



Land North of Camer Road, Meopham Environmental Statement

Chapter 8: Hydrology, Flood Risk and Drainage

GTA Civils & Transport Ltd on
behalf of The McManus Family

February 2026

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8. HYDROLOGY, FLOOD RISK AND DRAINAGE

Introduction

- 8.1 This chapter of the ES has been prepared by GTA Civils & Transport Ltd (GTA) and presents an assessment of the likely significant effects of the Proposed Development with respect to Hydrology, Flood Risk and Drainage. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. Taking into account the mitigation measures, the nature and significance of the likely residual effects are reported.
- 8.2 This chapter is supported by the following technical appendices:

- **Appendix 8.1: Flood Risk Assessment (FRA)**

Legislation and Policy Context

Legislation Context

- 8.3 The following legislation is relevant to the Proposed Development:
- Flood and Water Management Act 2010;
 - Water Industry Act 1991; and
 - Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

National Planning Policy

- 8.4 The following national planning policy is relevant to the Proposed Development:
- National Planning Policy Framework (2024)¹.

Local Planning Policy

- 8.5 The following local planning policies² are relevant to the Proposed Development
- Policy CS18: Climate Change, which covers Flood Risk, Water Quality, Sustainable Drainage and Surface Water Run-Off; and
 - Policy CS10: Physical and Social Infrastructure, which covers wastewater infrastructure.

Guidance

- 8.6 The following guidance is relevant to the Proposed Development:
- Planning Practice Guidance (PPG): Flood risk and coastal change (17 September 2025)³;
 - National standards for sustainable drainage systems (SuDS) (Defra, 30 July 2025)⁴; and
 - The SuDS Manual (CIRIA, C753)⁵.

Assessment Methodology and Significance Criteria

- 8.7 This section presents the methodology used to assess the potential effects of the Proposed Development in relation to hydrology, flood risk and drainage.

Consultation

- 8.8 The main consultees for hydrology in the context of the Site are the Environment Agency (EA), the LLFA at Kent County Council (KCC) and Southern Water. The position of each consultee on hydrology issues affecting the Site is largely set out in published guidance, which helps these public bodies manage their often-stretched resources efficiently. As a result, pre-planning consultations are not always necessary.
- 8.9 The EIA Scoping Opinion included consultee responses from the EA and from the LLFA as statutory consultees (**Appendix 1.4**). In addition, a pre-planning enquiry was submitted to the LLFA on 6 October 2025 requesting comments on the outline drainage strategy. The written response was received on 21 October 2025 under reference NON/2025/107281 and a copy is appended to the FRA (see **Appendix 8.1**).
- 8.10 Southern Water is a non-statutory consultee to the planning process. Prior to a planning submission, Southern Water only offers a simple check to identify whether the required capacity for wastewater is available in the piped network local to the Proposed Development. If capacity is not available for consented development, Southern Water will provide network reinforcement subject to the new connections charging rules as directed by Ofwat. Based on the scale of the Proposed Development and the local sewer records, the assessment assumes that existing sewer capacity is not available without requesting the pre-planning check.
- 8.11 **Table 8.1** presents a summary of comments raised by relevant consultees.

Table 8.1 Summary of Comments

Consultee	Comment	Response
EA	EIA Scoping Opinion response: <i>“Due to the high volume of work, we are unable to provide comments on Environmental Impact Assessment Scoping Reports at the present time”</i> .	Comments will be provided during the consultation period post-submission. Meanwhile, the EA’s published guidance on groundwater protection ⁶ has been considered.
Kent LLFA	EIA Scoping Opinion response: <i>Groundwater protection and appropriate surface water management are essential on site and should be thoroughly considered moving forward.</i>	These general comments have been addressed within the prepared drainage strategy which is set out in the FRA (see Appendix 8.1) and summarised in this chapter.
Kent LLFA	EIA Scoping Opinion response: <i>Major development will be assessed against Defra’s National Standards for SuDS.</i>	The FRA (see Appendix 8.1) includes an itemised consideration of how the outline drainage strategy meets the national standards.

