Former Sipson Garden Centre

Water Cycle Strategy Report
Revision P01

Virtus Data Centre
Outline Planning Application

Delivering a better world

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
00	09/10/2026	Draft Issue	KT	Kach Theeprawat	Technical Design Lead
01	16/10/2026	Final Issue	KT	Kach Theeprawat	Technical Design Lead

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1.Introduction

1.1 Background

This Water Cycle Strategy (WCS) has been prepared in support of the Outline Planning Application for the proposed Data Centre Development located within the London Borough of Hillingdon. The proposed development comprises a strategically important hyperscale data centre campus which will form part of the UK's critical digital infrastructure network and support the continued growth of cloud computing, digital storage, artificial intelligence applications and wider data processing requirements.

Water is a fundamental component of sustainable development. It influences infrastructure capacity, environmental quality, flood risk, climate resilience, biodiversity, public health and operational performance. Consequently, effective water management requires consideration of the entire water cycle rather than individual aspects of drainage or utility provision in isolation.

This report therefore adopts a holistic approach to water management and assesses how the proposed development interacts with water supply infrastructure, wastewater networks, rainfall runoff, receiving water environments and future climate change pressures. The strategy has been prepared in accordance with current planning policy and reflects the principles contained within the Environment Agency guidance on Water Cycle Studies, which promotes integrated water management and the coordinated planning of growth and infrastructure.

The strategy has been informed by several technical assessments prepared in support of the planning application, including:

- Flood Risk Assessment and Drainage Strategy.
- Utilities Statement.
- Climate Change Assessment.
- Sustainability Statement.
- BREEAM Pre-Assessment.
- Landscape and Ecology Assessments.
- Geotechnical and Environmental Investigations.

Together, these documents provide a comprehensive evidence base from which the water cycle implications of the proposed development can be assessed.

The preparation of this Water Cycle Strategy reflects the recognition that the South East of England is one of the most water stressed regions within the United Kingdom. Future population growth, economic development, climate change and increasing demand for infrastructure are expected to place continued pressure on water resources, wastewater systems and drainage infrastructure. Consequently, new development must not only demonstrate sufficient utility capacity but must also contribute positively towards sustainable water management objectives.

The proposed development has therefore been designed to minimise potable water demand, promote water reuse, improve flood resilience, enhance biodiversity and provide long-term adaptability to future climate conditions.

1.2 Purpose of the Water Cycle Strategy

The purpose of this Water Cycle Strategy is to provide an integrated assessment of the development's interaction with the entire water cycle and demonstrate that the proposed development can be delivered without creating unacceptable impacts on water resources, wastewater infrastructure, flood risk, water quality or the wider environment.

The strategy seeks to establish whether adequate infrastructure capacity exists to support the development and whether sufficient environmental capacity exists within the receiving catchment to accommodate future growth. In doing so, the report provides a strategic framework that supports the planning application and demonstrates compliance with national, regional and local planning policy requirements.

Specifically, the Water Cycle Strategy considers the following key questions:

- **Water Supply**

Can sufficient potable water be supplied to serve the development throughout its operational life without placing unacceptable pressure on existing water resources or infrastructure?

- **Water Demand**

Have appropriate measures been incorporated into the development to minimise potable water consumption and improve water efficiency?

- **Wastewater Infrastructure**

Can foul water generated by the development be safely collected, conveyed and treated using existing and proposed wastewater infrastructure?

- **Surface Water Management**

Can rainfall runoff generated by the development be managed sustainably whilst reducing flood risk and protecting receiving environments?

- **Water Quality**

Can the proposed development be delivered without causing deterioration in surface water or groundwater quality?

- **Climate Change**

Has the drainage and water management strategy been designed to remain effective throughout the anticipated operational life of the development under future climate conditions?

- **Environmental Capacity**

Can the wider catchment accommodate the proposed development without adverse impacts on water resources, infrastructure or environmental receptors?

- **Biodiversity and Blue-Green Infrastructure**

Can water management infrastructure contribute positively towards biodiversity enhancement, landscape quality and wider placemaking objectives?

By addressing these questions, the Water Cycle Strategy provides the evidence necessary to demonstrate that the development represents a sustainable form of growth and that water-related infrastructure and environmental considerations have been appropriately addressed.

1.3 Objectives of the Water Cycle Strategy

The primary objective of the strategy is to ensure that development of the site can proceed in a sustainable manner whilst maintaining appropriate protection of water resources and environmental receptors.

To achieve this objective, the strategy has been developed around the following principles.

Efficient Use of Water Resources

A fundamental objective is to minimise reliance on potable water supplies through the implementation of water efficient technologies, operational controls and water reuse opportunities.

This includes reducing demand at source through building design, implementing smart monitoring systems and maximising opportunities for rainwater harvesting and future water recycling initiatives.

Infrastructure Capacit

The strategy seeks to confirm that sufficient capacity exists within existing water supply and wastewater infrastructure to accommodate the proposed development and that any upgrades required can be delivered within normal utility planning programmes.

Flood Risk Reduction

The development has been designed to ensure that flood risk is not increased either within the site boundary or elsewhere within the receiving catchment.

The strategy incorporates attenuation storage, controlled discharge, exceedance routing and climate resilience measures to ensure appropriate flood risk management.

Protection of Water Quality

The drainage strategy adopts a treatment train approach in accordance with current SuDS best practice to minimise pollutant loading and protect downstream water bodies and groundwater resources.

Climate Resilience

The strategy seeks to ensure that the development remains operationally resilient under future climate conditions, including increased rainfall intensity, prolonged drought periods and rising temperatures.

Biodiversity Enhancement

The strategy promotes multifunctional drainage infrastructure which not only manages water effectively but also supports ecological enhancement, habitat creation and wider environmental objectives.

Policy Compliance

The strategy demonstrates compliance with:

- National Planning Policy Framework.
- Planning Practice Guidance.
- London Plan.
- Hillingdon Local Plan.
- Environment Agency Guidance.
- CIRIA SuDS Manual.
- Water Framework Directive objectives.

1.4 Assessment Methodology

The Water Cycle Strategy has been prepared using a staged assessment methodology combining review of technical studies, policy analysis, environmental baseline information and infrastructure assessments.

Stage 1 – Baseline Review
Review of existing environmental conditions including:

- Topography.
- Geology.
- Hydrology.
- Hydrogeology.
- Flood risk characteristics.
- Existing utility infrastructure.

Stage 2 – Infrastructure Assessment
Assessment of:

- Water supply infrastructure.
- Water demand requirements.
- Wastewater generation.
- Sewer network capacity.
- Drainage infrastructure requirements.

Stage 3 – Environmental Capacity Assessment
Assessment of:

- Water resource constraints.
- Receiving environment sensitivity.
- Water quality considerations.
- Climate change implications.

Stage 4 – Integrated Water Management Assessment
Development of a coordinated strategy incorporating:

- Water efficiency.
- Water reuse.
- Sustainable drainage systems.
- Biodiversity enhancements.
- Climate adaptation measures.

Through this process, the strategy identifies opportunities, constraints and mitigation measures and establishes a framework for sustainable water management across the development site.

1.5 Policy and Legislative Context

The Proposed Development has been assessed against relevant national, regional and local planning policy relating to water resource management, wastewater infrastructure, flood risk management, climate resilience, water quality protection and environmental enhancement. The Water Cycle Strategy has been prepared in accordance with the principles established within the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), Environment Agency guidance on Water Cycle Studies, the London Plan and the London Borough of Hillingdon Local Plan.[2][3][4][5][6]

The NPPF requires planning decisions to support sustainable development through the efficient use of natural resources, the provision of appropriate infrastructure and the implementation of measures that improve resilience to climate change. Particular emphasis is placed on ensuring that development is located in areas appropriate to flood risk, remains safe throughout its lifetime, does not increase flood risk elsewhere and incorporates Sustainable Drainage Systems (SuDS) where appropriate. The Proposed Development has been designed in accordance with these objectives through the implementation of a comprehensive water management strategy that integrates water efficiency, flood risk mitigation, surface water management, climate adaptation and environmental enhancement measures.

Planning Practice Guidance identifies the importance of ensuring that sufficient water supply, wastewater treatment and drainage infrastructure exist to support future growth. Water Cycle Studies are specifically recognised as a mechanism to assess environmental and infrastructure capacity and to ensure that development can be accommodated sustainably. This Water Cycle Strategy therefore considers not only site-specific drainage requirements but also the capacity of the wider water environment, utility infrastructure and receiving catchment to support the Proposed Development.

The strategy has also been prepared having regard to the Environment Agency's guidance on Water Cycle Studies, which promotes an integrated approach to water management and seeks to ensure that future growth does not adversely affect water resources, wastewater infrastructure, water quality, flood risk or environmental resilience. In accordance with this guidance, the assessment considers the entire water cycle and identifies measures to support sustainable growth, environmental capacity and long-term climate resilience.

At the regional level, the Water Cycle Strategy aligns with the objectives of the London Plan, particularly:

Policy SI5 Water Infrastructure, which seeks to ensure that development is supported by adequate water supply and wastewater infrastructure and promotes efficient use of water resources.

Policy SI12 Flood Risk Management, which requires development to minimise flood risk and remain safe throughout its operational life.

- Policy SI13 Sustainable Drainage, which requires the application of the drainage hierarchy and maximisation of Sustainable Drainage Systems.
- Policy G5 Urban Greening, which promotes the integration of green infrastructure and climate adaptation measures.
- Policy G6 Biodiversity and Access to Nature, which seeks to enhance biodiversity, ecological resilience and environmental quality through development.

[2] Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 (accessed October 2026)

[3] Available at: https://www.gov.uk/government/collections/planning-practice-guidance (accessed October 2026)

[4] Available at: https://www.gov.uk/guidance/water-cycle-studies (accessed October 2026)

[5] Available at: https://www.london.gov.uk/programmes-strategies/planning/london-plan (accessed October 2026)

[6] Available at: https://pre.hillingdon.gov.uk/planning-policy/local-plan-review (accessed October 2026)

The strategy has also been prepared having regard to the adopted London Borough of Hillingdon Local Plan Part 1 and Local Plan Part 2 Development Management Policies, which establish the framework for flood risk management, sustainable infrastructure, environmental protection and climate resilience within the Borough.[78]

Particular consideration has been given to:

- Policy EM6 (Flood Risk Management), which seeks to minimise flood risk, encourage sustainable drainage solutions and improve resilience to the effects of climate change.
- Policy DMEI 9 (Management of Flood Risk), which requires development to demonstrate that flood risk can be appropriately managed and that developments remain safe throughout their lifetime.
- Policy DMEI 10 (Water Management, Efficiency and Quality), which requires development to include Sustainable Drainage Systems, reduce surface water runoff, improve water efficiency and protect water resources and water quality.
- Policy DMEI 11 (Protection of Groundwater Resources), which seeks to ensure that groundwater resources are protected from contamination and adverse impacts arising from development.

The strategy has also taken account of the objectives of the Hillingdon Local Flood Risk Management Strategy and the Hillingdon Surface Water Management Plan, which identify surface water flooding, climate change adaptation, runoff reduction and integrated flood risk management as key priorities for the Borough. These documents promote the use of Sustainable Drainage Systems, multifunctional green infrastructure and nature-based solutions that deliver wider environmental benefits alongside flood risk mitigation.

In addition, the Water Cycle Strategy has been prepared with regard to the Water Environment Regulations and River Basin Management Planning framework, which require development to prevent deterioration in waterbody status, protect groundwater resources and support the achievement of wider environmental objectives. The adoption of a treatment-train approach to runoff management, pollution prevention measures and integrated SuDS infrastructure has been informed by these requirements and contributes towards the protection of both surface water and groundwater environments.

The sustainability aspirations of the Proposed Development have also influenced the strategy. Water efficiency measures, rainwater harvesting, smart metering, leak detection systems and reduced water consumption associated with air-cooled cooling technologies have been incorporated to support the project's sustainability objectives, reduce pressure on regional water resources and contribute towards the environmental performance targets identified within the Sustainability Statement and BREEAM assessment.

