Homes England

The Housing and Regeneration Agency

West of Ifield, Crawley
Environmental Statement: Volume 1: Main Report

CHAPTER 14: SURFACE WATER AND FLOOD RISK
Version 1 - Planning submission

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14 SURFACE WATER AND FLOOD RISK

14.1 Introduction

14.1.1 This chapter of the ES reports on the identification and assessment of likely significant surface water and flood risk effects to arise from the demolition and construction stage and operational stage of the Proposed Development.

14.1.2 The chapter describes the surface water and flood risk legislation, policy and guidance framework; the methods used to assess the potential impacts and likely effects; the baseline conditions at the Site and within the study area; the likely surface water and flood risk effects and the setting out of proposed mitigation measures, where feasible, in respect of any identified likely significant effects; proposed additional mitigation and any enhancement measures where applicable; the significance of residual effects; and inter-project cumulative effects.

14.2 Policy Context and Guidance

14.2.1 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - The European Union (Withdrawal) Act 2018 provided that some EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law. The Retained EU Law (Revocation and Reform) Act 2023 provided that from 31 December 2023, retained EU legislation and case law is known as 'assimilated law' and 'assimilated case law''. All references in this chapter to Directives, such as the Water Framework Directive, are to the Directives as they applied to the UK immediately before exit day - as they form part of retained EU law. Any statutory regulations which implemented Directives into UK domestic law, have, where necessary been amended by the Government to make minor and technical changes required to correct any deficiencies in cross-referencing which arose as a result of the UK no longer being a member of the European Union. For example, The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, was amended by The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019.
- National Legislation and Policy:
  - Water Resources Act 1991;
  - Land Drainage Act 1991;
  - Water Act 2003;
  - Flood and Water Management Act 2010[1];
  - The Water Environment (Water Framework Directive)(England and Wales) Regulations 2003;
  - The Flood Risk Regulations 2009[2];
  - The Environmental Permitting (England and Wales) Regulations 2016;

[1] Flood and Water Management Act, https://www.legislation.gov.uk/ukpga/2010/29/contents
[2] The Flood Risk Regulations 2009, https://www.legislation.gov.uk/uksi/2009/3042/contents/made

  - The Town and Country Planning (Development Management Procedure) Order, 2015[3]; and
  - National Planning Policy Framework (NPPF), 2024[4].
- Local Policy:
  - Policy 38 of the Horsham District Planning Framework (HDFC)[5].
- Local Plan Evidence Base:
  - Gatwick Sub-region Joint Water Cycle Study, 2020[6] and associated addendum, 2021;
  - Sussex North Water Neutrality Study (Part A to C)[7], 2022;
  - The Crawley Borough and Upper Mole Catchment Level 1 Strategic Flood Risk Assessment 2023 [8] (covering the Site area which, although the Site is outside of Crawley Borough, it is located within the Upper Mole Catchment);
  - Horsham District Council Strategic Flood Risk Assessment 2010[9];
- National guidance and industry standards:
  - Planning Practice Guidance (PPG) Flood Risk and Coastal Change, 2024[10];
  - Department of the Environment, Transport and the Regions (DETR), Guidelines for Environmental Risk Assessment and Management, 2000[11];
  - National Standards for Sustainable Drainage Systems: Non-statutory Standards, 2025[12];
  - CIRIA 753: The Sustainable Drainage Systems (SuDS) Manual, 2015[13];
  - Environment Agency (EA) 'good practice' (although withdrawn, the Pollution Prevention Guidelines (PPG1 to PPG6) is still considered to provide the only available and relevant advice. Copies are available via the National Archives)[14]:
  - PPG1: Understanding Your Environmental Responsibilities;
  - PPG2: Above ground oil storage tanks;
  - PPG3: Choosing and using oil separators: prevent pollution;
  - PPG4: Treatment and disposal of sewage where no foul sewer is available;
  - PPG5: Works in, near or over watercourses: prevent pollution; and
  - PPG6: Construction and demolition sites: prevent pollution.

3 Her Majesty's Stationery Office (HMSO), 2015. Statutory Instruments 2015, No. 596, Town and Country Planning, England, The Town and Country Planning (General Permitted Development) (England) Order 2015

4 Ministry of Housing, Communities & Local Government, December 2024, National Planning Policy Framework.

5 Horsham District Council (2015) Horsham District Planning Framework.

6 Gatwick Sub-region Joint Water Cycle Study, 2020 https://crawley.gov.uk/sites/default/files/2021-01/Gatwick_sub_region_water_cycle_study_August_2020.pdf, Addendum https://crawley.gov.uk/sites/default/files/2021-01/Addendum_to_water_cycle_study_January_2021.pdf

7 Sussex North Water Neutrality Study (Part A to C) https://crawley.gov.uk/planning/planning-applications/you-apply/water-neutrality-crawley#

8 Crawley Borough Council. Crawley Borough and Upper Mole Catchment Level 1 SFRA. Available online at: https://crawley.gov.uk/planning/planning-policy/local-plan/local-plan-evidence-base/local-plan-evidence-base-environmental-sustainability

9 Horsham District Council Strategic Flood Risk Assessment, https://www.horsham.gov.uk/planning/planning-policy/evidence-base/strategic-flood-risk-assessment

10 Ministry of Housing, Communities & Local Government (Live Document). Planning Practice Guidance [online]. Available at: http://planningguidance.communities.gov.uk/

11 Department of the Environment, Transport and the Regions (DETR), Environment Agency and Institute for Environment and Health, 2000, Guidelines for Environmental Risk Assessment and Management.

12 Department for Environment, Food and Rural Affairs (DEFRA), June 2025. https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds

13 https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards
CIRIA, The SuDS Manual (C753), November 2015

14 https://webarchive.nationalarchives.gov.uk/20140328090931/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx

14.3 Consultation

14.3.1 The initial formal Scoping Opinion was issued by HDC in November 2020 (HDC ref: EIA/20/0004), based on the Applicant's intention to submit an outline planning application for the Site. However, the Applicant decided to pursue a hybrid application, and it became necessary to review and reassess the scope of the ES for the revised Proposed Development, as outlined in the ES Scoping Opinion Request Report dated 17th October 2023. Consequently, a new Scoping Opinion was requested and subsequently issued in November 2023 (HDC ref: EIA/23/0007). Since November 2023, the design of the Proposed Development has altered slightly with the addition of proposed groundwater abstraction wells, and therefore it was considered necessary to reassess the scope of the ES. An additional Scoping Opinion regarding the revised hybrid planning application was adopted by HDC on the 15th July 2024. This Chapter addresses all comments received across all scoping opinions and relevant consultations.

14.3.2 Consultation in respect of flood risk, specifically the consideration of flood modelling and the development of options for flood alleviation has been undertaken with the Environment Agency (EA) since 2020. It was confirmed by email (dated 28th November 2022), that Ramboll's flood modelling *"is considered as suitable for purpose"*. Due to updates to the Proposed Development's layout through the design process, Arcadis have since updated the previously accepted Ramboll model with updates described in the Arcadis Hydraulic Modelling Report (10051123-ARC-260-ZZ-TR-ZZ-002). Comments received by the EA in both November 2022 and November 2023 are summarised in Table 14-1 below.