Consultee	Comment	Response
Kent LLFA	Pre-application enquiry response: <i>Although infiltration testing was undertaken, it did not follow the BRE 365 test procedure. Nevertheless, the results provide a good indication that infiltration is likely to be viable across the site...</i> <i>The current information is suitable for outline design purposes; however, further infiltration testing and groundwater monitoring will likely be required to provide broader coverage across this large site, assess the extent of deeper superficial deposits, and determine groundwater levels—particularly at the site's low points.</i>	The FRA (see Appendix 8.1) sets out that further ground investigations will be carried out at detailed stage.
Kent LLFA	Pre-application enquiry response: <i>Before water is discharged via infiltration measures, consideration must be given to the incorporation of water reuse features (e.g. water butts or other rainwater harvesting systems).</i>	The FRA (see Appendix 8.1) sets out that on-plot rainwater harvesting measures will be considered at detailed stage.
Kent LLFA	Pre-application enquiry response: <i>A strategy reliant solely on a 'pipe to pond' layout would not be considered acceptable. We would support a proposal where residual runoff, which cannot be discharged via source control features, is conveyed via swales and pocket wetlands to the proposed infiltration basins.</i>	The FRA (see Appendix 8.1) sets out the drainage strategy which includes swales and pocket wetlands upstream of infiltration basins.
Kent LLFA	Pre-application enquiry response: <i>Infiltration features must be designed so that rainfall events up to the 3.3% AEP event can half-empty their runoff volume within a maximum of 24 hours.</i>	The FRA (see Appendix 8.1) includes calculations demonstrating sufficient capacity.
Kent LLFA	Pre-application enquiry response: <i>Calculations are provided for the climate change-adjusted 1-in-100-year event only.</i>	The FRA (see Appendix 8.1) includes calculations for a range of return periods.

Consultee	Comment	Response
Kent LLFA	Pre-application enquiry response: <i>As of the 10th of May 2022, the Environment Agency's climate change allowances have been updated...The LLFA would now seek the 'upper end' allowance is designed for both the 30 (3.3%) and 100 (1%) year storm scenarios.</i> <i>...if the allowance for the 2050s epoch is higher than that for the 2070s epoch</i> <i>...we would expect that for a development that has a lifetime beyond 2061, the higher of the two allowances is to be used.</i>	The calculations in the FRA (see Appendix 8.1) include the latest climate change allowances for the Medway Management Catchment; specifically, 35% for the 1 in 30 AEP (2070s epoch, Upper end allowance) and 45% for the 1 in 100 AEP (2050s epoch, Upper end allowance). For the 1 in 100 AEP, the allowance for the 2050s epoch is higher than that for the 2070s epoch.

Study Area and Scope

Study Area

- 8.12 The study area comprises the Site itself as well as the hydrological catchments in which the Site is located. The Site is close to the upstream watershed of its catchment, which ultimately drains to the Thames Estuary at Ebbsfleet.
- 8.13 The baseline conditions were assessed for the year 2025. For the purposes of assessing climate change impacts the design life horizon for the completed development is taken as 2125.

Scope

- 8.14 The following aspects will be considered in the ES as a significant effect is considered likely:
- The flood risk to the Proposed Development from surface water sources;
 - The flood risk to neighbouring land as a result of the Proposed Development;
 - Impacts on water quality in the receiving groundwater aquifer during both the construction and operational phases; and
 - The capacity of the existing wastewater infrastructure to accommodate foul drainage from the Proposed Development.
- 8.15 The following aspects will not be considered in the ES because potential effects are not likely to be significant:
- Flood risks from fluvial, groundwater and reservoir sources; and
 - Wastewater disposal during the construction phase.

Assessment Methodology

Impact Areas

- 8.16 Existing surface water flood risk has been assessed using the EA Risk of Flooding from Surface Water (RoFSW) mapping⁷ and consideration of the topography and land use characteristics within the catchment. Available records of historical flooding have been considered.
- 8.17 Management of surface water runoff has been assessed using Defra's National standards for SuDS. The assessment includes review of in situ infiltration tests. Water quality impacts have been assessed using the Simple Index Approach as set out in The SuDS Manual.
- 8.18 Wastewater infrastructure capacity has been considered based on information made available by Southern Water as the incumbent sewerage undertaker for the Site.

Significance Criteria

- 8.19 The scale attributed to each effect has been determined based on the sensitivity of the receptor and magnitude of impact arising as a result of the Proposed Development. Professional judgement and experience have been drawn upon to assess the scale and significance.

Receptors and Receptor Sensitivity

- 8.20 The sensitivity of each receptor was evaluated as being high, medium, low or negligible based on a review of the baseline position of each receptor and its performance against benchmark areas. The receptors and the definition of sensitivity of a receptor (high, medium, low) is based on a scale set out in **Table 8.2**.

