Heathrow

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Environmental Information Consultation Document (EICD)

Chapter 13: Water environment

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13. Water environment

13.1 Introduction

13.1.1 As indicated within **Chapter 1: Setting the scene for consultation – environmental information**, 'water environment' is an environmental aspect for which environmental information is presented for 2026 Public Consultation.

13.1.2 This chapter is supported by **Figure 13A.1**, **Figure 13A.2**, **Figure 13A.3**, **Figure 13A.4**, **Figure 13A.5**, **Figure 13A.6**, and a glossary of terms.

13.2 What do we mean by the 'water environment'?

13.2.1 The water environment refers to natural and man-made systems where water is found, such as rivers, seas, lakes, reservoirs, and underground water (groundwater). It also includes surface water and foul drainage networks that collect and convey rainwater and wastewater. The water environment refers not just to the physical presence of water but also includes the chemical and biological conditions of the water. Key receptors within the water environment include:

- Main rivers, ordinary watercourses, and features including lakes, reservoirs and canals – natural and managed waterbodies across the landscape.
- Coastal and marine waters – seas and coastal environments.
- Groundwater – water present within the ground which supports water supply and can interact with river flow.
- Flood risk and water management – the risk of flooding and how water is managed to protect people and the environment from flooding.
- Surface water drainage – pipework, drains, and sustainable drainage systems (SuDS) which collect and treat rainwater.
- Foul drainage – pipework and associated infrastructure which collects wastewater and transports it for treatment.
- Water quality – the chemical and biological condition of water.
- Water resources – the water that is available for use by people, businesses, agriculture, and industry.

13.2.2 Ecological effects relating to the water environment, such as aquatic ecology and the ecological connectivity of rivers are reported within **Chapter 12: Biodiversity** of this consultation document.

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13.3 Why the water environment might change

13.3.1 As indicated within **Chapter 2: Description of the Project**, the Project would require the rivers to the west of the existing airport to be diverted. This would alter the water environment in the following ways:

- Altering the location of the rivers would change the flow dynamics, hydrological functioning and geometry (hydromorphology) of these features.
- The River Colne, Wraysbury River, Duke of Northumberland's River, and Longford River would pass beneath the Northwest Runway in the north west of the draft Order Limits (the River Colne and Wraysbury River within one channel and the Duke of Northumberland's River and Longford River in a second channel). This would require the careful amalgamation and splitting of river flows upstream and downstream of the combined channel sections, to maintain existing flows within each river network.
- The alignment of the Colne Brook would be diverted in an open channel to the west of the Northwest Runway.
- During the construction period, temporary diversions of the Colne Brook, the combined River Colne and Wraysbury, and combined Duke of Northumberland's and Longford River would be required to facilitate surrounding infrastructure. The temporary diversion length would be minimised where possible.
- The existing floodplain would be altered due to the amended river alignments and proposed ground levels. This would require the delivery of flood storage areas to manage river flow during flood conditions and ensure that flood risk is not increased elsewhere.
- Diverting the rivers over areas of existing landfill would require the channels to be lined with an impermeable barrier to protect water quality and prevent a risk of contamination, which has the potential to alter groundwater flow.

13.3.2 The position of the proposed runway in the north west would require Old Slade Lake, Colnbrook North, Colnbrook West, Orlitts Lake and Swan Lake to be infilled. This would remove these features from the water environment and locally alter the flow of groundwater.

13.3.3 The construction of basements and below ground structures, alongside earthwork movements, would also locally alter the flow of groundwater. Temporary dewatering during construction also has the potential to alter groundwater flow.

13.3.4 The change in surfacing (in terms of areas which are soft landscaped and hard landscaped) would alter how rainfall infiltrates into the ground beneath or flows off a surface. There would be temporary and some permanent changes during the construction stage, and permanent changes during the operational stage of the Project.

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13.3.5 Increased requirements for foul drainage could increase pressure on the wider foul drainage and treatment network. Similarly, any increase in potable water requirements during the construction and operational stages could affect the local drinking water supply and/or the wider water environment.

13.4 Legislation, policy and guidance

13.4.1 In the UK, there is a variety of legislation, policy and guidance that has been put in place to manage and improve the water environment.

13.4.2 The key legislation relevant to this assessment includes both European directives and UK legislation. The EU Water Framework Directive (2000/60/EC) [1] aims for all water bodies to achieve good or high ecological status by 2027. It is enacted in the UK through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The associated Environmental Quality Standards Directive (2008/105/EC) [2] sets limits for priority substances in water to ensure chemical status is maintained, while the Groundwater Directive (2006/118/EC) [3] introduces measures to prevent and control groundwater pollution.

13.4.3 The Flood and Water Management Act 2010 [4] places responsibility on the Environment Agency (EA) and local authorities to manage flood risk and oversee drainage systems, supported by a requirement for flood risk assessments for new developments.

13.4.4 The Land Drainage Act 1991 [5] governs changes to ordinary watercourses, requiring consent from local authorities to protect water quality and flow. The Water Resources Act 1991 [6] and Water Act 2003 [7] form the foundation for regulating water resources, abstraction, and flood defences. The Environmental Permitting (England and Wales) Regulations 2016 control certain activities near EA-designated main rivers, ensuring compliance for works affecting them, and provide for environmental permits for water discharge consents. The Environmental Protection Act 1990 provides controls over pollution and waste.

13.4.5 The Reservoirs Act 1975 [8] provides safety regulations for large reservoirs, mandating inspections and monitoring, with the EA overseeing enforcement.

13.4.6 National planning policy and guidance (including the Airports National Policy Statement (ANPS) [11] and the National Networks National Policy Statement [11]), remains the national policy against which the DCO application will be determined. This planning policy, alongside the National Planning Policy Framework [12], flood risk and coastal change planning practice guidance [14], climate change allowances [15], and National standards for sustainable drainage systems [16] require developments to manage flood risk, water resources, and wastewater. The policies also require climate change to be taken into account and for projects to consider and incorporate sustainable drainage.

13.4.7 Relevant regional and local planning policy includes local planning authority local plans, strategic flood risk assessments, river basin district management plans, and the London Plan (2021).

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13.5 Assessment summary

13.5.1 This section summarises the approach to the water environment assessment and explains how conclusions have been drawn in this chapter.

Environmental measures

13.5.2 The Project incorporates a range of environmental measures, including those described in the Blue and Green Infrastructure (B&GI) Environmental Measures Topic Paper. These measures form an integral part of the Project and have therefore been considered as 'embedded' within the assessment.

13.5.3 The assessment presented in this chapter assumes implementation of these embedded measures.

Baseline

13.5.4 The baseline for the water environment assessment is informed by data collection via surveys, numerical and computational modelling, and desk-based information, including:

- Data collected up to 2019, including groundwater levels, groundwater quality, surface water quality and flow monitoring.
- Site visits up to 2019 to assess watercourses and potential Water Framework Directive (WFD) mitigation.
- Fluvial, groundwater, and surface water quality modelling undertaken up to 2019 which fed into emerging Project design.
- Groundwater level monitoring undertaken post 2019 (using the loggers installed prior to 2019).
- Online mapping – for example, publicly-available information from the Environment Agency (EA).

13.5.5 The baseline has also been informed by the 2025 Scoping Opinion (specifically to include further consideration of tidal flood risk), and ongoing technical engagement with relevant stakeholders.

13.5.6 The study area is the area in the vicinity of the Project within which baseline data is being collected and has been developed and agreed upon by relevant statutory bodies and stakeholders.

13.5.7 The following figures set out the hydrological context of the draft Order Limits:

- **Figure 13A.1** shows watercourses within the vicinity of the existing airport such as the River Crane to the east and River Colne and associated tributaries to the west.
- **Figure 13A.2** presents the study area for the water environment assessment reported in this chapter.

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- **Figure 13A.3** presents the WFD mitigation sites identified at this stage. The final WFD mitigation sites will be subject to discussion with the EA and relevant stakeholders.
- **Figure 13A.4** shows the EA's flood map for planning in relation to the draft Order Limits, the majority of which falls within Flood Zone 1.
- **Figure 13A.5** shows the EA's Risk of flooding from surface water map, with sporadic ponding shown across the wider area.
- **Figure 13A.6** shows the residual risk of reservoir flooding.