14.3.3 Table 14-1 summarises the key ES Scoping Opinion responses and separate consultations that have been undertaken with respect to the surface water and flood risk assessment.

Table 14-1: Summary of Consultation

Consultee and Form/ Date of Consultation	Summary of Comments	Where in this Chapter Comments are addressed
HDC and Crawley Borough Council (CBC) 22nd September 2020	Detailed comments were received from the E A raising objections to the initially proposed approach (scoping out of a Water Resources and Flood Risk Chapter). In view of the scale of development and its location next to the River Mole and Ifield Brook. The EA advised that flood risk and water resources should be scoped into the Environmental Impact Assessment as there are significant flood risk issues, including the adequacy of the proposed flood defence works, the risk of flooding to the development and its occupants and surface water drainage.	This Chapter has been written in order to comply with the request for a Water Resources Chapter within the ES.
The Ifield Society request from HDC to CBC for comments: Letter dated 29th October 2020	The Ifield Society letter includes several items under the Surface Water Resources and Flood Risk (Water Environment) which includes the need to take account of more recent CBC Local Plan Review documents (Regulation 19), including Joint Water Cycle Study. The drainage officer has emphasised key principles should be followed for surface water and flood risk:	The Joint Water Cycle Study has informed the assessment within this Chapter, as noted in Section 14.2. The Site does not include any land within Crawley Borough Council and therefore the Crawley Borough Local Plan (2024) is not part of the Development Plan for determining this planning application. Further comment has also been provided in the Planning Statement (WOI-HPA-DOC-PS-01) which accompanies the planning application.

Table 14-1: Summary of Consultation		
	• Proposed buildings and structures (including SuDS) should be outside of the flood plain. • SuDS strategy should include plan for all four pillars of SuDS. • No land raising within the Ifield Brook Wood and Meadows will be accepted.	The Drainage Strategy (WOI-HPA-DOC-SWDS-01), which is submitted with the hybrid planning application, demonstrates the SuDS strategy compliance with the drainage officer requirements. A Water Neutrality Statement (WOI-HPA-DOC-WNS-01) has been prepared and is submitted with the planning application. This statement outlines the inclusion of rainwater harvesting as a water resource to meet irrigation needs for allotments and landscaped podiums. The only proposed development within Ifield Brook Wood and Meadows is associated with the proposed off-Site primary pedestrian/cycle route. This pedestrian/ cycle route will not lead to significant land raising.
EA Model Approval dated 28th November 2022	The EA set out that the hydraulic model files have been reviewed and it has been concluded that any instabilities within the model do not appear to be resulting in a significant impact on the results.	The EA's conclusion in terms of model instability and effects on the results, have been addressed in the updated hydraulic model designs. An updated Flood Risk Assessment (FRA) (WOI-HPA-DOC-FRA-01) has been prepared and has been submitted with the hybrid planning application.
CBC: Letter dated 17th November 2023	CBC highlighted there are no references within the Scoping report to the issue of Water Neutrality. CBC highlight that there could be an impact of the increased water demand from a development of this scale on the Arun Valley Special Area of Conservation (SAC), Arun Valley Special Protection Area (SPA) and Arun Valley Ramsar sites, which are all within the Sussex North Water Supply Zone. CBC note the requirement to address this matter to ensure compliance with the Habitat Regulations.	A Water Neutrality Statement (WOI-HPA-DOC-WNS-01) has been prepared which will be submitted with the planning application. This statement includes comment on the proposed provision of alternative water sources (rainwater harvesting and groundwater) as part of the delivery of a private potable water supply and as required, SNOWS credits (offset). The report includes proposed measures to mitigate the impact of the development on the Arun Valley SAC, Arun Valley SPA and Arun Valley Ramsar sites.
HDC: Letter dated 27th November 2023	The Lead Local Flood Authority (LLFA) have the following comments (summarised): • The Flood Risk Assessment (FRA) must include all sources of flood risk. It is strongly suggested that the use of SuDS is considered from the beginning of the design process. • The applicant is to complete a sequential/exception test which includes surface water flood risk.	The FRA (WOI-HPA-DOC-FRA-01) includes consideration of surface water in the sequential/exception test section. The Drainage Strategy (WOI-HPA-DOC-SWDS-01) demonstrates appropriate allowance for SuDS in the masterplan of the Proposed Development.
EA Letter dated 13th November 2023	The EA emphasised the need for a site specific FRA that includes consideration of the new bridge crossing and flood compensation proposals. In addition the EA requires the FRA to cover (summarised): • Consider the cumulative impacts up and downstream of the proposed development.	The FRA (WOI-HPA-DOC-FRA-01) includes consideration of the new bridge crossing and flood compensation areas. The FRA demonstrates that the Proposed Development would have no impacts to flood risk upstream and downstream of the Site boundary.

Table 14-1: Summary of Consultation		
	• Take into account the most up-to-date climate change allowances. Consider flood risk across the lifetime of the development. • Fully cover the risk to flooding throughout the lifetime of the development, with consideration of construction phases. • Consider development within the functional floodplain/Flood Zone 3b. • Flood storage compensation should be on a level-for-level basis and hydraulically and hydrologically linked. • Additionally the EA would expect that any new bridge to be clear span, being a bridge that requires no bed or bank reinforcement and no support in the watercourse. • The EA note that 'Table 13.4 [of the Scoping Opinion Request Report] incorrectly reflects the current WFD classification of the River Mole as 'good'. The table should be in line with paragraph 13.4.10'.	This Chapter includes a description of cumulative impacts. Section 14.10 includes consideration of effects during demolition, construction and completed development stages. The proposed bridge structure is clear span over the watercourse, as seen in the River Mole Bridge General Arrangement Drawings (Arcadis: 10051123-ARC-160-1B-DR-SE-00001 and 10051123-ARC-160-1B-DR-SE-00002) As stated in the WFD Assessment (WOI-HPA-DOC-WFDA-01) 'Baldhorns Brook' and the 'Mole upstream of Horley' represent separate sections of the overall profile of the River Mole within the Site. The status of each relevant surface waterbody is included within the WFD Assessment.
Gatwick Airport: Letter dated 2nd December 2023 and repeated point about SuDS on 12th June 2024	Gatwick Airport state that SuDS should ideally be below ground structures so that there is no open water to attract birds. However some above ground SuDS schemes may be permissible providing the drain down time is within 24 hrs. Depending on the design of the SuDS scheme- a Bird Hazard Management Plan may be needed. Enhancements of existing ponds should not lead to attracting birds hazardous to aviation above the existing population.	The Drainage Strategy (WOI-HPA-DOC-SWDS-01) demonstrates that proposed SuDS features have been designed with a drain down time of 24hrs or less. A separate Bird Hazard Management Plan has been prepared (ES Volume 2 Technical Appendix 8.16).
HDC Ecology Comments: Letter dated 13th November 2023	HDC raised comments on Water Neutrality.	As discussed above, a Water Neutrality Statement (WOI-HPA-DOC-WNS-01) has been prepared which will be submitted with the planning application.
Natural England (NE): Letter dated 8th November 2023 and repeated on 4th July 2024.	A number of water dependent protected nature conservation sites have been identified as failing condition due to elevated nutrient levels. Therefore the ES needs to take account of any strategic solutions for nutrient neutrality.	A nutrient neutrality assessment has not been carried out because the Site is not located in a designated nutrient neutrality zone.
Place Services: on behalf of HDC: Letter dated 28th June 2024	Highlighted Natural England's advice regarding water neutrality.	As discussed above, a Water Neutrality Statement (WOI-HPA-DOC-WNS-01) has been prepared which will be submitted with the hybrid planning application. The report includes proposed measures to mitigate the impact of the development on the Arun Valley SAC, Arun Valley SPA and Arun Valley Ramsar sites.
HDC: Letter dated 15th July 2024	HDC have relayed comments from Thames Water and Southern Water, summarised below: Thames Water:	The Drainage Strategy (WOI-HPA-DOC-SWDS-01) demonstrates that both foul water and surface water requirements can be met, both on and off-Site.