Table 8.2 Receptor Sensitivity Description

Value (Sensitivity)	Description
High	The receptor has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
Low	The receptor is tolerant of change without detriment to its character, or is of low or local importance.
Very Low	The receptor is of very low importance and rarity and is local in scale.

Magnitude of Impact

- 8.21 The magnitude of impact to a receptor has been determined by considering the estimated deviation from baseline conditions both before, and, if required, after mitigation. The scale used for determining the magnitude of an impact has been based on **Table 8.3**.

Table 8.3 Magnitude of Impact Description

Impact Magnitude	Description
High	Major alteration to key features of the baseline conditions such that the post-development character or attributes will be fundamentally changed.
Medium	Alteration to one or more key features of the baseline conditions such that the post-development character or attributes will be materially changed.
Low	A minor shift away from baseline conditions. Change will be discernible or detectable but not material. The underlying character or attributes will be similar to the pre-development situation.
Very Low	Very little change from baseline conditions. Change barely distinguishable.

Assessing Significance

- 8.22 **Table 8.4** provides a matrix for determining the significance of an effect based on the sensitivity of the receptor and the magnitude of impact.

Table 8.4 Significance of Effect Matrix

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major Beneficial / Adverse	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Minor Beneficial / Adverse or Negligible
Medium	Major Beneficial / Adverse	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Negligible
Low	Moderate Beneficial / Adverse	Minor Beneficial / Adverse	Negligible	Negligible
Very Low	Minor Beneficial / Adverse	Negligible	Negligible	Negligible

- 8.23 Effects classified as major or moderate are considered 'significant'. Effects classified as minor or negligible in scale are considered 'not significant'.

Limitations and Assumptions

- 8.24 As set out in the Consultation section above, a pre-planning check from Southern Water has not been requested and the assessment assumes that existing sewer capacity is not available.

Baseline Conditions

Establishing Baseline Conditions

8.25 Data sources for the assessment include the following:

- Topographical survey of the Site and LiDAR terrain data for the wider catchment;
- EA flood risk mapping⁸;
- Geological and hydrogeological mapping datasets from the British Geological Survey (BGS)⁹ and Defra/EA¹⁰;
- Southern Water's asset mapping; and
- In situ trial pit and infiltration test data.

8.26 For more details refer to the FRA (**Appendix 8.1**)

Baseline Conditions

8.27 The baseline position will be taken as the current conditions on the Site, taking account of the planning designations and assuming that all existing land uses in the surrounding area beyond the Site remain. Refer to the FRA for more details (**Appendix 8.1**)

Topography

8.28 The Site lies on the north edge of the Kent Downs and falls steadily from south to north. Ground levels are highest at the south at around 105m AOD. Levels fall to 93m AOD at the north-east corner of the Site and to 85m AOD at the north-west. A railway line flanks the north boundary of the Site. The line is embanked in the west and in cutting to the east.

Hydrology and Flood Zone

8.29 The Site lies entirely within Flood Zone 1 – Low Probability and is remote from any areas of river or coastal flood risk. There are no watercourses at or in the vicinity of the Site, reflecting the permeable soils in this part of Kent.

8.30 Analysis of available hydrological mapping and LiDAR terrain data indicates that the Site lies within a catchment that ultimately drains to the Thames at Ebbsfleet. However, the railway cutting at the north-east appears to have potential to divert overland runoff eastwards into the River Medway catchment.

Ground conditions

8.31 The published bedrock geology for the Site is Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated) – Chalk, with a zone of Thanet Formation – Sand above the chalk in the east of the Site. Superficial deposits of Head – Clay, Silt, Sand and Gravel are mapped in the lower areas of the Site to the north-east and to the north-west.