Climate change has been a key consideration throughout preparation of the Water Cycle Strategy. The proposed drainage infrastructure incorporates current climate change allowances in accordance with Environment Agency guidance and includes substantial attenuation storage, Sustainable Drainage Systems, rainwater harvesting infrastructure, blue-green infrastructure and climate-resilient landscape design. These measures ensure that the development remains resilient throughout its operational life and contributes positively towards wider regional climate adaptation objectives.

[7] Available at: https://hillingdonlocalplan.commonplace.is/en-GB/proposals/v3/sustainable-infrastructure (accessed October 2026)

[8] Available at: https://www.hillingdon.gov.uk/media/13343/Local-Flood-Risk-Management-Strategy/pdf/6gHillingdon_LFRMS_-_LBH_Final.pdf (accessed October 2026)

2. DEVELOPMENT DESCRIPTION

2.1 Introduction

This chapter provides an overview of the Proposed Development and identifies the characteristics of the scheme that influence the design and implementation of the Water Cycle Strategy. Understanding the nature, scale and operational requirements of the development is essential in assessing future demands on water resources, wastewater infrastructure and drainage systems.

The proposed development comprises the demolition of existing structures and the construction of a new data centre facility with an anticipated operational capacity of approximately 54MW. The development would provide approximately up to 54,000 sqm of gross internal floorspace, including data halls, administration block, plant, and associated ancillary infrastructure.

From a water management perspective, the development presents a number of opportunities. Unlike many industrial or manufacturing facilities, data centres generally have relatively low operational occupancy levels and correspondingly low domestic water demands. Furthermore, the adoption of air-cooled cooling infrastructure significantly reduces water consumption compared with alternative cooling technologies, enabling the development to minimise pressure on local water resources whilst supporting regional sustainability objectives.

The proposed development has therefore been designed around the principles of water efficiency, climate resilience and integrated water management, which are reflected throughout this Water Cycle Strategy.

2.2 Site Location and Context

The site is irregular in shape and comprises the former Sipson Garden Centre and associated land. The northern part of the site contains the former garden centre buildings, areas of hardstanding, a car park, and external areas previously used for the display and storage of goods associated with the garden centre use. The southern part of the site comprises an undeveloped field.

The site is bounded to the east by a section of the M4 motorway in the vicinity of Heathrow Airport. A further section of the M4 motorway runs immediately to the north of the site. The western boundary is formed by the A408, from which the site gains vehicular access. A small number of residential properties are located to the south-west of the site, fronting the A408.

The Holiday Inn Hotel, which is currently being refurbished, is situated immediately north of the site, while The Plough public house occupies the north-western corner of the site boundary. The Plough is designated as a locally listed building. To the south of the site are residential properties forming part of the settlement of Sipson.



Figure 1 ***AECOM Architectural Render, October 2026***

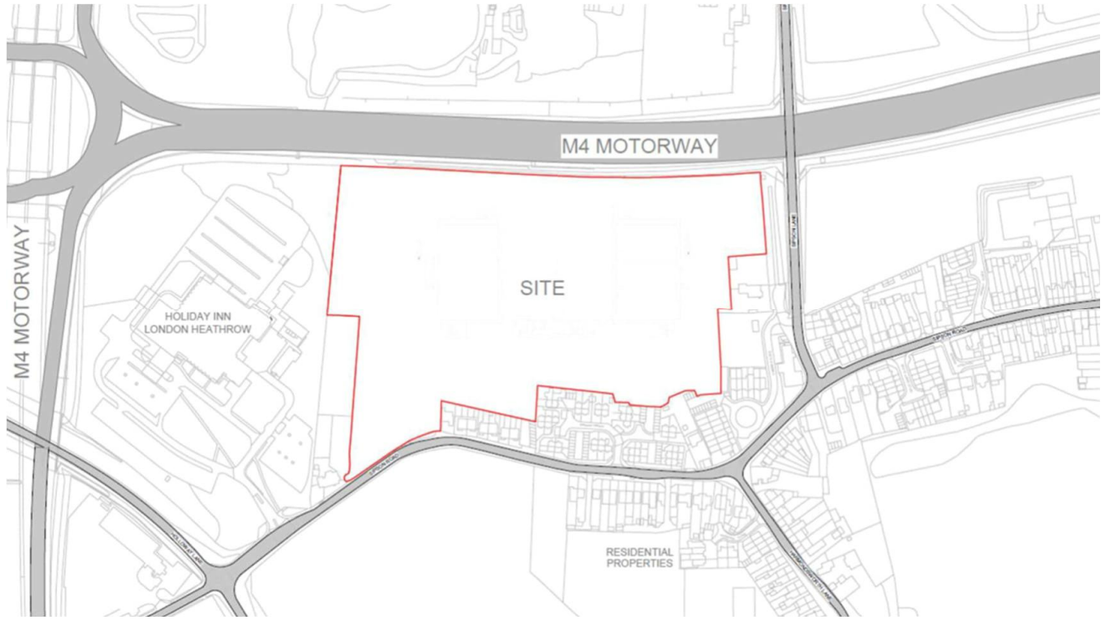


Figure 2 ***extract of drawing PGF-ACM-00-XX-DR-AR-100000 - Site Location Plan rev P1***

2.3 Description of the Proposed Development

The Proposed Development comprises a new hyperscale data centre campus together with all associated infrastructure required to support long-term operation of the facility.

The development is expected to comprise the following principal elements:

Data Centre Buildings

The primary land use within the site consists of data hall buildings which will accommodate server infrastructure, communications equipment and associated technology systems. These facilities represent the operational core of the development and have informed many aspects of the water and energy strategies.

Administration Accommodation

Office and administration facilities will provide accommodation for operational staff, management personnel, support services and welfare functions. These buildings represent the principal source of domestic water demand within the development and will incorporate extensive water efficiency measures.

Electrical Infrastructure

The development includes substations, switch rooms and associated utility compounds that provide critical electrical infrastructure for the site.

Access and Servicing Infrastructure

Internal access roads, service yards, parking facilities, maintenance areas and other supporting infrastructure will facilitate ongoing operation and maintenance activities.

Landscape and Ecological Infrastructure

A comprehensive landscape strategy will be implemented across the site, incorporating habitat enhancement measures, biodiversity improvements, attenuation features and blue-green infrastructure that contribute towards wider environmental objectives.

Sustainable Drainage Infrastructure

A network of sustainable drainage systems will be integrated throughout the development and form a key component of the overall site infrastructure.

The combination of these elements creates a multifunctional development that balances operational requirements with sustainability and environmental performance objectives.

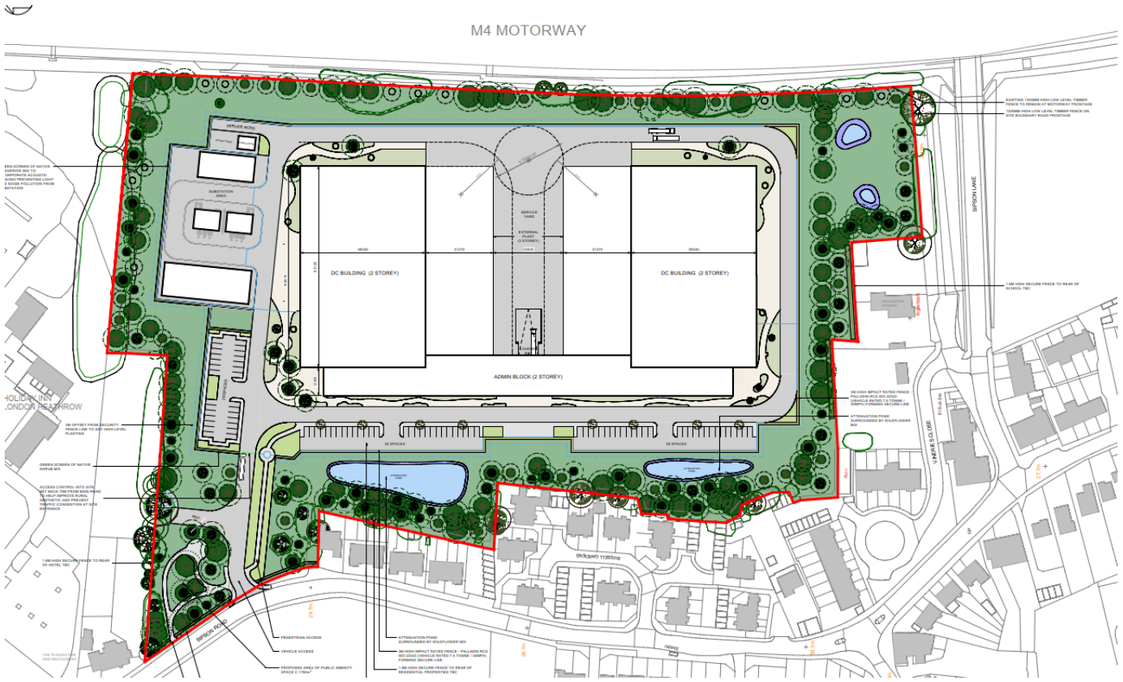


Figure 3 ***extract of drawing PGF-ACM-00-XX-DR-AR-051100 – Outline Planning – Illustrative Masterplan***

2.4 Development Parameters

The proposed development has been designed as a long-term strategic infrastructure asset with an operational lifespan extending over several decades.

Given the scale and significance of the development, infrastructure systems have been designed with considerable resilience and adaptability to accommodate future technological changes, operational requirements and climate change effects.

The masterplan has been developed to ensure that:

- Water infrastructure can be delivered efficiently.
- Existing utility constraints are respected.
- Future utility upgrades can be accommodated where required.
- Surface water management can be integrated into the landscape design.
- Climate resilience objectives can be achieved.

This approach provides flexibility throughout future design development whilst ensuring that key environmental constraints and opportunities are appropriately addressed.

2.5 Operational Characteristics Relevant to the Water Cycle

A key objective of this Water Cycle Strategy is to understand how the operational characteristics of the development influence future water demand, wastewater generation and drainage requirements.

Unlike residential or conventional commercial developments, modern hyperscale data centres exhibit a number of characteristics that are relevant to water management.

Low Occupancy Density

Data centres typically accommodate relatively small numbers of operational personnel compared to the gross floor area of the facility.

Consequently, domestic water demand and foul water generation are significantly lower than would normally be expected from a development of comparable scale.

The primary sources of domestic water demand are anticipated to comprise:

- Staff welfare facilities.
- Washrooms.
- Office accommodation.
- Kitchen and refreshment facilities.
- Maintenance activities.

This operational profile results in relatively low wastewater generation rates and reduces pressure on both the water supply and wastewater networks.

Continuous Operation

The development is expected to operate continuously throughout the year.

The reliability of infrastructure systems is therefore critically important and has influenced the design of water supply, wastewater and drainage systems throughout the site.

Water infrastructure must be sufficiently robust to ensure long-term resilience and operational continuity under a range of environmental conditions.

Long Design Life

Data centre facilities are typically designed to operate over several decades.

Consequently, water management infrastructure has been designed not only to address current environmental conditions but also future climate change impacts that may emerge throughout the lifespan of the development.

Sustainability Requirements

The proposed development is targeting high environmental performance standards through alignment with BREEAM and LEED sustainability principles.

Accordingly, water efficiency, rainwater harvesting, climate adaptation, biodiversity enhancement and sustainable drainage are integrated into the overall development strategy.

2.6 Cooling Strategy and Water Demand Implications

The cooling strategy is one of the most significant factors influencing operational water demand, energy performance and long-term sustainability within modern data centre developments. As part of the design development process, careful consideration has been given to the relationship between cooling technology, water consumption, operational resilience, future computing requirements and climate adaptation.

The Proposed Development has been designed around a high-efficiency cooling strategy that utilises a high-temperature chilled water system served by air-cooled chiller infrastructure and chilled water fan wall units (FWUs). The cooling architecture has been developed in accordance with the wider VIRTUS design principles and has been specifically selected to minimise

operational water demand whilst maintaining resilience, flexibility and energy efficiency throughout the operational life of the facility.

