



GA2, Land north of Great Ashby Environmental Statement

Chapter 16: Water Resource and Flood Risk

Woods Hardwick Ltd on behalf
of Pictures Estate Limited

November 2025

Iceni Projects Ltd.

Da Vinci House, 44 Saffron Hill, London, ECN1 8FH

T: 020 3640 8508 **F:** 020 3435 4228 **W:** iceniprojects.com

16. WATER RESOURCE AND FLOODING

Introduction

- 16.1 This chapter of the ES has been prepared by Woods Hardwick Ltd and presents an assessment of the likely significant effects of the Proposed Development with respect to Water Resources and Flooding. 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.
- 16.2 This chapter is supported by the following technical appendices:
- **Appendix 16.1:** Flood Risk Assessment and Drainage Strategy (FRA & DS) Rev F (prepared by Woods Hardwick)
 - **Appendix 16.2:** Desk Study & Ground Investigation Report Rev 1 (prepared by Geotechnical and Environmental Associates (GEA))
 - **Appendix 16.3:** Technical Note on Surface water Flow Route Diversion (prepared by PJA)

Competence

- 16.3 For a summary of the competency of the author of this chapter, refer to **Appendix 1.6**.

Legislation and Policy Context

Legislation Context

- 16.4 The following legislation is relevant to the Proposed Development:
- Environmental Protection Act (1990)¹;
 - Water Resources Act (1991)²;
 - Environment Act (1995)³;
 - Water Industry Act (1999)⁴;
 - Anti-Pollution Works Regulations (1999)⁵;
 - Control of Pollution (Oil Storage) (England) Regulations (2001)⁶;
 - Water Act (2003)⁷;
 - Flood and Water Management Act (2010)⁸; and
 - Environmental Protection Act (2021)⁹.

National Planning Policy

16.5 The following national planning policy is relevant to the Proposed Development:

- National Planning Policy Framework (2025)¹⁰.

Local Planning Policy

16.6 The following local planning policies are relevant to the Proposed Development

- North Hertfordshire Local Plan 2011 – 2031¹¹;
 1. Policy SP18: Site GA2 – Land off Mendip Way, Great Ashby;
 2. Policy D1: Sustainable design;
 3. Policy NE7: Reducing flood risk;
 4. Policy NE8: Sustainable drainage systems;
 5. Policy NE9: Water quality and environment; and
 6. Policy NE10: Water conservation and wastewater infrastructure.

Guidance

16.7 The following guidance is relevant to the Proposed Development:

- National standards for sustainable urban drainage systems (2025)¹²;
- The SuDS Manual C753 (CIRIA 2015)¹³;
- Designing for exceedance in urban drainage (CIRIA C635)¹⁴;
- Sewerage Sector Guidance (SSG)¹⁵;
- Building Regulations Part H¹⁶;
- BS EN 752:2017 – Drain and Sewer Systems Outside Buildings¹⁷;
- The Environment Agency's approach to groundwater protection (2018)¹⁸;
- Hertfordshire LLFA Summary Guidance for developers (2021)¹⁹;
- Hertfordshire Local Flood Risk Management Strategy (2019)²⁰; and
- Hertfordshire LLFA Climate Change Allowance Note²¹.

Assessment Methodology and Significance Criteria

- 16.8 This section presents the methodology used to assess the potential effects of the Proposed Development in relation to Water Resource and Flood Risk.

Consultation

- 16.9 The Environmental Statement chapter and subsequent Flood Risk Assessment produced for North East Stevenage has been consulted on with the following stakeholders:

- Environmental Agency;
- North Herts Council;
- Hertfordshire County Council Lead Local Flood Authority; and
- Thames Water.

- 16.10 **Table 16.1** presents a summary of the comments raised in the Council's EIA Scoping Opinion and other discussions with relevant consultees with respect to Water Resource and Flood Risk.

Table 16.1 Summary of Comments Raised in the Scoping Opinion

Consultee	Comment	Response
Environment Agency	No environmental concerns	N/A
Lead Local Flood Authority (LLFA)	Opportunities should be sought on how the development may further reduce flood risk downstream as part of this development. The latest climate change allowances are required to be applied at the time of the assessment. The latest FEH rainfall method should be applied in all hydraulic modelling calculations at the time of any calculations and assessment. The protection of the Source Protection Zone is required to be considered in the proposed drainage for the site.	The proposed masterplan incorporates mitigation works in relation to the existing surface water flow route which runs through the site. The latest climate change allowances have been applied to all calculations. The drainage calculations utilise the latest FEH data. No infiltration is proposed.

