

Developers' Guide for Surface Water Management

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Introduction

As a Lead Local Flood Authority (LLFA), Southwark Council is responsible for managing flood risk from surface water, groundwater and ordinary watercourses throughout the borough. In order to effectively reduce flood risk, Southwark is committed to limiting surface water runoff flowing into both separate and combined sewers throughout the borough. To achieve this, Southwark requires the use of sustainable drainage systems (SuDS) in all developments, in line with policy 5.13 of the London Plan (updated 2015). This is further supported by section 9.3 of Southwark's Sustainable Design Supplementary Planning Document.

In our roles as the Local Planning Authority and the LLFA, we will review both Flood Risk Assessments and Drainage Strategies as part of the appraisal of planning applications. This guidance has been developed to inform developers of the requirements for planning submissions, including guidance on how this information should be prepared and to what criteria the documentation should be developed.

Should there be any queries on the information provided in this document, or any other queries regarding flood risk and drainage with respect to developments, Southwark's Flood Risk Management Team may be contacted via floodriskmanagement@southwark.gov.uk.



Requirements for Flood Risk Assessments and Drainage Strategies

This section highlights the requirements with regard to flood risk and drainage submissions for planning permission for developments in Southwark. The level of detail required will need to be tailored for the specific development. If the developer is in any doubt about the information required or the level of detail to be provided, it is strongly recommended that the developer seeks clarification from Southwark's Flood and Drainage Team.

It is highly recommended that pre-application discussions take place before submitting an application to the Local Planning Authority to minimise the risk of project delays due to rejections.

The participation of other consentory bodies (particularly statutory consultees) in pre-application discussions should also be undertaken whenever possible to enable early consideration of all fundamental issues, even when further discussions will be required at a later stage. These agencies or bodies may include (but not be limited to):

- Environment Agency
- Canal and River Trust
- Highway Authority
- Thames Water (sewage undertaker)

2.1 Planning Applications

Planning applications may be submitted either as outline applications with one or more matters reserved for later determination, or as full applications. The level of information that needs to be submitted for each type of application will vary depending on the size of the development, flood risk and complexity of proposed drainage systems. The following table should be used as a guide only for the documentation required for each stage of applications. The requirements may vary depending on the size of the development and local conditions.

Document	Pre-Application	Outline Application	Full Application
Site Specific Flood Risk Assessment	Recommended (but not essential)	✓	✓
Drainage Strategy	Recommended (but not essential)	✓	✓
Preliminary Layout Drawings	✓	✓	
Preliminary Hydraulic Calculations		✓	
Ground Investigation Report (where infiltration is proposed)		✓	
Evidence of Third Party Agreement for Discharge to their System		✓	✓
Detailed Development Layout Drawings			✓
Detailed Hydraulic Calculations			✓
Geotechnical Factual and Interpretive Reports (including infiltration results)			✓
Discharge Agreements (Temporary and Permanent)			✓

Additional information may be required depending on the type and size of development, and for specific site conditions. For larger developments, consideration should also be given to phasing; this should be reflected in the documentation.

Further details on what is required for Flood Risk Assessments (FRAs) and Drainage Strategies are provided in the next sections.

2.2 Flood Risk Assessments

For the majority of developments, site specific FRAs are required in line with the National Planning Policy Framework (NPPF). This is to ensure that inappropriate development in areas of flood risk are avoided by directing developments away from areas at high risk, or where development is necessary, ensuring that flood risks are adequately considered. Site specific FRAs should be appropriate to the scale, nature and location, and are required for developments:

- In flood zone 2 or 3, including minor developments and change of use.
- More than 1 hectare in size within flood zone 1.
- Less than 1 hectare in size within flood zone 1, including a change of use in development type to a more vulnerable class (e.g. from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea.
- In an area within flood zone 1 with known drainage issues.