13.5.8 Core baseline conditions such as the location and physical form of the rivers remain the same in comparison to the 2019 baseline data, although conditions within the water features, such as water quality or flow conditions, could have changed since that time. For the purposes of this chapter, based on available data it is considered that all water environment baseline conditions have remained broadly consistent since 2019, and remain appropriate for describing the likely significant effects arising from the construction and operational stages of the Project. Supplementary work to validate and update the baseline since 2019 is being undertaken, to further inform development of the Project and the water environment assessment (discussed within **Section 13.9**) that will be reported in the Environmental Statement provided as part of the DCO Application.

13.6 Assessment approach

13.6.1 The assessment considers each of the elements of the water environment that are listed below:

- Surface water features and groundwater bodies.
- Groundwater flow and water quality (groundwater and surface water quality).
- Water supply, drainage, and wastewater infrastructure:
  - Water supply
  - Surface water drainage
  - Foul water drainage
- Flood risk:
  - Fluvial and tidal
  - Pluvial (overland surface water runoff)
  - Groundwater
  - Artificial sources (such as reservoirs and canals)
  - Sewers

13.6.2 The assessment considers guidance set out in the Design Manual for Roads and Bridges LA 104 'Environmental assessment and monitoring' [15] and LA 113 'Road

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drainage and the water environment' [16]. While this guidance was originally designed for highways projects, it forms industry best practice guidance regarding value assignment for receptors, and significance of effect for potential impacts arising from the Project.

13.6.3 The Water Framework Directive (WFD) assessment is a measure of the potential effects on a waterbody (be this a river or groundwater body). Non-compliance with the WFD assessment can be linked to an overall deterioration of a WFD waterbody and therefore an effect on a receptor.

13.6.4 Conclusions on the significance of effects arising from the Project have been determined through consideration of the latest technical guidance where available, professional judgement, and take into account assessments and modelling undertaken to date. To define significance of effect, the sensitivity of receptor (receptors outlined in **Section 13.3**) and scale of the change resulting from the Project (the potential changes set out in **Section 13.4**) have been considered.

Surface water features

13.6.5 The assessment includes consideration of the amended and diverted rivers to understand the proposed changes to channel geomorphology, river flow and sediment loading, alongside the potential for pollutants (including atmospheric deposition), mixing and dilution of watercourse flows, and the effects on the water level of retained lakes where these are connected to groundwater.

13.6.6 A preliminary WFD assessment was undertaken in 2019. The assessment identified potential mitigation sites, which are presented within **Figure 13A.3**.

13.6.7 The WFD assessment has been reviewed alongside updated Environment Agency (EA) WFD Cycle 3 datasets. Findings of the surveys and consideration of waterbody effects have been taken into account to support this consultation document. Further surveys and assessment will be completed to support the WFD assessment submitted as part of the DCO application. The WFD assessment will identify how waterbodies will be affected by activities associated with the Project, which could comprise changes to channel geomorphology, river flow, water quality, and groundwater quantity or quality. The WFD assessment will evaluate compliance of the Project with the WFD objectives, and take into account any embedded WFD environmental mitigation measures. The overarching WFD objectives are set out below:

- Objective 1: The development will not cause deterioration in any element of waterbody classification.
- Objective 2: The development will not prevent the WFD status objectives from being reached within the waterbody or other downstream/upstream waterbodies.
- Objective 3: The development will not negatively impact European designated habitats within or linked to the waterbody.

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- Objective 4: The development will contribute towards the delivery of the relevant River Basin Management Plan (RBMP), within which the impacted waterbodies are situated.

13.6.8 Where relevant, ecological effects in relation to aquatic and ecological connectivity will be detailed within **Chapter 12: Biodiversity**.

Groundwater interactions and water quality

13.6.9 An assessment of likely significant effects on groundwater was undertaken in 2019, through development of a groundwater model. The assessment was developed taking into account baseline groundwater monitoring and considered the potential changes in flow due to the scheme proposals at that time. This modelling has been reviewed to draw conclusions for this Environmental Information Consultation Document (EICD) and will be updated based on ongoing groundwater monitoring to support the Environmental Statement (ES) as part of the DCO application. The modelling will take climate change into consideration. An updated modelling methodology was prepared and issued to relevant statutory bodies and stakeholders as part of ongoing technical engagement.

13.6.10 A preliminary assessment of water quality was undertaken in 2019 and has been reviewed against latest development proposals, updates to national planning policy and technical guidance and updated EA water quality datasets to draw conclusions for the EICD. The full water quality assessment will be submitted as part of the DCO application and will include consideration of groundwater quality and surface water quality, alongside the potential pathways for pollution and contamination. Consideration will be given in the ES to whether the Project would cause any alterations to existing groundwater abstractions and surface water discharges.

13.6.11 Surface water quality and groundwater quality monitoring was previously undertaken to support the 2019 assessment, alongside a conceptual surface water quality model. This has been reviewed against latest development proposals, updates to national planning policy and technical guidance, and new survey data obtained from existing boreholes since 2019 to draw conclusions for the EICD. Further surface water quality and groundwater quality monitoring will be undertaken to support the assessment to be reported in the ES and will be incorporated within the updated model where appropriate.

13.6.12 A semi-quantitative assessment of likely significant effects on surface water quality will be undertaken, supplemented by qualitative assessment where appropriate. The likely significant effects arising from the Project on groundwater quality will be qualitatively assessed within the ES assessment, taking into account potential contamination sources during the construction and operational stages.

13.6.13 An assessment of groundwater and surface water quality and groundwater flow will be made, based on quantified baseline data, and assessment conclusions will be presented within the ES. Professional judgement in accordance with best practice guidance will be used to determine the level of significance of effect following assessment, taking into account factors such as land use, relative change in

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groundwater levels, and pollution pathways within and adjacent to the draft Order Limits.

Potable water, drainage, and wastewater infrastructure

13.6.14 A quantified assessment will be undertaken to support the ES, involving calculation of the existing and proposed potable water demand, surface water drainage discharge and foul drainage discharge.

13.6.15 A qualitative assessment of potable water demand was undertaken to support the 2019 assessment, which has been reviewed against up-to-date planning policy and technical guidance and latest development proposals to draw the conclusions of the EICD. This will be further updated to support the ES assessment. Engagement with stakeholders will be undertaken regarding the proposed potable water demand and foul water discharges (Affinity Water and Thames Water respectively) to ascertain whether and at what stage there will be adequate supply and capacity within their respective networks. Any requirement for upgrade works to Thames Water and/or Affinity Water assets will be established during stakeholder engagement.

13.6.16 A qualitative drainage impact report was undertaken in 2019 and the assessment has been reviewed against latest development proposals and updates to national planning policy and technical guidance. This includes updated EA peak rainfall climate change allowances and the new national standards for sustainable drainage systems to assess key principals and elements of the drainage strategy in which to draw conclusions for the EICD. A quantified outline surface water drainage strategy will be developed to support the ES assessment and submitted as part of the DCO application. The strategy will incorporate sustainable drainage systems (SuDS) and ensure that the rate of runoff into the water environment does not increase in comparison to the existing baseline, and where possible is reduced. This will ensure that flood risk is not increased elsewhere, and that appropriate treatment is provided prior to discharge to manage any effects on surface water quality. The strategy will form part of the environmental measures set out within the B&GI Environmental Measures Topic Paper and will be incorporated within the ES assessment. Wider SuDS benefits, such as improving biodiversity and providing amenity benefits, will also be taken into account within the ES.

Flood risk

13.6.17 A quantified and qualitative assessment of flood risk was undertaken in 2019 and has been reviewed against latest national and local flood risk planning policy, as well as most recent iterations of the EA Flood Map for planning and long-term flood risk datasets and EA climate change allowances for peak river flow and peak rainfall intensities to draw conclusions for the EICD. The assessment will be updated to support the ES to appropriately assess the potential effects of flood risk due to the Project.

13.6.18 Fluvial hydraulic modelling was undertaken in 2019. The modelling has been reviewed alongside latest development proposals such as revisions to proposed

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flood storage areas. Further consultation has been made with EA to discuss and agree latest technical guidance and national planning policy, including updates to EA climate change allowances to peak river flow. Further iterations in the technical assessment have been used to draw conclusions for the EICD and will be further updated to support the ES assessment. The updated modelling will take into account both the existing and proposed scenarios, assessing changes in fluvial flood risk from the River Colne and its tributaries. The assessment will use the latest EA hydraulic model, considering climate change impacts on the proposed Project, which includes the diverted watercourses. It will identify whether flood risk changes in a measurable way and whether risk increases elsewhere.

13.6.19 The fluvial hydraulic modelling will consider how these interactions change from the baseline scenario through construction and operation. Engagement will be undertaken with the EA in relation to the key years for assessment, which will represent times when the most substantial changes occur to the existing watercourses and floodplain.