Thames Water	Please can the following issues be considered and covered in the Environmental Statement: 1. The developments demand for Sewage Treatment and network infrastructure both on and off site and can it be met 2. The surface water drainage requirements and flood risk of the development both on and off site and can it be met. 3. Build - out/ phasing details to ensure infrastructure can be delivered ahead of occupation. 4. Any piling methodology and will it adversely affect neighbouring utility services.	Please refer to Appendix - Applicant's response to EIA Scoping Opinion. These items will either be included in the introductory chapters of the Environmental Statement or within standalone planning documents, as follows: 1. infrastructure demand – this will be dealt with in the utilities assessment. 2. surface water drainage requirements – As set out in the Scoping Report, changes to the surface water drainage regime and potential risk of surface water flooding to the site or downstream will be considered in the Environmental Statement. Surface water flood risk has been scoped out. A standalone flood risk/drainage strategy will also be submitted with the application, and the detail will be described in the introductory chapters. 3. Phasing details will be included in Chapter 3 of the Environmental Statement. 4. An overview of the construction methodology will be included in Chapter 3. Consideration of piling will be included in the utilities assessment. Please refer to Thames Water Pre-planning Enquiry provided within the FRA Appendix N.
Natural England	The assessment should take account of the risks of water pollution and how these can be managed or reduced.	Surface water treatment is provided in accordance with the requirements of the CIRIA SuDS Guidance.

Great Ashby Community Council	GACC can see no reference to the environmental problem of the treatment of generated wastewater and sewage. GACC understands that the current infrastructure within Great Ashby is under pressure and this will need to be addressed. Thames Water does not appear to be a consultee, but the discharge of waste is an environmentally sensitive issue and it is hoped this will be scoped into the EIA.	Pre-planning discussions have taken place between the applicant and Thames Water. Thames Water have advised that they will modelling the network and design and implement the necessary mitigation at such time as the site benefits from outline planning consent. This is their standard approach and if necessary temporary measures will be put in place.
Weston Parish Council	The section of Waste does not include a reference to foul water. Given the current nationwide challenges of foul water processing and the consequential impact of treatment plants being overwhelmed, we would have thought it essential that this is regarded as being in scope. This is especially important in this area given the proximity, importance and environmental sensitivity of the River Beane.	There have been three pre-planning enquiries with Thames Water for this development and continuous liaison with Thames Water will ensure that the development does not result in negative foul impacts. Thames Water has stated that in they will be able to make appropriate upgrades to the network, however they can only begin modelling work to design a solution once the site has received planning permission.

Study Area and Scope

Study Area

- 16.11 The study is confined to the redline site boundary extent and the Thames Water foul drainage network into which foul water flows from the site will discharge.
- 16.12 The baseline year of the assessment is 2025.

Site Location

- 16.13 Please refer to the plan included within **Chapter 1**.

Scope

- 16.14 The Scoping Report identified the following as aspects that would not be considered in the ES because potential effects on these receptors are not likely to be significant:
- Impact on foul water network. Capacity checks will be undertaken by Thames Water and any reinforcement works that are required either to the piped drainage network or at the receiving treatment works will be undertaken prior to the discharge of flows from the site to the network.

- Surface water flood risk, flows will be managed, attenuated and discharged at a restricted rate in accordance with agreements made with the Local Authority.
- Any existing surface water flow routes will either be incorporated into the proposed drainage network or kept free from built development.

Assessment Methodology

Impact Areas

- 16.15 A Site Investigation has been undertaken by GEA to determine whether the underlying conditions on the Site are suitable for drainage via infiltration.
- 16.16 The site's underlying ground conditions are generally not suitable to support an infiltration based surface water drainage strategy. It is therefore proposed that surface water is attenuated onsite and discharged to the existing ditch network at the calculated greenfield rate.
- 16.17 The surface water drainage strategy will incorporate a range of sustainable drainage systems such as swales, permeable paving and attenuation basins. Unlined permeable paving will be used in localised areas where ground conditions allow infiltration.
- 16.18 The strategy will ensure that surface water is treated such that it is an acceptable quality prior to discharge.
- 16.19 Thames Water have been commissioned to undertake a Pre-Planning Assessment Report to determine if there is sufficient capacity within the foul water network to accommodate the proposed development. Their response is that currently the sewerage network has enough capacity for 20 houses, however off-site reinforcements can be made to serve the remainder of the development.

