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# Norwich to Tilbury

## Volume 6: Environmental Statement

**Document: 6.12 Environmental Statement Chapter 12 - Hydrology, Land Drainage and Flood Risk - Clean Version**

**Final Issue B**

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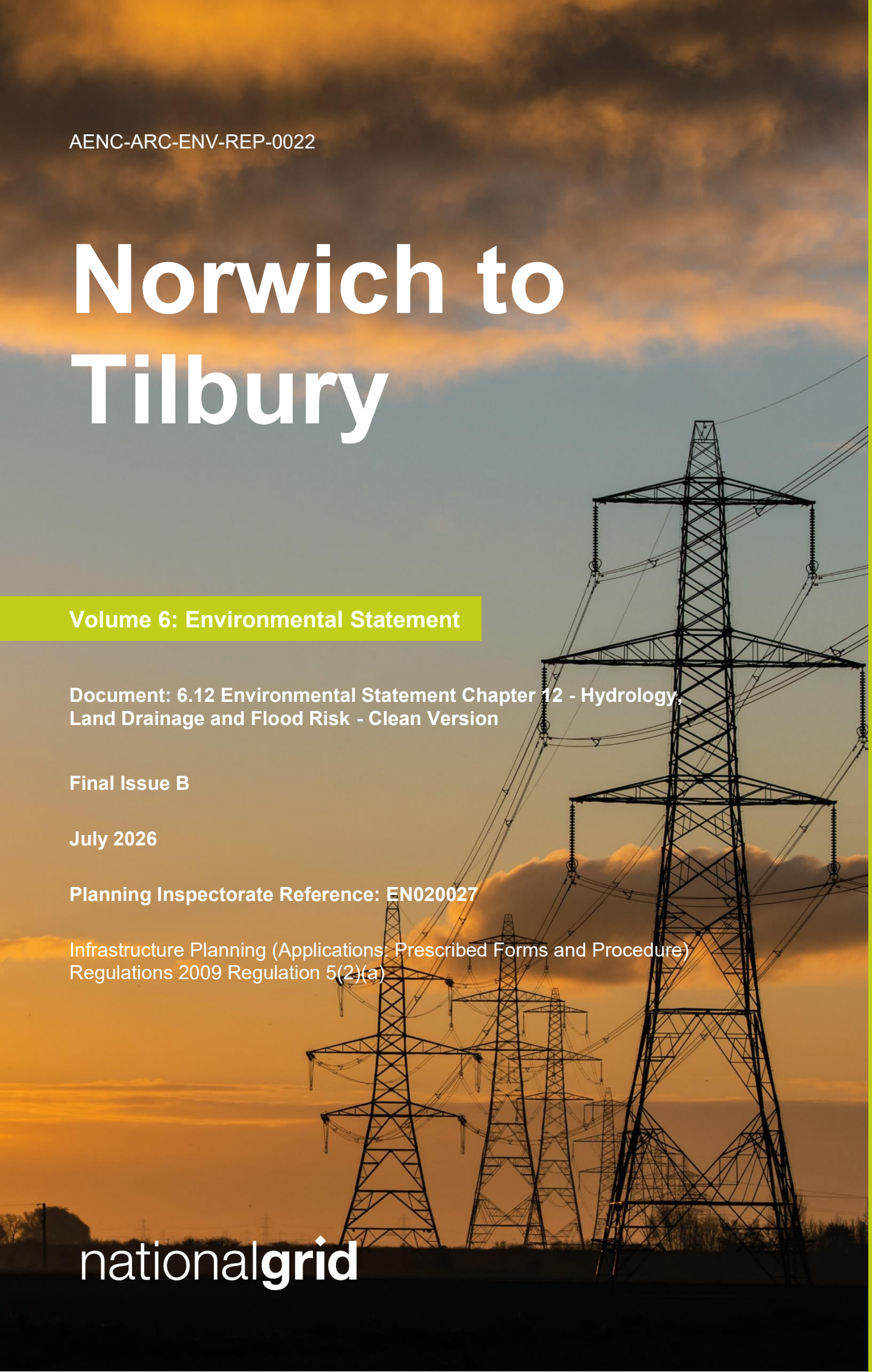

nationalgrid

# Revision History

| Version | Date | Submitted at |
|---|---|---|
| A | 29 August 2025 | DCO Application |
| B | 21 July 2026 | Deadline 7 to include latest cross references and the latest commitments in **7.2 Code of Construction Practice [Revision G]** |

# Contents

# 12. Hydrology, Land Drainage and Flood Risk

## 12.1 Introduction

12.1.1 This chapter of the Environmental Statement (ES) (Volume 6 of the Development Consent Order (DCO) application) details the assessment of the potential residual effects of Norwich to Tilbury (the 'Project') on Hydrology, Land Drainage and Flood Risk. This chapter covers effects on the following:

- Hydromorphology, surface water quality and existing water interests (abstractions and discharges) during construction
- Land drainage (including agricultural drainage) and flood risk from all relevant sources, during construction and operation (and maintenance).

12.1.2 There are interrelationships related to the likely residual effects on Hydrology, Land Drainage and Flood Risk and other environmental topics. Therefore, please also refer to the following chapters:

- Chapter 6: Agriculture and Soils (document reference 6.6) (Revision B)
- Chapter 8: Ecology and Biodiversity (document reference 6.8) (Revision C)
- Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B)
- Chapter 10: Health and Wellbeing (document reference 6.10) (Revision C).

12.1.3 This chapter is supported by the following figures and appendices:

- Figure 12.1: Study Area and Water Environment Features (document reference 6.12.F1)
- Figure 12.2: Flood Risk Areas (document reference 6.12.F2)
- Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B)
- Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B).

12.1.4 This chapter has also been drafted in parallel with the following DCO documents:

- Flood Risk Assessment (FRA) (document reference 7.9)
- Water Framework Directive (WFD) Assessment (document reference 7.10).

## 12.2 Key Regulatory and Planning Policy Context

### National Policy Statement (NPS)

12.2.1 Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2) (Revision B) sets out the key overarching policy relevant to the Project. The Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2024a) is the key overarching policy relevant to the Project. This is supported by the NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b).

12.2.2 Full consideration of the relevant NPSs for the Project and this chapter can be found in the Policy Compliance Document (document reference 5.7).

#### Overarching NPS for Energy (EN-1)

12.2.3 NPS EN-1 contains the following paragraphs relating to Noise and Vibration which have been considered within this chapter.

12.2.4 Paragraph 5.8.13 of EN-1 states *'A site-specific flood risk assessment should be provided for all energy projects in Flood Zones 2 and 3 in England…In Flood Zone 1 in England…, an assessment should accompany all proposals involving:*

- *Sites of 1 hectare or more*
- *Land which has been identified by the EA* [Environment Agency]*... as having critical drainage problems*
- *Land identified (for example in a local authority strategic flood risk assessment* [SFRA]*) as being at increased flood risk in future*
- *Land that may be subject to other sources of flooding (for example surface water)*
- *Where the EA..., Lead Local Flood Authority, Internal Drainage Board or other body have indicated that there may be drainage problems'.*

12.2.5 Paragraph 5.8.14 states that FRAs 'should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account'.

12.2.6 The minimum requirements for FRAs are set out in Paragraph 5.8.15 and include that an FRA should *'be proportionate to the risk and appropriate to the scale, nature and location of the project [and] consider the risk of flooding arising from the project in addition to the risk of flooding to the project'.*

#### NPS for Electricity Networks Infrastructure (EN-5)

12.2.7 NPS EN-5 covers resilience to climate change and the need to look to design for flood resilience. Paragraph 2.3.2 of EN-5 states '*Applicants should in particular set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to:*

- *flooding, particularly for substations that are vital to the network'*.

12.2.8 Paragraph 2.3.3 of EN-5 advises that '*the resilience of the project to the effects of climate change must be assessed in the Environmental Statement (ES)*

*accompanying an application',* also stating that *'future increased risk of flooding would be covered in any flood risk assessment*'.

12.2.9 Full consideration of the relevant NPSs for the Project and this chapter can be found in the Policy Compliance Document (document reference 5.7).

## Other National Legislation and Policy

12.2.10 Although the Project will be considered against the national policy stated above, the assessment has also been undertaken in accordance with, and with reference to, the following national legislation and policy:

- The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019
- Environment Act 2021
- Land Drainage Act 1991
- The Environmental Permitting (England and Wales) Regulations 2016
- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2025) and accompanying Flood Risk and Coastal Change planning practice guidance (Ministry of Housing, Communities and Local Government, 2024)
- Water Supply, Wastewater and Water Quality planning practice guidance.

## Regional and Local Policy

12.2.11 Chapter 2: Key Legislation and Planning Policy Context (document reference 6.2) (Revision B), the Planning Statement (document reference 5.6) (Revision B) and Policy Compliance Document (document reference 5.7) set out relevant regional and local policy.

12.2.12 Key regional and local policy relevant to Hydrology, Land Drainage and Flood Risk, that has informed the assessment within this ES (Volume 6 of the DCO application), comprises:

- Essex Flood Risk Management Strategy; including the Sustainable Drainage Systems Design Guide for Essex (Essex County Council, 2018 and 2020a)
- Suffolk Flood Risk Management Strategy, including Appendix A: Sustainable Drainage Systems (SuDS): a local design guide (Suffolk County Council, 2023)
- Norfolk Flood Risk Management Strategy (Norfolk County Council, 2015 and 2021 review).

12.2.13 These strategies set out policies to reduce the effects of flooding to local communities within the counties and outline the requirements of new development in terms of managing surface water runoff and drainage.

