

A photograph of a small stream flowing through a lush, green park. The stream is surrounded by tall grasses and various plants. In the background, there are trees and a building. The sky is bright and clear.

# Level 2 Strategic Flood Risk Assessment

London Borough of Croydon



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# 1 Introduction

## 1.1 Terms of Reference

AECOM has been commissioned by Croydon Council, on behalf of London Borough of Croydon, London Borough of Merton, London Borough of Sutton and London Borough of Wandsworth Councils to review and update their joint Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) for the administrative area covered by the four boroughs.

## 1.2 Project Background

The National Planning Policy Framework<sup>1</sup> (NPPF) and associated Planning Practice Guidance for Flood Risk and Coastal Change (PPG)<sup>2</sup> emphasise the active role Local Planning Authorities (LPAs) should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process. The NPPF outlines that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and LPAs should use the findings to inform strategic land use planning. The overall approach of the NPPF to flood risk is broadly summarised Paragraph 103:

***When determining planning applications, LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific FRA following the Sequential Test, and if required the Exception Test, it can be demonstrated that:***

- ***within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location, and***
- ***development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems."***

### 1.2.1 Level 1 SFRA Deliverables

One combined revised Level 1 SFRA report has been prepared for the four Boroughs. The purpose of the Level 1 SFRA was to collate and analyse the most up to date readily available flood risk information for all sources of flooding, and provide an overview of flood risk issues across the study area. The borough wide mapping deliverables for the London Borough of Croydon are presented in the **Level 1 SFRA Appendix A Figures 2.1 – 2.6**.

The Level 1 SFRA provides guidance on:

- The application of the Sequential Test by each LPA when allocating future development sites to inform their Local Plans, as well as by developers promoting development on windfall sites.
- Managing and mitigating flood risk, the application of sustainable drainage systems (SuDS), and the preparation of site specific Flood Risk Assessments (FRAs).
- Potential flood risk management objectives and policy considerations which may be developed and adopted by the London Boroughs as formal policies within their developing Local Plans.

## 1.3 Level 2 SFRA

Using the strategic flood risk information presented within the Level 1 SFRA, Croydon Council undertook the Sequential Test to document the process whereby future development is steered towards areas of lowest flood risk. Where it was not possible to accommodate potential development sites outside those areas identified to be at risk of flooding, the Exception Test may be required, as set out in Table 1-1. This Level 2 SFRA Report provides information to support the application of the Exception Test for future development sites.

<sup>1</sup> Department for Communities and Local Government. 2012. *National Planning Policy Framework*. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>2</sup> Department for Communities and Local Government. 2014. *Planning Practice Guidance: Flood Risk and Coastal Change*. Available at: <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

**Table 1-1 Flood Risk Vulnerability and Flood Zone 'Compatibility' (PPG, 2014)**

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test Required	✓	✓
	3a	Exception Test Required	✓	✗	Exception Test Required	✓
	3b	Exception Test Required	✓	✗	✗	✗

✓ - Development is appropriate ✗ - Development should not be permitted

### 1.3.1 Exception Test

The purpose of the Exception Test is to ensure that where it may be necessary to locate development in areas at risk of flooding, new development is only permitted where the flood risk is clearly outweighed by other sustainability factors and where the development will be safe during its lifetime, considering climate change.

The NPPF states that for the Exception Test to be passed:

- *Part 1 - "It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and*
- *Part 2 - A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."*

Both elements of the test will have to be passed for development to be allocated or permitted.

In order to determine Part 1 of the Exception Test, applicants should assess their scheme against the objectives set out in the LPA's Sustainability Appraisal (Level 1 SFRA Appendix B Table B-3).

In order to demonstrate satisfaction of Part 2 of the Exception Test, relevant measures, related to those presented within Section 9 of the Level 1 SFRA, should be applied and demonstrated within a site-specific flood risk assessment (FRA), as detailed in Section 11 of the Level 1 SFRA.