Table 14-1: Summary of Consultation		
	• Foul water requirements both on and off-Site can be met, including treatment and network infrastructure. • Surface Water drainage requirements can be met, including management of flood risk. • Build–out and phasing details to demonstrate infrastructure can be delivered ahead of occupation. • Piling methodology and potential impact on utilities. Southern Water: • Southern Water records show public water mains with the Site boundary. • No excavations within 6m of public water main without prior consent. • Possible additional public sewer within the Site boundary, if found during construction, ownership should be confirmed before further works commence.	The construction programme and phasing of the Proposed Development has been detailed in the Outline Construction Environmental Management Plan (OCEMP) prepared by Ramboll (ES Volume 2 Technical Appendix 5.1). A detailed CEMP would be prepared and implemented by the contractors for each future detailed phase, which would include measures to manage the quality of surface water run-off from the Site. For the detailed element, the Phase 1 OCEMP[15] prepared by Arcadis, states that a construction programme and phasing plan will be included in the final CEMP.
EA Letter dated 4th July 2024	Abstraction of groundwater, including requirement to locate any discharges or potential contaminative land uses outside of the 50m Source Protection Zone that would be created around the proposed abstraction borehole. The EA comments for flood risk are broadly the same as in 2023. Note: any proposed works or structures within 8m of any designated main rivers will need a Flood Risk Activity Permit.	An enquiry on abstraction boreholes for the Proposed Development was issued to the EA (London and East Sussex) to engage on the Section 32 borehole drilling and testing application (WR32: Water abstraction: application for a consent to investigate a groundwater source) and associated Water Feature Survey aspects. The approach and timescales for the application as well as arrangements for future engagement were agreed. The Proposed Development abstraction proposal is considered to pose a low hydrogeological risk given the extent of the underlying unproductive strata (Weald Clay - mudstone). Within the submitted Scoping Report in 2024, construction and operational stage effects were scoped out for groundwater as the Hydrogeological Risk Assessment (HyRA) (WSP-WATER-REPORT-INT-0002) found no significant impacts on groundwater (or groundwater dependent) receptors based on their sensitivity and likely magnitude of change and incorporated embedded mitigation (which includes appropriate permits/licenses as well as best practice and pollution prevention controls). Therefore, no potentially significant effects to groundwater were identified and groundwater effects were scoped out of the ES for both construction and operation.

[15] Arcadis, West of Ifield Phase 1 Infrastructure, Outline Construction Environmental Management Plan, 10051123-ARC-XXX-ZZ-TR-CM-00001, March 2024.

Table 14-1: Summary of Consultation		
		Any future production boreholes would be drilled and abstractions licenced in line with EA guidance, including any requirements for Source Protection Zones (SPZ), as mentioned in Phase 1 ESA (WOI-HPA-DOC-GCA1-01) which has been submitted with the planning application.

14.4 Assessment Scope

14.4.1 As there is no published guidance specifically for the assessment of water resources in EIA, the assessment has been undertaken by means of professional judgement. This assessment has taken account of applicable legislation, guidance and policy.

Technical Scope

14.4.2 The assessment has been based on the standard approach described in ES Volume 1 Chapter 2: EIA Process and ES Methodology, and is informed by the law, policy and guidance listed at Section 14.2, as well as by professionally judgement. The technical scope of the assessment has been based on the latest Scoping Opinion and has considered the following matters:

- Contamination of surface water bodies: The potential for effects on surface water quality of the River Mole and downstream receiving waterbodies during the operation of the Proposed Development;
- Changes to fluvial flood risk: Flood risk impacts to and from the Proposed Development; and
- Changes to surface water flow regime: Changes to flood risk in the study area and to downstream receptors as a result of the Proposed Development (e.g. changes to the surface water runoff regime and associated downstream flood risks).

14.4.3 The FRA (WOI-HPA-DOC-FRA-01) includes consideration of the Proposed Development in terms of the Sequential Test and Exception Test as described within the NPPF. Therefore, the acceptability of the Proposed Development in flood risk terms is addressed within the FRA and this chapter focuses on the environmental impacts and likely significant effects in respect of flood risks.

Spatial Scope

14.4.4 The study area has been determined by means of professional judgment and covers both the area up to 5 km from the centre of the Site as well as the area within the same river catchment, as t is considered unlikely that effects would extend beyond such a geographic area. The EA assesses surface water quality at a river catchment level. Therefore, the potential for impacts on downstream water quality has been considered at a river catchment level. The cumulative schemes to be considered have been identified. There are a number of schemes within the same river catchment or within 5 km of the Proposed Development. The cumulative effects for flood risk/water quality impacts have been considered for these schemes.

Temporal Scope

14.4.5 The assessment has considered impacts arising during the demolition and construction stage which would be expected to be temporary and short to long term (5-15 years) in nature and from the completed development stage which would be expected to be permanent and long-term in nature (i.e., more than 10 years).

14.5 Baseline Characterisation Method

Desk Study

14.5.1 To establish baseline conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- FRA (WOI-HPA-DOC-FRA-01);
- Drainage Strategy (WOI-HPA-DOC-SWDS-01);
- WFD Assessment (WOI-HPA-DOC-WFDA-01);
- Surface water hydrology, including water features and surface water drainage in the vicinity of the Site, based on EA geo-spatial data, Ordnance Survey mapping and further topographic surveys carried out on behalf of the Applicant;
- Existing catchment pressures (e.g. point source and diffuse pollution issues) from the EA's online catchment data explorer; and
- Any flood risks, typically associated with fluvial and surface water sources at this location, based on consultation with the EA, as well as further site-specific hydraulic modelling as described in FRA (WOI-HPA-DOC-FRA-01).