Unlike conventional data centre developments that rely on evaporative cooling towers and water-intensive cooling processes, the proposed cooling strategy avoids routine evaporative water consumption and significantly reduces dependence on potable water supplies. This approach represents one of the most important water conservation measures incorporated within the project and is a key contributor to the overall conclusions of this Water Cycle Strategy.

The selected design has also been developed to support future technological requirements and provides a flexible platform capable of accommodating:

- Traditional air-cooled IT deployments.
- High-density computing environments.
- Direct-to-chip liquid cooling technologies.
- Future AI and machine learning workloads.
- High-performance computing applications.
- Emerging cooling technologies as operational requirements evolve.

This future-ready approach ensures that the development remains adaptable throughout its operational life whilst maintaining low water consumption characteristics.

From a water resource perspective, the chosen cooling strategy delivers significant benefits when compared with conventional evaporative cooling systems. By substantially reducing cooling-related water demand, the development:

- Reduces reliance on potable water resources.
- Minimises pressure on strategic water supply infrastructure.
- Improves resilience during periods of drought and water stress.
- Supports regional water conservation objectives.
- Reduces wastewater generation associated with cooling operations.
- Enhances long-term operational sustainability.
- Contributes towards climate adaptation objectives.

The benefits of this approach are particularly important given the location of the development within the South East of England, which is recognised as one of the most water-stressed regions in the United Kingdom. Future climate projections indicate that increasing population growth, prolonged drought periods and changing rainfall patterns are likely to place additional pressure on available water resources. The adoption of a low-water-use cooling strategy therefore contributes positively towards wider regional resource management objectives.

The cooling infrastructure has also been designed to support high levels of operational efficiency. The system targets a Power Usage Effectiveness (PUE) of 1.2 or better, reflecting the wider sustainability aspirations of the development and reducing both operational energy consumption and associated environmental impacts. Opportunities for free cooling and partial free cooling have been incorporated within the design wherever conditions permit, reducing reliance on mechanical cooling systems and improving overall resource efficiency.

In addition to reducing operational water demand, the cooling infrastructure has been designed to remain resilient under future climate scenarios. Cooling plant selection and sizing have been undertaken using recognised industry design criteria, including allowances for anticipated future temperature increases and climate change effects. This approach ensures that the cooling infrastructure can continue to operate effectively under future environmental conditions and supports the long-term resilience objectives of the development.

2.7 Sustainability and Water Management Objectives

The proposed development has been designed in accordance with an overarching sustainability framework that recognises the interrelationship between water management, climate resilience, biodiversity and environmental protection.

Water-related sustainability objectives include:

Reduction of Potable Water Demand

Minimising reliance on treated potable water supplied through the public network.

Rainwater Reuse

Maximising opportunities to capture and reuse rainfall for suitable non-potable purposes.

Climate Resilience

Ensuring that water management infrastructure remains effective under future climate conditions.

Water Quality Protection

Protecting groundwater and surface water environments through implementation of appropriate drainage and pollution control measures.

Biodiversity Enhancement

Delivering habitat creation and ecological improvements through integration of drainage infrastructure and landscape design.

Resource Efficiency

Supporting wider environmental sustainability goals through reduced consumption of natural resources.

These objectives form the basis of the overall Water Cycle Strategy and have informed the design principles described throughout the following chapters.

3. Existing Site Conditions and Water Environment

3.1 Introduction

A comprehensive understanding of the existing water environment is fundamental to the preparation of an effective Water Cycle Strategy. The environmental baseline establishes the hydrological, hydrogeological and flood risk characteristics of the site and its surrounding area and provides the foundation for the development of appropriate water management measures.

This chapter draws upon the findings of the Flood Risk Assessment and Drainage Strategy, Utilities Statement, previous Water Cycle Study and supporting environmental investigations to describe the existing conditions that influence the design and operation of the proposed development.

The assessment considers the site's relationship with surface water, groundwater, existing drainage infrastructure, water resources and environmental receptors. It also identifies opportunities and constraints associated with the management of water throughout the development lifecycle.

Understanding the existing environment is particularly important because the proposed development is intended to operate over a long design life. Consequently, water management infrastructure must not only respond to current environmental conditions but also remain resilient to changing climatic and environmental pressures throughout the operational lifetime of the development.

3.2 Regional Hydrological Setting

The site is located within the wider Thames River Basin District and forms part of a highly urbanised catchment within West London. The surrounding area is characterised by extensive transport infrastructure, commercial development, industrial uses and strategic utility corridors, all of which influence the movement and management of water throughout the catchment.

Historically, urbanisation has significantly altered natural drainage pathways through the introduction of impermeable surfaces, engineered drainage systems and watercourse modifications. Consequently, much of the local hydrological regime is influenced by man-made drainage infrastructure rather than natural overland flow mechanisms.

Despite the highly urban nature of the surrounding area, surface water continues to play an important role in shaping local flood risk patterns and influencing drainage design. Extreme rainfall events can generate significant volumes of runoff which must be managed effectively through both public and private drainage systems.

The proposed development therefore forms part of a wider hydrological network and must be designed to ensure that its contribution to runoff rates and volumes does not adversely affect downstream receptors or increase flood risk elsewhere within the catchment.

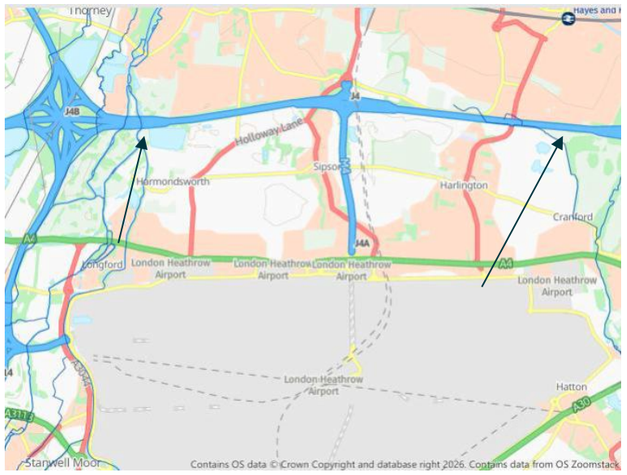


Figure 4 ***Watercourses (source:https://www.arcgis.com/apps/webappviewer/index.html***

Surface Water Catchment Characteristics

The site occupies land within a predominantly developed catchment where natural infiltration opportunities are limited due to both urbanisation and underlying geological conditions.

Surface water runoff generated throughout the wider catchment is typically conveyed through a combination of:

- Highway drainage systems.
- Surface water sewer networks.
- Private drainage infrastructure.
- Overland flow pathways.
- Attenuation features.

Rainfall falling on impermeable surfaces generally generates rapid runoff responses, increasing the importance of attenuation and controlled discharge systems to reduce flood risk.

The proposed development has therefore adopted a drainage philosophy that seeks to replicate natural drainage behaviour wherever practicable through the use of Sustainable Drainage Systems (SuDS), green infrastructure and attenuation storage.
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3.3 Topography and Site Drainage Characteristics

3.4.1 Existing Site Topography

The site generally comprises gently sloping land with relatively modest variations in ground level across the wider development area.

Review of available topographical information indicates that the site does not contain significant natural valleys, watercourses or steep gradients that would fundamentally constrain development. However, subtle variations in levels influence local surface water flow patterns and have been considered as part of the drainage design process.

A number of localised depressions are present within the wider site area that may act as temporary collection points for rainfall during intense storm events. These areas have informed the positioning and design of attenuation infrastructure within the proposed drainage strategy.

The relatively shallow topography presents opportunities to integrate landscape-led SuDS features into the development whilst maintaining appropriate drainage gradients and operational functionality.



Figure 5 ***Topographical Map (Source: https://en-gb.topographic-map.com/)***

3.4.2 Existing Drainage Conditions

The existing drainage regime reflects the site's previous and current land uses and consists primarily of conventional drainage infrastructure designed to convey runoff away from developed areas.

Whilst these systems generally function adequately under normal rainfall conditions, they do not provide the wider environmental benefits associated with contemporary SuDS design principles.

The proposed redevelopment therefore presents an opportunity to significantly enhance site-wide drainage performance through the introduction of:

- Attenuation storage.
- Water quality treatment.
- Rainfall reuse systems.
- Biodiversity enhancements.
- Exceedance management features.

The proposed drainage strategy therefore represents a substantial improvement over the existing drainage situation.

3.4 Geology and Ground Conditions

The geological conditions underlying the site have a significant influence on both groundwater behaviour and drainage design.

Available ground investigation information indicates that the site is predominantly underlain by:

- Langley Silt.
- London Clay.
- Coarse flint gravel.

These deposits are characteristic of large parts of West London and are generally associated with poor infiltration characteristics and low permeability. Beneath this, the coarse flint gravel layer is likely to allow for deeper infiltration systems.

The geological profile therefore exerts a strong influence on how rainfall interacts with the ground and has informed the selection of appropriate drainage solutions.

The low permeability nature of the underlying geology limits opportunities for infiltration-based drainage solutions such as shallow soakaways and infiltration basins.
Whilst infiltration techniques are often preferred within the drainage hierarchy, their effectiveness is heavily dependent on suitable ground conditions. Intrusive ground investigation at the next design stage will confirm the permeability of the flint gravel layer.

As a result, the drainage strategy has been developed around:

- Surface water attenuation.
- Infiltration.
- Rainwater harvesting.
- Controlled discharge.
- Blue-green infrastructure.
- Surface storage techniques.

This approach ensures that the drainage strategy responds appropriately to the site's geological constraints whilst still achieving sustainable drainage objectives.

3.5 Hydrogeological Environment

3.6.1 Groundwater Conditions

Groundwater has been considered as part of the wider environmental baseline assessment.

Available ground investigation records indicate that groundwater was not encountered at shallow depths during previous investigations and there is no evidence that groundwater flooding represents a significant constraint to development.

The absence of significant shallow groundwater provides additional flexibility in relation to construction methodologies and drainage infrastructure design.

Notwithstanding this, groundwater conditions will continue to be monitored throughout the detailed design process to ensure that any localised variations are appropriately addressed.

3.6.2 Groundwater Vulnerability

The site is not located within a designated Groundwater Source Protection Zone and is not situated within an area identified as supporting a strategic public water supply abstraction.

Consequently, the sensitivity of the groundwater environment is considered relatively low when compared with locations occupying protected groundwater catchments.

Nevertheless, groundwater remains an important environmental receptor and appropriate protection measures have been incorporated into the development design to prevent contamination from pollutants during both construction and operation.

These measures include:

- Pollution prevention controls.
- Bunded storage facilities.
- Controlled drainage systems.
- Spill response procedures.
- Long-term maintenance arrangements.

3.6 Existing Water Supply Infrastructure

3.7.1 Water Supply Context

The site is located within the operational area of Affinity Water and benefits from proximity to existing strategic water infrastructure.

Utility records indicate the presence of a strategic 12-inch diameter water main located adjacent to the eastern site boundary together with local distribution infrastructure serving surrounding development.

The existing network forms part of the wider regional water supply system and provides a strong basis for future connection of the proposed development.

3.7.1 Strategic Water Main Constraint

The strategic water main represents a key infrastructure constraint that has influenced the development of the masterplan.

An easement is associated with this asset to protect operational access and maintain serviceability throughout its operational life.

The proposed site layout respects this requirement and ensures that future maintenance access can be maintained without adversely affecting operation of the development.

The integration of existing utility infrastructure into the site layout demonstrates the coordinated approach adopted throughout the design process.

3.7 Existing Wastewater Infrastructure

3.8.1 Sewerage Context

The site falls within the wastewater catchment managed by Thames Water.

Utility investigations identify several foul sewer assets in proximity to the site, including:

- A 525mm diameter foul sewer located to the west.
- A 300mm diameter foul sewer located to the south.

These assets provide opportunities for future foul water connection and form part of the wider sewerage network serving the surrounding area.
Utility records indicate the presence of a strategic 12-inch diameter water main located adjacent to the eastern site boundary together with local distribution infrastructure serving surrounding development.

The existing network forms part of the wider regional water supply system and provides a strong basis for future connection of the proposed development.