- 8.32 The Soilscape¹¹ classifications at the Site comprise loamy and clayey soils with impeded drainage for the central and eastern areas, with freely draining shallow lime-rich soils over chalk in the west of the Site.
- 8.33 The Chalk bedrock is a highly productive Principal aquifer, while the area of Thanet Formation at the Site is classed as a Secondary A aquifer. The Head deposits are classed as Secondary undifferentiated. The BGS hydrogeological map scan indicates the elevation of the groundwater table in the Chalk was less than 100 feet (30m) AOD in January 1966. This is some 50m below ground level.
- 8.34 Most of the Site is within a groundwater Source Protection Zone (SPZ). A band at the west is within Zone II – Outer with the central band within Zone III – Total Catchment. Around 10% of the Site at the east is outside of the SPZ. An area of Zone I – Inner is located 0.6km to the north-west of the Site. The Site is not within a Drinking Water Safeguard Zone for groundwater, indicating that the SPZ below the Site does not relate to a public water supply where additional pollution control measures are needed.
- 8.35 In common with much of North Kent, the simplified groundwater vulnerability map shows the Site generally in the High risk category with the zones of Head deposits mapped as Medium-High. Soluble rock risk is mapped across the borough.
- 8.36 The In Situ Infiltration Test Report is appended to the FRA (see **Appendix 8.1**). The intrusive works were carried out in April 2025 and generally confirmed the mapped geology of Head deposits overlying Chalk bedrock. The recorded infiltration rates were above 1×10^{-5} m/s within the Chalk, but below 1×10^{-6} m/s within the Head deposits. The exploratory holes were found to be dry. Groundwater monitoring was conducted in one borehole in the centre of the Site over a 4-week period with fairly constant groundwater levels recorded between 4.64m to 4.75m below ground level (bgl).

Surface Water

- 8.37 The EA's RoFSW mapping shows isolated small low spots at the Site affected during the High risk scenario, the 1 in 30 annual exceedance probability (AEP). For the Medium risk (1 in 100 AEP) scenario, a potential flow pathway is evident along Camer Road towards Sole Street at the east boundary. For the Low risk (1 in 1,000 AEP) scenario, this pathway is shown to cross the north-east corner of the Site to the railway cutting. Another potential flow pathway is mapped in the west of the Site from Norwood Lane to The Railway Sidings during the Low risk scenario.
- 8.38 Anecdotal reports from local residents indicate that surface water flooding has occurred by the existing public house at the north-east of the Site, but there are no reports of flooding within the west of the Site. The pre-application enquiry response from the LLFA (see **Appendix 8.1**) mentions 5 reports of surface water flooding in the last 5 years, all of which occurred to the north-east of the Site due to drains being blocked or capacity exceed. This matches the anecdotal reports.

8.39 The Thameside Stage 1 Surface Water Management Plan (SWMP)¹² published by KCC in May 2013 mentions surface water flooding incidents in Norwood Lane and in the Wrotham Road area west of the Site due to blocked highway drains and heavy rainfall.

8.40 The SWMP maps show no surface water sewers in the rural part of Gravesham borough. This illustrates the established use of soakaway drainage across the catchment to dispose of runoff. Local flooding incidents appear to be associated with inadequate capacity and/or maintenance of the drainage systems.

Water Quality

8.41 The local geology is highly permeable, hence there are no surface water bodies in the vicinity of the Site. The likelihood of pollution migrating via surface water from the Site to the Thames and the adjacent environmental designation areas is therefore very low.

8.42 The BGS hydrogeological mapping identifies the chalk aquifer below the Site as producing “hard to very hard, good quality water”. The name of the Water Framework Directive (WFD) groundwater body below the Site is North Kent Medway Chalk, which extends across 233.7 km² from Ebbsfleet to Harrietsham. The WFD Cycle 3 classifications of status published by the EA¹³ are as follows:

- Overall Water Body Status: Poor
- Quantitative: Poor
- Chemical: Poor
- Trend Assessment: Upward trend

8.43 Attributed reasons for not achieving Good status (RNAG) include probable diffuse-source pollution due to poor nutrient and pesticide management associated with agriculture and rural land management. The objectives include reaching Good status by the year 2050.

Wastewater Disposal

8.44 There are public foul sewer systems serving Hook Green and Meopham Station to the west of the Site. The nearest sewer is in Norwood Lane at the south with a diameter of 150mm. The spine of the network is 225mm diameter and runs north along Wrotham Road. Based on the SWMP mapping, the sewer runs northwards through Istead Rise and terminates at Northfleet Wastewater Treatment Works (WTW).

8.45 Information within Southern Water’s Business Plan 2025-30 (AMP8)¹⁴ indicates that a statutory improvement scheme is underway to address a lack of capacity at Northfleet WTW to accommodate proposed growth in the catchment. Completion is scheduled for 2028.