14.5.2 Government guidance on future climate change[16] has been used within the FRA (WOI-HPA-DOC-FRA-01) to determine the potential future baseline in terms of fluvial flood risk. This guidance has also been used to inform the surface water drainage designs. The surface water drainage designs take into consideration requirements to deliver a water neutral development, in particular the potential to collect rainwater from the Site.

Field Study

14.5.3 Field study/data collection was not required at the Site as the data provided by other sources was deemed to be adequate and representative of the Site conditions.

14.6 Assessment Method

Methodology

Demolition and Construction Stage

14.6.1 The identification of likely significant effects during the demolition and construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

14.6.2 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of surface water resource receptors on the basis of their use, proximity to the Site, existing quality or resource value;
- Consideration of potential source-pathway-receptor linkages for surface water resources;
- Evaluation of the magnitude of potential impacts to surface water quality and hydrology as a result of the introduction of the Proposed Development;
- Consideration of embedded mitigation measures integral to the Proposed Development;
- Classification of the significance of likely effects;

[16] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

- Identification of additional mitigation measures, where considered necessary; and
- Re-assessment to conclude the significance of residual effects, and determine whether any are likely significant effects.

Completed Development Stage

14.6.3 The demolition and construction stage methodology has been applied to the identification of potential significant effects during the completed development stage. The assessment has also been informed by the Flood Risk Assessment and Drainage Strategy which have been undertaken to assess in more detail the flood risk and to inform the design of the Proposed Development, and associated mitigation strategies, in order to minimise any increase in flood risk to both on-Site and off-Site receptors and to the Proposed Development itself.

14.7 Assessment Criteria

14.7.1 The general criteria used to assess if an effect is significant or not is set out in Chapter 2, Sections 2.8 and 2.9. Further details specific to surface water and flood risk are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

14.7.2 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in Table 14-2.

14.7.3 In terms of flood risk, the NPPF classifies land uses according to vulnerability as follows (NPPF Annex 3):

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

14.7.4 These clarification classes have been used to inform the receptor sensitivity criteria in Table 14-2. Many elements of the Proposed Development and land with downstream (off-Site) hydrological connectivity (e.g. residential-type uses) are classified as 'more vulnerable' whereas those associated with transport infrastructure are classified as 'essential infrastructure'. Landscape and public realm elements are all be classified as 'less vulnerable'.

Table 14-2: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Feature of low quality and rarity, with potential for substitution or tolerant of some change, e.g. • Surface water WFD class 'Moderate' or 'Poor' • Sewer i.e., foul water and/or combined sewer
Medium	Feature of medium quality and rarity, with some potential for replacement and reasonably tolerant of some change, e.g. • Surface water WFD class 'Good' • Habitat for species protected under UK habitat legislation • Flood Risk: water-compatible or less vulnerable land uses[17]

[17] As noted in Annex 3 of the NPPF. Available online at: https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification

Table 14-2: Receptor Sensitivity Criteria	
High	• Feature of high quality and rarity, or with limited potential for replacement and highly sensitive to some change, e.g. • Surface water WFD class 'High' • Habitat for species protected under European Union (EU) legislation or • Flood Risk: more vulnerable, essential infrastructure or highly vulnerable land uses[17].

Impact Magnitude Criteria

14.7.5 The magnitude of impact has been classified as low, medium or high, in accordance with the criteria set out in Table 14-3.

Table 14-3: Impact Magnitude Criteria	
Magnitude of Impact	**Criteria**
Low	Some measurable alteration/change in the quality or quantity of surface waters and/or to the physical or biological characteristics of surface waters and associated flood risk (small change in the potential extent or depth of flooding but not to the scale at which the flood hazard* would change).
Medium	Measurable alteration/change in the quality or quantity of surface waters and/or to the physical or biological characteristics of surface waters and associated flood risk (a notable change in the potential extent or depth of flooding but no significant change in the flood hazard* classification).
High	Large scale alteration/change in the quality or quantity of surface waters and/or to the physical or biological characteristics of surface waters and associated flood risk (a significant change in the potential extent or depth of flooding and also the flood hazard* classification).

*In the context of flooding, a hazard is typically a combination of depth and velocity, with some consideration of the potential for debris within flood waters.

Scale of Effect Criteria

14.7.6 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 14-4.

Table 14-4: Scale of Effect Criteria			
Magnitude of Impact	**Sensitivity of Receptors**		
	Low	**Medium**	**High**
Low	Negligible	Negligible - Minor	Minor
Medium	Negligible - Minor	Minor	Moderate
High	Minor	Moderate	Major

14.7.7 In accordance with Chapter 2, Section 2.9, moderate and major effects are considered significant in EIA terms (shown in grey).

14.7.8 In determining the significance of reported effects, consideration has been given to the type of effect i.e., direct, indirect or secondary, the geographical extent of the effect and permanence of the effect i.e. temporary or permanent.

14.7.9 Duration of effect has been described as short, medium or long-term, in accordance with the criteria set out in Chapter 2.

Nature of Effect Criteria

14.7.10 The nature of the effect has been described as either adverse, neutral or beneficial as follows:

- **Beneficial** – an advantageous effect to a receptor;

- Neutral – an effect that on balance, is neither beneficial nor adverse to a receptor or equally beneficial and adverse; or
- Adverse – a detrimental effect to a receptor.

14.8 Assumptions and Limitations

14.8.1 The assessment has relied on data provided by:

- Ordnance Survey Mapping;
- EA Flood Mapping and data;
- Topographical Survey;
- The Crawley Borough and Upper Mole Catchment Level 1 SFRA 2023 [18] (covering the Site area which is within the Upper Mole Catchment);
- Horsham District Council Strategic Flood Risk Assessment 2010 [19]; and
- British Geological Survey (BGS) borehole logs and site investigation reports.

14.8.2 It has been assumed that these data sets have been reported correctly.

14.9 Baseline Conditions

Existing Baseline

Surface Water Bodies

14.9.1 The River Mole runs through the Site and immediately adjacent to the western boundary of the Site. The river is not tidal at this location. The Ifield Brook runs immediately adjacent to the eastern boundary of the Site.

14.9.2 In respect of water quality, the EA's river basin planning process involves setting environmental objectives for all surface waters (including estuaries and coastal waters) within River Basin Management Plan (RBMP) districts and devising programmes of measures to meet those objectives.

14.9.3 The third cycle of river basin planning in the UK (running from the publication of river basin plans in 2022 to 2027) sets out that the Site lies within three separate basins. The east of the Site is within the Ifield Brook basin, the west within the Baldhorns Brook (downstream River Mole) basin and the north/north-east in the River Mole basin.