In preparing the site specific FRA, the applicant should collect all available information pertaining to the site to accurately determine flood risks and for consideration in the development of a drainage strategy. Relevant information available from Southwark Council includes:

- [Strategic Flood Risk Assessment](#)
- [Local Flood Risk Management Strategy](#)
- [Surface Water Management Plan \(SWMP\)](#) and Flood Risk Maps
- [Preliminary Flood Risk Assessment \(PRFA\)](#)

The Environment Agency's standing advice should be followed if the FRA is being undertaken for:

- A minor extension (household extensions or non-domestic extensions less than 250m² in area) in flood zone 2 or 3.
- More vulnerable uses in flood zone 2 (except for landfill or waste facility sites, caravan or camping sites).
- Less vulnerable uses in flood zone 2 (except for agriculture and forestry, waste treatment, and water and sewage treatment).
- Water compatible uses in flood zone 2.

This includes developments involving a change of use into one of these vulnerability categories or into the water compatible category.

There are 5 designated Critical Drainage Areas (CDAs) within Southwark. Southwark Council expects FRAs to be undertaken for all developments within the CDAs. FRAs will also be required for development proposals near CDAs that could potentially impact on flooding in a CDA; Southwark would however expect that opportunities for reducing surface water run-off should be explored in all cases. Further details on the locations of the CDAs are available in Southwark's SWMP.

Detailed flood maps and boundaries of our CDAs are available from the EA's website, the council's SWMP and Appendix A of the updated SFRA.

Section 5 of the updated SFRA additionally contains further detailed guidance for developers in the preparation of site-specific FRA's and flood risk mitigation.

2.3 Drainage Strategy

Where the existing site drainage is to be modified in any way, or new surface water drainage is to be provided, a Drainage Strategy should be submitted, either as a part of the site specific FRA or as a separate document. As a general rule, the following information should be submitted as part of the Drainage Strategy, as a minimum:

- Description of the existing and proposed drainage arrangements for the site, including existing and proposed topography.
- Calculation of the existing surface water runoff for the site. This should consider the existing permeable area for brownfield sites.
- Calculation of the proposed runoff from the site. This should consider any proposed impermeable areas for the site and how this compares to any existing impermeable areas. Full justification should be provided for the proposed runoff rate.
- Estimates of the volume of attenuation storage that would be required on site.
- Assessment of the suitability for Sustainable Drainage Systems (SuDS) to be used for surface water management. This should include recommendations and indicative sizing for chosen SuDS measures and an explanation of how the drainage hierarchy has been followed.
- Site drainage layout; this should include a site plan showing locations of SuDS measures, pipelines and flow control devices. Demonstration should be provided that the proposed system is spatially feasible and space has been made on site for the selected SuDS measures.
- Explanation of who will maintain the site drainage system, including SuDS measures, and how the maintenance will be funded over the lifetime of the development. Evidence should be provided that access for maintenance will be physically possible.
- Evidence that the site has an agreed point of discharge; this may be in the form of a written agreement of discharge (section 106 or similar), or evidence of discussions held with the relevant undertaker / authority, e.g. Thames Water for discharge to combined sewers. If a substantial portion of surface water is to be infiltrated on site, the applicant will need to provide percolation tests in accordance with relevant standards.
- Any required phasing arrangements that must be considered; this should document how drainage is considered during all stages of the development, avoiding interim phases which are unprotected. This will likely only be required for larger developments.

Where the drainage strategy is for a detailed application, it is expected that further detail is provided. This should include:

- A fully labelled network diagram showing all dimensions (pipe numbers, gradients, sizes, locations, manhole details, etc.) of every element of the proposed drainage system (pipes, swales, storage areas, ponds, etc.) and how these relate to submitted calculations.
- Detailed engineering plans (including levels, detail drawings, long sections and cross sections, etc.) will be needed for each of the SuDS and critical drainage elements, including details of the methods of flow control.
- Detailed calculations and/or modelling of the SuDS and drainage system, showing the behavior of the site under various rainfall events.
- Qualitative consideration of residual risk and suitable design for exceedance events, considering flow pathways and storage.
- Further detail of maintenance arrangements, including confirming of adoption, operation and maintenance manual.

Further details on the requirements for hydraulic design are provided in section 3 of this guidance.

In general, drainage strategies are not required for any development where no changes are to be made to the external layout of the site (primarily change of use applications). However, Southwark Council expects all developments to take advantage of any suitable opportunities to reduce surface water runoff, e.g. installation of water butts.