Receptors

8.46 A list of existing and future receptors is included in **Table 8.5**.

Table 8.5 Existing and Future Sensitive Receptors

Receptor	Sensitivity
Existing Receptors	
Downstream surface water environment	Low (no surface water bodies in the vicinity of the Site)
Off-site surface water flood risk – people and property	High
North Kent Medway Chalk groundwater body	Medium
Public wastewater infrastructure – flooding and pollution risk if capacity exceeded	Medium
Future Receptors	
Flood risk to future residents and school pupils at the Proposed Development	High

Future Baseline

- 8.47 If construction of the Proposed Development were not to start, it is expected that the current conditions at the Site would remain largely unchanged over the next 10 years. Existing agricultural practice will remain subject to the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018, also known as the Farming Rules for Water, which aim to prevent water pollution and soil erosion.
- 8.48 A modest increase in existing surface water flood risk may be realised due to predicted impacts of climate change, but this would be limited to the areas of land already identified as at risk.
- 8.49 The ‘upward trend’ in groundwater body status may gradually continue, but the target for achieving WFD Good status is currently set as 2050. Hence, it is unlikely that this will be achieved in the next decade.
- 8.50 The ongoing improvement works at Northfleet WTW are programmed for completion by 2028, thus resolving the current lack of capacity for proposed growth in the catchment.

Assessment of Effects (Construction and Operational)**Environmental Design and Management**

- 8.51 The design of the Proposed Development includes embedded primary mitigation measures in the form of the proposed SuDS strategy. The details of the SuDS strategy are set out within the FRA (see **Appendix 8.1**). The SuDS strategy includes source control components as well as grassed swales and pocket wetlands to treat development runoff and remove pollutants prior to discharge to ground via infiltration. The infiltration components comprise on-plot soakaways for roof runoff and strategic infiltration basins serving the hard paved areas.

Effects During Construction

- 8.52 The construction period is programmed to continue into the early 2030s. There may be overlap as some phases of development are completed and operational while other phases remain under construction. For the purposes of assessment within this chapter, the Construction Phase effects are considered as those occurring due to the actual construction activities. Effects related to completed phases are considered as Completed Development.

Flood Risk

- 8.53 The construction activities will have no material effect on the existing flood risk around the Site. This topic is considered further under Completed Development.

Water Quality

- 8.54 The works will involve vegetation clearance and movement of large volumes of soil including temporary stockpile creation. There will be large areas of exposed earth until new surfaces are constructed and vegetation cover is established. Therefore, during the works there is an increased risk of silt pollution where soil is washed downstream by heavy rainfall. However, there are no watercourses or surface water features in the locality of the Site. On this basis, the significance is assessed as **negligible**.
- 8.55 The groundwater body beneath the Site would not be impacted by silt wash-off, but could be impacted by oil/chemical spillage. The works will require heavy plant with on-site refuelling provision, concrete pours and materials storage as usual for a construction project of this type. The risk of pollution of groundwater due to spillage of oils and chemicals is therefore increased during the Construction Phase.
- 8.56 A spill would be localised and, if allowed to remain in situ, would in most cases break down over time in the soil. Nonetheless, the Site includes SPZ II and III designations and hence the significance of a groundwater pollution incident is assessed as **moderate adverse**. Mitigation measures are discussed in the next section.

Wastewater Disposal

- 8.57 The construction activities will have no material effect on the local wastewater infrastructure.