## Guidance

12.2.14 Relevant guidance, specific to Hydrology, Land Drainage and Flood Risk, that has informed this ES (Volume 6 of the DCO application), comprises:

- Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Planning Inspectorate, 2024)

- Various Construction Industry Research and Information Association publications that provide construction good practice for preventing pollution of the water environment, for example, C532: Control of water pollution from construction sites
- Design Manual for Roads and Bridges (DMRB) LA 113: Road drainage and the water environment (National Highways, 2020)
- Essex Green Infrastructure Strategy (Essex County Council, 2020b)
- Essex Green Infrastructure Standards (Essex County Council, 2022).

## 12.3 Scope of the Assessment

12.3.1 The scope of the assessment has been informed by the Environmental Impact Assessment (EIA) Scoping Report (document reference 6.19) and EIA Scoping Opinion (document reference 6.20) provided by the Planning Inspectorate in 2022 on behalf of the Secretary of State. The scope has also been informed through consultation (including non-statutory consultation and statutory consultation summarised in Table 12.1) and engagement with relevant consultees. A summary of the scope of the Hydrology, Land Drainage and Flood Risk assessment is provided in Appendix 5.2: Scope of the Assessment (document reference 6.5.A2) (Revision B).

12.3.2 In addition, the EIA Scoping Opinion, together with a response from National Grid against each point raised by the Planning Inspectorate relevant to Hydrology, Land Drainage and Flood Risk, is provided in Appendix 5.1: National Grid's response to the EIA Scoping Opinion (document reference 6.5.A1) (Revision B).

12.3.3 Since submission of the EIA Scoping Report (document reference 6.20) and receipt of the EIA Scoping Opinion (document reference 6.20) the Project no longer interacts with the Tilbury Flood Storage Area (FSA) therefore this receptor is no longer relevant and not considered further in this chapter.

### Project Engagement and Consultation

12.3.4 Consultation and engagement with relevant stakeholders has informed the assessment presented in this chapter. Responses to representations received during the statutory consultation in summer 2024 and subsequent consultations in 2025 are provided in Appendix K and Appendix M of the Consultation Report (document reference 5.1) (Revision B).

12.3.5 A summary of discussions and how these have influenced the Project, scope and the approach to the assessment are provided in Table 12.1.

Table 12.1 Engagement undertaken relevant to Hydrology, Land Drainage and Flood Risk

| Reference | Comment | National Grid's Response |
|---|---|---|
| Thematic Meeting, Environment Agency and host planning authorities, July 2022 | It was noted the Project should consider flood risk and a site-specific FRA should be undertaken, with particular focus on management of surface water drainage. | An FRA (document reference 7.9) has been prepared to support and inform the ES (Volume 6 of the DCO application).<br>Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) |

| Reference | Comment | National Grid's Response |
|---|---|---|
| | It was raised there is a need to consider effects on groundwater and aquifers and that groundwater as a source of flood risk should be scoped into the FRA. | (Revision B) provides an assessment of effects on groundwater and aquifers. Groundwater flooding has been addressed within the FRA (document reference 7.9). |
| | It was raised more current policy guidance and good practice should be applied as the published EN-1 is out of date. | The requirements of the 2024 update to EN-1 have been considered, alongside other current policy, including the NPPF, guidance, for example, from the Planning Inspectorate about WFD assessments, and good practice. |
| | It was raised the Project design and assessments should accommodate the most recent Environment Agency climate change guidelines. | The most recent Environment Agency climate change guidelines (currently dating to May 2022) have been applied. |
| Environment Agency, June 2023 | Confirmation was received that the Environment Agency has no comments or concerns to raise regarding the key aspects of the proposed methodology and Zone of Influence for the WFD Assessment (as detailed in a technical note shared in May 2023). | The Project notes the feedback and has continued to engage with the Environment Agency as the assessment has progressed. |
| Environment Agency and Lead Local Flood Authorities (LLFAs), and the Water Management Alliance Internal Drainage Boards (IDBs), June 2023 | Confirmation received that the Environment Agency agrees with the proposed scope and methodology for the FRA. | The Project notes the feedback and has continued to engage with the Environment Agency as the FRA has progressed. |
| | Essex County Council, in their role as LLFA, requested that information be included within the FRA about the Project's approach to s23 consent[1] and includes reference to key local flood risk strategies and standards. | The FRA (document reference 7.9) includes details of the Project's intended approach to securing consent for works to ordinary watercourses and has been prepared in line with relevant local flood risk strategies and standards. |
| | Norfolk County Council required that due to the duration of the construction of the Project (four years) and the multiple phasing of the construction programme, a Construction Surface Water Management Plan be provided. They expected all sources of | The Project is disapplying s23 of the Land Drainage Act 1991 through agreement of protective provisions with the relevant drainage authorities. |
| | | The FRA (document reference 7.9) includes information on the intended approach to surface |

[1] S23 of the Land Drainage Act 1991, with reference to ordinary watercourse consent

| Reference | Comment | National Grid's Response |
|---|---|---|
| | flood risk to be evaluated in the FRA and requested comment on the proposed approach to defining Flood Zone 3b.<br>No comments were received from Thurrock Council or the IDBs. | water management during construction. Key principles and initial proposals are described, and the Project has secured a commitment for the Main Works Contractor(s) to further develop the outline strategy and prepare a Surface Water Management Plan. A commitment to prepare these documents is included within the Outline Code of Construction Practice (CoCP) (document reference 7.2) (Revision G).<br>The FRA (document reference 7.9) appraises all relevant sources of flood risk to the Project/ arising from the Project. The Project has engaged with the Environment Agency with regard to defining Flood Zone 3b, and a precautionary approach has been adopted whereby, where published data is lacking that defines it, Flood Zone 3b has been treated as the extent of Flood Zone 3 for assessment purposes. |
| Environment Agency review of technical note describing the floodplain compensation storage strategy, July 2024 | Confirmation received that the Environment Agency are broadly satisfied with the initial compensatory storage details provided, which seem to be precautionary, noting that they would look to condition that full details are provided before work takes place.<br>Concerns were expressed regarding the proposals for temporary works within the Tilbury Flood Storage Area stating that it must be demonstrated that offset capacity is provided for lost storage. | Initial compensatory storage details are described in the FRA (document reference 7.9) which has been shared and agreed with the Environment Agency. Full details would be provided by the Main Works Contractor(s) in support of future Flood Risk Activity Permit applications for creation of the storage areas.<br>The Project design has been revised and no land within the Order Limits encroaches into the Tilbury Flood Storage Area, nor the defended floodplain of the River Thames. |
| Environment Agency review of Stages 1 and 2 of the WFD Screening Assessment (document | Confirmation received that the Environment Agency have no significant comments and are agreeable to the approach taken | Information on the physio-chemical elements of scoped in waterbodies has been provided under Stage 4 WFD Screening |

| Reference | Comment | National Grid's Response |
|---|---|---|
| reference 7.10), August 2024 | to scoping in/out WFD waterbodies. | Assessment (document reference 7.10). |
| Suffolk Wildlife Trust – meeting to discuss the Waveney and Little Ouse Recovery (WaLOR) Project and how it will interact with the Norwich to Tilbury Project, July 2024 | The Trust raised concerns about the potential for exacerbation of problems with surface water inundation of Roydon Fen and requested further consideration on how pylon development could impact the hydrology of Roydon Fen. | Roydon Fen is included as a receptor in this assessment (Section 12.7, paragraph 12.7.15). |
| Environment Agency and LLFA review of technical note describing principles linked to management of rainfall runoff and land drainage during construction and operation (and maintenance) of the Project and linked to works in, under and in proximity to watercourses and flood defences, September 2024 | Full details of the comments are provided in Appendix A of the FRA (document reference 7.9). In overview, the feedback provided further advice on the application of SuDS to manage Project runoff, including recommendations for the climate change allowances to be incorporated into the drainage designs, and the design storms that drainage infrastructure should accommodate.<br>With regard to watercourse crossings, the potential requirement for consent for these works under the Land Drainage Act/ Environmental Permitting Regulations was highlighted and advice was provided as to the minimum sizes of culverts. Confirmation was also sought as to the duration that temporary watercourse crossings would be in place. | Full responses are provided in Appendix A of the FRA (document reference 7.9). In overview, the advice provided with regard to SuDS would be adhered to in detailing the operational surface water drainage strategy and Surface Water Management Plan to be developed by the Main Works Contractor(s). Climate change allowances in accordance with published Environment Agency guidance would be utilised and it is confirmed that temporary works such as watercourses crossings may be in place for up to five years. |
| Environment Agency review of Stage 3 of the WFD Screening Assessment (document reference 7.10), October 2024 | If haul roads throughout the construction pose a risk to chemical status of all WFD groundwater bodies, these should be screened in.<br>During dewatering of excavations, any dewatered water needs to be discharged as close to the excavations as possible and as soon as practically possible so that the waterbody from which water is | Where haul roads overlap WFD groundwater bodies, these groundwater bodies have been screened in and the potential for detriment to these assessed at Stage 4 of the WFD Assessment (document reference 7.10).<br>The requirement regarding dewatering is noted and is covered by commitment GH14 within the Outline CoCP |

| Reference | Comment | National Grid's Response |
|---|---|---|
| | dewatered will be recharged as much and soon as possible.<br>A number of comments were raised specific to a design option (the Waveney Valley Alternative) which has subsequently been discounted and removed from the Project. | (document reference 7.2) as a mitigation measure (Revision G). |
| Environment Agency review of Stage 4 of the WFD Screening Assessment, February to April 2025 | The Environment Agency provided feedback on the document with a key topic being watercourse crossings.<br>A meeting was subsequently held to discuss the approach to watercourse crossings, especially with respect to culverts and the soffit heights of bridges. | Stage 4 of the WFD Assessment (document reference 7.10) has been updated to address the feedback received and to reflect the approach to watercourse crossings that was agreed in the meeting. |
| Environment Agency review of draft FRA, March/April 2025 | The Environment Agency provided feedback on the draft FRA including in relation to sustainable drainage and groundwater.<br>They stated, '*We would have no objection if this FRA was to support the DCO application for the Norwich to Tilbury project, as we consider it provides a suitable way to make assessment of the flood risks arising from the proposed development'.* | The FRA (document reference 7.9) has been updated to address the feedback received.<br>Appendix C has been included in the FRA (document reference 7.9) to cover surface water drainage proposals. It is noted that these drainage proposals are subject to further development at later design stages. |
| LLFA review of draft FRA, March/April 2025 | Essex County Council (informed by comments from Tendring District Council), Norfolk County Council, Suffolk County Council and Thurrock Council provided feedback on the draft FRA.<br>The majority of the feedback received related to surface water management and surface water drainage proposals, but feedback was also provided in relation to climate change allowances, culverts, permanent access routes and recently published flood risk information. | The FRA (document reference 7.9), which has been informed by the most recently published flood risk information has been updated to address the feedback received. In particular Appendix C has been added to provide information on surface water drainage proposals. |