Significance Criteria

- 16.20 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

- 16.21 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 16.2**.

Table 16.2 Receptor Sensitivity Description

Value (Sensitivity)	Description
High	• A water resource which is of high quality and highly sensitive to change. • Includes sites with nature conservation designations with water-dependent ecosystems: e.g. Special Protection Area and Special Area of Conservation. • Also includes all nature conservation sites of national importance designated by statute including Sites of Special Scientific Interest and National Nature Reserves. • A groundwater aquifer constituting a valuable resource because of high quality and yield, extensive exploitation for public, private domestic, agricultural and/or industrial supply, or designated sites of nature conservation are dependent on groundwater. • A floodplain or flood storage area necessary to protect highly vulnerable development and valued resources from flooding. • An individual that is at risk of loss of live and livelihood from significant flooding to their home or business. • A public water utility that holds no capacity and is at currently experiencing constant service issues.
Medium	• A water resource of medium quality and medium sensitivity to change. • Includes non-statutory sites of regional or local importance designated for water dependent ecosystems. • A groundwater aquifer of limited value because its quality does not allow potable or other quality-sensitive uses (but which may be used for agricultural or industrial purposes) and where exploitation is not extensive, or where local areas of nature conservation are known not to be sensitive to groundwater quality. • A floodplain or flood storage area protecting development and resources which are classified to be of medium vulnerability. • An individual that is at risk of life changing impacts from significant flooding to their home or business. • A public water utility that holds little capacity and is often experiencing service issues.
Low	• A water resource of low quality and low sensitivity to change. • A groundwater aquifer of low water quality and/or very low permeability that make exploitation of the aquifer unfeasible, or where changes to groundwater are not expected to have an impact on local ecology. • A floodplain or flood storage area with limited or no flood protection value. • An individual that is at risk of minor injury from significant flooding to their home or business. • A public water utility that holds capacity but in times of extreme stress experiences service issues.

Very Low	• A water resource of little or no interest. • An individual that is inconvenienced by significant flooding to their home or business. • A public water utility that experiences no service issues.
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Magnitude of Impact

16.22 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 0.

Table 16.3 Magnitude of Impact Description

Impact Magnitude	Description
High	• Loss (or gain) of a water resource or a major shift away from the baseline conditions. • Effects that result in a fundamental change to water quality condition either by a relatively high amount over a long-term period or by a very high amount over an episode such that a water resource is greatly changed from the baseline situation or any change that does not comply with the Water Framework Directive. • For groundwater, a major permanent or long-term change to groundwater quality or available yield. Existing resource use is irreparably affected. Changes to quality or water table level that have a major impact on local ecology. Or water availability is increased as a result of the development. • For floodplains, a major loss (or gain through defence or compensation schemes) of flood storage capacity or change to risk of flooding. • For flood risk to on and off-site users, loss of life, homes business and vital infrastructure. • For public water utilities, causing major failure of the system providing no service to users.
Medium	• Loss (or gain) of a part of a water resource or a measurable shift from the baseline conditions. • Effects that may be long-term or temporary. Effects that result in a change in the ecological status or productivity/commercial value of a water resource. • Changes to the local groundwater regime predicted to have a slight effect on resource use but not rule out any existing supplies. Minor impacts on local ecology may result. • For floodplains, a moderate loss (or gain) of flood storage capacity or change to risk of flooding. • For flood risk to on and off-site users, causing life changing impacts and loss of income and property. • For public water utilities causing failure of the system to work adequately causing large reduction in potable capacity/ foul surcharging.