Effects Once the Proposed Development is Operational

Flood Risk

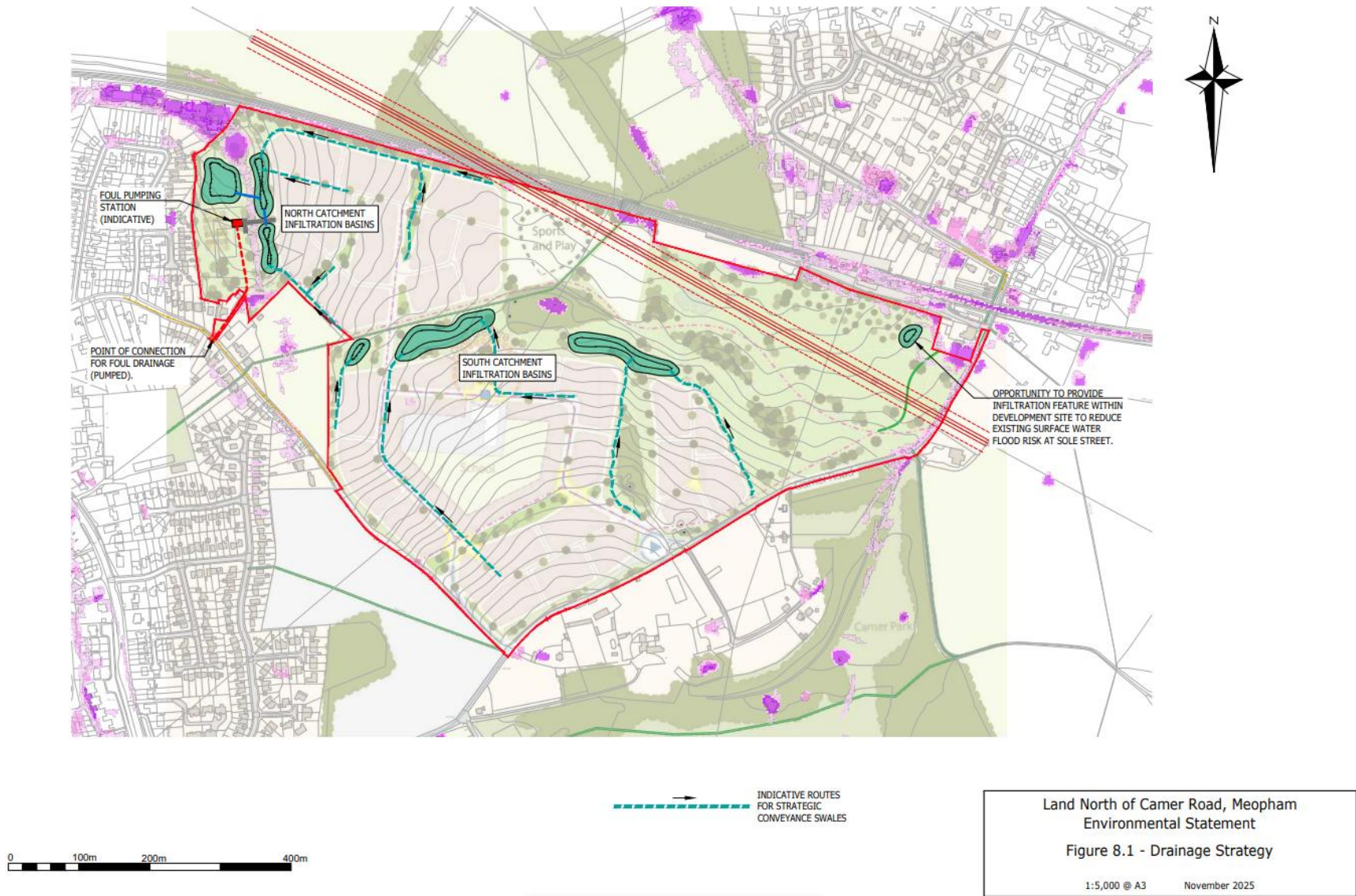
- 8.58 The FRA (see **Appendix 8.1**) concludes that all vulnerable uses proposed are located outside of flood risk areas in accordance with the NPPF. Land affected by surface water flood risk is kept free of built development. Existing surface water flood risk pathways have been observed in the parameter plans and the proposed SuDS strategy with affected areas incorporated into the green and blue infrastructure corridors as green open space and other compatible outdoor amenity uses. By keeping built development outside of flood risk areas, the effect on the Proposed Development is **negligible**.

8.59 The principal issue discussed in the FRA is the management of surface water runoff from new development at the Site. The proposed masterplan layout results in an increase of impermeable area to approximately 14.6ha. The FRA sets out the required inherent primary mitigation in the form of the proposed SuDS strategy which is summarised as follows:

- The in-situ ground investigations yielded suitable soakaway rates within the chalk strata to accommodate infiltration features.
- Infiltration drainage techniques will provide a complete surface water management solution which means that an off-site discharge will not be required.
- Runoff from roofs will discharge to ground via on-plot soakaways.
- Runoff from hard paved areas will be treated by the SuDS components and conveyed to strategic infiltration basins located within the public open space.
- Sufficient storage volume will be provided based on the recorded infiltration rates at each location to cater for all rainfall events up to the 1 in 100 (1%) AEP including an additional 45% allowance for climate change.
- Assumptions about the soakaway storage volumes to be provided within the development parcels to deal with roof runoff have been made within the FRA.