3.8.2 Existing Network Characteristics

The presence of strategic foul sewer infrastructure in close proximity to the site is a significant advantage from a development perspective.

The nature of the proposed land use means that foul water generation will remain relatively low compared with many commercial developments and therefore significant pressure on the existing wastewater network is not anticipated.

Future consultation with Thames Water will confirm final connection arrangements and available network capacity.

3.8 Flood Risk Baseline

3.9.1 Overview

Flood risk has been assessed from all relevant sources in accordance with national planning policy and Environment Agency guidance.

The assessment considered:

- Fluvial flooding.
- Tidal flooding.
- Surface water flooding.
- Groundwater flooding.
- Reservoir flooding.
- Sewer flooding.
- Infrastructure failure.

Overall, the site benefits from a favourable flood risk context and no significant constraints have been identified that would prevent development from proceeding.

3.9.2 Fluvial Flood Risk

The site lies entirely within Flood Zone 1, which is defined as land having the lowest probability of flooding from rivers and the sea. As a result, flood risk associated with rivers is considered negligible and does not represent a constraint to the proposed development. The site's location within Flood Zone 1 also demonstrates compliance with the overarching principles of the Sequential Test set out within national planning policy.

Notwithstanding this, the site is potentially susceptible to surface water (pluvial) flooding, which occurs when rainfall exceeds the infiltration capacity of the ground or the capacity of drainage systems, resulting in overland flow. The risk of surface water flooding is typically greater where soils have low permeability or where there are extensive impermeable surfaces.

According to the Environment Agency's Flood Map for Surface Water, parts of the proposed development site are indicated as being at risk of surface water flooding, including areas shown to have a high probability of flooding from intense or prolonged rainfall events. Areas of the site are shown to have a greater than 3.3% annual probability of flooding, equivalent to a 1 in 30-year event.

The mapping indicates areas of medium to high probability of surface water flooding towards the central part of the site and adjoining the access road. These flood extents display consistency with the topographical low points previously identified, indicating that local depressions within the site have the potential to collect and retain surface water, resulting in localised ponding. The Environment Agency's surface water mapping therefore provides further confirmation of the influence of site topography on surface water flow paths.

A further contributing factor to the potential for surface water flooding is the low permeability of the underlying geology. As previously highlighted, the superficial Langley Silt deposits and London Clay bedrock comprise moisture-retentive soils. These low-permeability strata reduce the rate at which rainfall can infiltrate into the ground, causing the soil to become saturated during periods of prolonged or intense rainfall. Consequently, surface water runoff can exceed the capacity of the ground to absorb water, increasing the likelihood of localised flooding and ponding across the site.

Accordingly, whilst the site is located within Flood Zone 1 and is not considered to be at significant risk of flooding from rivers or the sea, surface water flooding represents a relevant consideration in the assessment of the site. The areas identified by the Environment Agency mapping should therefore be considered in the detailed site layout and surface water drainage strategy, with appropriate measures incorporated to manage runoff, avoid the obstruction of existing flow paths and reduce the potential for localised flooding and ponding.

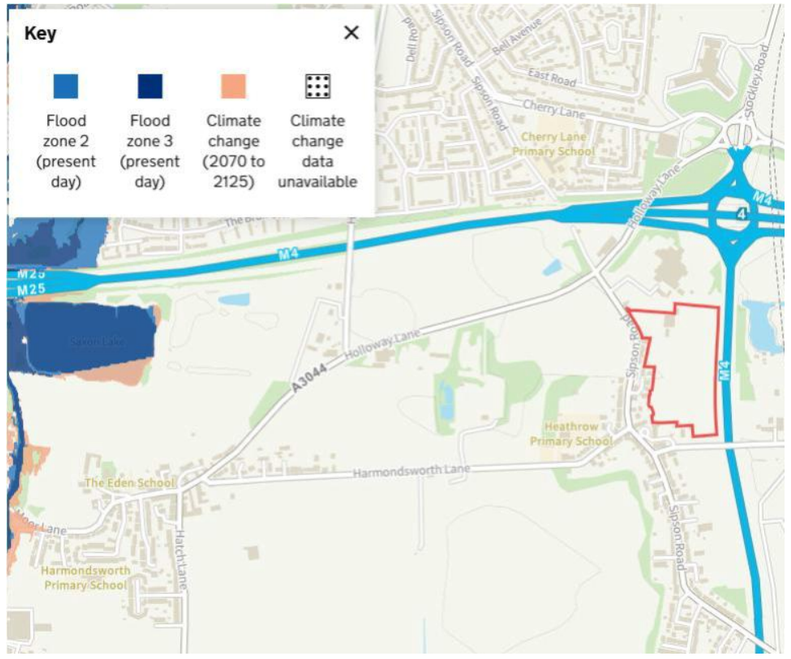


Figure 6 Environment Agency's Flood Map for Planning (Source: https://flood-map-forplanning.service.gov.uk)

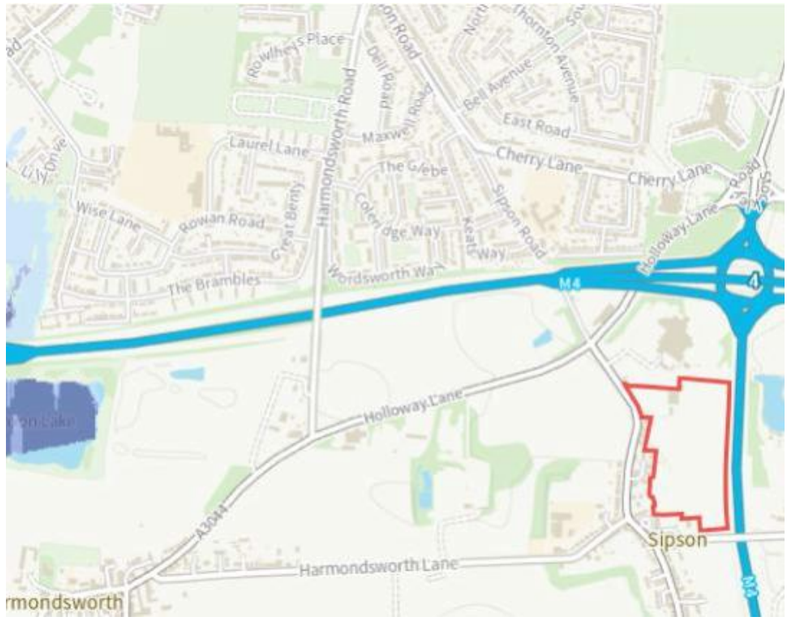


Figure 7 *Rivers and Sea Map Flood Risk(Source:https://check-long-term-flood-risk.service.gov.uk/rivers-and-sea)*

3.9.3 Surface Water Flood Risk

Surface water flooding represents the most significant flood-related consideration affecting the site. Review of national mapping datasets indicates that isolated areas of the site may be susceptible to temporary ponding during extreme rainfall events, particularly within localised topographic depressions.

The site is underlain by mainly clayey soils, with a gravelly layer at approximately 5m depth. The gravel layer is subject to high groundwater levels and may contribute to infiltration through the use of soakaways. However, where infiltration is restricted by the underlying low-permeability soils, surface water runoff will need to be appropriately managed to prevent uncontrolled discharge and localised flooding.

The site is predominantly brownfield and includes areas of impermeable hardstanding and roofs. Existing drainage arrangements do not appear to incorporate significant attenuation and runoff is understood to be directed towards the Highway (Sipson Road). The proposed development will therefore provide a controlled and sustainable approach to surface water management, including attenuation, controlled discharge and Sustainable Drainage Systems (SuDS).

The Preliminary Drainage Strategy has been developed to manage surface water runoff generated by the proposed development. Roof areas will discharge via downpipes, while impermeable areas will drain through a piped network comprising carrier drains and manholes, with appropriate separation where Highways drainage connections are required. Gullies will be provided to serve the proposed access roads, with the network designed to collect and convey runoff to the proposed attenuation system.

The proposed strategy incorporates substantial attenuation storage to manage surface water runoff generated during rainfall events. Based on a review of the impermeable site area and the proposed discharge rate, approximately 4,800m³ of storage is proposed. The attenuation system will restrict discharge to the agreed rate, thereby reducing peak runoff and preventing uncontrolled increases in flows to the receiving drainage network.

Where appropriate, rainwater harvesting storage and equipment will also be incorporated. The strategy further includes Sustainable Drainage Systems (SuDS), providing opportunities for water quality treatment and biodiversity benefits in accordance with the principles set out within the relevant SuDS guidance. Ponds will provide additional water quality benefits, while interceptors will be incorporated where required to serve service yard areas and associated drainage.

The proposed drainage regime will also incorporate measures to intercept and manage surface water before it enters the wider drainage network. This includes the use of ACO channels to serve yard areas, gullies to collect runoff from access roads and appropriate drainage infrastructure to convey flows towards the attenuation system. The arrangement will be designed to ensure that surface water is appropriately contained and managed within the site.

The increasing frequency of intense rainfall events associated with climate change means that effective management of surface water runoff is a critical aspect of the development design. The proposed attenuation and controlled discharge strategy provides resilience against increased rainfall intensity by limiting peak runoff rates and providing sufficient storage to temporarily retain surface water during storm events.

Overall, although surface water flooding remains a relevant consideration for the site, the proposed drainage strategy incorporates attenuation storage, controlled discharge, SuDS, rainwater harvesting and appropriate drainage infrastructure to manage surface water runoff. These measures will reduce the potential for uncontrolled surface water flows, localised ponding and off-site flood risk, and will ensure that surface water generated by the proposed development is managed in a controlled and sustainable manner.

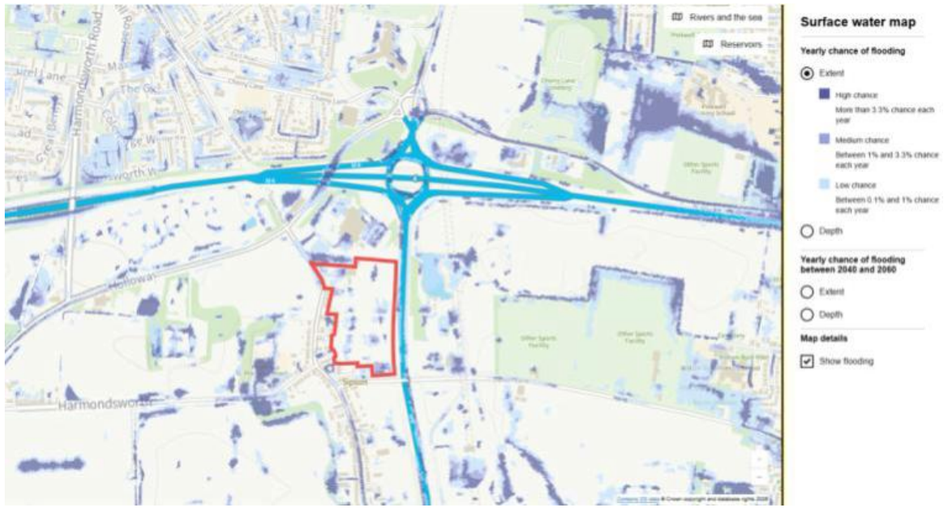


Figure 8 ***Surface Water Map for Flood Risk (Source: https://check-long-term-flood-risk.service.gov.uk/map)***

3.9.4 Groundwater Flood Risk

Groundwater flooding has not been identified as a primary source of flood risk to the Proposed Development site. However, groundwater levels can rise seasonally following prolonged rainfall, and elevated groundwater levels may reduce the capacity of the ground to receive and infiltrate rainfall. This could increase the potential for surface water flooding and may affect the suitability of infiltration-based drainage.

Groundwater susceptibility mapping and available site investigation information indicate that the likelihood of groundwater emergence at the surface is limited. A review of available borehole records within the Proposed Development site found no reference to groundwater, although the available records are insufficient to confirm current groundwater levels.