14.9.4 The Ifield Brook has been designated as a Heavily Modified Water Body (HMWB) with a catchment which extends to cover approximately 15.02 km^2 in area. The HMWB designation recognises that a waterbody has been significantly physically modified to support uses providing valuable economic and social benefits, and that achievement of 'good status' for the water body cannot be achieved without changes to the water body's hydromorphology that would significantly adversely affect the economic and social benefits. An HMWB is required to achieve an alternative objective of 'good ecological potential' as opposed to 'good status'. The good ecological potential of a heavily modified or artificial water body is measured against the maximum ecological quality it could achieve given the constraints imposed upon it by those heavily modified or artificial characteristics necessary for its use. In this waterbody, the Ifield Brook is classified as being of Moderate Ecological Status. The Badhorns Brook is not designated as an artificial or HMWB. The catchment area is approximately 12.39 km^2 in area. The brook is classified as being of Poor Ecological Status.

[18] https://crawley.gov.uk/planning/planning-policy/local-plan/local-plan-evidence-base/local-plan-evidence-base-environmental-sustainability

[19] Horsham District Council Strategic Flood Risk Assessment, https://www.horsham.gov.uk/planning/planning-policy/evidence-base/strategic-flood-risk-assessment

14.9.5 The River Mole is a HWMB with a catchment area of approximately 29.58 km^2. It is classified as being of Moderate Ecological Status.

14.9.6 There are five ecological potential classes for HWMB and Artificial Water Bodies (maximum, good, moderate, poor and bad). The chemical classification status (either good or fail) for the surface water body is measured against the environmental standards for chemicals that are priority substances and priority hazardous substances. All three basins come under the classification of 'fail' in terms of the chemical status.

14.9.7 The reasons for not achieving 'Good' status are listed as a combination of physical modification, point source sewage or contamination releases and diffuse pollution from contaminated waterbed sediments and the urbanisation of the catchment.

14.9.8 As set out in the FRA a drain flows initially in a general easterly direction through the Site on the southern edge of Rusper Road, and is described in the FRA as the 'Rusper Road Drain'. This drain is culverted beneath several property driveways before being culverted in a northerly direction beneath Rusper Road (grid reference 524060, 137030) and then flows in a northerly direction, also through the Site.

14.9.9 Along much of Rusper Road, the drain is shown to be a shallow ditch. During inspection by Homes England on the 29th May 2025, much of this ditch was observed to be dry. However, there are outfalls to the ditch south of Rusper Road which contribute to flow from the network of drains within the golf course.

14.9.10 Review of the catchment using boundaries delineated in the Flood Estimation Handbook (FEH) web service[20] suggest that the catchment area of the Rusper Road Drain is significantly less than 1km^2 and a significant proportion of the catchment area is likely to be within the Site boundary.

Fluvial Flood Risk

14.9.11 As set out in the FRA (WOI-HPA-DOC-FRA-01). areas of fluvial Flood Zone 2 and Flood Zone 3 are present in the north and east of the Site. There is also a limited section at the downstream (northern) limit of the Rusper Road Drain which is shown to have a fluvial flood risk. Land on the southern boundary was formerly shown to have a fluvial flood risk, although this has been removed in the latest update to the EA's fluvial Flood Zone mapping. Whilst three separate historical fluvial flooding events are shown to have affected land in the northeast of the Site, none of the proposed residential, employment or school areas or the CWMMC, playing pitches or allotments are shown to have been affected during these events. The residential, employment and school elements of the Proposed Development, as well as the locations of allotments and sports pitches, are proposed to be located on land shown in the 2025 updated EA Flood Map for Planning to be outside of the extent of fluvial (river) flooding during a future climate change adjusted 1 in 1,000 annual probability event, even in the absence of any catchment scale flood defence; i.e. within a fluvial Flood Zone 1. This means that the probability of fluvial (river) flooding to these parts of the Site should be considered to be low.

14.9.12 The CWMMC crosses over fluvial Flood Zones 2 and 3 via a bridge. Embankments would be built that are located within Flood Zones 2 and 3 to raise the road out of the floodplain.

14.9.13 The updated Flood Map for Planning defines as a Flood Zone a potential area of flooding related to the Rusper Road Drain that crosses the Site from west to east and then to the north . However, this is considered an erroneous designation and evidence has been

[20] https://fehweb.ceh.ac.uk/

provided in the FRA that this potential flood risk is associated with overland pluvial (surface water) flows and is not a fluvial risk.

Surface Water Flood Risk

14.9.14 The EA's Risk of Flooding from Surface Water (RoFSW) map[21] identifies areas in England and Wales at potential risk of surface water (pluvial) flooding. As set out in the FRA (WOI-HPA-DOC-FRA-01), the RoFSW mapping of the potential chance of surface water flooding within the Site identifies a chance of surface water ponding at a location even if the depth would be very shallow. The EA also presents the chance of surface water flooding reaching specific depths. This shows that for much of the area predicted to have a chance of surface water flooding, the chance of such water reaching 300mm would be Very Low or Low. It is considered that this surface water flood risk is associated with the drainage ditch that corresponds with the additional new areas of Flood Zones 2 and 3 (derived from direct rainfall modelling) as discussed previously.

14.9.15 It must be noted that the RoFSW mapping is only based on the best information held by the EA with regard to ground elevations and drainage. The modelling is completed at a national scale and the EA has stated that there are a number of assumptions in the model used to produce this mapping. Specifically, it is stated by the EA that the model cannot represent every detail of the urban landscape and very local mechanisms of flooding. Drainage capacity is the biggest factor in uncertainty in the modelling. The EA has to make assumptions where no drainage data is available and therefore the outputs of the model may be less accurate. OS MasterMap data on land cover, and data on soil type and land permeability (which would represent the Clay nature of the geology in this location) is used to represent the spatial variation in runoff and infiltration rates.

14.9.16 Of particular relevance to the Site location, there are a network of drains within the golf course which are a combination of open channels and below ground culverts. Whilst the open channels may be reflected in the mapping if large enough to be reflected in the terrain data, any below ground connectivity between these drains and the downstream Rusper Road Drain is not fully considered in the mapping. The culvert beneath Rusper Road itself is also not considered in the mapping. Buildings are also artificially raised above ground levels data within the model to represent the likely slowing of water flow to internal areas. As a result, external ground areas adjacent to buildings are shown to receive an accumulation of surface water runoff which may not be accurate. This is less of an issue in the Site location due to the predominantly greenfield setting although it may also contribute to the overestimation of risk.

14.9.17 Therefore, whilst there is an overland flow route indicated from west to east along the north side of the golf course and south of Rusper Road, this is considered to be an inaccurate representation, as the capacity of below ground drains and detailed topographical features may not be accurately considered. The mapping suggests that water could flow overland in an uncontrolled manner towards Rusper Road and would then back up on the upstream (southern) edge of the road prior to overtopping the road and then continuing to flow to the north. Mapping clearly shows no hydraulic connectivity following the route of the culvert and confirms that the mapping predicts water would back up south of the road until it reaches an elevation at which it would overtop further west and then into the Yew Trees property to the north of the road. It is also noted that there is a raised embankment along the boundary of this property north of Rusper Road which is not reflected in the EA's mapping but that would limit the movement of water along the erroneous route. Therefore

[21] Environment Agency Long-Term Flood Risk Map, available at https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

this overland flow route is considered to be an inaccurate representation and significant over estimation of flood risk extents in the EA's mapping.