### 1.3.2 Level 2 SFRA deliverables

The Level 2 SFRA reports have been produced for each Borough individually. This Report comprises the Level 2 SFRA for the London Borough of Croydon. The scope of the Level 2 SFRA is to consider the detailed nature of the flood characteristics within a flood zone including, where appropriate:

- flood probability;
- flood depth;
- flood velocity;
- rate of onset of flooding; and
- duration of flood.

The Level 2 SFRA provides a detailed assessment of the flood risk for specific development sites which have been identified by Croydon Council as requiring the application of the Exception Test. Site Assessment Pro Forma are presented in Appendix C.

#### Position Statement

December 2016

**At the time of completing this report, information on the rate of onset of flooding and duration of flooding were not available for the Environment Agency's updated hydraulic model for the River Wandle and River Graveney.**

It should be noted that some of the sites within this Level 2 report are located in Flood Zones 1 or 2 and in accordance with the NPPF (Table 1-1) the Exception Test is not typically required. However, given the risk of flooding from other sources to the sites and surrounding areas, Croydon Council has considered it appropriate to encourage the principles

of the Exception Test to be applied, and therefore recommendations have been provided to indicate how development may be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, may reduce flood risk overall.

### 1.3.3 Level 2 SFRA sites for assessment

Table 1-2 provides a list of the sites assessed in this Level 2 SFRA:

**Table 1-2 London Borough of Croydon Level 2 SFRA sites for assessment**

Site ID	Site Address	Site ID	Site Address
16	Heath Clark, Stafford Road	375	7 Cairo New Road
25	Morrisons Supermarket, 500 Purley Way	393	Whitgift Centre, North End
30	Purley Leisure Centre, car park and former Sainsbury's Supermarket, High Street	396	Praise House, 145-149 London Road
31	Croydon College car park, College Road	398	Coombe Cross, 2-4 South End
35	Purley Baptist Church, 2-12 Banstead Road	403	Roman House, 13-27 Grant Road
48	294-330 Purley Way	405	Capella Court & Royal Oak Centre, 725 Brighton Road
54	BMW House, 375-401 Brighton Road	409	Beech House, 840 Brighton Road
115	Cheriton House, 20 Chipstead Avenue	411	Palmerston House, 814 Brighton Road
123	Prospect West and car park to the rear of, 81-85 Station Road	416	Challenge House, 618 Mitcham Road
162	St George's House, Park Lane	420	87-91 Biggin Hill
174	30-38 Addiscombe Road	430	Grafton Quarter, Grafton Road
190	Car park to the rear of Leon House, 22-24 Edridge Road	490	95-111 Brighton Road
194	St George's Walk, Katharine House and Park House, Park Street	495	Dairy Crest dairy, 823-825 Brighton Road
195	Leon House, 233 High Street	499	Croydon University Hospital Site, London Road
201	Lidl, Easy Gym and car park, 99-101 London Road	504	Stroud Green Pumping Station, 140 Primrose Lane
203	West Croydon station and shops, 176 North End	517	Milton House, 2-36 Milton Avenue
236	Apollo House, Wellesley Road	522	Surface car park, Wandle Road
294	Croydon College Annexe, Barclay Road	636	Land west of Timebridge Community Centre, Lodge Lane
314	Valley Park (B&Q and Units A-G Daniell Way), Hesterman Way	662	Coombe Road Playing Fields, Coombe Road
320	S G Smith, 409-411 Beulah Hill	683	Purley Back Lanes, 16-28 Pampisford Road
325	Telephone Exchange, 88-90 Brighton Road	764	Land to the east of Portnalls Road, Portnalls Road
324	Purley Oaks Depot Site	945	Waitrose, 110-112 Brighton Road
326	Ambassador House, 3-17 Brigstock Road	946	Stubbs Mead Depot, Factory Lane
332	Superstores, Drury Crescent	1DM31.4	Setting of the Sanderstead Local Centre (1)
334	Valley Leisure Park, Hesterman Way	2DM31.4	Setting of the Sanderstead Local Centre (2)
337	Zodiac Court, 161-183 London Road	3DM31.4	Setting of the Sanderstead Local Centre (3)
347	Tesco, 2 Purley Road	4DM31.4	Around Forestdale Neighbourhood Centre
350	Wing Yip, 544 Purley Way	5DM31.4	Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre
351	Furniture Village, 222 Purley Way	6DM31.4	Brighton Road (Sanderstead Road) Local Centre with its setting
355	Sainsbury Supermarket, 2 Trafalgar Way	7DM31.4	Area around Kenley station
374	Reeves Corner former buildings, 104-112 Church Street	8DM31.4	Settings of Shirley Local Centre and Shirley Road Neighbourhood Centre