## 12.4 EIA Approach and Methods

12.4.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology / approach used to undertake the assessment on Hydrology, Land Drainage and Flood Risk. The overarching approach is also described in Chapter 5: EIA Approach and Method (document reference 6.5) (Revision B).

### Data Sources

12.4.2 The baseline has been informed by a desk study which has drawn on the following key information sources:

- Ordnance Survey mapping, aerial mapping, and Multi-Agency Geographic Information for the Countryside (MAGIC) Maps (Department for Environment, Food and Rural Affairs (Defra), 2024a)
- Hydrology Data Explorer (Defra, 2024b)
- Statutory Main River map for England (Environment Agency, 2024a)
- Catchment data explorer database of Cycle 2 and Cycle 3 WFD information (Environment Agency, 2024b)
- Thames and Anglian River Basin Management Plans (Environment Agency, 2022a)
- Water quality data archive (Environment Agency, 2023)
- Records of licensed surface water abstractions and consented discharges to surface water sources (Environment Agency, 2022b)
- Flood Map for Planning (Environment Agency, 2025a)
- Long term flood risk map for England (Environment Agency, 2025b)
- Spatial flood defences database (Environment Agency, 2024c)
- The Historic Flood Map and Recorded Flood Outlines datasets (Environment Agency, 2022c)
- Flood Estimation Handbook webservice (Centre for Ecology and Hydrology, 2021) defining surface water catchment areas and hydrological properties (e.g., rainfall, slopes, soil permeability)
- High-resolution aerial imagery available to the Project
- Environment Agency flood model outputs (including flood extent and flood depth data) for the floodplains of main rivers that are proposed to be crossed by Project infrastructure
- Field notes and photographs collected during aquatic ecology surveys, which were conducted in September 2024 along reaches extending 50 m upstream and 50 m downstream of proposed crossing locations, recording observations of various channel and bank characteristics including substrate type, water depth, flow type, riparian vegetation, artificial modifications, and any other notable features. Further details of these surveys are provided in Appendix 8.4: Aquatic Report (document reference 6.8.A4) (Revision B).

## Study Area

12.4.3 As defined in the EIA Scoping Report (document reference 6.19) and agreed within the EIA Scoping Opinion (document reference 6.20), the Study Area for the Hydrology, Land Drainage and Flood Risk assessment includes the area within the Order Limits and extends to a 500 m buffer around the Order Limits. The Study Area has also been agreed with the Environment Agency and is considered appropriate based on the nature of Project construction and operation (and maintenance) activities and technical knowledge of similar projects.

12.4.4 The Study Area for the water environment is shown on Figure 12.1: Study Area and Water Environment Features (document reference 6.12.F1).

## Site Survey

12.4.5 No site surveys have been undertaken specifically for this assessment and this approach has been discussed and agreed with the Environment Agency. However, as noted previously, the desk study reported in this chapter has been supported by information gathered during the aquatic ecology surveys. In addition, surveys of watercourses at proposed crossing locations, e.g. topographical surveys, undertaken by the drainage design teams, are ongoing. The information collected has informed the Project's approach to watercourse crossings and the additional data that will be gathered will be used by the Main Works Contractor(s) to shape the detailed designs of these crossings, in addition to the designs and specific locations of drainage outfalls.

## Assessment Methodology

12.4.6 This section sets out the methodology used for assessing the effects on Hydrology, Land Drainage and Flood Risk for those aspects scoped into the assessment, as set out within the EIA Scoping Report (document reference 6.19) and agreed in the EIA Scoping Opinion (document reference 6.20). The scope of the Hydrology, Land Drainage and Flood Risk assessment is provided in Appendix 5.2: Scope of the Assessment (document reference 6.5.A2) (Revision B).

12.4.7 All assessment work has applied a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.

12.4.8 A value (sensitivity) is assigned, then a magnitude of impact, then a significance of effect as described in the following sub-sections of this chapter. The assessment methodology for Hydrology, Land Drainage and Flood Risk draws from LA 113, part of the DMRB (National Highways, 2020). Whilst primarily intended for use in assessing the effects of highways projects on the water environment, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure projects on water environment receptors. The method promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change.

12.4.9 LA 113 does not provide a prescriptive assessment methodology for hydromorphology. The criteria within Table 12.2 and Table 12.3, and the assessment of effects relating to hydromorphology, are informed by published literature, namely the 'Guidebook of Applied Fluvial Geomorphology' (Sear *et al.*, 2009) and the 'River Hydromorphology Assessment Technique Training Manual' (Department for Agriculture, Environment and Rural Affairs, 2014). This is a precedented approach that has been applied on other similar projects.

12.4.10 The assessment in this chapter assumes that all mitigation – embedded (design measures), standard practice, and any additional mitigation measures (as defined in Chapter 4: Project Description (document reference 6.4) (Revision B)) – are in place before assessing the effects. This is in accordance with guidance from the Institute of Environmental Management and Assessment (IEMA) as part of preparing a proportional assessment (IEMA, 2024) and the EIA Scoping Report (document reference 6.19).

12.4.11 The assessment in this chapter has been informed by the FRA (document reference 7.9) and WFD Assessment (document reference 7.10).

### Value/Sensitivity

12.4.12 The criteria for assigning the value/sensitivity of Hydrology, Land Drainage and Flood Risk receptors are shown in Table 12.2. These values are based on Table 3.70 of LA 113 (National Highways, 2020).

Table 12.2 Value / sensitivity criteria

| Importance | Typical Criteria | Typical Examples | |
|---|---|---|---|
| Very High | Nationally significant attribute of high importance | Surface Water | Watercourses having a WFD classification shown in a River Basin Management Plan (RBMP) and Q95* ≥ 1.0 $m^3/s$.<br>Site protected/designated under European Commission (EC) or United Kingdom (UK) legislation (Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), Ramsar Site, Salmonid water)/ Species protected by EC legislation. |
| | | Flood Risk | Essential infrastructure or highly vulnerable development[2]. |
| | | Hydromorphology | Varied morphological features with no sign of channel modification, displaying natural flow regime and fluvial processes. Sediment regime that is in equilibrium and provides a diverse mosaic of habitat types suitable for species sensitive to changes in turbidity. |
| High | Locally significant attribute of high importance | Surface Water | Watercourse having a WFD classification shown in a RBMP and Q95 flow (indicative of a summer low flow condition) <1.0 $m^3/s$.<br>Species protected under EC or UK legislation. |
| | | Flood Risk | More vulnerable development. |

[2] Definitions set out in the NPPF Planning Practice Guidance (PPG) Annex 3, https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification

| Importance | Typical Criteria | Typical Examples | |
|---|---|---|---|
| | | Hydromorphology | Predominantly natural water feature with a range of morphological features. Limited signs of artificial modifications. Sediment regime that provides suitable habitat for species sensitive to changes in turbidity (e.g. migratory salmon, freshwater pearl mussel). |
| Medium | Of moderate quality and rarity | Surface Water | Watercourses not having a WFD classification shown in a RBMP and Q95 >0.001 $m^3/s$. |
| | | Flood Risk | Less vulnerable development. |
| | | Hydromorphology | Water feature with channel cross-section partially modified in places but exhibiting some morphological features. Varied flow types but with an obviously impacted natural flow regime. Sediment regime that provides some physical habitat for species sensitive to changes in turbidity. |
| Low | Lower quality | Surface Water | Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001 $m^3/s$. |
| | | Flood Risk | Water compatible development. |
| | | Hydromorphology | Water feature that has been extensively modified. Exhibits limited to no morphological diversity, with uniform flow, bed and bank profiles and low energy. Sediment regime that provides for very limited physical habitat for species sensitive to changes in turbidity. |

** The Q95 is the flow equalled or exceeded 95% of the time and is typical of a summer flow.*

### Impact Magnitude

12.4.13 The magnitude of impact considers the expected scale and extent of change. Impact magnitude has been assigned based on the criteria shown in Table 12.3. The criteria are based on Table 3.71 of LA 113 (National Highways, 2020).