Groundwater flooding is therefore not expected to influence the operational performance of the development. Nevertheless, site-specific groundwater monitoring and investigation should be undertaken during detailed design to confirm groundwater levels and assess the suitability of infiltration-based drainage measures. Subject to the findings of these investigations, the risk of groundwater flooding at the site is considered to be low.

3.9 Water Quality Baseline

3.10.1 Surface Water Quality

The site is located within a highly urbanised environment where runoff generated from developed areas has the potential to contain pollutants including sediments, hydrocarbons and other contaminants.

The management of water quality therefore represents an important consideration in the development of the drainage strategy.

The proposed development seeks to improve water quality performance through the implementation of a SuDS treatment train approach that provides multiple stages of treatment prior to discharge.

3.10.2 Groundwater Quality

Groundwater quality is protected through existing geological barriers and the absence of sensitive groundwater abstractions within the immediate vicinity of the site.

Notwithstanding this favourable baseline position, groundwater protection measures have been incorporated into the development design to ensure that pollutants cannot enter the groundwater environment during either construction or operation.

4. Water Supply Assessment

4.1. Introduction

The provision of a reliable, resilient and sustainable water supply is a fundamental requirement for the successful delivery and operation of the Proposed Development. This chapter assesses the existing water resource context, available water supply infrastructure, anticipated operational water demand and the measures incorporated within the development to minimise potable water consumption.

The assessment has been informed by the Utilities Statement, Water Cycle Study, Sustainability Statement, BREEAM Pre-Assessment, Climate Change Assessment and supporting technical design information prepared for the Proposed Development.

The purpose of this chapter is to demonstrate that:

- Adequate water resources are available to support the development.
- Existing and future water infrastructure can accommodate the proposed demand.
- Water consumption has been minimised through sustainable design measures.
- The development aligns with regional and national water efficiency objectives.
- The development contributes towards long-term resilience of the wider water environment.

The chapter also considers the increasing importance of water efficiency within the South East of England, where climate change, population growth and future development pressures continue to place pressure on finite water resources.

4.2. Existing Wastewater Infrastructure

4.2.1 Wastewater Catchment

The site is located within the wastewater catchment managed by Thames Water, which is responsible for the collection, conveyance and treatment of foul water generated throughout the area. As one of the largest wastewater service providers in the United Kingdom, Thames Water operates an extensive network of sewerage infrastructure including:

- Local foul sewer networks.
- Strategic trunk sewers.
- Pumping stations.
- Wastewater treatment works.
- Stormwater management infrastructure.

The proposed development benefits from its location within an area already served by established wastewater infrastructure, reducing the need for extensive off-site network expansion. The existence of mature wastewater infrastructure in the vicinity of the site provides confidence that future connections can be achieved through conventional utility delivery mechanisms.

4.2.2 Existing Sewer Network

Utility searches undertaken as part of the infrastructure assessment have identified existing strategic foul sewer assets in close proximity to the site boundary. Key assets include:

- **Existing 525mm Diameter Foul Sewer**

A strategic foul sewer approximately 525mm in diameter is located to the west of the site.

This sewer forms part of the wider wastewater collection network and provides a potential connection opportunity for the Proposed Development. Its size and strategic importance indicate that it is capable of collecting flows from a broad catchment area and may therefore form part of the preferred long-term foul drainage strategy.

- **Existing 300mm Diameter Foul Sewer**

A further foul sewer approximately 300mm in diameter is located south of the site.

This sewer also provides a potential point of connection and may offer flexibility during subsequent detailed design development. The existence of multiple potential connection opportunities provides resilience within the infrastructure planning process and reduces the likelihood that wastewater infrastructure constraints will affect development delivery.

4.2.2 Existing Network Characteristics

The wastewater network surrounding the site has historically developed to serve a mixture of industrial, commercial, infrastructure and urban development. The network is therefore already established within a highly developed area and is designed to accommodate a diverse range of wastewater sources. The location of strategic sewer infrastructure immediately adjacent to the site is considered beneficial from a planning and infrastructure perspective because it minimises:

- Length of new connection infrastructure.
- Construction impacts.
- Utility diversion requirements.
- Future operational risks.

This infrastructure context has informed the development of the masterplan and has contributed to the conclusion that wastewater management is unlikely to represent a significant constraint to development.

4.3. Wastewater generation

The volume of foul water generated by a development is typically influenced by:

- Building occupancy.
- Internal water demand.
- Nature of operational activities.
- Water efficiency measures.
- Reuse and recycling systems.

For many commercial developments, wastewater infrastructure can become a significant planning consideration due to high occupancy levels and associated domestic water consumption. However, the operational characteristics of data centres differ substantially from conventional office, retail or industrial developments. As a result, wastewater generation is generally much lower than might otherwise be expected based solely on gross floor area.

4.3.1 Operational Population

The primary source of foul water generated by the Proposed Development will be domestic wastewater arising from:

- Staff welfare facilities.
- Washrooms.
- Changing facilities.
- Kitchen and refreshment areas.
- Administration accommodation.

The anticipated operational population of the development is relatively modest when compared with traditional commercial developments of similar scale. This reflects the highly automated nature of modern hyperscale data centre operations, where a large proportion of operational activities are controlled and monitored remotely. Consequently, the number of personnel

regularly occupying the site is significantly lower than would be expected within traditional commercial office developments. This characteristic greatly reduces wastewater generation and limits pressure on downstream infrastructure.

4.3.2 Estimated Foul Water Flows

Based on the proposed operational characteristics and anticipated staffing levels, average foul water generation has been estimated at approximately: **5.1m³/day**

Peak discharge rates are anticipated to be in the order of: **0.5 to 0.7 litres per second**

These flows are considered low relative to the scale of the proposed development and are considerably lower than those generated by many other employment, commercial or residential developments. The relatively low foul water generation reflects:

- Low staffing levels.
- Water-efficient sanitary fittings.
- Demand reduction measures.
- Reduced water consumption associated with the cooling strategy.

Consequently, the Proposed Development is expected to exert only a modest demand upon the existing wastewater network.

4.4. Wastewater reduction

A direct relationship exists between water consumption and wastewater generation.
By reducing potable water demand, the development simultaneously reduces the volume of wastewater requiring collection and treatment. The water efficiency measures incorporated throughout the development therefore provide benefits not only for water resource management but also for wastewater infrastructure capacity.
These measures include:

- Low-flow sanitary fittings.
- Dual-flush WC systems.
- Water-efficient appliances.
- Smart metering systems.
- Leak detection technology.
- Building Management System monitoring.

Collectively, these measures reduce both water demand and foul water generation when compared with standard building specifications.

4.4.1 Air-Cooled Cooling Systems

The adoption of air-cooled cooling systems provides further wastewater benefits. Unlike evaporative cooling systems, air-cooled technologies do not generate significant wastewater streams associated with cooling tower blowdown or water treatment processes. This substantially reduces wastewater generation and contributes towards the overall efficiency of the development from both a water supply and wastewater management perspective. The cooling strategy is therefore a key factor influencing the positive conclusions of this wastewater assessment.

4.5. Wastewater treatment Capacity and Construction phase management

4.5.1 Wastewater treatment capacity

In accordance with the principles of the Environment Agency's guidance on Water Cycle Studies, consideration has been given not only to the collection and conveyance of foul water from the site, but also to the ability of the wider wastewater treatment system to accommodate future flows generated by the Proposed Development.

The Water Cycle Study guidance recognises that sustainable growth requires sufficient capacity throughout the entire wastewater pathway, including local sewer networks, strategic trunk sewers and downstream wastewater treatment infrastructure. Consequently, the assessment has considered the likely implications of the development beyond the immediate site boundary.

The Proposed Development is expected to generate relatively low foul water flows compared with many commercial developments of equivalent scale. This is a direct consequence of the operational characteristics of modern hyperscale data centres, which typically accommodate low numbers of operational personnel relative to gross floor area and incorporate highly efficient water management systems.

Based on current design assumptions, average foul water generation is estimated to be approximately **5.1m³/day**, with peak discharge rates in the order of **0.5 to 0.7 litres per second**. These flows are considered modest within the context of the wider wastewater catchment and are not expected to materially influence the operation of the existing sewer network or receiving treatment infrastructure.

The receiving wastewater treatment catchment will be confirmed through ongoing consultation with Thames Water during future design stages. This process will establish:

- The preferred point of connection.
- The receiving wastewater treatment works.
- Existing network capacity.
- Available treatment headroom.
- Planned asset upgrades.
- Future Asset Management Plan (AMP) investment programmes.

Whilst detailed capacity confirmation remains subject to utility provider review, the low wastewater generation rates associated with the development suggest that significant wastewater treatment constraints are unlikely. The operational demand generated by the development is substantially lower than many alternative land uses occupying a comparable site area and is therefore anticipated to have a negligible impact on the performance of the wider treatment system.

Accordingly, wastewater treatment infrastructure is not currently considered to represent a constraint to development.

4.5.2 Construction Phase Wastewater Management

During the construction phase, temporary wastewater generation will arise principally from site welfare facilities, staff amenities and routine construction-related activities.

Construction wastewater volumes are expected to be limited and will be managed through temporary facilities and contractor-led environmental management procedures in accordance with relevant legislation, best practice guidance and planning requirements.

The principal objectives of the construction wastewater management strategy will be to:

- Prevent pollution of surface water and groundwater resources.
- Protect existing drainage infrastructure.
- Avoid overloading local sewer networks.
- Manage wastewater responsibly throughout the construction programme.
- Minimise environmental impacts associated with temporary site activities.

Construction welfare facilities will discharge to appropriately managed systems agreed with the relevant utility provider and regulatory authorities, ensuring that all wastewater is collected and disposed of in accordance with applicable regulatory requirements. In addition to domestic wastewater, construction activities have the potential to generate contaminated runoff through earthworks, material storage, vehicle movements and temporary construction compounds. If left unmanaged, these activities could adversely affect local drainage systems and environmental receptors.

To mitigate these risks, the construction phase will incorporate a comprehensive suite of pollution prevention measures including:

- **Temporary Drainage Controls**

Temporary drainage systems will be installed where necessary to manage site runoff and prevent uncontrolled discharge from construction areas.

- **Sediment Management Measures**

Appropriate measures such as settlement tanks, silt traps and filtration systems will be implemented to prevent excessive sediment entering drainage infrastructure.

- **Fuel and Chemical Storage Controls**

Fuel, oils and hazardous substances will be stored within appropriately bunded areas in accordance with best practice guidance.

- **Spill Response Procedures**

Emergency spill kits and response procedures will be maintained on-site to minimise environmental impacts in the event of accidental releases.

- **Construction Environmental Management Measures**

Environmental controls will be implemented through a Construction Environmental Management Plan (CEMP) to ensure that all contractors operate in accordance with agreed pollution prevention procedures.

These measures will collectively ensure that construction-related wastewater and runoff are managed appropriately and that the development does not adversely affect existing drainage systems, wastewater infrastructure or environmental receptors during the construction phase.

5. Flood Risk and Climate Resilience

5.1 Introduction

Flood risk management forms a key component of the Water Cycle Strategy and is fundamental to ensuring that the Proposed Development can be delivered safely and sustainably throughout its operational lifetime.

A detailed Flood Risk Assessment (FRA) has been prepared in support of the planning application and should be read alongside this report. The FRA considers all sources of flooding affecting the site and identifies the mitigation measures required to ensure compliance with national planning policy, London Plan requirements and Environment Agency guidance.

This chapter provides a strategic summary of the flood risk assessment and demonstrates how flood risk considerations have informed the development of the wider water management strategy.

The assessment considers flooding from:

- Rivers.
- Surface water.
- Groundwater.
- Reservoirs.
- Sewer systems.
- Infrastructure failure.

In addition, consideration has been given to future climate change impacts and the long-term resilience of the proposed development.

5.2 Existing Flood Risk Baseline

A review of Environment Agency flood mapping, local flood risk information, site-specific investigations and topographical surveys confirms that the site benefits from a favourable flood risk context.

The site lies wholly within **Flood Zone 1**, which represents land with the lowest probability of flooding from rivers and the sea. The nearest principal watercourse is the River Colne, located approximately 2 kilometres from the site. Given the separation distance and absence of direct hydraulic connectivity, fluvial flooding is not considered a significant constraint to development.