8.60 The SuDS strategy layout is illustrated as **Figure 8.1**. Refer to the FRA at **Appendix 8.1** for more details.

Figure 8.1 Drainage Strategy



- 8.61 This strategy reduces runoff to similar to the greenfield conditions by infiltrating excess runoff to ground. This will mitigate any increase in flood risk downstream of the Site resulting from the increase in impermeable surface area. The significance of the effect on downstream flood risk is assessed as **negligible** due to the inherent primary mitigation (the SuDS strategy).

Water Quality

- 8.62 The Proposed Development does not include any effluent discharges to ground. The FRA includes assessment of water quality impacts associated with development runoff using the Simple Index Approach. In the developed scenario, the Site is conservatively classified as medium pollution hazard level to represent the inclusion of the spine roads. A summary of the assessment is given in **Table 8.6** below based on the SuDS strategy which includes source control, swales and the infiltration basins in sequence forming a treatment train. Refer to the FRA at **Appendix 8.1** for more information.

Table 8.6 Assessment of runoff water quality

Pollutant Category	Pollution hazard indices for medium hazard classification	Total mitigation indices based on SuDS strategy
Total suspended solids (TSS)	0.7	1.1
Metals	0.6	1.1
Hydrocarbons	0.7	1.2

- 8.63 The assessment demonstrates that the inherent primary mitigation within the drainage system will adequately protect the receiving groundwater body. the significance is therefore assessed as **negligible**.

Wastewater Disposal

- 8.64 The foul drainage strategy is set out in the FRA (see **Appendix 8.1**) and comprises a pumped connection to the existing public foul sewer network to the south of the Site. The Proposed Development will create an additional demand on the local sewer network and on the Northfleet WTW.
- 8.65 As mentioned earlier, a statutory improvement scheme by Southern Water is underway to provide capacity at Northfleet WTW to accommodate proposed growth in the catchment. Completion is scheduled for Q2 2030. Construction of the Proposed Development is anticipated to commence in Q4 2027, which means sufficient capacity will be in place at the WTW in time for the first phase of the Proposed Development to be completed, likely Q1 2030. On this basis, the effect of the Proposed Development on the WTW capacity (and indirectly upon the receiving water body) will be **negligible**.
- 8.66 As stated earlier, Southern Water will assess the sewer network capacity following submission of a planning application. It is assumed that the size of the Proposed Development will be too large for the foul drainage flows generated to be accommodated within the existing sewer system without

causing flooding and pollution downstream. Without mitigation, this significant effect is assessed as **moderate adverse**.

Mitigation Measures

Mitigation During Construction

- 8.67 From the foregoing assessment, mitigation measures are needed during the construction works to prevent pollution entering groundwater. The risk will need to be controlled by means of good-practice site management and this issue will be dealt with in the Construction Environmental Management Plan (CEMP) which will be required by planning condition. The CEMP will include such measures as follows:
- Outlets (to infiltration features) protected with geotextile or straw bales;
 - Action plans to protect groundwater from spillages;
 - Pumped discharges for dewatering to be filtered through a silt interceptor or via temporary settlement basins;
 - Storage and filling points etc for oils, fuels or chemicals will be sited on impervious bases in a bunded compound with sump;
 - Tanks will be double-bunded, secured and sited away from drainage systems;
 - Phasing of earthworks and seeding coordinated to limit the duration that bare soils are exposed;
 - Temporary silt fencing installed at the bottom of slopes and stockpiles;
 - Use of biodegradable erosion control matting along above-ground flow routes; and
 - Regular inspections of all pollution control measures.
- 8.68 Additional measures may be required following the intrusive site investigations and preparation of any remediation strategy required to address any identified contamination sources.
- 8.69 These mitigation measures represent normal best-practice site management techniques and are not generally unique to this development. To ensure the measures remain in place for the duration of the works the CEMP will set out that the Developer and the Principal Contractor will monitor and record site conditions and operations to ensure the provisions set out in the CEMP are adhered to. A formal review of the CEMP will be carried out after commencement to ensure all provisions are adhered to, and to identify any potential improvements to operations. A record of this review will be provided to GBC upon request.
- 8.70 With the CEMP in place the risk of a pollution event is greatly minimised. Robust, well-managed action plans will also help to ensure any pollution event is contained and cleaned up promptly before it can enter the water environment, or urgently remediated before any lasting adverse effects are experienced. With the mitigation measures in place, the baseline conditions will be unchanged and the residual effects of the Proposed Development will be **negligible**.