Table 12.3 Impact magnitude criteria

| Importance | Typical Criteria | Typical Examples | |
|---|---|---|---|
| Major adverse | Results in loss of attribute and/or quality and integrity of the attribute | Surface Water | Loss or extensive change to a fishery. Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in waterbody WFD classification. |
| | | Flood Risk | Increase in peak flood level (>100 mm). |
| | | Hydromorphology | Significant impacts on the bed, banks, and vegetated riparian corridor, resulting in changes to sediment transport, load, and turbidity. Significant shift away from baseline conditions at the waterbody scale. |
| Moderate adverse | Results in effect on integrity of attribute, or loss of part of attribute | Surface Water | Partial loss in productivity of a fishery.<br>Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies.<br>Contribution to reduction in waterbody WFD classification. |
| | | Flood Risk | Increase in peak flood level (>50 mm). |
| | | Hydromorphology | Some changes to bed, banks and vegetated riparian corridor, resulting in some changes to sediment transport, load, and turbidity at the multi-reach scale. |
| Minor adverse | Results in some measurable change in attributes, quality or vulnerability | Surface Water | Potential for a low risk of pollution.<br>Minor effects on abstractions. |
| | | Flood Risk | Increase in peak flood level (>10 mm). |
| | | Hydromorphology | Limited impacts on bed, banks, and vegetated riparian corridor resulting in limited changes to sediment characteristics. |
| Negligible | Results in effect on attribute, but of insufficient magnitude to affect the use or integrity | The Project is unlikely to affect the integrity of the water environment. | |
| | | Surface Water | No measurable change. |
| | | Flood Risk | Negligible change to peak flood level (< +/- 10 mm). |
| | | Hydromorphology | Minimal or no measurable change from baseline conditions. Any impacts highly localized; no impacts at the reach scale. |

| Importance | Typical Criteria | Typical Examples | |
|---|---|---|---|
| Minor beneficial | Results in some beneficial effect on attribute or a reduced risk of negative effect occurring. | Surface Water | Minor contribution to improvement in waterbody WFD classification. |
| | | Flood Risk | Creation of flood storage and decrease in peak flood level (>10 mm). |
| Moderate beneficial | Results in moderate improvement of attribute quality | Surface Water | Moderate contribution to improvement in waterbody WFD classification. |
| | | Flood Risk | Creation of flood storage and decrease in peak flood level (>50 mm). |
| Major beneficial | Results in major improvement of attribute quality | Surface Water | Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse.<br>Improvement in waterbody WFD classification. |
| | | Flood Risk | Creation of flood storage and decrease in peak flood level (<100 mm). |
| No change | | No loss or alteration of characteristics, features or elements; no observable impact in either direction. | |

### Significance

12.4.14 Significance of effects have been assessed using professional judgement considering the sensitivity (or value) of the receptor within the Study Area, and the magnitude of change (impact) likely to be caused by the activities of the Project. These factors are combined to give an overall significance of effect.

12.4.15 Significance has been derived using the matrix set out in Chapter 5: EIA Approach and Method (document reference 6.5) (Revision B). This has been supplemented by professional judgement, which where applicable, has been explained to give the rationale behind the values assigned. Significant effects, in the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations'), are effects of moderate or greater significance.

### Limitations of Assessment

12.4.16 As with all types of assessment of effects on the water environment, the assessment depends on the accuracy of data provided by third parties. It has therefore been assumed that data provided by third parties is accurate.

12.4.17 No quantitative assessments (modelling) and no water-quality sampling and analysis, or other site surveys have been undertaken, as it is considered that sufficient baseline data are available to generally characterise flood conditions and the water quality of surface water receptors within the Study Area. This has been agreed with

key stakeholders. However, data gathered during the aquatic ecology surveys, as well as from the drainage surveys that are ongoing, have been used to supplement desk study data sources and have been used to shape watercourse crossing methodologies and mitigation measures.

## Key Parameters for Assessment and Assumptions

12.4.18 This section describes the key parameters and assumptions that have been used / made when undertaking the assessment presented within this chapter. The assumptions this chapter is based on are listed below:

- It is assumed that no discharges (other than treated and restricted surface water runoff) to surface waters are required for the Project during its construction and operation (and maintenance)
- It is also assumed that there would be no new temporary or permanent abstractions and that the water supply needs of the Project during construction would be sourced either from mains water supply or in remote locations; where this option may not be available, water would be tankered in. With regards to grey water generated from welfare facilities, it is assumed that this would be discharged to the public sewer, or where this is not practicable, be collected and tankered off site to a licensed disposal facility
- The choice of watercourse crossing technique is dependent on several factors, for example, watercourse size, flood risk sensitivity, ecological sensitivity and location. Where underground cables cross watercourses, it is assumed that ordinary watercourses would be open cut crossings. Some watercourses, for example comprising main rivers and WFD designated watercourses would be crossed using a trenchless technique. Details of specific watercourse crossings are identified within Appendix 4.2: Watercourse Crossing Details (document reference 6.4.A2) (Revision C) which forms the basis of the assessment in the ES (Volume 6 of the DCO application)
- It is assumed that crossings of main rivers and WFD waterbodies for access would be with temporary bridges. Bridge soffit heights would be set on a site specific basis, following more detailed survey and design work by the appointed Main Works Contractor(s). On watercourses achieving High or Good WFD status for aquatic invertebrates, soffit heights would be set as high as practicable above the Q95 water level (indicative of a summer, low flow condition), accounting for site specific constraints
- Where excavation of soil is required, for example at the base of the pylons and for the cable trenches, and where water is encountered in the excavation, it would be pumped out using an appropriate pump and a sump made in the subsoil using the excavator. The water would be pumped from the sump and allowed to filter through silt traps. The assessment presented within the ES (Volume 6 of the DCO application) assumes that there may be the need for temporary 'short-term dewatering', such as removal of rainwater or surface water when undertaking soil excavation. It is anticipated these would be local discharges to ground (after using settlement tanks) and not to watercourses. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents
- Along Primary Access Routes (PARs), as shown on Figure 16.1: Primary Access Routes (document reference 6.16.F1) works may be required to make the existing

highway more suitable for construction vehicles, including localised road widening and removal of street furniture. Any areas of road widening would be served by suitable surface water drainage systems and construction of the works would be subject to the standard and embedded mitigation measures described in Section 12.6. As such no significant effects on hydrology, land drainage and flood risk are anticipated associated with the construction or operation of these PARs.

## 12.5 Baseline Conditions

### Existing Baseline

12.5.1 Baseline conditions have been gathered from desk-based information (see Section 12.4) and presented with reference to the section of the Project within which they are located.

12.5.2 No canals have been identified in the Study Area and these are not considered further.

### Sites Designated for Nature Conservation Interest

12.5.3 There are numerous ponds and lakes within the Study Area, some of which are part of sites designated for nature conservation. Statutory sites designated for nature conservation interest within the Study Area include SSSIs, SACs, Ramsar Sites, SPAs, County Wildlife Sites (CWSs) and Local Wildlife Sites (LWSs). There are also Local Nature Reserves (LNRs), one of which, Roydon Fen, is part of the Waveney and Little Ouse Recovery (WaLOR) Project. Details of sites designated for nature conservation are provided in Chapter 8: Ecology and Biodiversity (document reference 6.8) (Revision C). Where surface waters play a key role in sustaining the designated interest features, these sites have been included as a receptor in this assessment. These have been identified in collaboration with the Project ecologists and include:

- Stour and Orwell Estuaries Ramsar Site, SPA and SSSI
- Norfolk Valley Fens SAC
- Flordon Common SSSI (component of Norfolk Valley Fens SAC)
- Fore and Bushey Groves CWS
- River Gipping (Sections) CWS
- River Waveney (Sections) CWS
- Thrandeston Marsh CWS
- Black Brook LWS
- Higham Meadow CWS
- Sproughton Park CWS
- Coggeshall Hall Farm LWS
- Sandy Wood LWS
- Bluntswall Wood LWS
- Roydon Fen LNR

- St Margarets Wood and Lane LWS
- Buckingham Hill LWS
- Mucking Heath Complex, Southfields LWS.

12.5.4 Groundwater Dependent Terrestrial Ecosystems are addressed separately in Chapter 8: Ecology and Biodiversity (document reference 6.8) (Revision C).

## Existing Water Interests (Surface Water Abstractions and Discharges)

12.5.5 Data to characterise existing water interests has been collected from the Environment Agency. Watercourses in the Study Area receive, transport and dilute consented and informal discharges. Details of consented discharges and their locations are shown in Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) and Figure 12.1: Study Area and Water Environment Features (document reference 6.12.F1).

12.5.6 Existing abstractions support a range of uses, including general agriculture, spray and trickle irrigation, mineral washing, and dust suppression. Consented discharges constitute treated sewage discharges and storm overflows, as well as trade effluents.

12.5.7 Information on private water supplies and groundwater abstractions is provided in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B) and Appendix 9.3: Groundwater Baseline and Qualitative Groundwater Risk Assessment (document reference 6.9.A3) (Revision B).

## Watercourses, Their Water Quality and Hydromorphology

12.5.8 Watercourses in the Study Area are shown in Figure 12.1: Study Area and Water Environment Features (document reference 6.12.F1). A summary table of WFD status data for the watercourses described in the following sections can be found in Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B).

### Section A – South Norfolk

12.5.9 Within Section A, there are two main rivers (Frenze Beck and the River Waveney) that would be crossed by the Order Limits and one main river (River Tas[3]) that is not crossed by the Order Limits but flows through the Study Area. There are also numerous tributaries of these rivers, classified as ordinary watercourses. The watercourses in Section A generally flow in an easterly or north-easterly direction towards The Broads. Their catchments can be categorised as generally rural in their land use, with relatively flat topography.

12.5.10 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of several other WFD waterbodies (e.g. Intwood Stream and Dickleburgh Stream). These are listed in Section A of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data

[3] There is also a reach of the River Tas crossed by the Order Limits that is not designated as main river.