Low	• Localised effect on a water resource or a minor shift away from the baseline conditions. • Changes in water quality that are likely to be relatively small or be of a minor temporary nature such that water resource ecology or commercial value is slightly affected whether beneficial or adverse. • Changes to groundwater quality, levels or yields that do not represent a risk to or benefit an existing resource use or ecology. • For floodplains, a minor loss (or gain) of flood storage capacity or change to risk of flooding. • For flood risk to on and off-site users, causing loss of income to business owners and shift workers. • For public water utilities, causing long term impacts. This may require assets to be improved earlier than designed.
Very Low	• Very slight change from the baseline conditions such that no discernible effect upon the water resource's ecology results. • Very slight change from groundwater baseline conditions approximating to a 'no change' situation. • For flood risk to on and off-site users, inconvenience to users. For public water utilities, no meaningful impact can be found • on the network.

Assessing Significance

- 16.23 **0** provide a matrix for determining the significance of an effect based on the sensitivity of the receptor and the magnitude of impact.

Table 16.4 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
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

- 16.24 Effects classified as major or moderate are considered ‘significant’. Effects classified as minor or negligible in scale are considered ‘not significant’.

Limitations and Assumptions

- 16.25 This ES Chapter is written and based on the review of information available at the time of writing. Conclusions presented are a combination of professional views supported by liaising with relevant key stakeholders and consultees together with the latest relevant policy and guidance.

Baseline Conditions

Establishing Baseline Conditions

- 16.26 Ground Investigation: The Desk Study & Ground Investigation Report undertaken by GEA (**Appendix 16.2**) in March 2023 has been reviewed to establish existing site conditions.
- 16.27 The EA Online Flood Maps including Surface Water Flood Map and Reservoir Flood Map data have all be reviewed to establish the flood risk to the site and surrounding area.
- 16.28 Thames Water sewer asset plans have been reviewed to establish existing networks supplying the site.
- 16.29 The topographic survey undertaken by Terrain Surveys in July 2021 has been reviewed to establish levels of existing site features and ground slopes.

- 16.30 PJA was commissioned to prepare a to undertake a preliminary catchment analysis and high-level flow calculations to enhance understanding of an existing identified surface water flow route, as shown on the publicly available Long Term Flood Risk Information, Flood Risk from Surface Water map.

Baseline Conditions

Site and Topography

- 16.31 The site, which currently comprises agricultural land and woodland, is located within Weston Parish, a civil parish situated within the administrative boundary of North Hertfordshire District Council (NHDC) who represent the Local Planning Authority (LHA).
- 16.32 The topographical survey drawing (**Appendix 16.1**) shows that the site generally site falls towards the existing watercourse located south of the site. Site levels vary from 144.42m AOD to 112.14m AOD.

Existing Surface and Foul Water Drainage

- 16.33 Thames Water's sewer records confirm the presence of existing foul and surface water sewers which run along Mendip Way to the west of the site. There are no existing foul water sewers within the site boundary.

Existing Water Mains

- 16.34 It is noted that there is an existing 180mm PE Affinity Water main within Mendip Way
- 16.35 Affinity Water were contacted to establish if capacity exists in the mains networks within the vicinity of the site, they confirmed that the existing network does not have sufficient capacity to supply the new development but did note that the following reinforcement work will be required in order to supply the site:

"It is recommended that the pump at Pinn Green Reservoir is set at 20m to improve the pressure at the critical point. In addition, it is recommended that the standby pump at the Pinn Green Reservoir is activated and the pressure control set at 20m to reduce the impact upon the network".

- 16.36 The developer's contribution will be covered by the payment of our infrastructure charge, which will be levied against each new property connected to our network.

Existing Watercourse

- 16.37 The nearest EA main river is the River Beane, a tributary of the River Lea, situated approximately 2.3km south east of the site. However, it should be noted that there is an existing ditch which runs adjacent to the south/south western boundaries of the site, alongside an existing balancing pond in the same area.

Existing Land Drainage

- 16.38 The site is currently greenfield, comprising agricultural land and woodland. There are therefore no formal land drainage systems on site.

Flood Data

- 16.39 The Environment Agency (EA) Flood Map demonstrates that the site lies within Flood Zone 1 and is therefore classified as having less than a 1 in 1,000 annual probability of flooding from rivers or seas.