Mitigation Once the Proposed Development is Operational

- 8.71 Off-site upgrades to the wastewater network may be required to serve the completed Proposed Development. Any capacity improvements required will need to be in place prior to occupation of the completed Proposed Development.
- 8.72 The mechanism for addressing sewer capacity issues to accommodate new development is established is by means of Infrastructure Charges which all developers must pay. Sewer connections will not be permitted prior to the delivery of any upgrade solutions required to service those connections.
- 8.73 Any network improvements required would be carried out by Southern Water. The nature of any upgrades will be determined following Southern Water's detailed modelling work and would be funded entirely by Southern Water who recoup costs through the Infrastructure Charging arrangements.
- 8.74 The typical programme for delivering upgrades for projects of this scale is 18-24 months including modelling, design and construction, and this programme will commence following outline planning consent. This will be coordinated and phased with the Proposed Development's programme to ensure all required off-Site improvements are delivered in time for modelled occupation thresholds. Based on current programme information, construction of the Proposed Development is anticipated to commence in 2028, leaving ample time for the required off-Site reinforcements to be implemented in advance of connection.
- 8.75 On the basis that all off-Site improvements will be carried out by Southern Water before the Proposed Development is completed, the residual effect will be **negligible**.

Residual Effects and Monitoring

- 8.76 The residual effects arising from the Proposed Development are summarised in **Table 8.7** below.

Table 8.7 Summary of Residual Effects

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect	Mitigation and Monitoring	Residual Effect**
Construction Effects						
Silt pollution and spillage incidents	Downstream surface water environment (Low)	Temporary, Local	Very Low	Negligible	None required, but adherence to the CEMP also mitigates	Negligible
Oil/chemical spillage	North Kent Medway Chalk groundwater body (Medium)	Temporary, Local	Medium	Moderate Adverse	Adherence to the CEMP	Negligible
Operational Effects						
Built development in surface water flood risk area	People and property (High)	Permanent, Local	Nil – risk areas preserved free of built development	Negligible	None required	Negligible
Increase in surface water runoff due to increase in impermeable surface area	People and property (High)	Permanent, Local	Very Low – embedded primary mitigation (SuDS strategy)	Negligible	None required	Negligible
Impact on groundwater quality from development runoff being discharged to ground	North Kent Medway Chalk groundwater body (Medium)	Permanent, Local	Very Low – embedded primary mitigation (SuDS strategy)	Negligible	None required	Negligible

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect	Mitigation and Monitoring	Residual Effect**
Increased pollution at WTW outfall due to Proposed Development foul drainage flows	Public wastewater infrastructure (Medium)	Permanent, WTW Catchment	Very Low	Negligible	None required	Negligible
Increased sewer flood risk downstream	Public wastewater infrastructure (Medium)	Permanent, WTW Catchment	Medium	Moderate Adverse	Southern Water network upgrades	Negligible

Notes: * incorporating environmental design and management, ** incorporating mitigation and monitoring measures

Likely Significant Environmental Effects

- 8.77 With the mitigation measures in place as described, there are no residual significant effects resulting from the Proposed Development.

Summary and Conclusions

- 8.78 The Proposed Development includes embedded primary mitigation in the form of the SuDS strategy which will manage runoff volume and water quality prior to discharge to ground. The risk of a pollution incident affecting the groundwater body beneath the Site during the Construction phase will be managed by means of the CEMP which will be secured by planning condition. Impacts on the wastewater network will be mitigated by means of Southern Water's upgrades funded by Infrastructure Charges.
- 8.79 With these measures in place, the Proposed Development will not result in any residual significant effects relating to hydrology, flood risk and drainage.

Effect Interactions and Cumulative Effects

Cumulative Effects of the Proposed Development with Other Development Schemes

- 8.80 The cumulative schemes identified earlier in this ES are in the same hydrological catchment as the Proposed Development and therefore could have a potential cumulative effect on the local hydrology, flood risk and drainage. However, the mitigation measures required for the Proposed Development – the SuDS strategy (embedded), the CEMP and Southern Water's network upgrades – will also be required for the other development schemes. With such measures in place, any cumulative effects will be mitigated.

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