(Environment Agency, 2023) for the Study Area[4], and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). The River Waveney is included within the Anglian RBMP.

12.5.11 The WFD classifications for the waterbodies are informed by monitoring a range of parameters that are indicators of water quality from Environment Agency monitoring sites. The waterbodies in Section A share similar quality characteristics: they all share a moderate ecological status and a failing chemical status. Multiple reasons for not achieving good (RNAG) status are reported for these waterbodies, with polybrominated diphenyl ethers (PBDE) being common to all. Phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources are RNAGs common to all the waterbodies in Section A except the Yare, Tas (Head to Tasburgh) and Waveney. A RNAG common to the Tas (Head to Tasburgh) and Waveney is dissolved oxygen, and this is attributed to drought.

12.5.12 The Section A Study Area is not located within a surface water Drinking Water Protected Area but the southern part of the Order Limits and Study Area, from Tibenham to Diss, are located within the Anglian Waveney (SWSGZ1020) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section A is partially located within Nitrate Vulnerable Zones (NVZs).

12.5.13 In terms of their physical form, some of the watercourses within the Study Area are designated as 'heavily modified'. 'Heavily modified' refers to a watercourse being modified from its natural state for human use. In terms of both their hydrological regime and morphology, the WFD waterbodies in Section A are all designated as 'supports good' status. However, several of the watercourses within the Study Area have been subject to modifications for the purposes of land drainage. Watercourses that serve a land drainage function tend to have relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

### Section B – Mid Suffolk

12.5.14 Within Section B, there are three main rivers (River Waveney, River Gipping and The Channel) that would be crossed by the Order Limits and one main river (a tributary of the Gipping called the Jordan) that is not crossed by the Order Limits but flows through the Study Area. There are also numerous tributaries of these rivers, classified as ordinary watercourses. Some reaches of the River Gipping within the Study Area are classified as main river and other reaches are classified as ordinary watercourse. In the northern portion of Section B, most watercourses tend to flow in a north-easterly direction, whereas in the southern portion of Section B, watercourses tend to flow in a south-easterly direction. Most of the catchments can be categorised as generally rural in their land use. However, some watercourses, such as the River Gipping, have urban areas within their catchments including towns such as Stowmarket and Ipswich. The catchments have a relatively flat topography.

12.5.15 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Little Ouse and Mendlesham Stream). These are listed in Section B of Table A12.1.3 of Appendix

[4] WFD status data from 2022 is available for ecological status but for chemical status ('does not require assessment' in 2022) the most recent available data is 2019. This is applicable to WFD data presented for the whole Study Area.

12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the Waveney (upstream (u/s) Frenze Beck) waterbody is shown in Section A. The River Waveney and River Gipping are included in the Anglian RBMP.

12.5.16 Most of the waterbodies in Section B share similar quality characteristics as they are all failing under chemical status, and most have moderate ecological status. The Jordan has good ecological status whereas the Belstead Brook and Gipping (downstream (d/s) Stowmarket) have poor ecological status due to fish for the Belstead Brook and macrophytes (aquatic plants) and phytobenthos (autotrophic organisms) for the Gipping. Multiple RNAGs are reported for these waterbodies with PBDEs being common to all. Other common RNAGs are phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources.

12.5.17 Section B is partially located within a surface water Drinking Water Protected Area in the vicinity of Stowmarket and Flowton (Gipping (d/s of Stowmarket)). The majority of Section B is located within either the Anglian Waveney (SWSGZ1020) or Anglian Gipping and Alton Water (SWSGZ1022) surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section B is entirely located within NVZs.

12.5.18 In terms of their physical form, three of the WFD waterbodies in Section B of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) are designated as ‘heavily modified’. The hydromorphological status for all these waterbodies is ‘supports good’, although the hydrological regime for the Dove tributary – Eye, Gipping (d/s Stowmarket) and Somersham Watercourse waterbodies ‘does not support good’. These three waterbodies have RNAGs attributed to groundwater abstraction.

### Section C – Babergh, Colchester and Tendring

12.5.19 Within Section C, there are five main rivers (Belstead Brook, Spring Brook, the River Stour, Stutton Brook and Salary Brook) that would be crossed by the Order Limits and one main river (River Brett) that is not crossed by the Order Limits but flows through the Study Area. There are also numerous tributaries of these rivers, classified as ordinary watercourses. The watercourses in Section C tend to flow in an easterly or south-easterly direction, generally towards the Orwell and Stour estuaries. Their catchments can be predominantly categorised as generally rural in their land use, with some watercourses such as the Belstead Brook and River Stour flowing through towns such as Ipswich and Manningtree respectively. The catchments have relatively flat topography.

12.5.20 Ardleigh Reservoir is partially located within Section C and its main outflow is the Salary Brook.

12.5.21 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Tenpenny Brook and Holland Brook). These are listed in Section C of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the

Belstead Brook and Gipping (d/s Stowmarket) waterbodies is shown in Section B. The River Brett and River Stour are included in the Anglian RBMP.

12.5.22 The waterbodies in Section C share similar quality characteristics as they are all failing for chemical status, and all have moderate ecological status, except for the Stutton Brook which has poor ecological status due to fish and phosphate. Multiple RNAGs are reported for these waterbodies with PBDEs and mercury and its compounds being common to all. A RNAG common to all the waterbodies except the transitional waterbodies (i.e. the Orwell and Stour estuaries) is phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources. Fish is another common RNAG, and several waterbodies also have RNAGs relating to physical modification.

12.5.23 Section C is partially located within two surface water Drinking Water Protected Areas (Gipping (d/s of Stowmarket) and Stour (d/s River Brett)). Areas of Section C are partially located within the Anglian Gipping and Alton Water (SWSGZ1022), Anglian Gipping and Alton Water (SWSGZ1021) and Anglian Stour and Abberton (SWSGZ1024) surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section C is entirely located within NVZs.

12.5.24 In terms of their physical form, most of the WFD waterbodies in Section C of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) are designated as ‘heavily modified’, with many having been physically modified for land drainage or land management functions. Watercourses modified for these purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms. The hydromorphological supporting elements status for some of the WFD waterbodies in Table A12.1.3 is ‘supports good’ but the hydrological regime for some of the waterbodies is stated as ‘does not support good’. The RNAGs for the River Brett, attribute this to surface water and groundwater abstraction.

### Section D – Colchester

12.5.25 Within Section D, there are three main rivers (the Black Brook, Roman River and the River Colne) that would be crossed by the Order Limits and one main river (a tributary of the Roman River) that is not crossed by the Order Limits but flows through the Study Area. The watercourses within Section D tend to flow in an easterly or south-easterly direction, ultimately discharging to the Colne estuary. Most of the catchments of the watercourses in Section D are predominantly rural, however there are several urban areas in the catchment of the River Colne, including Colchester which is downstream of the Study Area. The catchments have relatively flat topography.

12.5.26 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Domsey Brook). These are listed in Section D of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the Salary Brook, Stour (d/s

River Brett) and Stour (Lamarsh – River Brett) waterbodies is shown in Section C. The River Stour and River Colne are included in the Anglian RBMP.

12.5.27 The waterbodies in Section D are all failing for their chemical status. The Colne and Roman River have moderate ecological status whereas the Domsey Brook has good ecological status. Two RNAGs are reported for the Domsey Brook, PBDEs and mercury and its compounds, which are common to all the waterbodies in Section D. RNAGs common to the Colne and Roman River waterbodies are macrophytes and phytobenthos, perfluorooctane sulphonate (PFOS)[5], physical modifications and phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources.

12.5.28 The central part of Section D is located within three surface water Drinking Water Protected Areas (Stour (d/s River Brett), Stour (Lamarsh – River Brett) and Colne (d/s Doe's Corner). Section D is almost entirely within surface water Drinking Water Safeguard Zones including the following: Anglian Stour and Abberton (SWSGZ1024), Anglian Colne and Ardleigh (SWSGZ1026, SWSGZ1027) and Anglian Chelmer and Blackwater (SWSGZ1028). Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section D is entirely located within NVZs.

12.5.29 In terms of their physical form, all the WFD waterbodies within Section D of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) are designated as 'heavily modified'. The Roman River waterbody has a hydrological regime that 'does not support good' (attributed to surface water abstraction) whereas the hydrological regime for the Domsey Brook is 'high'. Despite its hydrological regime status, the Domsey Brook is only classified as 'supports good' (rather than 'high') for its hydromorphological supporting elements overall because it is designated as 'heavily modified'[6]. The Colne and Roman River WFD waterbodies, along with several other watercourses within the Study Area, serve a land drainage or land management function. Watercourses modified for these purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

### Section E – Braintree

12.5.30 Within Section E, there are three main rivers (the River Blackwater, one of its tributaries and the River Brain) that would be crossed by the Order Limits. Watercourses in Section E tend to flow in a south-easterly direction, ultimately discharging to the Blackwater estuary. Some of the smaller catchments of the watercourses in Section E are predominantly rural but the catchments of the River Blackwater and the River Brain cover urban areas such as Braintree. The catchments have relatively flat topography.

12.5.31 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Ter). These are listed in Section E of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data (Environment Agency, 2023) for the Study

[5] PFOS is a man-made substance belonging to a group of chemicals known for their water, grease, and stain repellent properties. It is extremely persistent, toxic and bioaccumulative.

[6] Under the WFD, a 'heavily modified' waterbody cannot be classified as 'high' for its hydromorphological compliance.

Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the Roman River and Domsey Brook waterbodies is shown in Section D. The River Blackwater is included in the Anglian RBMP.