Existing Sources of Flooding

- 16.40 Fluvial/Tidal: As previously mentioned, the proposed development land is situated in Flood Zone 1. Therefore, it is considered that the site is not at risk of flooding from rivers and/or watercourse. It should also be noted that the nearest sea to the site is the North Sea, which is located over 120km to the east of the site. Given this distance, the proposed development is also not considered to be at risk of flooding from the sea.
- 16.41 Surface Water and Overland Flow: The EA Surface Water Flood map shows that the majority of the development is not considered to be at risk of surface water flooding. There are however surface water flow routes through the site which correlate with the natural valleys on the site. PJA were commissioned to undertake a preliminary catchment analysis and high-level flow calculations to enhance understanding of the flow route. This preliminary analysis and the high level calculations have informed an initial estimate of the potential diversion channel and associated cross-sectional requirements which have been agreed in principle by the LLFA and have now been incorporated into the latest site masterplan. As agreed with the LLFA this route is kept separate from the proposed onsite surface water drainage network. Based on the information above, the proposed development is not considered to be at risk of flooding from this source.
- 16.42 Groundwater: A Ground Investigation of the site was undertaken by Geotechnical & Environmental Associated Limited (GEA) in February 2023. From the report, it is noted that no groundwater was encountered during drilling and the standpipes were found to be dry during the monitoring visit. Therefore, the flood risk from groundwater is considered to be low.
- 16.43 Sewers: As previously mentioned, the Thames Water sewer records did not identify any existing foul and surface water sewers within the site boundary. In addition, a sewer flooding enquiry was carried out with Thames Water who confirmed that they have no records of flooding in the vicinity of the site in the last 20 years. As such, the flood risk from sewers is considered to be low.
- 16.44 Reservoir: The EA Reservoir Flood Map shows that no part of the site or any immediately neighbouring land is shown to be at risk of flooding from reservoirs. The proposed development is therefore not considered to be at risk of flooding from the aforementioned source.

Geology

- 16.45 From the Ground Investigation Report (**Appendix 16.2**) it is noted that beneath a nominal thickness of made ground, Superficial Deposits were found over the Lewes Nodular Chalk Formation and Seaford Chalk Formation. The made ground comprised dark brown silty sandy clay with gravel rootlets extending to depths of between 0.10m and 0.50m. The superficial deposits generally comprised of slightly sandy clay with variable fine to coarse chalk and flint gravel. These deposits extended to depths of between 0.80m and 7.00m and the thickness of the stratum was found to be more consistently thick in the west of the site with thickness reducing in the east.

Hydrogeology

- 16.46 According to Defra's Magic Map the site is located within a groundwater Source Protection Zone 3 – Total Catchment.
- 16.47 The Aquifer Designation Map (Bedrock) indicates there is a Principal bedrock aquifer below the site. Whilst the Aquifer Designation Map (Superficial Drift) identifies Secondary (undifferentiated) superficial drift beneath part of the site.

Surface Water and Groundwater Quality

- 16.48 The site is currently greenfield, comprising agricultural land and woodland. Therefore, the existing site arrangements and activities cannot affect the quality of the groundwater and surface water. Receptors
- 16.49 A list of existing and future receptors is included in Table 16.5.

Table 16.5 Existing and Future Sensitive Receptors

Receptor	Sensitivity
Existing Receptors	
Groundwater	Medium to High
Public Sewer	Very Low to Low
Off-site Users	Low to Medium
Public Mains Water Network	Low to Medium
	Medium to High
Future Receptors	
Surface Water Bodies	Medium to High
On site Users	Low to Medium

Future Baseline

- 16.50 Future baseline elements relating to surface water and flood risk will not significantly change should development proposals not proceed.
- 16.51 Thames Water sewer and mains water capacity may reduce as other developments take place and connect to the existing sewer network.

Assessment of Effects (Construction and Operational)

Environmental Design and Management

- 16.52 The development design generally excludes the use of infiltration SuDS and included green SuDS to improve pollution mitigation of surface waters before discharging to the existing ditch network to the south of the development site. It should be noted however, that unlined permeable paving will be used where possible, within parts of the site with good infiltration rates.
- 16.53 Allowances for climate change have been made in the design to ensure that the proposed drainage system will cope with the increased rainfall intensities in the future.

Effects During Construction

Surface Water Flooding

- 16.54 Changes in site topography due to site clearance and construction works can alter existing flow paths and site low points. This can result in surface water ponding in new areas on site which are more vulnerable in terms of surface water flooding.
- 16.55 The EA surface water flood map shows that there are surface water flow routes through the site, these will be accommodated within the development proposals or diverted to suit.
- 16.56 Following pre-application discussions with the LLFA, JBA were commissioned to undertake a preliminary catchment analysis of one of the main flow routes through the site. This preliminary analysis and high level calculations have informed an initial estimate of the potential diversion channel capacity which has now been incorporated into the site Masterplan.
- 16.57 Although temporary and short term ponding is not desirable, this is likely to be an effect of moderate adverse significance without sufficient mitigation measures.