13.6.20 Tidal flood interactions will be taken into account as part of the fluvial hydraulic modelling. No infrastructure is proposed within the existing tidal flood extents, with the exception of potential WFD mitigation sites. The extents of tidal influence will be taken into account within the WFD mitigation design, to ensure the mitigation is designed appropriately.

13.6.21 A pre-development and post-development groundwater model was developed in 2019 and has been updated to suit latest development proposals and latest technical guidance, planning policy and updated climatic datasets. Consultation has also been undertaken with the EA to discuss the inclusion of climate change allowances into the model. Outcomes from additional assessment have been used to draw conclusions of the EICD. The groundwater modelling to support the ES assessment will build upon the substantial modelling previously undertaken. The post-development model will incorporate any additional or amended structures which could alter the levels or flow of groundwater beneath and around the draft Order Limits, and account for the impacts of climate change. This will be used to provide a qualitative assessment of groundwater flood risk to the Project and surrounding areas. Professional judgement will be applied, supported by available guidance, to determine the likely significance of effects, taking account of factors such as the scale of change and land use within and adjacent to the draft Order Limits.

13.6.22 A qualitative assessment of pluvial flood risk was completed in 2019 and has been reviewed alongside updated surface water flood mapping to inform the EICD conclusions. Pluvial flood risk within the draft Order Limits is relatively sporadic, with no substantial overland flow routes identified. Further qualitative assessment will use the EA's latest climate change pluvial flood risk extents and the proposed Project topographic levels to identify exceedance routes and ensure these are appropriately addressed within the surface water drainage strategy.

13.6.23 Flood storage areas were included in the 2019 design within the River Colne Valley to mitigate potential increases in flood risk and these are still required for this purpose. These areas are being assessed through hydraulic modelling, taking

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account of updated guidance on modelling methods and climate change allowances, which may result in design size variations. The assessment results will be reported in the flood risk assessment submitted with the DCO application. Although the flood storage areas will be empty for most of the time, their storage volume when full means they will be classified as statutory reservoirs and will be designed, constructed and maintained in accordance with the Reservoirs Act 1975.

13.7 Assessment results

Surface water features

13.7.1 Surface water features would be altered during the construction and operation of the Project. This would affect rivers and lakes within the River Colne catchment, to the west of the existing airport.

13.7.2 To enable construction, the Wraysbury River and River Colne would be permanently diverted and combined within a single channel as part of the covered river corridor, before being separated into their respective watercourses to the south and west of the expanded airport.

13.7.3 Similarly, the Duke of Northumberland's River and Longford River would be permanently diverted and combined within the covered river corridor beneath the runway, before being separated into their respective channels to the south of the expanded airport. The diversion and combination of these rivers would result in a net loss of river length.

13.7.4 Flows within each river would seek to mirror the existing situation where rivers are combined and split back to their respective channels. Where river divisions are above landfill, impermeable barriers would be created to ensure no potential for contamination.

13.7.5 The river diversions would be appropriately sequenced, with the respective and required flood storage areas provided in advance of the works proposed, to ensure there is no increase in flood risk elsewhere for key Project construction milestones.

13.7.6 As set out within the B&GI Environmental Measures Topic Paper, where rivers need to be diverted to facilitate the Project, they would be retained in open channel where feasible and designed appropriately to accommodate flows during everyday rainfall scenarios and flood conditions (low flows and high flows) for the lifetime of the Project. The rivers would be designed in line with best practice, providing low flow meanders where feasible and a varied aquatic and ecological habitat suitable to their respective location.

13.7.7 Appropriate procedures – as set out in the draft Code of Construction Practice (CoCP) – would be applied to ensure industry good practice is followed during construction in relation to pollution and water quality.

13.7.8 Water Framework Directive (WFD) mitigation sites would be identified as part of the WFD assessment, aiming to mitigate the effects on the water environment. Mitigation measures to be undertaken on retained rivers would be identified, including through

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technical engagement, both within the draft Order Limits and elsewhere within the associated river catchments where appropriate. This includes:

- River restoration works where possible, aiming to mitigate the effects in relation to WFD objectives.
- A programme of monitoring to confirm the effectiveness of the mitigation.
- A programme of maintenance to ensure that the environmental measures continue to function as intended post construction.

13.7.9 As the WFD baseline surveys and design of the Project and environmental mitigation measures are ongoing, there remains uncertainty at this stage in relation to whether the environmental measures would be sufficient to mitigate adverse effects of the Project on the river environment. A precautionary approach has therefore been taken at this stage, resulting in a potential likely **significant effect** on surface water features. The environmental measures and WFD mitigation will continue to be developed before submitting the DCO application, and the assessment of likely significant effects on the water environment in the Environmental Statement (ES) will take into account the further development of these measures and mitigation.

13.7.10 Existing lakes would be retained where feasible. However, this is not possible in all cases due to:

- The required location of proposed infrastructure.
- Safety considerations due to the proximity of the surface water features to the new and extended runways.
- The potential for bird strikes.

13.7.11 Colnbrook North, Orlitts Lake, Colnbrook West and Swan Lake are not designated as waterbodies under the WFD and would be infilled as part of the Project. Old Slade Lake would be partially infilled.

13.7.12 A monitoring programme will be committed to as part of the DCO application and developed post-DCO consent, subject to agreement by relevant statutory bodies and stakeholders. The programme will be implemented for pre-construction, construction and operational phases of the Project to assess potential effects arising as a result of the Project.

13.7.13 At this stage, the Project is anticipated to give rise to a likely **significant effect** on groundwater levels arising from the infilling of existing lakes which are connected to the aquifer and contribute to groundwater levels. Likely **significant effects** are also anticipated in relation to the infilled lakes, as these features will be removed.

Groundwater levels and water quality

13.7.14 Below ground infrastructure would be designed appropriately to protect against groundwater ingress during operation and to manage groundwater flows.

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13.7.15 Measures detailed within the draft CoCP would manage the potential for the mobilisation of contaminants during construction. Appropriate dewatering strategies would be adopted in agreement with relevant statutory bodies and stakeholders.

13.7.16 In accordance with the draft CoCP, a pollution control strategy would be developed, which would include the provision of facilities to manage spills, fuels and de-icer during the construction and operational activities. Appropriate bunding of storage features would also be provided.

13.7.17 Where there are potential interactions with areas of contamination during operation (for example, where rivers are above areas of land that contains contaminants), features would be appropriately lined to avoid contamination to rivers and effects on surface water quality.

13.7.18 Overall, there would be localised amendments to groundwater flow due to the Project. However, it is not considered that there would be a change which could affect the overarching flow regime within the Lower Thames Gravels WFD groundwater body. Groundwater modelling is currently being undertaken to assess the current groundwater flow regime baseline, the impacts of the Project upon it and the effectiveness of any necessary mitigation measures. The outcome of the assessment will be reported within the ES that accompanies the DCO application.

13.7.19 As a result, it is currently anticipated that there would be **no likely significant effect** in relation to groundwater interactions, groundwater quality or surface water quality.

Potable water, drainage, and wastewater infrastructure

13.7.20 Potable water supply to the existing airport is currently provided by Affinity Water. The existing airport has three existing groundwater borehole abstractions which have a combined annual license of 1.9 million litres per day (l/d) for general use relating to evaporative cooling. Engagement is being undertaken with Affinity Water to confirm current and future demand requirements in relation to potable water and ensure that potable water supply is available before occupation of the Project. Opportunities to incorporate water efficiency measures would be provided where appropriate.

13.7.21 Foul flows across the existing airport are drained to a combination of gravity and pumped Thames Water sewers. Any potential change in foul discharge is being discussed with Thames Water, to ensure there is adequate capacity in their receiving network to accommodate flows accordingly. If required, appropriate upgrade works would be undertaken to ensure no adverse effects to the wider water environment as a result of the Project.

13.7.22 Surface water runoff from the existing airport is currently attenuated and treated before discharge. An outline surface water drainage plan would be developed through engagement with relevant statutory bodies, to ensure that surface water flows are managed and there is no increase in the rate of runoff in comparison to the existing situation, which could otherwise increase flood risk elsewhere. The sustainable drainage systems (SuDS) provided as part of the drainage strategy would ensure that appropriate treatment is provided before discharge, in line with national and local guidance. As set out within the B&GI topic paper, holistic amenity

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and biodiversity benefits would be incorporated and provided where appropriate, taking existing airport safety into account.

13.7.23 As a result, it is currently anticipated that there would be **no likely significant effect** in relation to potable water, surface water drainage or foul drainage.