12.5.32 The waterbodies in Section E share similar quality characteristics as they are all failing for chemical status, and all have moderate ecological status. Multiple RNAGs are reported for these waterbodies with the following being common to all: PBDEs, mercury and its compounds and phosphate from point (sewage discharge) and diffuse (poor agricultural and soil management) sources. RNAGs related to physical modification are also common to the Brain and Blackwater waterbodies.

12.5.33 Section E is partially located within the Blackwater (Combined Essex) surface water Drinking Water Protected Area and is almost entirely located within the Anglian Chelmer and Blackwater (SWSGZ1028 and SWSGZ1029) surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section E is entirely located within NVZs.

12.5.34 With the exception of the River Ter, the WFD waterbodies within Section E are designated as 'heavily modified'. The hydromorphological supporting elements for the Brain and Ter WFD waterbodies are classified as 'supports good'. Many of the watercourses within Section E have been modified for land drainage, land management, water industry and flood protection purposes. Watercourses modified for land drainage or management purposes tend to have a relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

### Section F – Chelmsford and Brentwood

12.5.35 Within Section F, there are six main rivers (River Ter, Straw Brook, River Chelmer, Chignall Brook, River Can and Roxwell Brook) that would be crossed by the Order Limits and one main river (a tributary of the River Wid) that is not crossed by the Order Limits but flows through the Study Area. Watercourses in Section F tend to flow in an easterly or south-easterly direction, ultimately discharging to the Blackwater estuary. Upstream of the Study Area, most of the catchments of the watercourses in this Section are predominantly rural, although the River Chelmer and River Can flow through Chelmsford downstream of the Study Area. The catchments have relatively flat topography.

12.5.36 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Boreham Tributary). These are listed in Section F of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the River Ter waterbody is shown in Section E. The River Chelmer and River Can are included in the Anglian RBMP.

12.5.37 The waterbodies in Section F share similar quality characteristics as they are all failing for chemical status and are designated either moderate or poor for their ecological status, with the exception of Boreham Tributary which has good ecological status. The poor ecological status of the Can and Wid (Margaretting Hall – River Can) waterbodies is due to macrophytes and phytobenthos, and due to phosphate

for the Wid. The poor ecological status of the Roxwell Brook is due to fish. Multiple RNAGs are reported for the waterbodies in Section F with the following being common to all: PBDEs and mercury and its compounds. Other common RNAGs include phosphate from point (sewage discharge) and diffuse sources (poor agricultural and soil management), physical modification, fish, invertebrates and PFOS.

12.5.38 Section F is not located within any surface water Drinking Water Protected Areas but is located entirely within the Anglian Chelmer and Blackwater (SWSGZ1029) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section F is entirely located within NVZs.

12.5.39 The Chelmer and Chignall Brook waterbodies are designated as 'heavily modified' whereas the rest of the waterbodies are not designated as artificial or heavily modified. The Chelmer and Chignall Brook waterbodies have both been physically modified for land drainage purposes. The hydromorphological supporting elements for all the waterbodies in Section F are designated as 'high' or 'supports good'.

### Section G – Brentwood, Basildon and Chelmsford

12.5.40 Within Section G, there are three main rivers (River Wid, Stock Brook and Haverings Grove Brook) that would be crossed by the Order Limits and two main rivers (River Crouch and River Wid tributary) that are not crossed by the Order Limits but flow through the Study Area. Most of the watercourses in Section G tend to flow in an easterly or north-easterly direction, ultimately discharging to the Blackwater or Crouch estuaries. The nature of their catchments is varied, with some watercourses in Section G having predominantly rural catchments and other catchments covering urban areas such as Brentwood. The catchments have relatively flat topography.

12.5.41 In addition to the catchments associated with the main rivers noted above, the Study Area also covers the catchments of other WFD waterbodies (e.g. Mardyke). These are listed in Section G of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the Wid (Margaretting Hall – River Can) and Wid (Ingatestone Hall – Margaretting Hall) waterbodies is shown in Section F. The River Crouch is included in the Anglian RBMP and the Mardyke is included in the Thames RBMP.

12.5.42 The waterbodies in Section G of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) share similar quality characteristics as they are all failing for chemical status and are designated either moderate or poor for their ecological status. The poor ecological status of the Wid (Doddinghurst Brook – Shenfield Sewage Treatment Works) waterbody is due to macrophytes and phytobenthos and phosphate. Multiple RNAGs are reported for the waterbodies in Section G with the following being common to all: PBDEs, mercury and its compounds and phosphate from diffuse (poor agricultural and soil management) sources. Other common RNAGs include phosphate from point sources (sewage discharge), physical modification, invertebrates, and fish.

12.5.43 Section G is not located within any surface water Drinking Water Protected Areas. Most of the Section, except for the southern end, is located within the Anglian Chelmer and Blackwater (SWSGZ1029) surface water Drinking Water Safeguard Zone. Information on groundwater Safeguard Zones is included in Chapter 9:

Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Section G is entirely located within NVZs.

12.5.44 In terms of their physical form, some of the waterbodies in Section G are designated as 'heavily modified' whilst others are not designated artificial or heavily modified. Those designated as 'heavily modified' have been modified for land drainage and flood protection purposes. The hydromorphological supporting elements for all the waterbodies in Section G are designated as 'high' or 'supports good'.

### Section H – Thurrock

12.5.45 Within Section H, there is one main river (tributary of the Mardyke) crossed by the Order Limits and there are five main rivers (Mardyke tributaries and the West Tilbury Main watercourse) not crossed by the Order Limits but within the Study Area. These watercourses discharge to the Thames downstream of the Study Area via tidal flats and mostly have flapped outfalls. In the northern portion of Section H there are two tributaries of the Mardyke, which are ordinary watercourses at the point they are crossed by the Order Limits but are designated main rivers downstream of this, within the Study Area. The Mardyke tributaries within Section H are small ditches that tend to flow in a south-westerly direction before discharging to the Mardyke west of the Study Area. The Mardyke at Purfleet flows in a south-westerly direction and discharges to the Thames at Purfleet via a flapped outfall. West Tilbury Main is another main river that is not crossed by the Order Limits but flows through the Study Area, in the southern portion of Section H. It discharges to the Lower Hope Reach of the Thames via a flapped outfall.

12.5.46 Although land within the Study Area is predominantly rural, some of the catchments of the watercourses in Section H cover urban areas such as Tilbury.

12.5.47 WFD waterbodies within Section H are listed in Section H of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B), which summarises baseline WFD status data (Environment Agency, 2023) for the Study Area, and shown on Figure 12.3: Water Framework Surface Waterbody Status (document reference 6.12.F3) (Revision B). Data for the Mardyke (East Tributary) waterbody is shown under Section G. The southern portion of Section H is located within the Thames Middle transitional WFD waterbody catchment which is part of the tidal Thames and the Thames TraC (transitional and coastal) operational catchment. There are multiple ordinary watercourses, ditches, and ponds within this waterbody catchment in Section H. The Thames Middle waterbody incorporates a 40 km reach of the Thames from the Thames Barrier to Lower Hope Reach. The Mardyke and the Thames are included in the Thames RBMP.

12.5.48 Although the waterbodies in Section H have similar overall ecological and chemical status, there are differences in their status for the supporting elements. For example, the Thames Middle waterbody is designated good, moderate, or high for all the ecological supporting elements whereas the Mardyke has a poor classification for macrophytes and phosphate and bad status for dissolved oxygen. Regarding their chemical status, the Mardyke is failing due to PBDEs, PFOS and mercury and its compounds whilst the Thames Middle waterbody is also failing due to benzo(a)pyrene, benzo(b)fluoranthene, benzo(g-h-i) perylene and tributyltin compounds. Multiple RNAGs are reported for the waterbodies in Section H, with the following being common to both: PBDEs, PFOS, mercury and its compounds and physical modification. The Thames Middle waterbody also has several RNAGs

relating to tributyltin compounds which are attributed to urbanisation, contaminated land and bed sediments, landfill leaching and sewage discharges.

12.5.49 Section H is not located within any surface water Drinking Water Protected Areas or any surface water Drinking Water Safeguard Zones. Information on groundwater Safeguard Zones is included in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). The northern half of Section H is located within an NVZ.

12.5.50 Both waterbodies in Section H of Table A12.1.3 of Appendix 12.1: Hydrology, Land Drainage and Flood Risk Baseline Data (document reference 6.12.A1) (Revision B) are designated as 'heavily modified', modified for purposes such as flood protection, land drainage and transport. The hydromorphological supporting elements for the Mardyke waterbody are classified as 'supports good'. The Mardyke is slow flowing and has a shallow gradient and its tributaries within the Study Area have multiple straightened reaches. These characteristics are also typical of the ordinary watercourses within the Thames Middle WFD waterbody catchment in Section H.

## Flood Risk and Land Drainage

12.5.51 A summary of the baseline information for flood risk and land drainage is provided below by Project sections. Further detail is included in the FRA (document reference 7.9).

12.5.52 Figure 12.2: Flood Risk Areas (document reference 6.12.F2), shows the extents of Flood Zones 2 and 3 within the Study Area and the areas at risk of surface water flooding. Flood Zone 3 covers land with an annual chance of flooding from rivers of 1 in 100 (1%) or greater or with an annual chance of flooding from the sea of 1 in 200 (0.5%) or greater. Flood Zone 2 covers land between Flood Zone 3 and the extent of the flooding from rivers or the sea with an annual chance of flooding of 1 in 1000 (0.1%). Flood Zone 1 is equivalent to an annual chance of flooding from rivers and the sea of less than 1 in 1,000 (0.1%).

