK
Attenuation Tank 1	FEH: 2 years: +0 %: 480 mins: Winter	10.246	10.246	0.182	0.182	3.5	0.000	1.2	20.282	77.302	OK

Project: 24-069 Sir Frederick Messer Estate Surface Water Model		Date: 28/08/2024			
		Designed by: MT	Checked by: TSH		Approved By: SAC
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address:			



FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max.
 DS Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FEH: 30 years: +40 %: 480 mins: Winter	10.526	10.526	0.610	0.610	8.5	0.000	2.4	80.567	24.412	OK
Attenuation Tank 1	FEH: 30 years: +40 %: 480 mins: Winter	10.583	10.583	0.519	0.519	9.7	0.000	3.0	57.491	35.410	OK

Project: 24-069 Sir Frederick Messer Estate Surface Water Model		Date: 28/08/2024			
		Designed by: MT	Checked by: TSH		Approved By: SAC
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address:			



FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max.
 DS Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FEH: 100 years: +0 %: 480 mins: Winter	10.504	10.504	0.588	0.588	8.3	0.000	2.3	78.710	27.104	OK
Attenuation Tank 1	FEH: 100 years: +0 %: 480 mins: Winter	10.560	10.560	0.496	0.496	9.3	0.000	3.0	56.317	38.211	OK

Project: 24-069 Sir Frederick Messer Estate Surface Water Model		Date: 28/08/2024			
		Designed by: MT	Checked by: TSH		Approved By: SAC
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address:			



FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. DS Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 2	FEH: 100 years: +45 %: 480 mins: Winter	10.795	10.795	0.879	0.879	9.9	0.000	2.3	98.764	0.705	OK
Attenuation Tank 1	FEH: 100 years: +45 %: 480 mins: Winter	10.851	10.851	0.787	0.787	13.5	0.000	3.0	69.036	2.048	OK

Appendix H Haringey SuDS Pro Forma

SuDS Flows and Volumes – LLFA Technical Assessment Proforma

This form identifies the information required by Haringey LLFA to enable technical assessment of flows and volumes determined as part of drainage / SuDS calculations.

*Note : * means delete as appropriate; Numbers in brackets refer to accompanying notes.*

SITE DETAILS

- 1.1 Planning application reference TBA.....
- 1.2 Site name ...Sir Frederick Messer Estate.....
- 1.3 Total application site area ⁽¹⁾ 5988.....m²..... ha
- 1.4 Is the site located in a CDA or LFRZ Y
- 1.5 Is the site located in a SPZ /N

VOLUME AND FLOW DESIGN INPUTS

- 2.1 Site area which is positively drained by SuDS ⁽²⁾ 3105.....m²
- 2.2 Impermeable area drained pre development ⁽³⁾ 0.....m²
- 2.3 Impermeable area drained post development ⁽³⁾ 3105m²
- 2.4 Additional impermeable area (2.3 minus 2.2) 3105..... m²
- 2.5 Predevelopment use ⁽⁴⁾ Mixed*
- 2.6 Method of discharge ⁽⁵⁾ combined sewer*
- 2.7 Infiltration rate (where applicable) N/A..... m/hr
- 2.8 Influencing factors on infiltration N/A.....
- 2.9 Depth to highest known ground water table N/A..... mAOD
- 2.10 Coefficient of runoff (Cv) ⁽⁶⁾ 100%.....
- 2.11 Justification for Cv used
- 2.12 FEH rainfall data used (Note that FSR is no longer the preferred rainfall calculation method) Y
- 2.13 Will storage be subject to surcharge by elevated water levels in watercourse / sewer N
- 2.14 Invert level at outlet (invert level of final flow control) 8.447 mAOD
- 2.15 Design level used for surcharge water level at point of discharge⁽¹⁴⁾ ? mAOD

SuDS Flows and Volumes – LLFA Technical Assessment Proforma

CALCULATION OUTPUTS

Sections 3 and 4 refer to site where storage is provided by attenuation and / or partial infiltration. Where all flows are infiltrated to ground omit Sections 3 -5 and complete Section 6.

3.0	Defining rate of runoff from the site	
3.2	Max. discharge for 1 in 1 year rainfall	l/s/ha, 0.82 l/s for the site
3.2	Max. discharge for Q_{med} rainfall	l/s/ha, 0.96 Q_{bar} ..l/s for the site
3.3	Max. discharge for 1 in 30 year rainfall	l/s/ha, 2.21 l/s for the site
3.4	Max. discharge for 1 in 100 year rainfall	l/s/ha, 3.07 l/s for the site
3.5	Max. discharge for 1 in 100 year plus 30%CC	l/s/ha, ...l/s for the site
4.0	Attenuation storage to manage peak runoff rates from the site	
4.1	Storage - 1 in 1 year	m ³ m ³ /m ² (of developed impermeable area)
4.2	Storage - 1in 30 year ⁽⁷⁾	m ³ m ³ /m ²
4.3	Storage - 1in 100 year ⁽⁸⁾	m ³ m ³ /m ²
4.4	Storage - 1 in 100 year plus 40%CC ⁽⁹⁾	...208.....m ³ m ³ /m ²
5.0	Controlling volume of runoff from the site	
5.1	Pre development runoff volume ⁽¹⁰⁾	m ³ for the site
5.2	Post development runoff volume (unmitigated) ⁽¹⁰⁾	m ³ for the site
5.3	Volume to be controlled/does not leave site ^(5.2 - 5.1)	m ³ for the site
5.4	Volume control provided by	
-	Interception losses ⁽¹¹⁾	0 m ³
-	Rain harvesting ⁽¹²⁾	0 m ³
-	Infiltration (even at very low rates)	0 m ³
-	Separate area designated as long term storage ⁽¹³⁾	208.....m ³
5.5	Total volume control (sum of inputs for 5.4)	208.....m ³ ⁽¹⁵⁾
6.0	Site storage volumes (full infiltration only)	
6.1	Storage - 1in 30 year ⁽⁷⁾	m ³ m ³ /m ² (of developed impermeable area)
6.2	Storage - 1 in 100 year plus CC ⁽⁹⁾	m ³ m ³ /m ²

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Notes

1. All area with the proposed application site boundary to be included.
2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces includes, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF status in all instances. The design statement and drawings explain / demonstrate how flows will be managed from the site.
5. Runoff may be discharge via one or a number of means.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the application should justify the selection of Cv.
7. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
8. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of specified areas to shallow depths (150-300mm) may be permitted in agreement with the LLFA.
9. Climate change is specified as 30% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
10. To be determined using the 100 year return period 6 hour duration rainfall event.
11. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques.
12. Please refer to Rain harvesting BS for guidance on available storage.
13. Flow diverted to Long term storage areas should be infiltrated to the ground, or where this is not possible, discharged to the receiving water at slow flow rates (maximum 2 l/s/ha). LT storage would not be allowed to empty directly back into attenuation storage and would be expected to drain away over 5-10 days. Typically LT storage may be provided on multi-functional open space or sacrificial car parking areas.
14. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Storm sewers are designed for pipe full capacity for 1 in 1 to 1 in 5year return period. Beyond this, the pipe network will usually be in conditions of surcharge. Where information cannot be gathered from Thames Water, engineering judgement should be used to evaluate potential impact (using sensitivity analysis for example).
15. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.