## 1.4 Updated Climate Change Allowances

Since the publication of the Level 1 SFRA for London Boroughs of Croydon, Merton, Sutton and Wandsworth, the Environment Agency has released the updated guidance 'Flood Risk Assessment Climate Change Allowances'<sup>3</sup> (19<sup>th</sup> February 2016), and has been used to update the Environment Agency Adapting to Climate Change: Advice for flood and coastal erosion risk management authorities (April 2016<sup>4</sup>). The new guidance determines the climate change allowances that should be considered for net sea level rises, peak river flow and peak rainfall intensity across England and Wales and are significantly different to its predecessor.

### Position Statement

December 2016

**At the time of publishing this Level 2 SFRA, the updated climate change allowances have not been incorporated into the fluvial flood models covering the boroughs or the Environment Agency's Flood Map for Surface Water. Therefore the flood risk mapping used for the Level 2 site assessments is based on existing flood models which are available at the time of publishing and that these extents are based on +20% climate change allowance (Level 1 SFRA Section 3.2.5). The mitigation recommendations i.e. flood levels, are the same for both previous and new allowances. However, it is important to note that any future site specific FRAs would be required to consider the updated climate change allowances.**

When the fluvial flood models are updated to incorporate the latest climate change allowances, the Level 1 and Level 2 SFRA will require updating.

The updated climate change allowances relevant to the London Borough of Croydon Level 2 SFRA have been summarised in the following sections. Tidal flood risk has not been included as there are no areas within the London Borough of Croydon which are shown to be at risk of tidal flooding.

### 1.4.1 Fluvial flood risk allowance

Table 1-3 shows peak river flow allowances for the Thames river basin district. The Environment Agency Flood Zone and NPPF flood risk vulnerability classification of the development should be used to determine which Allowance Category is most appropriate to be applied to the assessment (as shown in Table 1-4).

The lifetime of the development should be considered when determining which future climate change allowance time period should be used. The lifetime of a proposed development should be judged based on the characteristics of the development. In the case of residential developments, a minimum lifetime of 100 years should be taken when selecting climate change allowance percentages. For other types of development, the applicant should assess how long they anticipate the development to be in place for, and justify the lifetime of the development. Otherwise, a 75 year lifetime should be used. Therefore, in most cases, it is suggested that applicants use the '2060 to 2115' allowances in Table 1-3.

All site-specific FRAs should demonstrate that finished floor levels are at a minimum of 300mm above the 1% AEP (1 in 100 year) flood event plus an appropriate allowance for climate change. Table 1-4 identifies that for More Vulnerable developments in Flood Zone 2, the 'Central' (25%) climate change allowance is the Environment Agency's minimum benchmark for flood risk mitigation, and in Flood Zone 3a the minimum benchmark for flood risk mitigation is the 'Higher Central' (35%) climate change allowance. A sensitivity test should also be undertaken using the higher central (35%) in Flood Zone 2 and the Upper End allowance (70%) in Flood Zone 3a, to ensure that the finished floor levels are a minimum of 50mm above this flood water level.

**Table 1-3 Peak river flow allowances for the Thames river basin district (use 1961 to 1990 baseline)**

Allowance Category	2010 to 2039	2040 to 2059	2060 to 2115
Upper end	25%	35%	70%
Higher central	15%	25%	35%
Central	10%	15%	25%

<sup>3</sup> Environment Agency (2016) Flood risk assessments: climate change allowances. Available at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. Accessed 23<sup>rd</sup> February 2016.