Groundwater flood risk is also considered low. Historic ground investigation records indicate that groundwater was not encountered at shallow depths and the site is not located within an area identified as being particularly susceptible to groundwater flooding. Similarly, flood risk associated with reservoirs, canals, artificial water bodies and utility infrastructure is considered negligible.

The principal flood-related consideration affecting the site is therefore surface water flooding. The existing site contains areas of hardstanding and low permeability soils which can result in localised ponding during periods of intense rainfall. Climate change is expected to increase the frequency and intensity of such events in the future, making effective surface water management a key design consideration.

Consequently, management of rainfall runoff forms the primary focus of the proposed flood mitigation strategy.

5.3 Surface Water Flood Risk and Drainage Response

Surface water flooding occurs when rainfall exceeds the capacity of local drainage systems or where runoff accumulates within topographical depressions.

National surface water flood mapping identifies localised areas of potential ponding across parts of the site under extreme rainfall conditions. Whilst these risks are not considered significant in the context of the proposed development, they have informed the design of the drainage strategy.

A core objective of the development is to improve the management of surface water when compared with existing site conditions. This is achieved through the delivery of a comprehensive Sustainable Drainage System (SuDS) network that captures, stores, treats and controls runoff generated by the development.

The proposed strategy incorporates:

- Rainwater harvesting infrastructure.
- Green roofs.
- Rain gardens.
- Tree pits.
- Attenuation basins.
- Underground attenuation storage.
- Controlled flow systems.
- Exceedance flow routing.

Hydraulic modelling undertaken as part of the FRA indicates that approximately **4,800m³ of attenuation storage** will be required across the site to safely manage runoff associated with extreme storm events.

This storage volume will be delivered through a combination of above-ground and below-ground infrastructure integrated throughout the site.

The proposed drainage strategy therefore provides a significant improvement over the existing situation and ensures that the development does not increase flood risk elsewhere within the catchment.

Flood Risk Source	Flood Mitigation Measures
Watercourses	The Environment Agency (EA) Flood Risk Map shows the site located within Flood Zone 1, and in an area benefiting from flood defences. The residual risk of a breach is low. Therefore, the site is at low risk from watercourse flooding.
Groundwater Flooding	Based on the Ground Investigation Report, the site is at low risk of groundwater flooding and no mitigation measures have been proposed.
Surface Water and Overland Flows	The Environment Agency's (EA's) indicative Surface Water Flooding Map shows the site is generally at a low to medium risk of surface water flooding with an annual chance of flooding of no more than 3.3%. An isolated higher risk area is limited to a low point of the existing carpark. Development site levels will be adjusted in this area with proposed buildings to have falls away from building thresholds, with overland exceedance routes directed to soft landscaping and SuDS features. The flood risk from surface water is therefore considered to be low.
Reservoir Flooding	The EA's information states that the development is not within breach extents of reservoir flooding. The residual risk of a breach flood event is low due to these being maintained and regularly inspected.
Sewers	Given the location of the Thames Water sewers in relation to the finished floor levels of proposed buildings, it is very unlikely that the site would be at risk of sewer flooding. There are also no known recorded incidents of sewer flooding within the vicinity of the site.

5.4 Climate Change and Future Flood Resilience

Climate change represents one of the most significant long-term influences on flood risk and water management infrastructure.

Current climate projections indicate that future weather patterns are likely to be characterised by:

- More frequent extreme rainfall events.
- Increased rainfall intensity.
- Greater seasonal variability.
- More frequent storm events.
- Increased drought periods.

Without appropriate mitigation, these changes have the potential to increase flood risk and place additional pressure on drainage infrastructure.

The proposed development has therefore been designed using the latest Environment Agency climate change guidance and incorporates climate change allowances within the drainage design process.

The adopted allowances include:

- 40% increase in rainfall intensity for the 1 in 30 year event.
- 45% increase in rainfall intensity for the 1 in 100 year event.

These allowances have informed the sizing of attenuation storage, flow control structures and surface water conveyance systems.

Beyond hydraulic performance, the development incorporates additional climate adaptation measures including rainwater harvesting, blue-green infrastructure, biodiversity enhancements and extensive landscape-based SuDS features.

Collectively, these measures ensure that the development remains resilient throughout its anticipated operational life and contributes positively to wider climate adaptation objectives.

5.5 Residual Flood Risk and Conclusions

Whilst no drainage system can completely eliminate flood risk, the proposed development has been designed to minimise residual risk through a combination of robust engineering design, climate change allowances and integrated flood management measures.

Exceedance flow routes have been incorporated into the masterplan to ensure that rainfall events exceeding the design standard can be safely managed without causing unacceptable impacts to buildings or critical infrastructure. Open spaces, landscape areas and drainage corridors will provide additional flexibility during extreme events and contribute towards overall site resilience.

The assessment concludes that:

- The site is located within Flood Zone 1.
- Flood risk from rivers, groundwater, reservoirs and other sources is low.
- Surface water flooding represents the principal flood-related consideration.
- The proposed drainage strategy significantly improves flood resilience relative to existing site conditions.
- Approximately 4,800m³ of attenuation storage will be provided.
- Climate change allowances have been fully incorporated into the design.

Residual flood risk can be appropriately managed through exceedance routing and resilient infrastructure design.

6. Water Supply Assessment

6.1 Surface Water Management Strategy

The management of surface water runoff represents a key component of the Proposed Development and has been a fundamental consideration throughout the masterplanning and design process. As identified within the Flood Risk Assessment, surface water flooding represents the principal flood-related consideration affecting the site and therefore forms the primary focus of the drainage strategy.

The drainage strategy has been developed in accordance with the principles of sustainable water management and seeks to manage rainfall as close as possible to where it falls. Rather than relying solely upon traditional piped infrastructure, the proposed approach incorporates a range of Sustainable Drainage Systems (SuDS) that reduce runoff rates, improve water quality, enhance biodiversity and contribute towards wider climate adaptation objectives.

The strategy has been prepared in accordance with:

- National Planning Policy Framework.
- Planning Practice Guidance.
- London Plan Policy SI13.
- CIRIA SuDS Manual (C753).
- Lead Local Flood Authority guidance.
- Environment Agency best practice guidance.

The overarching objectives of the drainage strategy are to:

- Reduce flood risk on and off-site.
- Replicate natural drainage processes where feasible.
- Restrict runoff rates to appropriate discharge rates.
- Provide water quality treatment.
- Improve biodiversity value.
- Enhance climate resilience.
- Support wider sustainability objectives.

The drainage hierarchy has been considered throughout the design process. Due to the site's geological conditions, opportunities for large-scale infiltration are to be confirmed subject to intrusive ground investigation and therefore, the strategy focuses on rainwater reuse, attenuation and controlled discharge. The resulting surface water management strategy provides a robust, sustainable and policy-compliant solution capable of supporting the long-term operation of the development.

6.2 Sustainable Drainage Systems (SuDS)

A comprehensive network of Sustainable Drainage Systems will be integrated throughout the development. The proposed SuDS strategy has been designed not only to manage runoff but also to deliver wider environmental benefits through a multifunctional blue-green infrastructure approach.

The SuDS network incorporates a wide range of complementary measures including:

- Rainwater harvesting systems.
- Green roofs.
- Rain gardens.
- Tree pits.
- Permeable paving.
- Landscape attenuation areas.
- Attenuation basins.
- Underground attenuation storage.
- Water quality treatment features.

Together these systems provide a series of linked drainage functions that reduce runoff at source, attenuate flows, improve runoff quality and create biodiversity enhancement opportunities.

The strategy is structured around the four recognised pillars of SuDS:

Water Quantity
Managing runoff rates and volumes to minimise flood risk and mimic, where possible, the natural hydrological behaviour of the site.

Water Quality
Providing treatment of runoff through multiple stages before discharge in accordance with CIRIA SuDS Manual guidance.

Biodiversity
Creating opportunities for habitat creation and ecological enhancement through integrated landscape and drainage infrastructure.

Amenity
Delivering attractive landscape features that contribute positively to the quality and character of the development. The proposed SuDS network therefore performs a significantly wider function than conventional drainage infrastructure and contributes directly to the wider sustainability objectives of the development.

6.3 Attenuation and Surface Water Discharge Strategy

Hydraulic modelling undertaken as part of the Flood Risk Assessment demonstrates that significant attenuation storage is required to safely manage runoff generated by the development. The assessment indicates that approximately 4,800m³ of attenuation storage will be required across the site to accommodate storm events up to and including the 1 in 100-year rainfall event plus climate change allowances.

This storage volume will be delivered through a combination of above-ground and below-ground infrastructure integrated within the development. A key element of the strategy is the use of landscape attenuation features which provide both drainage and environmental benefits. Approximately 1,000m³ of attenuation capacity is anticipated to be delivered through landscape basins and surface storage features integrated into the wider public realm and ecological strategy.

Additional attenuation volume will be provided through underground storage infrastructure located beneath roads, hardstanding areas and service areas. The combination of underground and above-ground solutions enables the efficient use of land whilst maximising environmental and biodiversity benefits.

Following attenuation, runoff is assumed to be able to discharge to ground in accordance with drainage hierarchy principles and planning policy requirements.

The discharge strategy has been developed to:

- Minimise downstream flood risk.
- Reduce pressure on existing drainage infrastructure.
- Improve resilience to climate change.
- Support sustainable catchment management.

Attenuation and appropriate control structures will ensure that runoff rates remain within acceptable limits and that water is released gradually following storm events.

This approach ensures that the development will not increase flood risk elsewhere and represents a substantial improvement in runoff management compared with existing site conditions.

7. Water Efficiency, Water Reuse and Sustainable Resource Management

The efficient use of water resources is a fundamental component of the sustainability strategy for the Proposed Development. The development is located within the South East of England, a region recognised as experiencing increasing pressure on available water resources due to population growth, climate change and future development requirements. Consequently, minimising potable water demand has been established as a key design objective from the earliest stages of the project. The proposed approach is based upon the principle of reducing water demand before considering additional infrastructure requirements. This is achieved through a combination of efficient building design, operational management measures and monitoring technologies that collectively minimise water consumption throughout the operational life of the development.

A significant factor contributing to reduced water demand is the adoption of air-cooled cooling technologies. Unlike conventional evaporative cooling systems, which can require substantial volumes of make-up water, air-cooled systems operate with significantly lower water requirements. This design decision represents one of the most important sustainability measures incorporated within the development and substantially reduces the demand placed on regional water resources.

Further reductions in potable water consumption will be achieved through the specification of water-efficient fixtures and fittings throughout administration, welfare and ancillary buildings. Proposed measures include:

- Dual-flush sanitary systems.
- Low-flow taps.
- Flow restrictors.
- Automatic sanitary water shut-off controls.
- Water-efficient appliances.
- Water reclaim system (refer to section 3.9)

We will be aiming to achieve BREEAM water criteria as stated in the ‘BREEAM Data Centres 2010’ document:

- WC – effective flush volume of 4.5 litres or less
- All taps (except kitchen taps) – 6 litres per minute or less
- Showers – 9 litres per minute or less
- Urinals – to be fitted with individual presence detectors, or ultra low flush / waterless urinals

Additional credits are expected to be achieved through the use of a closed-loop cooling system, which requires water for initial filling (plus minor makeup) only and results in negligible operational water consumption compared with the BREEAM baseline.

These measures will be supported by a comprehensive water monitoring strategy incorporating:

- Building-wide metering.
- Sub-metering of key water uses.
- Leak detection systems.
- Building Management System integration.
- Automated monitoring and reporting functionality.

Together, these measures ensure that water consumption is minimised, monitored and actively managed throughout the lifespan of the development.

7.1 Rainwater Harvesting and Water Reuse

The Proposed Development seeks to treat rainfall as a valuable resource rather than a waste product. Rainwater harvesting therefore forms an integral component of the wider water management strategy and contributes both to water efficiency objectives and surface water management objectives.