12.5.53 For surface water flooding:

- 'High' risk – means more than 3.3% (1 in 30) annual chance of flooding
- 'Medium' risk – means between 1% (1 in 100) and 3.3% (1 in 30) annual chance of flooding
- 'Low' risk – means between 0.1% (1 in 1000) and 1% (1 in 100) annual chance of flooding
- 'Very low' risk – means less than 0.1% (1 in 1000) annual chance of flooding.

12.5.54 The new substations, proposed works to existing substations, and the Cable Sealing End (CSE) compounds would be located within Flood Zone 1. One CSE compound at Wenham Grove is partially situated in Flood Zone 3. However, this CSE compound would be situated within the defined Limits of Deviation (LoD) to avoid Flood Zone 3, as secured by commitment W19 within the CoCP (document reference 7.2) (Revision G). The proposed temporary construction compounds would also be within Flood Zone 1.

12.5.55 The majority of the permanent Project infrastructure would be located outside of the areas shown to be at 'high' risk of surface water flooding in the Environment Agency Surface Water Map. Of the places where the Project interacts with the high risk zone for operation, the majority of these are access roads. However, the Tilbury North

Substation and Tilbury North (Tilbury side) CSE compound would be located where the mapping indicates there are existing surface water overland flow routes. Places where the Project interacts with the high risk surface water flooding zone during construction are described for each Project section below. Reference should be made to the FRA (document reference 7.9) for more detail.

### Section A – South Norfolk

12.5.56 In this Section, according to the Environment Agency Flood Map for Planning (Environment Agency, 2025a), the Order Limits are located almost entirely in Flood Zone 1 (low risk). As shown on Figure 12.2: Flood Risk Areas (document reference 6.12.F2), parts of the Order Limits are in Flood Zone 2 (medium risk) and Flood Zone 3 (high risk), associated with the River Tas, several of its tributaries, the Frenze Beck and the River Waveney.

12.5.57 As addressed in the FRA (document reference 7.9), there are two pylons proposed in the floodplain in Section A that would need compensatory storage, whereby the volume of storage that is lost for floodwaters is recreated by the Project by locally lowering ground levels. For pylons in the floodplain associated floodplain storage losses were calculated and indicative floodplain storage compensation areas were identified. These are shown on Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2) (Revision B). Further detail on the compensatory storage is provided in the FRA (document reference 7.9).

12.5.58 According to the Environment Agency Asset Information and Maintenance (AIMS) database (Environment Agency, 2024d), the only flood defences the Project crosses within Section A are natural high ground along the banks of the Frenze Beck.

12.5.59 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section A that have previously been flooded.

12.5.60 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land in Section A is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%). As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed.

### Section B – Mid Suffolk

12.5.61 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section B is located almost entirely in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within this Section are associated with the River Waveney, River Dove tributaries, the River Gipping and its tributaries, and The Channel.

12.5.62 As addressed in the FRA (document reference 7.9), there are three pylons proposed in fluvial floodplains in Section B that would need compensatory storage.

12.5.63 According to the Environment Agency AIMS database (Environment Agency, 2024d), the only flood defences the Project crosses within Section B are natural high ground along the banks of the River Waveney and River Gipping.

12.5.64 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section B that have previously been flooded.

12.5.65 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section B is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed. However, the temporary construction compound at Old Bury Road, near RG96, Mid Suffolk (RG-Main) is partially located on land shown to be at high risk of surface water flooding.

12.5.66 Groundwater flood risk varies throughout the Study Area. In most of Mid Suffolk this risk is negligible according to the SFRAs.

### Section C – Babergh Colchester and Tendring

12.5.67 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section C is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within Section C are associated with the Belstead Brook and one of its tributaries, Stutton Brook, River Brett/River Stour, Black Brook and Salary Brook (near Ardleigh Reservoir).

12.5.68 As addressed in the FRA (document reference 7.9), there are no pylons proposed in the floodplain in Section C.

12.5.69 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses within Section C are natural high ground associated with the River Stour.

12.5.70 There is one Recorded Flood Outline (Environment Agency, 2022c) in Section C, associated with a fluvial flood event on the River Stour in 1968.

12.5.71 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that the majority of land within Section C is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed. However, the land south of Little Bromley Road, Bradley Hall, Tendring (JC-CC05) Cable Compound is partially located on land shown to be at high risk of surface water flooding.

12.5.72 In south-east Babergh there is a risk of groundwater flooding associated with certain geologies and ground conditions such as locations where chalk bedrock is not overlain by impermeable superficial drifts. Further information is provided in the FRA (document reference 7.9).

### Section D – Colchester

12.5.73 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section D is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within Section D are associated with an unnamed drain (near Bellmead), the River Colne and its tributaries and the Roman River.

12.5.74 As addressed in the FRA (document reference 7.9), there are no pylons proposed in the floodplain in Section D.

12.5.75 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses in Section D are natural high ground along the banks of St Botolph's Brook, the River Colne and the Roman River.

12.5.76 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section D that have previously been flooded.

12.5.77 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section D is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed. However, the land west of A134, Tye Green, Colchester (TB-CC03/ Great Horkesley West) temporary construction compound is partially located on land shown to be at high risk of surface water flooding.

### Section E – Braintree

12.5.78 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section E is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within Section E are associated with the River Blackwater and one of its tributaries, the River Brain and the River Ter.

12.5.79 As addressed in the FRA (document reference 7.9), there is one pylon proposed in the floodplain in Section E that would need compensatory storage.

12.5.80 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses in Section E are natural high ground along the banks of the River Blackwater, one of its tributaries and the River Brain.

12.5.81 There is one Recorded Flood Outline (Environment Agency, 2022c) in Section E, associated with a fluvial flood event on the River Blackwater in 1947.

12.5.82 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section E is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed.

### Section F – Chelmsford and Brentwood

12.5.83 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section F is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within Section F are associated with the River Ter, River Chelmer, Chignall Brook, River Can, Roxwell Brook and one of its tributaries and River Wid tributaries.

12.5.84 As addressed in the FRA (document reference 7.9), there are two pylons proposed in the floodplain in Section F that would need compensatory storage.

12.5.85 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses in Section F are natural high ground along the banks of the River Ter, River Chelmer, Chignall Brook, River Can, Roxwell Brook and Margaretting Brook.

12.5.86 There are two Recorded Flood Outlines (Environment Agency, 2022c) in Section F, associated with fluvial flood events on the River Chelmer in 1947 and 2001.

12.5.87 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section F is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed. However, there are small parts of the temporary construction compound off Braintree Road, near TB134, Chelmsford (TB-Main) shown to be at high risk of surface water flooding.

### Section G – Brentwood, Basildon and Chelmsford

12.5.88 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that Section G is mostly located in Flood Zone 1 (low risk). Areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) within Section G are associated with the River Wid, Stock Brook and Haverings Grove Brook, as shown on Figure 12.2: Flood Risk Areas (document reference 6.12.F2).

12.5.89 As addressed in the FRA (document reference 7.9), there are three pylons proposed in the floodplain in Section G that would need compensatory storage.

12.5.90 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses in Section G are natural high ground along the banks of the River Wid, Stock Brook and Haverings Grove Brook.

12.5.91 The Recorded Flood Outline dataset (Environment Agency, 2022c) shows no areas within Section G that have previously been flooded.

12.5.92 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section G is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed.

### Section H – Thurrock

12.5.93 The Environment Agency Flood Map for Planning (Environment Agency, 2025a) shows that although there are areas of Flood Zone 2 (medium risk) and Flood Zone 3 (high risk) in the Study Area for Section H, the Order Limits are located within Flood Zone 1 (low risk).

12.5.94 According to the Environment Agency AIMS database (Environment Agency, 2024d), the flood defences the Project crosses in Section H include natural high ground along Amess Sewer. The Tilbury Flood Storage Area is partially located within the Study Area but is not within the Order Limits.

12.5.95 The Recorded Flood Outlines (Environment Agency, 2022c) in Section H are associated with tidal flood events on the River Thames.

12.5.96 The Risk of Flooding from Surface Water map (Environment Agency, 2025c) shows that most of the land within Section H is at very low risk of surface water flooding. As shown in the FRA (document reference 7.9), where there are interactions between the Project and the high risk zone during construction, these are mostly where haul roads and pylon construction working areas are proposed. There is also a surface water flow path through the land proposed for the Tilbury North Substation and the proposed Tilbury – Undergrounding/ Tilbury North (Tilbury side) CSE compound.