Flood risk

13.7.24 Flood storage areas are proposed within the Colne valley to ensure that fluvial flood risk is not increased elsewhere for the lifetime of the Project. Flood storage would be incorporated at key stages of the construction programme, to ensure there is no loss of flood storage during construction or operation.

13.7.25 No infrastructure is proposed within tidal risk areas, with the exception of potential WFD mitigation sites. The extent of tidal influence will be taken into account within the design of the WFD mitigation sites proposed.

13.7.26 As set out above, pluvial flood risks within the draft Order Limits are generally related to rainfall landing on the ground, rather than substantial overland flow routes. The outline surface water drainage strategy, which includes the use of SuDS, would capture and attenuate rainwater within the boundary of the Project to ensure that surface water flood risk is not increased elsewhere. An allowance for climate change will be incorporated to ensure flood risk is not increased elsewhere for the lifetime of the development.

13.7.27 The groundwater model will quantifiably confirm any relative change in groundwater level in comparison to the existing and proposed scenario. Based on the current Project design and assessment, it is not anticipated that there would be a substantial increase in groundwater flood risk to the Project or surrounding area. Further design information and survey data will be included within the groundwater model as part of the ES assessment and results will be reflected within the flood risk assessment.

13.7.28 Flood risk from reservoirs is considered to be residual, meaning there would be no risk of flooding under normal circumstances. The only risk would arise if the reservoir embankments or infrastructure failed when there was impounded water present. If this occurred, the water held within the reservoir would be released. Reservoirs are maintained to a high standard and inspected regularly in line with the Reservoirs Act 1975 and are therefore highly unlikely to fail. Consultation will be held with relevant statutory bodies and stakeholders to ensure the design of flood storage areas are compliant with planning policy and technical guidance.

13.7.29 Flood risk from canals is also considered to be residual, as there should be no flood risk from these features assuming normal operation of the infrastructure. Canals are considered to be highly managed infrastructure with water levels managed via locks, offtakes and outfalls.

13.7.30 Due to topography, land within the draft Order Limits may be at risk from a potential failure of the embankments associated with reservoirs and the Grand Union Canal (the canal located in closest proximity to the airport). A qualitative assessment of flood risk from these sources will be undertaken as part of the ES assessment, which will consider the potential failure locations and topographic flow routes from these

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locations to the draft Order Limits. Any resulting flood risk would result in **no likely significant effect** as this is only a residual risk (that is, it should not occur under normal operation).

13.7.31 Thames Water sewers are located within the draft Order Limits and are at risk of flooding during high intensity rainfall events when the volume of runoff from surrounding roads, buildings and land can significantly exceed the typical design standard for sewer networks. Further assessment of the potential flood risk will be undertaken through engagement with Thames Water. However, at this stage, through the control of surface water runoff, it is not anticipated that the Project would exacerbate or increase any existing flood risk. Any localised exceedance events would be managed on a location specific basis where appropriate, through consideration of design.

13.7.32 Construction phasing would be appropriately sequenced, with the respective and required surface water attenuation provided in advance of the works proposed, to ensure there is no increase in flood risk elsewhere. Appropriate procedures (as set out in the draft CoCP) would be applied to ensure industry good practice is followed during construction in relation to surface water drainage.

13.7.33 As a result, it is currently anticipated that there will be **no likely significant effect** in relation to flood risk.

13.8 Summary of likely water environment effects

13.8.1 As discussed in **Section 13.5**, ongoing assessments, additional surveys, updated technical modelling and further engagement will be undertaken before submission of the Environmental Statement (ES). Any updates will be taken into account as part of the ES, with the potential effects, receptors, and significance and scale of effects confirmed at the submission stage.

13.8.2 A summary of the current findings is set out as follows:

- Surface water features
  - Potential deterioration in WFD status – **likely significant effect**
  - Groundwater levels in existing lakes connected to aquifers – **likely significant effect**
  - Removal and infilling of lakes – **likely significant effect**
- Groundwater levels and water quality (groundwater and surface water quality) – **no likely significant effect**
- Water supply, drainage, and wastewater infrastructure:
  - Water supply – **no likely significant effect**
  - Surface water drainage – **no likely significant effect**
  - Foul water drainage – **no likely significant effect**
- Flood risk:

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- Fluvial and tidal – **no likely significant effect**
- Pluvial (overland surface water runoff) – **no likely significant effect**
- Groundwater – **no likely significant effect**
- Artificial sources (such as reservoirs and canals) – **no likely significant effect**
- Sewers – **no likely significant effect**.

13.9 Next steps and preparation of the Environmental Statement (ES)

13.9.1 Further baseline data collection, design, modelling and assessment work will be undertaken to support the water environment assessment which will be reported in the Environmental Statement (ES). This includes:

- Updated baseline data and survey in relation to flow monitoring, surface water quality, groundwater quality, groundwater levels, river habitat survey, fluvial audit and river condition assessment.
- Updated fluvial hydraulic modelling of the River Colne in relation to the baseline and proposed scenario.
- Updated groundwater modelling, to take into account additional groundwater level monitoring.
- Updated surface water quality modelling.
- Water Framework Directive (WDF) Assessment.
- Surface water drainage design.
- Foul drainage calculations.
- Potable water demand calculations.

13.9.2 The ES produced for the Draft Consent Order (DCO) application will be accompanied by the following documents:

- Flood risk assessment.
- Fluvial hydraulic modelling report.
- Drainage assessment.
- WFD assessment.
- Groundwater modelling report.
- Groundwater quality assessment.
- Surface water quality assessment.

13.9.3 Further technical engagement will be undertaken with statutory bodies and stakeholders to inform the assessment and accompanying documents that will be

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presented within the ES. This will include engagement with the lead local flood authorities, the Environment Agency, Canal and River Trust, Thames Water and Affinity Water.

13.9.4 The ES will consider up-to-date policy, guidance and legislation relating to the water environment.

13.9.5 Embedded environmental measures will continue to evolve to reflect updates to the baseline environment, changes in the Project design and statutory bodies and stakeholder engagement. These will be presented and assessed within the ES.

13.9.6 Other future development proposals that are not part of the Project, but which may have a combined influence on the water environment, will also be considered in the assessment.

13.10 Glossary

Term/Acronym	Definition
Aquatic	Anything relating to, living in, or occurring within water environments.
Aquatic ecology	The study of the interactions between organisms (plants, animals, and microorganisms) and the physical, chemical, and biological components of water environments.
Aquifer	A large body of underground rock, gravel, sand or silt that holds and allows the flow of groundwater through it.
Biodiversity	Refers to the variety of life on Earth, encompassing the diversity of species, habitats, and ecosystems, as well as the genetic variation within species.
Catchment	The area of land from which rainfall and surface water drain into a particular water feature, such as a river, stream, lake, reservoir or other waterbody, via surface runoff, groundwater flow and drainage networks.
Climate change	The long-term shift in global or regional climate patterns. It is attributed directly or indirectly to human activity altering atmospheric composition, alongside natural variability, resulting in higher temperatures, rising sea levels and extreme weather.
Contamination	The presence of hazardous substances in or under the ground, or in water bodies. It occurs when human activities leave a legacy of pollution (for example, from old industrial sites, landfills, or chemical spills) that poses an unacceptable risk to health or the environment.
Covered river corridor	The structure that carries rivers in channels beneath the new runway, allowing them to keep flowing where the runway crosses their route.
Dewatering	The removal or control of surface water or groundwater from a site, excavation, or soil to primarily enable construction, activities to take place.

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Term/Acronym	Definition
Discharges	An environmental permit enabling the discharge of appropriately managed and treated liquid effluent or waste water to surface waters or ground water.
Diversion (watercourse)	Temporary or permanent artificial alteration or re-routing of a length of a watercourse.
Downstream (watercourse)	Refers to the direction or location along a watercourse that is towards its mouth or outlet, meaning. the same direction as the natural flow of water.
Drainage	The system by which water is collected, conveyed, and discharged from an area. This can refer to both surface water runoff and foul (waste) water flows.
Flood risk	A combination of the probability and the potential consequences of flooding. Areas at risk of flooding are those at risk of flooding from any source, now or in the future. Sources include rivers and the sea, direct rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, reservoirs, canals and lakes and other artificial sources.
Flood risk assessment (FRA)	An assessment of the risk of flooding from all flooding sources and mechanisms, the identification of flood mitigation measures, and identification.
Flood risk from artificial sources	The likelihood and potential effect of flooding caused by the failure, operational malfunction, or structural breach of man-made infrastructure including canals, reservoirs and water infrastructure.
Flood storage	A structure that holds floodwater during times of flood and returns it to a river at a controlled rate, once the flood peak has passed.
Floodplain	An area that comprises land where water from rivers or the sea has to flow or be stored in times of flood. In the UK, the functional floodplain usually comprises land having a 3.3% or greater annual probability of flooding, or land that is designed to flood.
Fluvial flood risk	The likelihood and potential effect of flooding from watercourses arising when water levels exceed channel capacity.
Groundwater	Water that is stored beneath the ground surface in the pores and fractures of soil, sand and rock formations.
Groundwater abstractions	Water that has been abstracted from the ground.
Groundwater flood risk	The likelihood and potential effect of flooding from the groundwater rising to the surface, or subterranean structures including basements.
Groundwater flow	The movement of water through saturated soil and, superficial deposits and bedrock beneath the ground surface.
Groundwater modelling	A collection of mathematical calculations that give a simple representation of reality. They can be used to estimate groundwater flow and levels.