Groundwater Flood Risk

14.9.18 As set out in the FRA (WOI-HPA-DOC-FRA-01) water strikes were not recorded during investigation works at depths ranging from 0-35.5 m below ground level, throughout clay-based strata. However, during exploratory drilling in late 2024/ early 2025, to a depth of just over 200 metres below ground level (mbgl), groundwater levels were found to be close to ground level within the shallow bedrock; and close to ground level or slightly above ground level (artesian) at depth. All groundwater levels were found to be generally shallower than 4 mbgl.

Future Baseline

14.9.19 The only identified change to the future baseline with regard to surface water and flood risk are associated with climate change. The assessment of flood risk and the surface water drainage strategy provided in the FRA (WOI-HPA-DOC-FRA-01) and Drainage Strategy (WOI-HPA-DOC-SWDS-01) take account of the latest government guidance with regards to increased flood risk, as well as increased rainfall rates (HM Government. Flood Risk Assessments: Climate Change Allowances Guidance[22]).

Sensitive Receptors

14.9.20 The receptors identified as sensitive to the Proposed Development and which have been 'scoped-in' to the assessment are summarised in Table 14-5.

Table 14-5: Summary of Sensitive Receptors

Receptor	Sensitivity
On-Site surface water quality of tributaries, rivers and catchment within the Site and study area	Low
Flood risk status on Site (area applied for in detail - Phase 1)	High
Flood risk status on Site (area applied for in outline, residential elements)	High
Flood risk status on Site (area applied for in outline, landscape and public realm elements)	Medium
Flood risk status of downstream or upstream land characterised by 'water-compatible' or 'less vulnerable' land uses	Medium
Flood risk status of downstream or upstream land characterised by 'more vulnerable, highly vulnerable' or 'essential infrastructure' land uses	High

14.10 Assessment of Effects

Demolition and Construction Effects

Contamination of Surface Water Bodies

14.10.1 During demolition and construction activities, the operation of construction vehicles and general construction activities can potentially give rise to the contamination of surface water bodies by pollutants such as hydrocarbons, suspended solids and construction materials. This may lead to deterioration of surface water quality for on-Site or surrounding surface waterbodies.

14.10.2 As outlined in the Phase 1 Environmental Site Assessment (Phase 1 ESA) (Ground Conditions) Report (Ref 1620007949-RAM-ZZ-XX-RP-SS-00004) which is submitted as a supporting assessment with the planning application, identified potentially significant

[22] HM Government. Flood Risk Assessments: Climate Change Allowances Guidance. Available online at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

sources of contamination on Site appear to be limited in extent and would be manageable, in the context of the Proposed Development.

14.10.3 As set out in Chapter 5: Demolition and Construction Description, an Outline Construction Environmental Management Plan (OCEMP) for the outline component of the Proposed Development (ES Appendix 5.1) has been prepared and will be submitted as part of the hybrid planning application. With regard to surface water and flood risk in EIA terms, the OCEMP (ES Appendix 5.1) includes a commitment to environmental protection and details control measures and activities to be undertaken to minimise likely environmental impacts and avoid likely significant effects, as well as associated roles and responsibilities.

14.10.4 With regard to the management of contaminative risk to surface water bodies for Phase 1 works, a Phase 1 OCEMP[15] has also been prepared and submitted as part of the planning application. For Phase 1, as construction works are expected within 8 m of the banks of the River Mole, the Principal Contractor would be required to apply for an Environmental Permit from the EA prior to these works commencing.

14.10.5 Further to this, as outlined in the Phase 1 ESA (WOI-HPA-DOC-DCA1-01), additional work (i.e. standard ground conditions mitigation measures) would be required to satisfy the requirements of the local planning authority (as part of future reserved matter applications) to permit the Proposed Development.

14.10.6 For the entire Site, it is intended that surface runoff during construction would be discharged to existing sewers under consent to be obtained from Thames Water. The use of settlement facilities would aid the removal of any potentially contaminated material that might be derived from construction materials. Waste from temporary welfare facilities would be disposed of by contractors or to Thames Water sewers under consent. Interceptors would be regularly inspected, cleaned and maintained. Full records would be kept of inspections, maintenance works and measures undertaken to sustain equipment performance. Details of monitoring frequency and record-keeping would be specified in the detailed CEMP for the relevant phase of the Proposed Development.

14.10.7 Spoil material would be stored on-Site in the short-term and stockpiles would be located away from potential drainage routes. The stockpiles would be managed to ensure minimisation of surface runoff or windblown deposition of materials to local receptors. Any contaminated material required to be disposed of would be temporarily stored separate from the clean material, on a geotextile and disposed of appropriately in accordance with the standard regulatory regime.

14.10.8 The measures identified above would be specified within the detailed CEMP for each phase of the Proposed Development (which would be based on the OCEMP (ES Volume 2 Technical Appendix 5.1)), and implemented by the contractors, secured by means of an appropriately worded planning condition. This would therefore be embedded mitigation, and the magnitude of impact would be low.

14.10.9 On-Site tributaries, rivers and catchment within the Site and study area are considered to be of low sensitivity. The measures detailed in the CEMP would ensure that the magnitude of impact is low. Accordingly, the contamination of surface water bodies due to the Proposed Development during the demolition and construction stage would have a short-term, temporary **Negligible Adverse** (not significant) effect, and no further mitigation beyond the measures to be set out in the detailed CEMP is deemed necessary.

Fluvial Flood Risk

14.10.10 The demolition and construction stage of the Proposed Development would result in demolition and construction workers and plant operating within locations with a potential of flooding,

specifically for the Phase 1 works where there is a significant overland flow route shown in the north of the Site that crosses the route of the proposed CWMMC. A flood risk activity permit would be sought from the EA and works would, therefore, be carried out in accordance with EA requirements for demolition or construction works in these areas. This would ensure that there are no effects on demolition and construction workers as a result of flooding.

14.10.11 The proposed CWMMC development would impact on flood risk as a result of changes to hydromorphological status of the watercourse and floodplain. However, Arcadis has undertaken hydraulic modelling (as described in FRA (WOI-HPA-DOC-FRA-01)) which has been used to develop mitigation proposals and to assess post-development flood risks.

14.10.12 The proposed impact from the development of the CWMMC on flood risk and flood alleviation measures are described in the Arcadis Flood Risk Assessment Addendum and associated Arcadis Hydraulic Modelling Report (10051123-ARC-260-ZZ-TR-ZZ-002). The Arcadis Phase 1B Highways General Arrangement drawing sheet 5 (10051123-ARC-010-1B-DR-HE-00005), indicates the provision of culverts under the proposed CWMMC. The Flood Compensation Areas (FCA) provide a volume of additional flood storage within the floodplain, and this compensates for the volume lost due to the CWMMC earthworks. The Arcadis Flood Risk Assessment Addendum and associated Hydraulic Modelling Report (10051123-ARC-260-ZZ-TR-ZZ-002) provides more detail about the proposed FCAs and are included as part of the hybrid planning application submission documents.