Contamination of Water Resources

- 16.58 Pollution of nearby water bodies and groundwater aquifers may occur from:
- The operation of construction vehicles;
 - Dust generation from construction activities;

- Inappropriate maintenance of fuel and material storage areas;
- Oil leak/spillages;
- General construction activities (including any groundwater dewatering); and
- Potential mobilisation of any existing contaminants to water resources as a result of earthworks, trench excavations, piling and other construction activities.

16.59 General construction activities can cause contamination of surface and groundwaters by pollutants such as hydrocarbons, suspended solids, and construction materials. Inappropriate storage of construction materials (paints and solvents) may result in contaminants and sediments being mobilized into the water environment. The main receptor is the potential Secondary A groundwater aquifer below the site associated with the anticipated superficial deposits.

16.60 Without mitigation, the overall potential effect on surface water quality would be, moderate adverse.

Effects Once the Proposed Development is Operational

Surface Water Drainage

16.61 The development will introduce SuDS in the form of attenuation basins and swales; and soft landscaped areas to control surface water runoff and improve surface water quality before discharging into the existing ditch network to the south of the development site.

16.62 Upon localised infiltration testing at detailed design stage, if it is found that there are parts of the site with infiltration potential, unlined permeable paving will be used within private roads and drives. This provides a form of source control and will reduce the runoff discharged into the ditch network.

16.63 The LLFA and Thames Water have confirmed their agreement in principle for surface water to discharge into the existing ditch located south of the site. Therefore, the development will have a beneficial impact on the capacity of public sewers and an effect of negligible significance on groundwater body contamination.

16.64 A risk of pollutants spreading from roofs, roadways, and communal areas to the existing ditch network via the new surface water drainage network is present. SuDS have been proposed to reduce pollutants to an acceptable level prior to discharging to the river. However, there is still an effect of moderate adverse significance and further mitigation is required to ensure the quality of the water body is maintained.

Increase in Potable Water Demand

16.65 The Project will increase the demand for potable water from the existing Affinity Water delivery network. There is likely to be a permanent, effect of moderate adverse significance and mitigation is required.

Increase In Foul Water Discharge Rate

- 16.66 The Project is a major development which will result in increased residential density. There are approximately 640 proposed dwellings. This, together with the other proposed buildings, will increase the peak foul water flow rate to the existing Thames Water Sewers.
- 16.67 The increase in peak foul water flow rate could cause the capacity of the public sewer to be exceeded. A permanent effect of moderate adverse significant is present and mitigation is required.

Surface Water Flooding

- 16.68 As outlined, the EA surface water flood map shows that there are existing surface water flow routes through the site, these will be accommodated within the development proposals or diverted to suit.
- 16.69 Following pre-application discussions with the LLFA, JBA were commissioned to undertake a preliminary catchment analysis of one of the main flow routes through the site. This preliminary analysis and high level calculations have informed an initial estimate of the potential diversion channel capacity which has now been incorporated into the site Masterplan.
- 16.70 The proposed dwellings will generally be contained within the areas which are not at risk of surface water flooding . Therefore, prior to any mitigation measures there is an effect of a moderate adverse significance.

Mitigation Measures

Mitigation During Construction

Surface Water Flooding and Drainage

- 16.71 An Outline Construction Environment Management Plan (CEMP) has been prepared by Icen Projects Ltd. The CEMP states that a Surface Water Management Strategy will be implemented throughout the construction works. This should control surface water, and incorporate surface water interception to capture, separate and store debris, silt and related contaminants on-site.
- 16.72 The CEMP also states that a dialogue with Thames Water and the Environment Agency should be maintained through construction works, to put in place a monitoring system which will ensure the quality of surface water and groundwater resources are not being negatively impacted by construction works.
- 16.73 In addition, the CEMP includes the following measures may be considered to reduce the potential for adverse effects on water resources:
- Preparation of an Erosion and Sediment Control plan
 - Avoidance of the discharge of polluted water from the site

- Regular inspection of sediment and erosion controls to ensure sufficient capacity is present
- Implementation of wheel washes
- Drainage of surface water runoff and de-watering effluents to settling tanks to ensure suspended solids are removed prior to the discharge of water to a sewer, or removal by a suitably licensed waste carrier
- Inspection of safe controlled storage areas for fuels, chemicals and hazardous materials to ensure sufficient capacity is maintained;
- Prevention of spills and leaks, with appropriate and timely corrective measures executed should these occur.