<sup>4</sup> Environment Agency (April 2016) Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities

**Table 1-4 Flood Zone and development vulnerability classification used to identify peak river flow allowance category**

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Essential Infrastructure	Higher Central and Upper End allowances	Upper End allowance	Upper End allowance
Highly Vulnerable	Higher Central and Upper End allowances	Development should not be permitted	Development should not be permitted
More Vulnerable	Central and Higher Central allowances	Higher Central and Upper End allowances	Development should not be permitted
Less Vulnerable	Central allowance	Central and Higher Central allowances	Development should not be permitted
Water Compatible	Use none of the allowances	Central allowance	Central allowance

The Environment Agency requires evidence that an FRA has considered if it is appropriate to apply the high ++ allowances for the site. The high++ allowances apply to developments that are very sensitive to flood risk and with lifetimes beyond a century. The high++ allowances for river flow in the Thames river basin district are provided in Table 1-5.

**Table 1-5 H++ allowances for river flow**

River Basin District	Total potential change anticipated for 2020s	Total potential change anticipated for the 2050s	Total potential change anticipated for 2080s
Thames	25%	40%	80%

In September 2016, the Environment Agency produced area specific guidance on how to apply the updated climate change allowances in flood risk assessments. The Kent and South London area guidance<sup>5</sup> provides an indication of the appropriate level of technical assessment of climate change impacts on fluvial flooding for new developments depending on their scale and location. This should be used as a guide only and the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. Therefore **it is recommended that developers contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis.**

The guidance defines three possible approaches to account for flood risk impacts due to climate change in new development proposals:

- Basic: Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts.
- Intermediate: Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- Detailed: Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table 1-6 identifies how these approaches should be applied to different development types within each flood zone.

<sup>5</sup> [Environment Agency \(Sept 2016\), Kent and South London Area – Flood Risk Assessments: Climate change allowances](#)



**Table 1-6 Indicative guide to fluvial climate change assessment approach**

Vulnerability Classification	Flood Zone	Development Type		
		Minor	Small-major	Larger Major
Essential Infrastructure	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
Highly Vulnerable	Zone 2	Intermediate/Basic	Intermediate/Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
More Vulnerable	Zone 2	Basic	Basic	Intermediate/Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
Less Vulnerable	Zone 2	Basic	Basic	Intermediate/Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
Water Compatible	Zone 2	None		
	Zone 3a	Intermediate/Basic		
	Zone 3b	Detailed		

**Notes:**

- *Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches*
- *Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches*
- *Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 m<sup>2</sup>.*

Developers should check with the Environment Agency for the latest guidance on climate change allowances.

#### 1.4.2 Pluvial flood risk allowance

Table 1-7 shows anticipated changes in extreme peak rainfall intensity in small and urban catchments. The anticipated increase in rainfall intensity may cause greater volumes and rates of rainfall to enter the sewer network during storm events.

Croydon Council requires all site-specific FRAs and Drainage Strategies to assess both the Upper end and Central allowances to understand the range of impact. The lifetime of the development should be considered when determining which future climate change allowance time period should be used.

**Table 1-7 Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)**

Allowance Category	2010 to 2039	2040 to 2059	2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

## 2 Site Assessment Approach

### 2.1 Site Assessment Pro Forma

A Site Pro Forma has been prepared for each Level 2 site with the following sections:

- 1) Proposed Development
- 2) Summary of Level 1 Flood Risk
- 3) Level 2 Assessment
- 4) Recommendations and Policies

The information used to complete each of these sections is described below.

#### 2.1.1 Section 1 – Proposed Development

Section 1 provides details of the site as provided by the Council, including site ID, address, size, current use and proposed use. The vulnerability classification of the site has been defined according to the NPPF, (refer also to Section 8 Table 8-2 in the Level 1 SFRA).

#### 2.1.2 Section 2 – Summary of Level 1 Flood Risk

Section 2 summarises the flood risk on the site using the strategic flood risk assessment from the Level 1 SFRA. For the assessment of flood risk from rivers, the proportion of the site within each flood zone has been identified, along with the flood zone map showing the site.