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Term/Acronym	Definition
Hard landscaping	Built elements in outdoor spaces, typically involving man-made, durable materials which form paved surfaces and structures.
Hydraulic modelling	A collection of mathematical calculations that give a simple representation of reality. They can be used to estimate flow, water level and velocity in river channels, pipe networks, tidal systems and floodplains.
Impermeable	Describes a surface or material that does not allow water to pass through it, preventing infiltration into the ground. An example is a tarmacked pavement.
Low flows	When river discharge falls below normal seasonal levels, potentially affecting water availability, water quality and ecological health within the water environment.
Main river	A watercourse designated by the Environment Agency where it has primary responsibility for flood risk management and regulation.
Model tolerance	Defines the acceptable margin of error for a value and ensures numerical models and computations are accurate enough to remain valid.
Open channel	Watercourses with flows with a free surface open to the atmosphere.
Ordinary watercourse	Any channel in which water flows, including open channels and piped sections (culverts) which is not designated a 'main river'.
Pluvial flood risk	The likelihood and potential effect of flooding arising from surface water runoff caused by high intensity rainfall events.
Potable water	Water that is safe for humans to drink.
Recharge	The process by which water from precipitation, rivers, or other surface sources infiltrates through the soil and permeable geological strata to replenish aquifers beneath the ground.
Residual flood risk	Flood from flood management infrastructure, such as a breach or overtopping in flood defences, or flood risk that remains once all mitigation measures are taken into account.
River flow	The movement of water within a river channel, typically expressed as a rate of discharge over time.
Sewer flood risk	The likelihood and potential effect of flooding arising from a sewer system as a result of blockages, failure or overload of the sewer network.
Soft landscaping	The use of living, natural elements such as lawn areas and planting in the design and management of outdoor spaces, typically used to increase ecological and amenity value and form part of sustainable drainage systems features.
Sustainable drainage systems (SuDS)	A form of surface water management which mimics the natural drainage regime to attenuate, treat and discharge surface water runoff from a site. They are considered to be more sustainable than traditional piped approaches to surface water drainage.

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Term/Acronym	Definition
Tidal flood risk	The likelihood and potential effect of flooding from the sea, primarily caused by a combination of high tides and storm events.
Upstream (watercourse)	Refers to the direction or location along a watercourse that is towards its source (meaning, against the natural direction of flow).
Water Framework Directive (WFD)	A foundational piece of environmental legislation that requires the protection, enhancement, and restoration of the quality of all water bodies.
Water Framework Directive assessment	An assessment which considers the effects of the Project on the objectives of the WFD for waterbodies within the study area. The assessment considers whether the Project will contribute to a failure of the objectives.
Water quality	The condition of water based on chemical, physical and biological characteristics.
Water resources	Quantity, availability, and distribution of water in the natural environment that can be sustainably managed for human use and ecological needs.

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13.11 References

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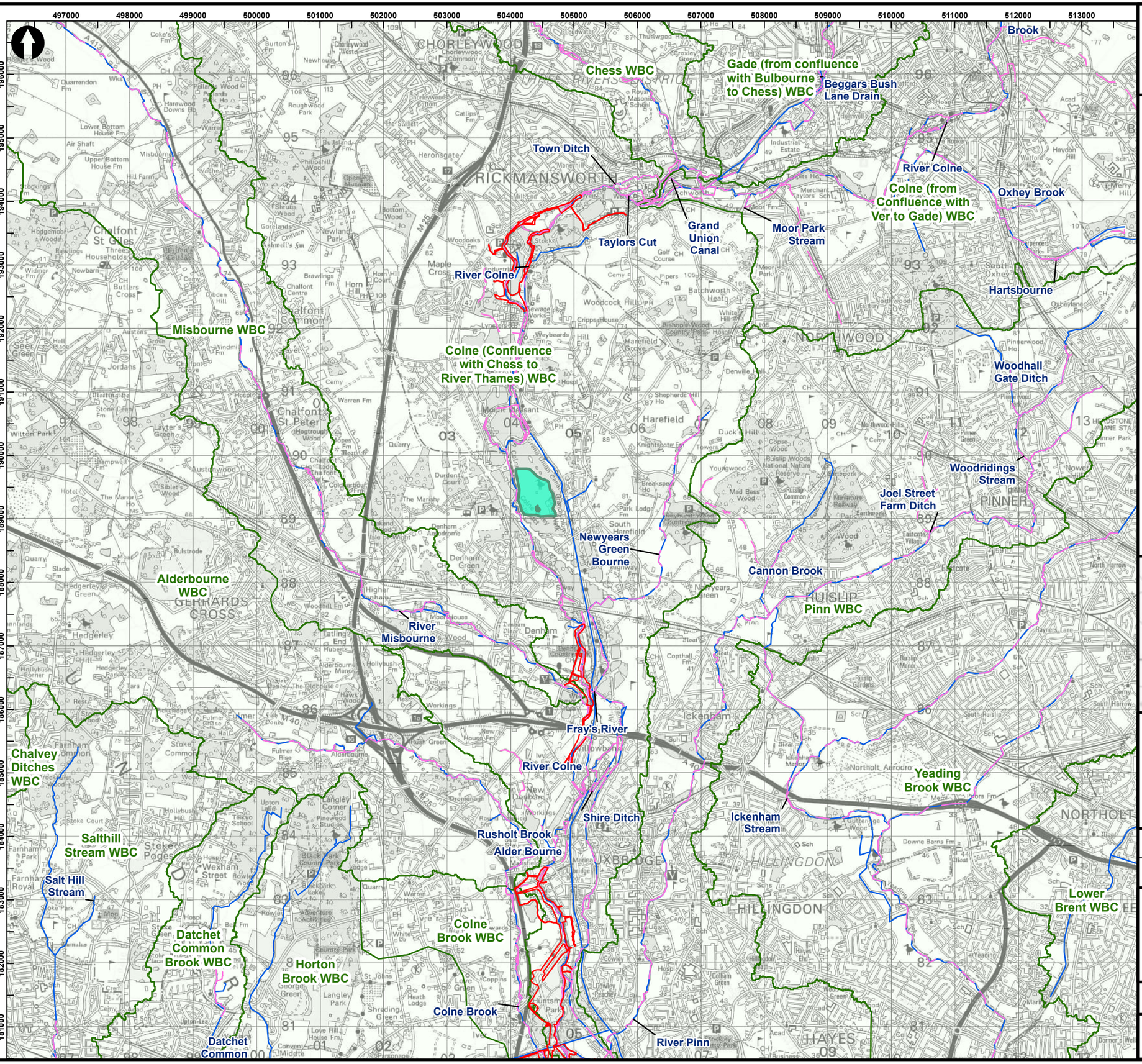
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Appendix 13A Figures

Figure 13A.1: Hydrological Setting

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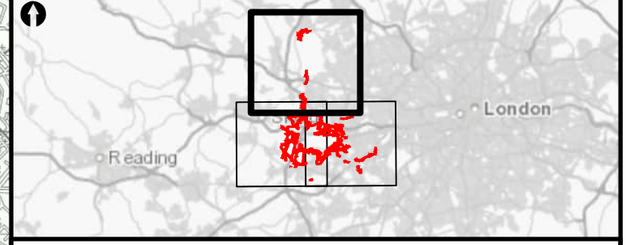


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- Draft DCO Order Limits
- EA Main Rivers
- OS Rivers
- WFD River Water Body Catchments (WBC)
- WFD Lake Water Bodies

0 300 600 1,200 1,800 2,400 3,000 3,600 Metres

Scale 1:60,000



Heathrow

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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.1: Hydrological Setting