16.74 As previously mentioned, the existing surface water flow routes through the site will be accommodated within the development proposals or diverted to suit. As agreed with the LLFA this route is kept separate from the proposed onsite surface water drainage network.

Contamination of Water Resources

16.75 The CEMP states that measures will be put in place to control the movement of construction vehicles, as well as the management of stockpiled materials on-site, and the safe storage of fuels and chemicals. Construction vehicles will be maintained and inspected regularly to ensure there are no leakages of fuels or related substances. The CEMP states that the storage of other equipment which uses fuel will also follow the safe regime with safe controlled areas, with measures such as drip trays and bunding. A detailed CEMP will be prepared, and this will be a live document that is managed by the Principal Contractor.

16.76 All site operatives and contractors will be required to be familiar with the procedures and processes as outlined in the CEMP. This is particularly relevant for large scale environmental events such as chemical spills and/or fuel tank bursts.

16.77 It will also require input and approval from the local authority in order to ensure a robust procedure is in place to minimise the environmental risk posed by the works. It is an organic and live document which will be reviewed regularly and incorporate all relevant EA guidance.

16.78 Construction vehicles are to be maintained and inspected regularly to ensure no leaking of fuel or related substances is happening. Storage of other equipment which uses fuel will follow the same regime and will be stored in safe controlled areas, e.g. drip trays and/or bunding to minimise risk. This will be implemented over the lifespan of the construction works.

16.79 Proposed drainage networks to control surface water over the duration of the works will incorporate surface water interception which will capture, separate and store debris, silt, and related contaminants on site prior to discharging to the receiving sewers. This discharge will be subject to approval from the water authority to ensure compliance.

- 16.80 A dialogue with both Thames Water and the EA will be maintained to establish a monitoring system that ensures the quality of the surface water and groundwater resources are not being negatively impacted by construction works.

Mitigation Once the Proposed Development is Operational

Surface Water Flooding & Drainage

- 16.81 The surface water drainage maintenance strategy for the site must be adhered to. This will ensure the SuDS are successfully providing the designed pollution mitigation prior to discharge to the existing ditch network. Furthermore, it will ensure that the site users are aware of the drainage and flood mitigation systems maintenance and management requirements. The draft management strategy is provided as part of the FRA & DS document prepared by Woods Hardwick.. The final document will be included in the Health & Safety file.
- 16.82 The surface water drainage strategy was developed in consultation with the LLFA through a series of pre-application discussions and formal written advice. Following the LLFA's correspondence (letter dated 21/07/2025) and subsequent meeting held on 27/08/2025, the FRA and DS have been updated to reflect the LLFA's requirements.
- 16.83 As agreed with the LLFA, there are two main surface water flow routes through the site. One of these originated within the site and therefore did not modelling. The second flow route, however, which emanates off-site from the west, has been modelled in detail and diverted through the site to suit the proposed layout. PJA undertook a preliminary catchment analysis and high-level flow calculations which informed an estimate of the potential diversion channel and associated cross-sectional requirements which have been agreed in principle by the LLFA and have now been incorporated into the latest site masterplan. As agreed with the LLFA this route is kept separate from the proposed onsite surface water drainage network.
- 16.84 The flow route is proposed to outfall into the existing ditch network to the south of the site. The condition of the outfall has been inspected on site as requested by the LLFA and it was found to be in good condition. The ditch will be inspected again prior to connection and any repairs that are necessary will be carried out.
- 16.85 Exceedance routing measures will be incorporated to ensure that surface water flows are directed away from buildings and towards the drainage system to be implemented on site. Finished floor levels will be raised to ensure safe access and egress to/from the site.
- 16.86 The above components of the drainage strategy and flood mitigation works have been developed in line with the LLFA's requirements and have been assessed through hydraulic modelling and site inspection. In combination, these measures will help to mitigate any adverse impacts of development.