Southwark Council understands that the required information may not be available to produce all of this documentation; however, we expect to see every effort made to provide a suitable level of detail. Should certain information not be available, we will likely recommend that a condition be imposed on the planning application to ensure that sufficient details are provided prior to the commencement of construction.

We recommend that any hydraulic calculations undertaken are appended to the drainage strategy document. An explanation of the methodology of the calculation should additionally be provided.



Hydraulic Design

As detailed in section 2.2, Southwark expect the existing brownfield / greenfield runoff rates for development sites to be calculated as part of the drainage strategy. This section details the requirements for calculating the runoff rates and selecting a suitable proposed runoff rate for the design. Southwark expects every effort to be made to reduce surface runoff for all developments to the equivalent greenfield rate, as detailed below.

3.1 Calculation of Existing Site Runoff Rates

An assessment of the both the existing and equivalent greenfield rates of discharge from the site should be calculated using the annual exceedance probability (AEP) in the table below.

Table 1: Annual Exceedance Probabilities for Surface Water Runoff Calculation

Site Characteristic	Annual Exceedance Probability (AEP)	Equivalent Return Period
Average site ground slope greater than 1%	100%	1 in 1 year
Average site ground slope 1% or less	50%	1 in 2 year

The methods used for calculating the runoff rates should be confirmed and explained in the Drainage Strategy, e.g. modified rational method, as well as details of any computer software packages used (e.g.) Microdrainage.

3.2 Calculation of Proposed Site Runoff Rates

The rate of surface water discharge for the 1% AEP design event (1 in 100 year return period) from the proposed development site, including an allowance for climate change. Reference should be made to the latest guidance regarding climate change allowances, as provided by the EA. These allowances are based on possible statistical projections and a range of time periods, to be used depending on the proposed development location, vulnerability and design life.

The updated allowances for small and urban catchments are presented in Table 2 below.

Table 2: Peak rainfall intensity allowances for small and urban catchments (adapted from EA guidance)

Time Period	Central	Upper End
Percentage change anticipated for 2015 - 2039	5%	10%
Percentage change anticipated for 2040 to 2069	10%	20%
Percentage change anticipated for 2072 - 2115	20%	40%

It is recommended that both the central and upper end allowances are considered in assessment of flood risk, in order to understand the potential range of climate change impact. The EA has provided detailed online guidance on the use of these allowances for flood risk assessment and it is recommended that reference is made to this source for the most up to date guidance.

Post-development discharge rates should be limited to the calculated greenfield rate (in line with the methodology described in 3.1 above). This is in line with policy 5.13 of the London Plan (updated 2015), see section 4 for details.

For some developments, site constraints or other mitigating factors may mean that achieving the greenfield runoff rates is not possible or prohibitively expensive. Where reduction of the flow to greenfield rates is not possible, Southwark expect the developer to agree a discharge rate with the Flood Risk Management team prior to submission of the planning application. In such situations, the developer will be required to provide robust demonstration that it is not feasible to achieve a better outcome. If the application is submitted without an agreed runoff rate, the Flood Risk Management Team may not recommend the proposal for approval.



3.3 Critical Storm Durations

The critical storm duration for each element of the drainage network should be determined by considering a range of summer and winter storm durations from 15 minutes up to the 1080 minute (7 day) duration. FSR (Flood Studies Report) rainfall data should only be used for critical storm durations less than 1 hour and FEH (Flood Estimation Handbook) rainfall data should be used for storm durations greater than 1 hour.

If computer modeling software has been used, e.g. Microdrainage, full printouts of model inputs and results should be provided, to allow for an assessment of the modelled information.



SuDS Assessment and Selection

In line with policy 5.13 of the London Plan (updated 2015), developers should utilise SuDS on all developments, unless there are practical reasons for not doing so. Therefore, Southwark expect to see suitable consideration given to using sustainable measures in line with the following drainage hierarchy:

- Store rainwater for later use
- Use infiltration techniques, such as porous surfaces in non-clay areas
- Attenuate rainwater in ponds or open water features for gradual release
- Attenuate rainwater by storing in tanks or sealed water features for gradual release
- Discharge rainwater direct to a watercourse
- Discharge rainwater to a surface water sewer / drain
- Discharge rainwater to the combined sewer

The use of SuDS should be considered early in the design, to ensure that a suitable drainage system is developed. SuDS options may require a significant land area, or may be difficult to incorporate once detailed design is underway.