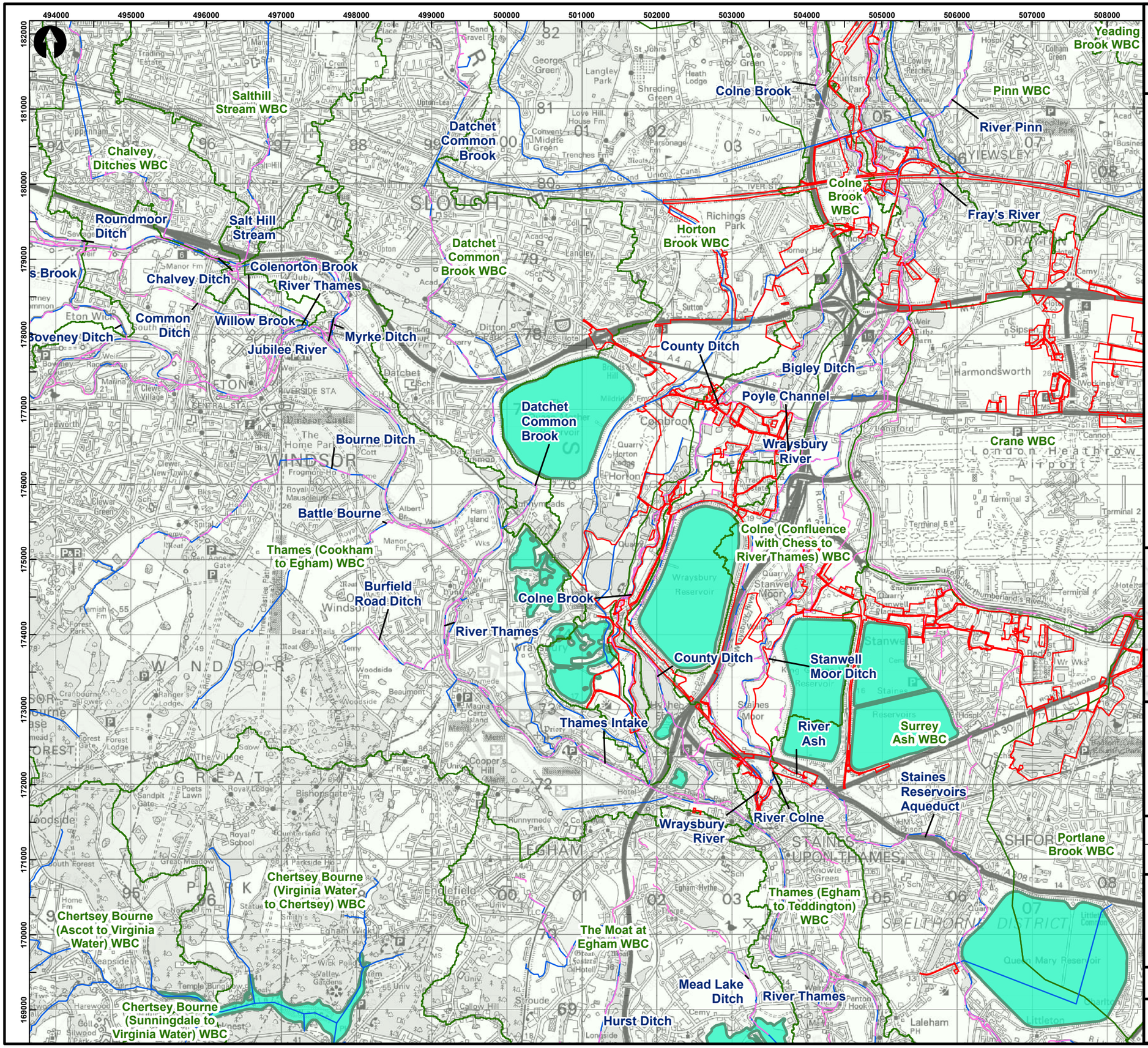
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Location-Level-Sub Series/System-Identifier	Version
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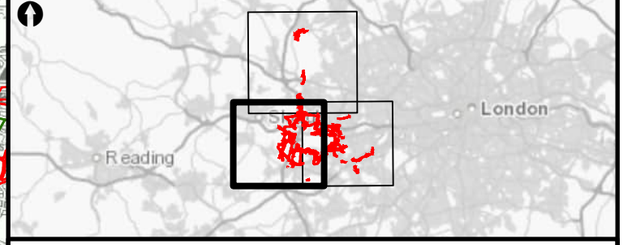


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- Draft DCO Order Limits
- EA Main Rivers
- OS Rivers
- WFD River Water Body Catchments (WBC)
- WFD Lake Water Bodies

0 250 500 1,000 1,500 2,000 2,500 3,000 Metres

Scale 1:50,000



Heathrow

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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.1: Hydrological Setting

Page 2 of 3

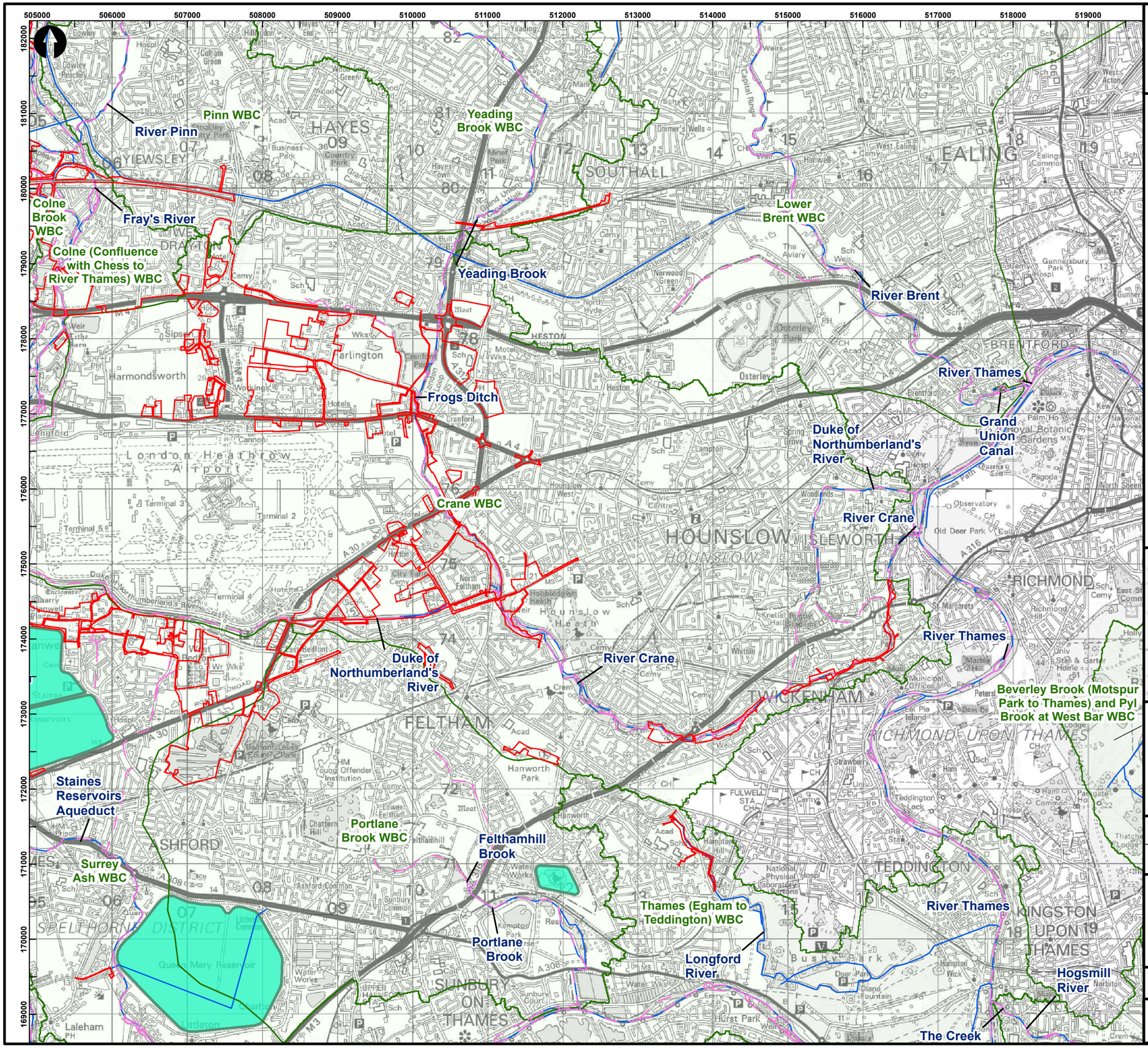
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WSP	LT	SM	16/06/2026	FINAL