The risk of flooding from surface water (using the Environment Agency uFMfSW data) and groundwater sources (using the British Geological Society (BGS) Susceptibility to Groundwater Flooding data) has been provided, identifying the maximum risk within the site, based on the categories set out in Section 8 Table 8-1 of the Level 1 SFRA.

The number of historic records of flooding from each source, within a 100m radius of the potential development site, has been identified, using the historic records provided by Croydon Council and the Thames Water DG5. Further details on each of the datasets, their uses and limitations can be found in the following sections within the Level 1 SFRA (Table 2-1):

**Table 2-1 Datasets described in the Level 1 SFRA used to assess each flood risk source in the Level 2 SFRA site assessments**

Flood Risk Source	Dataset	Level 1 SFRA reference
<b>Flooding from Rivers and Sea</b>	Detailed River Network	Section 3.2.1
	Historic Records of River and Tidal Flooding	Section 3.2.2
	NPPF Flood Zones	Section 3.2.3
	Functional Floodplain Flood Zone 3b	Section 3.2.4
	Climate Change	Section 3.2.5
	Flood defences	Section 3.2.6
	Flood Warning Areas	Section 3.2.8
	Emergency Rest Centres	Section 3.2.9
<b>Flooding from Surface Water</b>	Historic Records of Surface Water Flooding	Section 3.3.1
	Updated Flood Map for Surface Water	Section 3.3.2
	Drainage Catchments	Section 3.3.4
	Critical Drainage Areas (CDAs)	Section 3.3.5
<b>Flooding from Groundwater</b>	Historic Records	Section 3.4.1
	Susceptibility to Groundwater Flooding	Section 3.4.3
<b>Flooding from Sewers</b>	Historic Records (DG5)	Section 3.5.1
<b>Flooding from Reservoirs and Other Artificial Sources</b>	Risk of Flooding from Reservoirs	Section 3.6.1

### 2.1.3 Section 3 – Level 2 Assessment

Section 3 provides an increased level of information regarding the fluvial flood risk associated with the River Wandle and River Graveney and their tributaries based on available modelling outputs.

The defended scenario for the 1% annual exceedance probability (AEP) event, including a 20% allowance for climate change, has been used to map Flood Hazard Rating, Maximum Flood Depth and Maximum Velocity in proximity to each development site.

#### 2.1.3.1 Depth and velocity mapping

During a flood event, the water depth and velocity can vary considerably across the flooded area. It is therefore important to identify which areas are more likely to be hazardous to people and to try to locate high vulnerability developments in areas with a lower hazard. This is important for emergency planning to identify dry route access and egress during a flood event.

The maximum flood depth mapping has been provided at borough scale for London Borough of Croydon in **Appendix A Figure A.1 and A.2**.

**At the time of completing this report, information on the rate of onset of flooding and duration of flood are not available for the Environment Agency's updated hydraulic model for the River Wandle and River Graveney.**

#### 2.1.3.2 Hazard mapping

One of the outputs of the Environment Agency's hydraulic models for the River Wandle and River Graveney is flood hazard mapping, which categorises the danger to people for different combinations of flood water depth and velocity. The derivation of these categories is based on the methodology set out by Defra in Flood Risk Assessment Guidance for New Development FD2320/TR2<sup>6</sup> using the following equation:

$$\text{Flood Hazard Rating} = ((v+0.5)*D) + DF$$

Where  $v$  = velocity (m/s),  $D$  = depth (m),  $DF$  = debris factor

**Table 2-2 Hazard categories based on FD2320, Defra & Environment Agency 2005**

Flood Hazard		Description
Low	HR < 0.75	<b>Caution</b> – Flood zone with shallow flowing water or deep standing water
Moderate	0.75 ≥ HR ≤ 1.25	<b>Dangerous for some</b> (i.e. children) – Danger: flood zone with deep or fast flowing water
Significant	1.25 > HR ≤ 2.0	<b>Dangerous for most people</b> – Danger: flood zone with deep fast flowing water
Extreme	HR > 2.0	<b>Dangerous for all</b> – Extreme danger: flood zone with deep fast flowing water

The defended hazard outputs for the 1% AEP plus climate change scenario have been mapped for London Borough of Croydon in **Appendix A Figure A.3 and A.4**.