14.10.13 A FRA (WOI-HPA-DOC-FRA-01) has been produced and submitted as part of the planning application. As described in the FRA, although changes to flood depths may occur over a small portion of the existing floodplain within the Site (compared to the baseline situation), the maximum increased depth would be less than 0.1 m. Increases would only occur in areas already predicted to flood that would not be developed or would be developed only with the construction of Flood Compensation Areas (FCA). The flood risk status of such areas is not considered to be a sensitive receptor in EIA terms due to their intended use as FCA with no further development.

14.10.14 The Arcadis Flood Risk Assessment Addendum and associated Arcadis Hydraulic Modelling Report (10051123-ARC-260-ZZ-TR-ZZ-002) also concludes that there would be a very minor impact on flood risk downstream of the Site (off-Site), but this is limited to landscaped areas near to the River Mole.

14.10.15 Therefore, with consideration of the embedded mitigation measures and controls that would be implemented as part of the demolition and construction stage, the magnitude of impact on fluvial flood risk would be low.

14.10.16 Whilst the sensitivity of land uses in flood risk terms on-Site would range from Medium to High where development is proposed, the changes in flood risk would only occur in areas already predicted to flood that would not be developed or would be developed only with the construction of FCA, which are medium sensitive receptors in EIA terms. Therefore, the change in flood risk to these areas during the demolition and construction stage would be a long-term, temporary, **Negligible - Minor Adverse** (not significant) effect.

Surface Water Flood Risk

14.10.17 The proposed demolition and construction activities could contribute to the alteration of in-channel or overland flow regimes through excavations, disruption to artificial drainage, exposure of bare earth or rock, alteration to field drains and the construction of culvert extensions. This could lead to an increase in erosion and transport of sediment to watercourses. The OCEMP (ES Volume 2 Technical Appendix 5.1) includes a commitment to the provision of a construction drainage system for the Proposed Development which would

be designed and managed to comply with BS 6031:200912, which details methods that should be considered for the general control of drainage on construction sites.

14.10.18 The Phase 1 OCEMP (10051123-ARC-XXX-ZZ-TR-CM-00001) Appendix C includes an overview of surface water management and flood risk mitigation measures to be implemented during the construction phase, including a commitment for the Principal Contractor to utilise SuDS. A construction phase surface water management strategy must also be produced along with the final CEMP, which must be approved by HDC and the EA prior to commencement of works.

14.10.19 Therefore, with consideration of the controls set out in the OCEMP (ES Volume 2 Technical Appendix 5.1) that would be implemented as part of the demolition and construction stage, the magnitude of impact on flood risk status as a result to potential hydromorphological status of the surface watercourses and floodplain would be low.

14.10.20 The sensitivity of flood risk of downstream or upstream land is considered to be of Medium or High Sensitivity. Accordingly, the change in flood risk as a direct result of demolition and construction activities, would be a short term, temporary, **Negligible – Minor** or **Minor Adverse** (not significant) effect.

14.10.21 The Proposed Development would also lead to an increase in the impermeable surface area on-Site and therefore the surface water runoff characteristics of the Site. The drainage strategy specified by Arcadis seeks to maintain overland flow routes, originating from off-Site, in their natural flow paths without impeding flow and exacerbating flood risk elsewhere. The phasing of construction would also seek to ensure that drainage measures are installed prior to development of land they are designed to serve.

14.10.22 The planning application is also accompanied by a surface water drainage strategy (West of Ifield Drainage Strategy' (WOI-HPA-DOC-SWDS-01) which addresses potential issues associated with Site-derived rainfall runoff and run-on from outside the Site, unrelated to rivers and streams. Surface water discharge rates would be managed by SuDS features, predominantly comprising swales and detention basins (with a drain down time less than 24 hours to comply with Gatwick Airport's requirements to mitigate the risk of bird strike). Once operational, the Site would discharge at greenfield rates into the same existing watercourses where the Site currently discharges i.e. following existing topography. These watercourses are the River Mole, Ifield Brook and Hyde Hill Brook[23]. This would ensure that these watercourses would receive water from the same catchments as pre-development and at the same rate. The rates of discharge would be limited to existing greenfield rates for all rainfall events up to and including the climate change-corrected 100 year storm, as described in Drainage Strategy (WOI-HPA-DOC-SWDS-01).

14.10.23 Therefore, with consideration of the embedded drainage design measures that would be implemented as part of the demolition and construction stage, the magnitude of impact on surface water flood risk would be low. As the drainage design includes capacity to accommodate climate change related increases in peak rainfall depth (which would otherwise lead to an increase in off-Site runoff were no development proposed), the effect is considered to be beneficial.

14.10.24 The sensitivity of flood risk of downstream or upstream land is considered to be of Medium or High Sensitivity. Accordingly, the change in flood risk as a result of the construction of Site hardstanding and associated drainage, would be a long term, permanent, **Negligible – Minor** or **Minor Beneficial** (not significant) effect.

[23] In its upper reaches, Ifield Brook is known as Hyde Hill Brook.

Completed Development Effects

Contamination of Surface Water Bodies

14.10.25 SuDS features incorporated within the proposed surface water drainage strategy would provide treatment of surface water run-off from the Proposed Development at the completed development stage. As set out in the proposed drainage strategy, surface water discharged from the Site would be treated to an acceptable standard as informed by CIRIA Guidance Document C753. The Simple Index Approach has been used to determine whether the proposed water quality measures are sufficient for the Site for discharge to a watercourse. Sufficient treatment measures are then to be confirmed at detailed design stage in accordance with CIRIA SuDS Manual (Chapter 26).

14.10.26 Additionally, surface water collected from vehicular and delivery areas would be treated with a petrol interceptor as appropriate and in accordance with best practice to provide treatment for contaminants to a quality suitable for discharging to a surface watercourse.

14.10.27 In accordance with the proposed drainage strategy, it is intended for foul water to discharge to the existing Thames Water public sewer which bounds the Site to the east. The proposed site wide drainage strategies would be subject to adoptable standards and applications to be made to the relevant water authorities in line with Water Industry Act 1991.

14.10.28 On-Site tributaries, rivers and catchment within the Site and study area are considered to be of low sensitivity, due to the poor or moderate ecological quality as described in Section 14.9. With embedded mitigation measure and controls within the proposed SuDs strategy, the magnitude of impact would be low. Accordingly, the contamination of surface water bodies due to the Proposed Development during the completed development stage would have a long-term, permanent **Negligible Adverse** (not significant) effect.

Fluvial Flood Risk

14.10.29 With consideration of the embedded mitigation measures and controls that would be implemented as part of the demolition and construction stage, the magnitude of impact on fluvial flood risk during Completed Development would be low and no further effects, beyond those considered during demolition and construction, on fluvial flood risk are anticipated during the completed development phase.