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Version: 1.0

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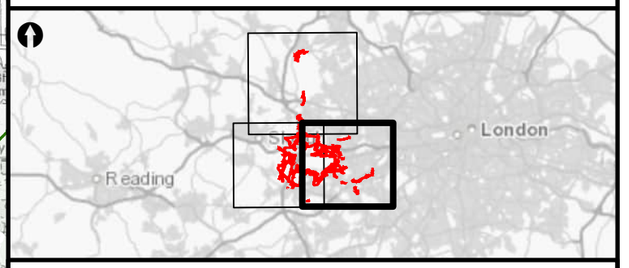


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- EA Main Rivers
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- WFD River Water Body Catchments (WBC)
- WFD Lake Water Bodies

0 250 500 1,000 1,500 2,000 2,500 3,000 Metres

Scale 1:50,000



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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.1: Hydrological Setting

Page 3 of 3

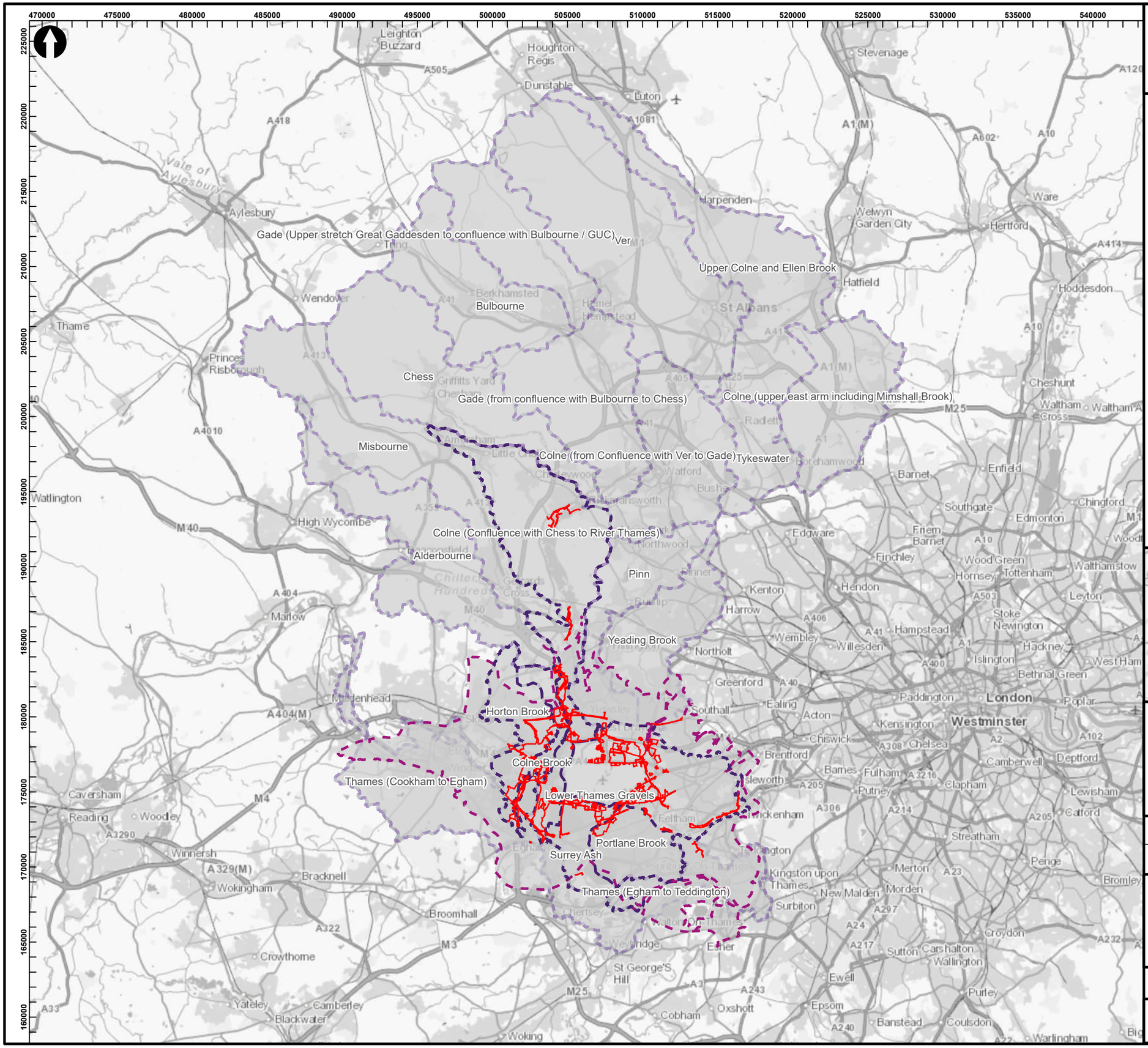
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WSP	LT	SM	16/06/2026	FINAL

Location-Level-Sub Series/System-Identifier	Version
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Figure 13A.2: Water Environment Study Area

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0 1,250 2,500 5,000 7,500 10,000 12,500 15,000 Metres

Scale 1:250,000



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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.2: Water Environment Study Area

Company	Drawn By	Chk/Approved	Drawn Date	Status
WSP	LT	SM	15/07/2026	FINAL

Location-Level-Sub Series/System-Identifier	Version
3R000-XX-GA-XXX-100029	1.0

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Figure 13A.3: WFD Mitigation Sites

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Draft DCO Order Limits

WFD Mitigation Sites

0 500 1,000 2,000 3,000 4,000 5,000 6,000
Metres

Scale 1:100,000



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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.3: WFD Mitigation Sites

Company	Drawn By	Chk/Approved	Drawn Date	Status
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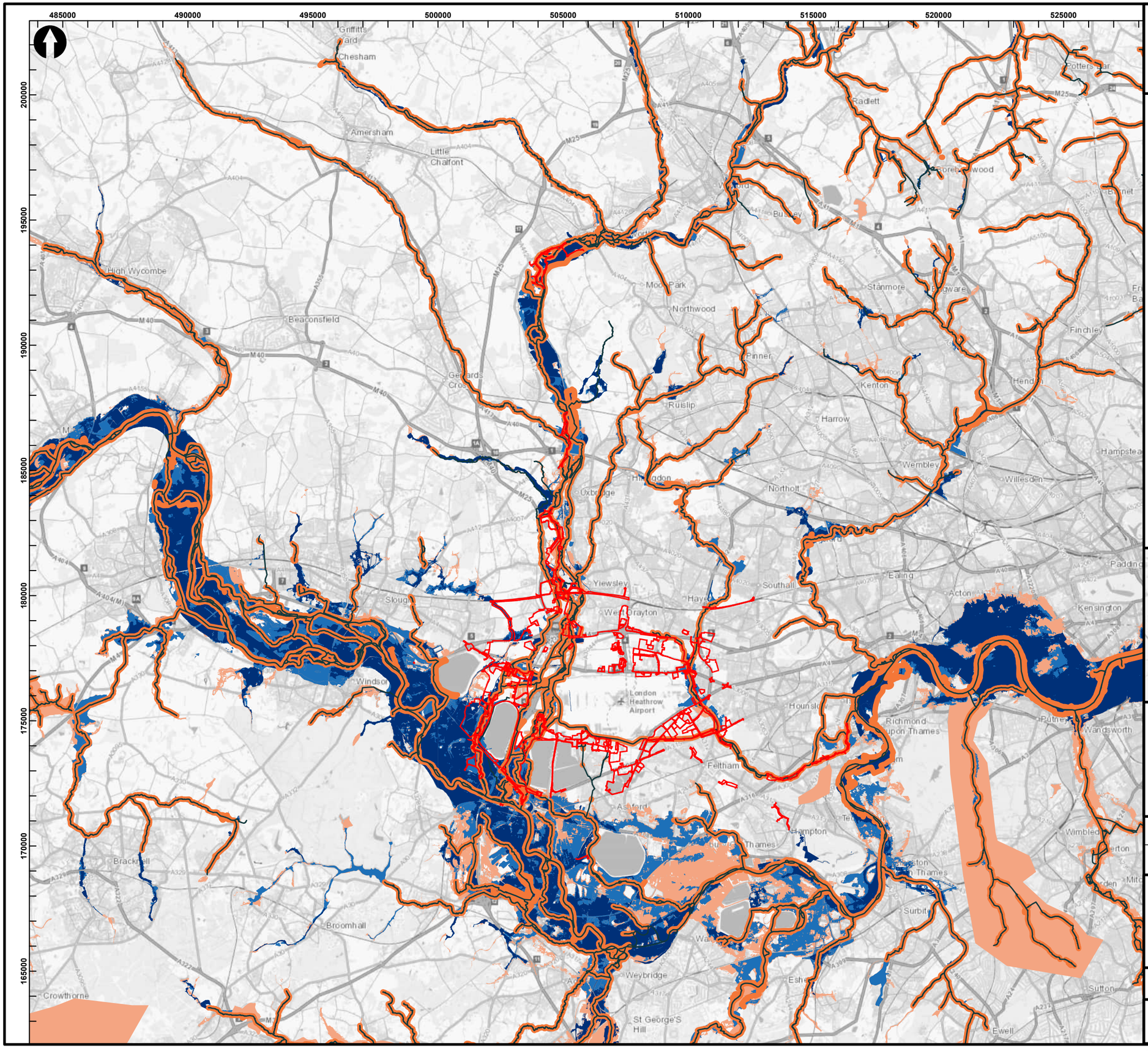
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3R000-XX-GA-XXX-100030	1.0