Rainfall collected from suitable roof areas will be stored within dedicated rainwater harvesting systems and reused where potable water quality is not required. Potential applications include:

- Toilet flushing.
- Landscape irrigation.
- Plant establishment watering.
- Green roof irrigation.
- Maintenance and cleaning activities.

The reuse of harvested rainwater provides several benefits. It reduces demand upon mains water supplies, supports climate resilience objectives, decreases surface water runoff entering the drainage network and contributes towards the wider sustainability aspirations of the development. The below standard detail indicates our intended design strategy for the rainwater harvesting system:

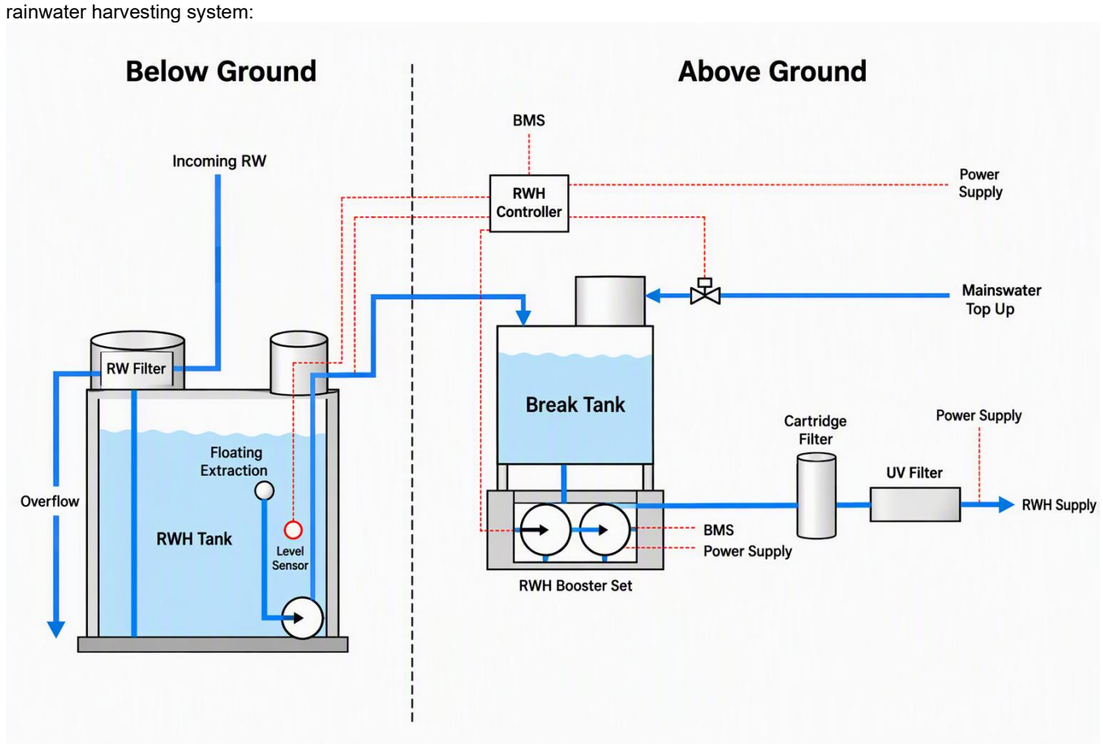


Figure 9: Standard rainwater harvesting system

Opportunities for future greywater reuse will also be considered during detailed design stages. Whilst the operational nature of the development generates relatively limited quantities of greywater, the long operational lifespan of the facility presents opportunities to accommodate future technological advances and additional resource efficiency measures where appropriate.

The development has therefore been designed with sufficient flexibility to allow future water reuse initiatives to be considered as part of ongoing sustainability improvement programmes.

7.2 Climate Resilience and Long-Term Water Resource Management

Climate change is expected to have a significant influence on future water resource availability throughout the South East of England. Current projections indicate increasing temperatures, more frequent drought conditions and greater seasonal variability in rainfall patterns. These changes have the potential to place increasing pressure on strategic water resources over the operational life of the development.

The proposed water efficiency strategy has therefore been developed with long-term resilience as a central objective. By reducing dependence on potable water supplies and incorporating alternative water sources, the development seeks to improve its resilience to future water stress conditions whilst supporting broader regional adaptation objectives.

Key resilience measures include:

- Air-cooled cooling systems.
- Water-efficient building services.
- Rainwater harvesting infrastructure.
- Smart monitoring and metering systems.
- Leak detection technology.
- Opportunities for future water reuse.
- Water-efficient landscape design.

The implementation of these measures will ensure that the development remains adaptable to future environmental conditions whilst minimising impacts on regional water resources.

The strategy also supports the wider sustainability ambitions of the project, including BREEAM and LEED certification objectives, and aligns with emerging industry commitments relating to climate-neutral data centre operation and responsible resource management.

Accordingly, the Proposed Development demonstrates a proactive and comprehensive approach to water efficiency that supports sustainable growth, improves climate resilience and contributes positively towards the long-term management of regional water resources.

8. Environmental Capacity, Climate Change and Future Resilience

8.1 Introduction

A key objective of the Water Cycle Strategy is to determine whether sufficient environmental and infrastructure capacity exists within the wider catchment to accommodate the Proposed Development throughout its operational life without creating unacceptable impacts on water resources, flood risk, water quality, wastewater infrastructure or environmental receptors.

Whilst previous chapters have considered individual components of the water cycle, it is also necessary to consider the cumulative interaction between these systems and their ability to remain effective under future environmental conditions. The Environment Agency's Water Cycle Study guidance identifies this as a critical stage in the assessment of sustainable growth and recognises that future development should only proceed where environmental and infrastructure capacity can be demonstrated.

This chapter therefore considers the ability of the wider water environment to support the Proposed Development having regard to:

- Water resource pressures.
- Existing utility infrastructure.
- Surface water management.
- Environmental quality.
- Future climate change.
- Cumulative development pressures.
- Long-term resilience.

The assessment has been informed by the Utilities Statement, Water Cycle Study, Flood Risk Assessment and Drainage Strategy, Sustainability Statement and Climate Change Assessment prepared for the Proposed Development.

8.2 Environmental Capacity and Catchment Resilience

The site is located within an established urban environment that is already supported by strategic utility infrastructure and forms part of a wider catchment that has historically accommodated significant commercial, industrial and infrastructure development.

From a water supply perspective, the development benefits from proximity to existing strategic infrastructure operated by Affinity Water. The site is served by a well-developed regional distribution network, including a strategic 12-inch water main located adjacent to the eastern boundary of the site. The availability of this infrastructure provides confidence that the proposed development can be accommodated without requiring substantial strategic upgrades to the wider water supply system.

The operational characteristics of the Proposed Development further support this conclusion. Unlike many industrial facilities, modern data centres have relatively low occupancy densities and therefore generate comparatively modest water demands. This benefit is enhanced through the adoption of air-cooled cooling technologies which substantially reduce operational water consumption when compared with conventional evaporative cooling systems.

The Water Cycle Strategy estimates peak potable water demand at approximately 2.3 litres per second, increasing to approximately 3.7 litres per second when fire water replenishment requirements are considered. In the context of the wider water resource system, this level of demand is considered modest and is not expected to create significant pressure on available supplies.

Similarly, wastewater generation remains relatively low. The anticipated foul water generation of approximately 5.1m³/day and associated peak discharge rates of approximately 0.5-0.7 litres per second are substantially lower than many alternative commercial developments occupying a comparable site area. Existing foul sewer infrastructure operated by Thames Water is located adjacent to the site and current assessments indicate that sufficient capacity is likely to be available within the wider wastewater network.

From a drainage perspective, the proposed development provides a significant improvement over existing site conditions. The introduction of a comprehensive Sustainable Drainage System incorporating attenuation storage, rainwater harvesting, green infrastructure and water quality treatment measures will improve the management of rainfall runoff and reduce the site's contribution to downstream flood risk.

Collectively, these characteristics indicate that sufficient infrastructure and environmental capacity exists to support the Proposed Development without generating unacceptable impacts on the wider water environment.

8.3 Climate Change, Future Growth and Long-Term Resilience

Climate change represents one of the most significant long-term pressures affecting the water environment and has therefore been a central consideration throughout the development of the Water Cycle Strategy.

Future climate projections indicate that the South East of England is likely to experience:

- Increased frequency and intensity of extreme rainfall events.
- More intense extreme weather events, for example, storms.
- Higher average and maximum temperatures.
- Longer periods of drought.
- Greater seasonal variability in rainfall (less precipitation in summers and increased precipitation in winters)

These changes have the potential to influence all aspects of the water cycle including water supply, wastewater infrastructure, surface water management and environmental quality.

The Proposed Development has been designed with these future conditions in mind and incorporates a wide range of adaptation measures intended to improve long-term resilience.

From a flood risk perspective, the drainage strategy incorporates current Environment Agency climate change allowances and approximately 4,800m³ of attenuation storage. The proposed drainage network has been designed to safely manage runoff associated with future rainfall intensification while ensuring that flood risk is not increased elsewhere within the catchment.

From a water resource perspective, the strategy seeks to minimise dependency upon potable water supplies through the adoption of water-efficient sanitaryware fittings and building services, rainwater harvesting systems and air-cooled cooling infrastructure. These measures significantly reduce the development's vulnerability to future drought conditions and support wider regional water conservation objectives.

The development also incorporates extensive blue-green infrastructure including green roofs, rain gardens, tree pits, landscape attenuation features and biodiversity enhancements. These measures provide multiple climate change adaptation benefits including urban cooling, improved ecological resilience, enhanced stormwater management and improved environmental quality.

Future growth within the wider area has also been considered. Whilst the surrounding catchment is expected to continue accommodating development throughout the plan period, the relatively modest water and wastewater demands associated with the Proposed Development mean that it is unlikely to materially influence strategic infrastructure planning assumptions. Furthermore, statutory undertakers will continue to account for future development requirements through their normal investment planning and Asset Management Programmes.

The Proposed Development is therefore considered capable of operating effectively under future climate conditions while maintaining resilience across the full water cycle.

8.4 Conclusions

This assessment has considered the ability of the wider environment, utility infrastructure and receiving catchment to accommodate the Proposed Development both under existing conditions and future climate scenarios.

The assessment confirms that no significant environmental constraints have been identified that would prevent delivery of the scheme.

In particular, the assessment concludes that:

- Existing water supply infrastructure is capable of supporting the proposed development.
- Wastewater generation is relatively low and can be accommodated within the existing wastewater network.
- Surface water runoff will be effectively managed through the proposed Sustainable Drainage System.
- Water quality will be protected through the implementation of treatment-train SuDS features and appropriate pollution prevention measures.
- Climate change has been incorporated throughout the design process through the application of future rainfall allowances, water efficiency measures and resilience-focused infrastructure.
- The proposed blue-green infrastructure network provides long-term benefits for biodiversity, environmental quality and climate adaptation.

- Cumulative impacts on the wider catchment are expected to be limited.
- The development contributes positively towards wider objectives relating to sustainable growth, resource efficiency and climate resilience.

Accordingly, the Proposed Development is considered capable of being accommodated within the environmental carrying capacity of the wider area and is consistent with national planning policy, London Plan objectives and the principles set out within the Environment Agency's guidance on Water Cycle Studies.

9. Integrated water management, implementation and long-term resilience

9.1 Integrated Water Management Strategy

The Proposed Development has been planned and designed in accordance with the principles of Integrated Water Management (IWM), whereby water supply, water demand, wastewater infrastructure, surface water drainage, water quality protection, biodiversity enhancement and climate adaptation are considered as interconnected components of a single environmental and infrastructure system.

This approach recognises that sustainable water management extends beyond the provision of individual utility connections and drainage infrastructure. Instead, the development seeks to establish a coordinated framework through which water resources are managed efficiently, environmental impacts are minimised and long-term resilience is enhanced. The strategy has therefore been developed to ensure that each element of the water cycle contributes positively towards the broader sustainability, environmental and operational objectives of the scheme.