Surface Water Flood Risk

14.10.30 As set out previously, the Proposed Development would lead to a large increase in hardstanding surfaces on-Site and therefore a subsequent increase in the initial runoff profile. However, any increases in surface water volumes would be managed by the construction of the proposed surface water drainage network which is integral to development design and would ensure that runoff does not exceed that for the pre-development Site and would include an appropriate allowance for climate change. No further effects, beyond those considered during demolition and construction, on surface water flood risk are anticipated during the completed development phase.

14.11 Assessment of Residual Effects

Additional Mitigation

Demolition and Construction Stage

Contamination of Surface Water Bodies

14.11.1 No significant effects are predicted and consequently no additional mitigation is required.

Flood Risk

14.11.2 No significant effects are predicted and consequently no additional mitigation is required.

Completed Development Stage

Contamination of Surface Water Bodies

14.11.3 No significant effects are predicted and consequently no additional mitigation is required.

Flood Risk

14.11.4 No significant effects are predicted and consequently no additional mitigation is required.

Enhancement Measures

14.11.5 No enhancement measures are proposed specifically in respect of water resources and flood risk. Enhancement measures for watercourses are proposed as part of the Biodiversity Net Gain Assessment (ES Volume 2 Technical Appendix 8.1).

Demolition and Construction Residual Effects

14.11.6 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

Completed Development Residual Effects

14.11.7 As no additional mitigation would be required, the residual completed development effects remain as reported in the assessment of effects section.

Summary of Residual Effects

14.11.8 Table 14-6 provides a tabulated summary of the outcomes of the (discipline) assessment of the Proposed Development.

Table 14-6: Summary of Residual Surface Water and Flood Risk Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction								
On-Site tributaries, rivers and catchment within the Site and study area	Contamination of surface water bodies by pollutants such as hydrocarbons, suspended solids and construction materials.	None Required due to measures already included in the OCEMP	Negligible (not significant)	-	D	T	R	St
Flood risk status of on-Site and off-Site land uses	Impact on flood risk status as a result of changes to hydromorphological status of the watercourse and floodplain, i.e. alteration of in-channel or overland flow regimes, and the construction of culvert extensions	None Required due to embedded mitigation measures and controls set out in the FRA.	Negligible - Minor (not significant)	-	D	T	R	Lt

Table 14-6: Summary of Residual Surface Water and Flood Risk Effects

	Temporary alteration to in-channel or surface water overland flow regimes through excavations, disruption to artificial drainage, and exposure of bare earth or rock	None Required due to measures already included in the OCEMP	Negligible -Minor (not significant)	-	D	T	R	St
			Minor (not significant)	-	D	T	R	St
	Increase in the impermeable surface area and therefore the surface water runoff characteristics of the Site	None Required due to embedded drainage design measures	Negligible -Minor (not significant)	+	D	P	R	Lt
			Minor (not significant)	+	D	P	R	Lt
Completed Development								
On-Site tributaries, rivers and catchment within the Site and study area	Contamination of surface water bodies through surface water run-off	None Required due to embedded drainage design measures	Negligible (not significant)	-	D	T	R	Lt
Fluvial Flood Risk	Impact on flood risk as a result of changes to hydromorphological status of the watercourse and floodplain	None Required due to embedded mitigation measures and controls set out in the FRA	Negligible - Minor (not significant)	-	D	T	R	Lt
Surface Water	Increase in the impermeable surface area and therefore the surface water runoff characteristics of the Site	None Required due to embedded drainage design measures	Negligible -Minor (not significant)	+	D	P	R	Lt

Notes:

* - = Adverse/ + = Beneficial/ +/- Neutral; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.

**Negligible/Minor/Moderate/Major

14.12 Cumulative Effects

Intra-Project Effects

14.12.1 As explained in ES Volume 1 Chapter 2: EIA Process and ES Methodology, intra-project cumulative effects are discussed in ES Volume 1 Chapter 16: Cumulative Effects.

Inter-Project Effects

14.12.2 It can be reasonably assumed that all of the cumulative schemes would be required to include standard mitigation measures, including the development of an appropriate remediation strategy (including the removal of sources of contamination as appropriate),

drainage strategy, CEMP and other measures, which would consider the disturbance and mobilisation of sediment and chemicals from the cumulative sites.

14.12.3 In accordance with national and local policy, it is reasonable to conclude that other schemes would similarly be required to demonstrate suitable surface water runoff management measures during construction and that discharges of surface water would be subject to suitable treatment such that there would be no cumulative significant effect on downstream water quality during demolition and construction works, or for the completed development. Furthermore, each cumulative would be expected to deliver improvements in respect of contamination, groundwater disruption, water demand and sewer capacity.

14.12.4 With regard to surface water flood risk, it is reasonable to consider that the LLFA would not consent to any surface water discharge from a development were it to increase downstream flood risk. Any discharge to sewer or to a fluvial watercourse would need to be restricted so as to provide betterment in terms of downstream capacity. Although the Proposed Development would discharge predominantly to fluvial, there would be no impact on downstream flood risk and there would be a beneficial effect on sewer capacity. It would be reasonable to assume that any other development would similarly need to decrease flood risk and reduce pressures on downstream sewer capacity such that any cumulative impact during the completed development stage would be beneficial.

14.12.5 Accordingly, the overall scale of water resources and flood risk cumulative effects would be no greater than that of the Proposed Development in isolation. Therefore, it is unlikely that there would be any significant adverse cumulative effects on flood risk or surface water quality.

14.13 Summary of Assessment

Background

14.13.1 This chapter has detailed the potential surface water and flood risk effects due to the construction and completed development stages of the Proposed Development. The assessment of construction and completed development stages has been undertaken taking into account the relevant national and local guidance and regulations.

Demolition and Construction Effects

14.13.2 During demolition and construction works, potential problems could arise as set out below:

- **Contamination of surface water bodies,** impacting the water quality of surface water bodies;
- **Changes to fluvial flood risk**, on-Site and on downstream and/or upstream land; and
- **Changes to surface water flow regime:** alteration of in-channel or overland flow regimes.

14.13.3 Overall, it is considered that the demolition and construction of the Proposed Development would result in a **'not significant'** effect on surface water and flood risk and identified receptors, and as such would not give rise to significant effects on surface water and flood risk.

Completed Development Effects

14.13.4 The following potential impacts on surface water could arise during the completed development stage of the Proposed Development:

- **Contamination of surface water bodies,** impacting the water quality of surface water bodies;
- **Changes to fluvial flood risk**, on-Site and on downstream and/or upstream land; and
- **Changes to surface water flow regime:** alteration of in-channel or overland flow regimes.

14.13.5 Overall, it is considered that the completed Proposed Development would result in a **'not significant'** effect on surface water and flood risk and identified receptors, and as such would not give rise to significant effects on surface water and flood risk.

Cumulative Effects

14.13.6 Accordingly, the overall scale of surface water resources and flood risk cumulative effects would be no greater than that of the Proposed Development in isolation. Therefore, it is unlikely that there would be any significant adverse cumulative effects on flood risk or surface water quality.