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Figure 13A.4: Environment Agency Flood Map for Planning

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- Draft DCO Order Limits
- EA Main Rivers
- Flood Defence
- Flood Zone 2 (Present Day)
- Flood Zone 3 (Present Day)
- Flood Zone 3 (Climate Change 2070 to 2125)

0 750 1,500 3,000 4,500 6,000 7,500 9,000 Metres

Scale 1:150,000

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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.4: Environment Agency Flood Map for Planning

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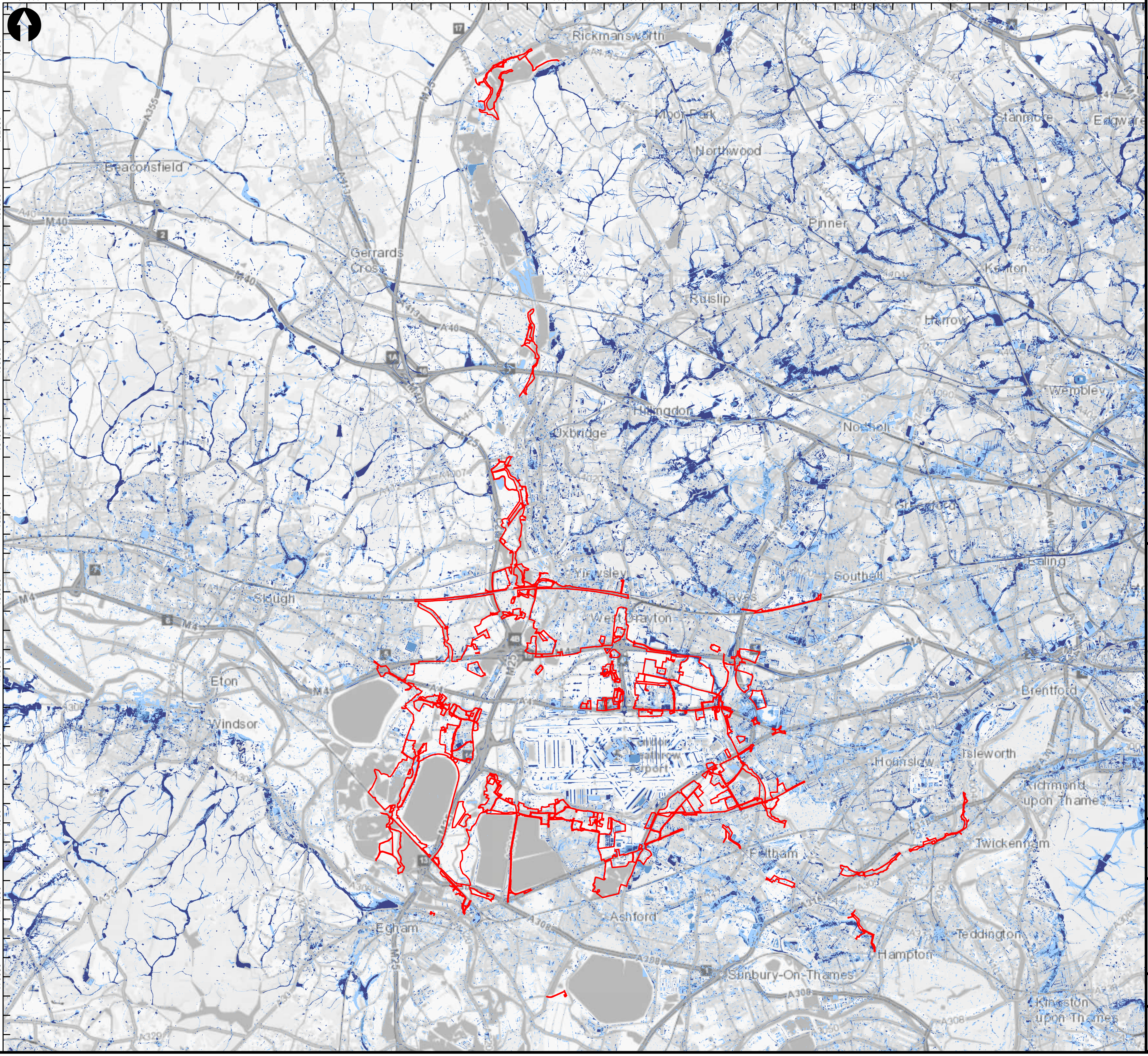
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Figure 13A.5: Environment Agency Long Term Flood Risk from surface water mapping

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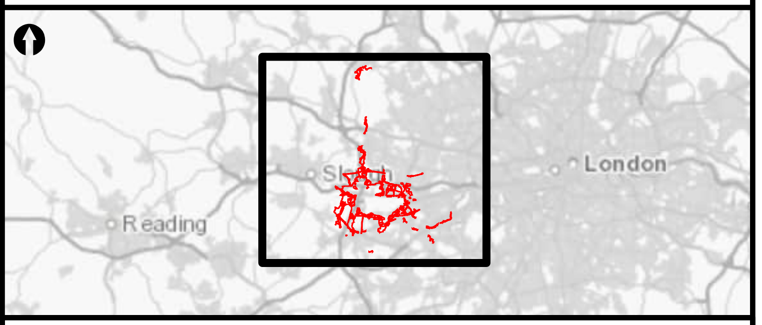
Draft DCO Order Limits

Annual Exceedance Probability (AEP)

- 1 in 30
- 1 in 100
- 1 in 1000

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Metres

Scale 1:100,000



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Scale	1:100,000
Project Name	Heathrow Expansion Project
Heathrow Project No.	3R000

Title

Figure 13A.5a Environment Agency Long Term Flood Risk from surface water mapping - present day

Company	Drawn By	Chk/Approved	Drawn Date	Status
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Draft DCO Order Limits

Annual Exceedance Probability (AEP)

- 1 in 30
- 1 in 100
- 1 in 1000

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Metres

Scale 1:100,000

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Title

Figure 13A.5b Environment Agency Long Term Flood Risk from surface water mapping - climate change

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WSP	LT	SM	16/06/2026	FINAL

Location-Level-Sub Series/System-Identifier: 3R000-XX-GA-XXX-100020

Version: 1.0

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Figure 13A.6: Environment Agency Long Term Flood Risk from reservoirs mapping

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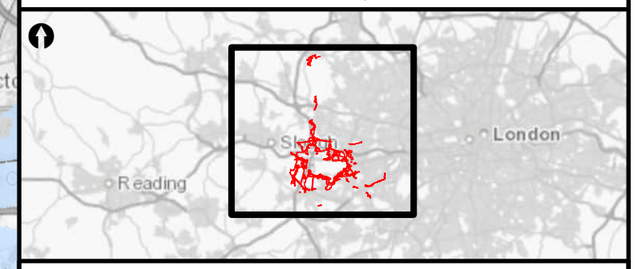
Reservoir Flood Extents

When river levels are normal

When there is also flooding from rivers

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Metres

Scale 1:100,000



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Project Name: Heathrow Expansion Project	Heathrow Project No.: 3R000

Title

Figure 13A.6: Environment Agency Long Term Flood Risk from reservoirs mapping

Company	Drawn By	Chk/Approved	Drawn Date	Status
WSP	LT	SM	08/06/2026	FINAL

Location-Level-Sub Series/System-Identifier	Version
3R000-XX-GA-XXX-100021	1.0

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