### 2.1.4 Section 4 – Recommendations and Policies

Section 4 identifies the recommendations and policies required for potential development on the site to pass Part 2 of the Exception Test. It follows the guidance set out in Section 9 of the Level 1 SFRA. Table 2-3 shows the typical fields within Section 4 of the site assessment pro forma and how these relate to the guidance of Section 9 of the Level 1 SFRA.

<sup>6</sup> Defra and Environment Agency (2005) FD2320/TR2 Flood Risk Assessment Guidance for New Development

**Table 2-3 Site Pro Forma Section 4 Fields**

Recommendations and Policies		Level 1 SFRA reference
Development Layout and Sequential Approach		Section 9.2
Finished Floor Levels		Section 9.3
Flood Resistance		Section 9.4
Flood Resilience		Section 9.5
Safe Access/Egress		Section 9.7
Floodplain Compensation Storage		Section 9.9
Flow Routing		Section 9.12
Flood Warning and Evacuation Plan		Section 9.14
Surface Water Management	Current risk of flooding:	Section 5
	Indicative runoff rates:	Section 10 and Appendix B
	SuDS Suitability:	Section 10.3 and 10.9
	Drainage Strategy and Approvals:	Section 10.6
	Indicative Unit Costs:	Section 10.4

#### 2.1.4.1 Surface Water Runoff Calculations

Indicative surface water runoff calculations have been undertaken to estimate the existing peak runoff rates from each of the development sites.

The SuDS Manual and the Non-Statutory Technical Standards for SuDS (Defra, 2015) recommend that the rate of runoff does not increase following development for the 1 in 1 year and 1 in 100 year events. The existing peak runoff rates for each development site for the 1 in 1 year and 1 in 100 year have been included in each Site Pro Forma.

Target peak runoff rates have also been provided based on national and regional planning policy requirements and best practice guidance for achieving greenfield runoff rates, and the London Plan (2015) policies. The estimates for greenfield rate have been included in the Site Pro Forma.

Full details regarding the methodology and assumptions made for calculating existing and target peak runoff rates are included in Appendix B.

#### 2.1.5 Section 5 – Exception Test Considerations

Section 5 summaries the key outcomes from the site assessment and highlights any recommendations, policies and mitigation measures required for the site to pass the Exception Test.

## 2.2 Impact of additional development on flood risk

Within the London Borough of Croydon, the following sites are located partially within Flood Zone 3a of the River Wandle and its tributaries. Without any flood mitigation measures applied to their design, such as compensation storage, these developments could increase the fluvial flood risk in other areas due to the removal of floodplain.

- Site 405 Capella Court & Royal Oak Centre, 725 Brighton Road, Purley
- Site 54 BMW House, 375-401 Brighton Road, Croham
- Site 495 Dairy Crest dairy, 823-825 Brighton Road, Purley
- Site 347 Tesco, 2 Purley Road, Purley
- Site 522 Surface car park, Wandle Road, Fairfield
- Site 6DM31.4 Brighton Road (Sanderstead Road) Local Centre with its setting
- Site 7DM31.4 Area around Kenley Station
- Site 946 Stubbs Mead Depot, Factory Lane, Broad Green



There are 58 potential development sites identified to be at high risk of surface water flooding in the London Borough of Croydon. Without surface water attenuation and SuDS incorporated into the design, these development sites could increase surface water flooding in other areas within their drainage catchment through changes in surface water flow routing and runoff rates. Therefore mitigation measures and SuDS are required for all planning applications.

## Appendix A. Depth and Hazard Mapping

## Appendix B. Indicative Surface Water Runoff Calculations

## Appendix C. Site Assessment Pro Forma



## About AECOM

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