Increase in Potable Water Demand

- 16.87 Affinity Water have been consulted with regards to the existing and future capacities of their network.
- 16.88 Water reduction measures will be implemented as part of the development to reduce the potable water demand. Design will consider, eco flush toilets, taps and showers. Rainwater harvesting methods will be considered for any irrigation system on the site.

Increase In Foul Water Discharge Rate

- 16.89 A pre-development enquiry has been made to Thames Water who have confirmed that there is currently insufficient capacity within the existing Thames Water foul water sewer network to serve the fully occupied development.
- 16.90 However, the response advises that it is Thames Water's responsibility to ensure that there is capacity within the network and at the receiving treatment works for development benefitting from planning consent. Modelling of the network will be undertaken to determine the necessary mitigation works which will be undertaken by Thames Water.

Residual Effects and Monitoring

- 16.91 The residual effects arising from the Proposed Development are summarised in Table 16.6 below.

Table 16.6 Summary of Residual Effects

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect (Statement of Significance BEFORE mitigation)	Mitigation and Monitoring	Residual Effect
Construction Effects						
Surface Water Flooding	On site users (Low to Medium)	Site	Medium	Moderate Adverse (Significant)	Adherence to the CEMP	Minor Adverse
Contamination of Water Resource from Construction	Ground Water and Surface Water Bodies (Medium to High)	Catchment	High	Major Adverse (Significant)	Adherence to the CEMP Monitoring groundwater and surface water body quality. Maintain dialogue with EA and Thames Water	Minor Adverse

Surface Water Drainage	On site users (Low to Medium)	Site	Medium	Moderate Adverse (Significant)	Adherence to the CEMP The existing surface water flow routes through the site will be accommodated within the development proposals or diverted to suit.	Minor Adverse
Operational Effects						
Contamination of Water bodies from Surface Water Run Off	Surface Water Bodies (Medium to High)	Catchment	Low	Moderate Adverse (Significant)	Adherence to the surface water drainage maintenance strategy.	Minor Adverse
Increase in Potable Water Demand	Public Mains Water Network (Medium to High)	District	Low	Moderate Adverse (Significant)	A pre-development enquiry to establish existing capacity.	Minor Adverse
Increase In Foul Water Discharge Rate	Public Sewer Network (Medium to High)	District	Low	Moderate Adverse (Significant)	A pre-development enquiry establishing existing capacity.	Minor Adverse
Surface Water Flooding and Drainage	On site and off-site users (Low to Medium)	Local	Medium	Moderate Adverse (Significant)	Adherence to the surface water drainage maintenance strategy.	Minor Adverse

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

Likely Significant Environmental Effects

- 16.92 The results of the assessment have concluded that post mitigation there will be one significant effect. Contamination of water resource from construction will remain to hold a potential effect of moderate adverse significance, post mitigation. Continuous water quality monitoring and liaison with the EA and Thames Water will provide information and further mitigation approaches to the adverse effect.
- 16.93 The proposals will have a positive effect on surface water flooding. The existing surface water flow routes through the site will be accommodated within the development proposals or diverted to suit.

Summary and Conclusions

- 16.94 This chapter has established the existing site conditions, highlighted environmental receptors sensitive to the development, the environmental effects during construction and the environmental effects during the use of the development.
- 16.95 This assessment concluded that there are several moderate adverse effects on the environmental receptors. These include:

During Construction:

- Surface Water Flooding

During Operation:

- Surface Water Drainage
- Increase in Potable Water Demand
- Increase In Foul Water Discharge Rate
- Surface Water Flooding

- 16.96 The investigation has provided sufficient methods to mitigate all moderate adverse effects.
- 16.97 One major adverse effect was established as

During Construction:

- Contamination of Water Resources from Construction

- 16.98 Mitigation measures have been provided reducing the effect to moderate adverse. Further monitoring of water quality, liaison with the EA and Thames Water is required to continue to mitigate this effect and ensure there is no negative impact on the quality of these water resources.
- 16.99 The chapter has successfully highlighted the actions required to mitigate the potential negative impacts of the development on the surrounding environment. With the mitigation methods provided, all by one effect have been reduced to a nonsignificant effect. For the single remaining residual adverse effect, suitable steps for further mitigation have been provided.

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