An overview of common types of SuDS measures, which may be suitable for installation within Southwark is included in Appendix B of the SFRA.

Further information on the use of SuDS is available from the following sources:

- CIRIA 753 SuDS Manual
- CIRIA C687 Planning for SuDS
- CIRIA W12 Sustainable Water Management in Schools
- CIRIA R156 Infiltration Drainage – Manual of Good Practice
- CIRIA C698 SuDS Construction Guide
- CIRIA C635 Designing for Exceedance in Urban Drainage
- DEFRA Non Statutory Technical Standards for Sustainable Drainage
- Local Authority SuDS Officer Organisation (LASOO) – Non Statutory Technical Standards for Sustainable Drainage – Best Practice Guidance



Common Issues

There are a number of items that are commonly seen in FRAs and Drainage Strategies, which Southwark consider to be undesirable. This section provides details of these elements.

5.1 *Common Issues with Flood Risk Assessments*

The following issues are commonly encountered in FRA submissions:

- Inadequate breach assessment – Breach modelling of the River Thames has recently been updated and the results have been incorporated into the Southwark SFRA. This information should be used to inform flood risk assessments in Flood Zone 3 of the Borough and should be considered in conjunction with site specific information provided by the EA and other sources.
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- Breach assessment conclusions – it is common to see FRAs which identify residual tidal flood risk, but later discount the risk as insignificant due to the low probability of a breach occurring. This is not an acceptable approach and suitable mitigation, resistance or resilience measures should be identified in the FRA.
- Inadequate resilience measures – where residual risk has been identified, developers commonly fail to recommend adequate resilience measures in line with the requirements for flood risk mitigation in order to satisfy the Exception Test. Reference should be made to the SFRA for further guidance on acceptable mitigation of residual flood risk.
- Lack of reference to Surface Water Flood Mapping. Detailed information on surface water flood risk is provided within Southwark's SFRA and SWMP and should be referenced in all FRAs.
- Poor or no assessment of the impact of basements on surface water and groundwater flow / flooding. An assessment should always be undertaken of the effect of the basement on groundwater levels, infiltration and surface water flows on site. Particular attention should be given to cases where the depth of the basement extends into known groundwater levels. Reference should be made to the Southwark document Basements and Flooding – Guide for Developers for further detail in relation to basement proposals.

5.2 *Common Issues with Drainage Strategies*

The following issues are commonly encountered in Drainage Strategy submissions:

- Daisy chained surface water connections – this refers to instances where a new drainage connection is made to existing highway drainage. This should be avoided at all costs as this can cause capacity issues. The preferred solution is to incorporate SuDS and then discharge at a controlled rate into the Thames Water sewer.
- Connection (misconnection or otherwise) of foul discharges to a surface water system – this is never acceptable, but does occur without consent.
- Combined manholes – in some parts of London, manholes containing foul and surface water sewer pipes have been historically installed. This can lead to contamination of surface water discharges and must be avoided.
- Pumped surface water mains – although there are some scenarios (e.g. very flat sites combined with shallow combined sewers) where pumped mains are necessary, they are not a preferred solution. Evidence will be required to demonstrate why a gravity system cannot be used.

- Permeable paving in the public highway- this has the potential to cause settlement issues in the highway, and should therefore be used with care. Permeable paving can be permitted in the highway in parking bays and in small cul-de-sacs where minimal vehicle traffic is expected. Use of permeable paving in the public highway should be approved by the Highway Authority.
- Linear drainage channels are not a preferred method of surface water collection. In general, the developer will need to provide sufficient details to demonstrate why SuDS or an alternative system is not suitable.
- Inadequate consideration given to the SuDS Hierarchy – demonstration must be provided how this has been taken into account in formulation of the drainage strategy. Underground attenuation systems or sewer discharge should only be considered where infiltration, surface water discharge, and above ground attenuation are not feasible.

This list is not exhaustive but comprises some of the main drainage issues noted in the course of reviewing planning applications. Further guidance on acceptable drainage provisions in highways can be sought from the Southwark Streetworks Design Manual (SSDM).