The Integrated Water Management Strategy is founded upon a hierarchy of intervention that prioritises:

- Reduction in potable water demand through efficient design and operational management.
- Reuse of available water resources through rainwater harvesting and future water reuse opportunities.
- Management of rainfall runoff at source through Sustainable Drainage Systems (SuDS).
- Protection and enhancement of surface water and groundwater quality.
- Reduction in flood risk and improvement of catchment resilience.
- Delivery of biodiversity, urban greening and environmental enhancement benefits.
- Long-term climate adaptation and operational resilience.

By applying this hierarchy, the Proposed Development seeks to minimise its dependence on strategic utility infrastructure whilst supporting the efficient management of water resources across the wider catchment.

A key component of the strategy is the adoption of a high-efficiency cooling solution utilising air-cooled chiller infrastructure and high-temperature chilled water systems. This approach significantly reduces operational water consumption compared with conventional evaporative cooling technologies and contributes towards wider regional objectives relating to water conservation and resource efficiency.

The strategy further incorporates water-efficient building services, rainwater harvesting systems, leak detection technology and smart metering infrastructure. These measures collectively reduce potable water demand, improve operational efficiency and contribute to the long-term sustainability of the development.

Surface water management is integrated within the wider landscape and ecological framework through the incorporation of a site-wide Sustainable Drainage System network. Green roofs, rain gardens, tree pits, attenuation basins, rainwater harvesting systems and underground attenuation storage have been incorporated to provide approximately 4,800m³ of attenuation capacity whilst simultaneously delivering water quality, biodiversity and climate adaptation benefits.

The resulting approach ensures that water management infrastructure performs a multifunctional role and contributes positively to both site-specific and catchment-wide environmental outcomes.

9.2 Implementation, Monitoring and Operational Management

The successful delivery of the Water Cycle Strategy is dependent upon the effective implementation, operation and ongoing management of the proposed infrastructure throughout the life of the development.

A comprehensive management and monitoring framework will therefore be established as part of the detailed design process and will provide the basis for the long-term stewardship of all water-related infrastructure.

The framework will establish:

- Asset ownership and management responsibilities.
- Inspection and maintenance requirements.
- Monitoring and reporting procedures.
- Performance management criteria.
- Review and continuous improvement mechanisms.

The framework will apply to all principal water management assets including Sustainable Drainage Systems, rainwater harvesting infrastructure, attenuation storage systems, flow control devices, water quality treatment features and monitoring equipment.

Particular emphasis will be placed upon preserving the long-term functionality of the SuDS network and ensuring that attenuation storage volumes, water quality treatment processes and biodiversity enhancements are maintained throughout the operational life of the development.

Operational performance will be supported through integration of water monitoring systems within the Building Management System (BMS), allowing for real-time monitoring of water consumption, leak detection, rainwater harvesting performance and overall system efficiency. This information will support proactive maintenance, allow early identification of operational issues and facilitate ongoing optimisation of asset performance.

The proposed management approach ensures that the environmental and operational benefits identified within this Water Cycle Strategy are retained beyond the construction phase and continue to be realised throughout the lifetime of the development.

9.3 Long-Term Resilience and Future Adaptability

The Proposed Development has been designed with a long operational lifespan and therefore requires infrastructure that is capable of responding to future environmental, technological and regulatory change.

Climate change is anticipated to increase the frequency and intensity of rainfall events, place additional pressure on regional water resources and alter the environmental conditions within which water infrastructure operates. The Water Cycle Strategy has therefore been developed to ensure that the development remains resilient under both current and future climate scenarios.

Future resilience is achieved through a combination of measures including:

- Incorporation of Environment Agency climate change allowances within drainage design.
- Provision of substantial site-wide attenuation storage.
- Reduction in potable water demand through efficient cooling technologies.
- Rainwater harvesting and water reuse infrastructure.
- Integration of blue-green infrastructure and climate-resilient landscaping.
- Adoption of smart monitoring and management systems.

In addition to climate resilience, the development has been designed to remain adaptable to future operational and technological advancements. The integrated nature of the proposed infrastructure allows opportunities for future enhancement, including additional water reuse measures, optimisation of monitoring systems and adaptation of landscape and ecological infrastructure to respond to changing environmental conditions.

The proposed approach ensures that the development is not only capable of meeting current infrastructure and environmental requirements but is also well positioned to respond to future challenges and opportunities over its operational life.

Accordingly, the Integrated Water Management Strategy provides a robust framework for the sustainable management of water resources, environmental protection and long-term resilience. Through the coordinated delivery of water efficiency measures, Sustainable Drainage Systems, biodiversity enhancements, climate adaptation infrastructure and proactive management arrangements, the Proposed Development establishes a comprehensive and future-proof approach to water management that is consistent with national planning policy, London Plan objectives and Environment Agency guidance on sustainable growth and integrated water management.

10. Conclusion

10.1 Introduction

This Water Cycle Strategy has been prepared in support of the Outline Planning Application for the Proposed Data Centre Development and provides an integrated assessment of the site's interaction with water resources, wastewater infrastructure, flood risk, surface water drainage, environmental protection and climate resilience.

The assessment has been informed by the Flood Risk Assessment and Drainage Strategy, Utilities Statement, Sustainability Statement, Climate Change Assessment, BREEAM Assessment and previous Water Cycle Study prepared for the site. Collectively, these studies provide a comprehensive evidence base from which the potential effects of the Proposed Development on the wider water environment have been assessed.

The purpose of the assessment has been to determine whether the development can be accommodated within the capacity of the existing and planned water environment and whether sufficient mitigation measures have been incorporated to ensure that the development remains sustainable and resilient throughout its operational life.

The assessment has considered the full water cycle including:

- Water resource availability.
- Water supply infrastructure.
- Water demand and efficiency.
- Wastewater generation and treatment.
- Surface water management.
- Flood risk.
- Water quality.
- Environmental capacity.
- Climate adaptation.
- Long-term operational management.

The findings demonstrate that the Proposed Development has adopted a comprehensive and integrated approach to water management that aligns with national planning policy, London Plan policy and the principles set out within the Environment Agency's guidance on Water Cycle Studies.

10.2 Water Supply and Resource Efficiency

The assessment confirms that the Proposed Development can be adequately served by existing and planned water infrastructure.

The site is located within the operational area of Affinity Water and benefits from proximity to strategic water supply infrastructure, including a 12-inch strategic water main adjacent to the site boundary. No fundamental water supply constraints have been identified that would prevent delivery of the development.

A key strength of the scheme is the relatively low operational water demand associated with the proposed land use. The adoption of air-cooled cooling systems significantly reduces potable water consumption compared with conventional evaporative cooling technologies and represents one of the most important water conservation measures incorporated within the project.

This strategy is further supported by:

- Water-efficient fixtures and fittings.
- Smart metering and monitoring systems.
- Leak detection infrastructure.
- Rainwater harvesting systems.
- Future flexibility for additional water reuse opportunities.

Collectively, these measures minimise demand on regional water resources and support wider objectives relating to resource efficiency and long-term water security.

10.3 Wastewater Infrastructure

The Proposed Development can be adequately accommodated within the existing wastewater infrastructure framework.

The site benefits from proximity to existing foul sewer infrastructure operated by Thames Water and no strategic wastewater constraints have been identified through the assessment process.

The anticipated foul water generation associated with the development remains modest due to the relatively low operational occupancy characteristics of modern hyperscale data centres and the incorporation of water efficiency measures throughout the development.

Consequently, wastewater generation is not expected to place significant pressure on the existing sewer network or downstream treatment infrastructure.

Future coordination with Thames Water will continue through detailed design stages to confirm connection arrangements and any local network requirements; however, wastewater infrastructure is not considered to represent a barrier to development.

10.4 Flood Risk and Surface Water Management

Flood risk has been assessed from all relevant sources including fluvial flooding, surface water flooding, groundwater flooding, sewer flooding and reservoir flooding.

The site lies wholly within Flood Zone 1 and therefore benefits from the lowest probability of flooding from rivers and the sea. Groundwater and reservoir flood risks are similarly considered low and do not represent significant constraints to development.

Surface water management has been identified as the principal flood-related consideration affecting the site. In response, the Proposed Development incorporates a comprehensive Sustainable Drainage System designed to manage runoff safely and sustainably throughout the operational life of the development.

The proposed drainage network includes:

- Rainwater harvesting systems.
- Green roofs.
- Rain gardens.
- Tree pits.
- Attenuation basins.
- Underground attenuation storage.
- Water quality treatment features.
- Controlled discharge infrastructure.

The drainage strategy has been developed to accommodate approximately 4,800m³ of attenuation storage and incorporates current Environment Agency climate change allowances. Drainage design is subject to the results of intrusive ground investigation, Reserved Matters and Detailed Design at later design stages.

The implementation of this infrastructure will significantly improve the management of runoff across the site when compared with existing conditions and ensures that flood risk is not increased elsewhere within the catchment.

10.5 Water quality, environmental protection and climate resilience

A key objective of the Water Cycle Strategy has been the protection and enhancement of the wider water environment.

The proposed development incorporates a treatment-train approach to runoff management that provides multiple stages of treatment prior to discharge. This approach minimises pollutant loading, protects receiving water environments and supports wider water quality objectives.

Groundwater protection measures, pollution prevention procedures and long-term maintenance arrangements have also been incorporated to ensure that environmental receptors remain protected throughout both construction and operation.

The assessment has additionally considered future climate change impacts and concludes that the development has been designed to remain resilient under future climate conditions. Through the incorporation of:

- Climate-responsive drainage infrastructure.
- Water-efficient technologies.
- Rainwater harvesting systems.
- Blue-green infrastructure.
- Biodiversity enhancements.
- Long-term monitoring frameworks.

the development demonstrates a robust and adaptable response to the future challenges associated with climate change.

Importantly, many of these measures provide benefits that extend beyond the site boundary and contribute positively towards wider catchment resilience and environmental sustainability objectives.

10.6 Overall Conclusions

This Water Cycle Strategy has demonstrated that the Proposed Data Centre Development has been designed in accordance with the principles of sustainable development, integrated water management and long-term climate resilience. The assessment has considered the full water cycle, from water resource availability and potable water supply through to wastewater treatment, flood risk management, surface water drainage, environmental protection and operational management. Through this holistic assessment it has been demonstrated that the development can be accommodated within the capacity of the existing and planned water environment without resulting in unacceptable effects on infrastructure, environmental receptors or the wider catchment.

A key conclusion of the assessment is that the development has been conceived around the principle of minimising demand upon natural resources whilst maximising environmental performance. This approach is evident throughout the design process and is reflected in the selection of air-cooled cooling technologies, water-efficient building systems, rainwater harvesting infrastructure and integrated Sustainable Drainage Systems. Collectively, these measures ensure that water is treated as a valuable resource and that demand is reduced wherever practicable before additional infrastructure requirements are considered.

The assessment has demonstrated that potable water demand associated with the development is relatively modest when considered against the scale and strategic importance of the proposed facility. Existing water supply infrastructure operated by Affinity Water is located in close proximity to the site and no strategic constraints have been identified that would prevent connection to the public water supply network. The development therefore represents a sustainable and efficient use of existing infrastructure whilst also supporting wider regional objectives relating to water conservation and resource efficiency.

Similarly, the assessment has confirmed that wastewater generation remains relatively low due to the operational characteristics of the proposed data centre campus. Existing wastewater infrastructure operated by Thames Water is available within the vicinity of the site and the anticipated foul water flows can be accommodated without placing significant pressure on the surrounding sewer network. Based on the information available at this stage, wastewater infrastructure does not represent a constraint to development and there is no evidence to suggest that the proposed scheme would adversely affect the operation of the wider wastewater system.

From a flood risk perspective, the site benefits from a highly favourable baseline position. The development is located wholly within Flood Zone 1 and is therefore situated within an area of lowest risk from fluvial and tidal flooding. Surface water flooding represents the primary flood-related consideration affecting the site; however, the proposed development incorporates a comprehensive surface water management strategy that significantly improves drainage performance relative to existing conditions. The provision of approximately 4,800m³ of attenuation storage, combined with a site-wide Sustainable Drainage network and treatment train will manage surface water runoff rates and volumes to replicate a greenfield area.