12.5.97 A summary of the baseline conditions for all watercourses in the Study Area can be found in Table 12.4.

Table 12.4 Hydrology, Land Drainage and Flood Risk receptors and their value

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| River Tas (Section A) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Extensive modification in places but some morphological features. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| Frenze Beck (Section A) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Extensive modification in places but some morphological features. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Watercourse and its tributaries receive consented discharges. No recorded abstractions. |
| River Waveney (Section A/B) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modification in places but predominantly natural in other places, evidence of morphological features. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| | Water supply and dilution and transport of wastewater | Medium | Watercourse and its tributaries receive consented discharges. No recorded abstractions. |
| River Gipping (Section B) | Flood flow storage and conveyance | High | Area of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Heavily modified in places but evidence of morphological features in Study Area. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Supports receipt of consented discharges along its tributaries. No recorded abstractions. |
| The Channel / Somersham Watercourse (Section B) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Low-energy watercourse with channels heavily modified (e.g. for land drainage). |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Supports receipt of consented discharges along its tributaries. No recorded abstractions. |
| River Jordan (Section B) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Channel modified in some places but evidence of a range of morphological features. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Belstead Brook (Section C) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | High | Range of morphological features, modified in some places with natural flow regime impacted in some places. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Low | No recorded abstractions or consented discharges within the Study Area. |
| Spring Brook (Section C) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Modified in places, limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Low | No recorded abstractions. No consented discharges. |
| River Stour (Section C) | Flood flow storage and conveyance | Very High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. Both fluvially dominated and tidally dominated in different parts of the Study Area. |
| | Hydromorphology | Medium | Channel modified in some places but evidence of a range of morphological features. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Very High | Receives consented discharges and supports abstractions for agriculture and nature conservation. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Stutton Brook (Section C) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Channel modified in places but exhibits a range or morphological features with evidence of some varied flow types. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| Salary Brook (Section C) | Flood flow storage and conveyance | Medium | Areas of Flood Zone 2 and 3 along watercourse but very limited in extent in the reach of the watercourse in the Study Area. |
| | Hydromorphology | Medium | Channel modified in some places but evidence of some morphological features. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| River Brett (Section C) | Flood flow storage and conveyance | High | Areas of Flood Zone 2 and 3 along watercourse. |
| | Hydromorphology | Medium | Partially modified but with a range of morphological features. Impacted natural flow regime. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Black Brook / St Botolph's Brook (Section D) | Flood flow storage and conveyance | High | Areas of Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Limited morphological diversity, low energy and very limited diversity of flow types. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |
| River Colne (Section D) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Heavily modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |
| Roman River (Section D) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Heavily modified and limited morphological diversity within Study Area. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Tributary of Roman River (Section D) | Flood flow storage and conveyance | Medium | No mapped areas of Flood Zone 2 and 3 but important for local land drainage. |
| | Hydromorphology | Low | Typically uniform channel, very limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| River Blackwater (Section E) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |
| River Blackwater Tributary (Section E) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Low energy watercourse, modified in places, limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Low | No recorded abstractions or consented discharges. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| River Brain (Section E) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Recorded abstractions for irrigation. No consented discharges. |
| River Ter (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |
| Straw Brook (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Uniform channel within the Study Area, modified in places, limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| River Chelmer (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |
| Chignall Brook (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Typically uniform channel within the Study Area, modified in places, limited morphological diversity. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Low | No recorded abstractions or consented discharges. |
| River Can (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Recorded abstraction for irrigation, no consented discharges. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Roxwell Brook (Section F) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges, no recorded abstractions. |
| River Wid Main River Tributaries (Section F/G) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Low | Typically uniform channel within the Study Area, modified in places, limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| River Wid (Section G) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | High | Receives consented discharges and supports abstractions for irrigation. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Stock Brook (Section G) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| Haverings Grove Brook (Section G) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 within the Order Limits. |
| | Hydromorphology | Medium | Modified in places but evidence of some morphological features and varied flow types. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| River Crouch (Section G) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 along watercourse. |
| | Hydromorphology | Medium | Modified in places with a typically uniform/straight channel within the Study Area. However, the channel is natural in some places and there is evidence of some morphological features and varied flow types so 'medium' assigned using the cautionary approach. |
| | Water quality | High | Watercourse having a WFD classification and Q95 <1.0 $m^3/s$. |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Mardyke Tributaries (Section H) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 along watercourse, important for local land drainage regime. |
| | Hydromorphology | Low | Impacted natural flow regime, channel cross-section modified for land drainage and flood defence. Limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 $m^3/s$ |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| West Tilbury Main (Section H) | Flood flow storage and conveyance | High | Areas of mapped Flood Zone 2 and 3 along watercourse, important for local land drainage regime. |
| | Hydromorphology | Low | Impacted natural flow regime, channel cross-section modified for land drainage and flood defence. Limited morphological diversity. |
| | Water quality | Medium | Watercourse not having a WFD classification and Q95 >0.001 m3/s |
| | Water supply and dilution and transport of wastewater | Medium | Receives consented discharges. No recorded abstractions. |
| Ordinary watercourses with mapped areas of Flood Zone 2/3 | Flood flow storage and conveyance | Medium | Some areas of mapped Flood Zone 2 and 3 within the Order Limits but tend to be limited and not extensive. |
| | Hydromorphology | Medium | Extensive modification in places but some morphological features. Varied flow types but with an obviously impacted natural flow regime. |
| | Water quality | Medium | Watercourses do not have a WFD classification in the RBMP, inferred WFD class of 'Moderate' based on available data. |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| | Water supply and dilution and transport of wastewater | Medium | Watercourses support only a small number of consented discharges or, in some cases, a single abstraction point. |
| Other ordinary watercourses and land drains | Flood flow storage and conveyance | Low | Features that store and/or convey water at the local scale, generally not posing significant flood risk. |
| | Hydromorphology | Low | Typically modified with limited morphological diversity and in some cases do not support a permanent flow system. |
| | Water quality | Low | Watercourses not having a WFD classification shown in RBMP, inferred WFD class of 'Moderate' based on available data. |
| | Water supply and dilution and transport of wastewater | Medium | Watercourses support only a small number of consented discharges or, in some cases, a single abstraction point. |
| Ardleigh Reservoir (Section C) | Flood flow storage and conveyance | Low | Waterbody with low probability of flooding. |
| | Water quality | High | Supplies water to Anglian Water and Affinity Water. |
| | Water supply and dilution and transport of wastewater | Very High | |
| | Recreation / value to economy | Medium | Used for some recreation activities (e.g. fishing and sailing). |
| Ponds and lakes | Flood flow storage and conveyance | Low | Waterbodies with low probability of flooding. |
| | Water quality | Medium | Waterbodies do not have a WFD classification in the RBMP, inferred WFD class of 'Moderate' based on available data. |
| Land drainage regime | Flood flow storage and conveyance | Medium | Key for local drainage, typically of moderate quality/ rarity. |
| People / existing development within the floodplain | | Very High | Essential infrastructure or highly vulnerable development* |
| | | High | More vulnerable development* |
| | | Medium | Less vulnerable development* |

| Receptor | Attribute | Value (Sensitivity) | Rationale |
|---|---|---|---|
| Sites designated for nature conservation – Stour and Orwell Estuaries Ramsar Site, SPA and SSSI | Hydrological regime | Very High | The hydrological regime is an integral part of an estuary; a site of international biodiversity importance |
| Sites designated for nature conservation – Norfolk Valley Fens SAC and Flordon Common SSSI (component of Norfolk Valley Fens SAC) | Hydrological regime | High | Hydrological regime essential for fens (wetlands); sites of international/ national biodiversity importance |
| Sites designated for nature conservation – River Gipping (Sections) CWS; River Waveney (Sections) CWS; Thrandeston Marsh CWS; Black Brook LWS and Coggeshall Hall Farm LWS; Roydon Fen LNR | Hydrological regime | High | Sites are along stretches of watercourses or include watercourses; sites of local or county biodiversity importance |
| Sites designated for nature conservation – Fore and Bushey Groves CWS; Higham Meadow CWS; Sproughton Park CWS; Sandy Wood LWS; Bluntswall Wood LWS; St Margarets Wood and Lane[7] LWS; Buckingham Hill LWS and Mucking Heath Complex, Southfields LWS; Wortham Ling SSSI | Hydrological regime | Medium | Hydrological regime is a consideration for these sites but is less critical or integral; sites of local or county biodiversity importance |

** In line with the flood risk vulnerability classifications from the NPPF/PPG[2]*

[7] Woodland is not mapped as ancient woodland on the National Ancient Woodland Inventory (Woodland Trust, 2025), however is considered an ancient woodland for the purpose of the ES, as a worst case, as its designation citation indicates it contains ancient woodland features

## 12.6 Future Baseline

12.6.1 The future baseline relates to known or anticipated changes to the current baseline in the future which should be assessed as part of the Project in the ES (Volume 6 of the DCO application).

12.6.2 While it is unknown whether the overall future trend would be for water quality improvement or degradation, legislative drivers, for example the Flood and Water (Amendment etc. (EU Exit)) Regulations 2019, would encourage future water quality improvements.

12.6.3 Future investment in the regional sewer network would likely contribute to improving the current status of the Mardyke catchment, where point-source pollution from wastewater treatment works is stated as a current pressure in the RBMP.

12.6.4 The UK Government forecasts that it is likely that Flood Zones 2 and 3 would increase in area coverage in the future baseline scenario, therefore introducing flood risk to areas previously unaffected. However, this may be counteracted by the implementation of flood risk management policies. Latest predictions are also for increased frequency of high intensity rainfall events, that would increase the risk of flooding from surface water. Resilience to this form of flood risk has been built into the Project's design.

## 12.7 Proposed Mitigation

12.7.1 The approach to mitigation including a description of the mitigation hierarchy is set out in Chapter 5: EIA Approach and Method (document reference 6.5) (Revision B). Three types of mitigation have been incorporated into the Project and assessment: embedded, standard and additional environmental mitigation.

### Embedded Mitigation

12.7.2 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.

12.7.3 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.

12.7.4 Embedded measures are those that are intrinsic to and built into the design of the Project, which are presented in Table 4.2 of Chapter 4: Project Description (document reference 6.4) (Revision B). Embedded measures relevant to Hydrology, Land Drainage and Flood Risk are summarised below:

- The Project has avoided sensitive features, such as the floodplains of watercourses, through the corridor and routing studies where possible
- Pylons would be situated a minimum of 8 m from the top of bank of any designated main river and a minimum of 3.5 m from the top of bank of any ordinary watercourses (as documented in W20 of the Outline CoCP (document reference 7.2) (Revision G))
- For access roads and haul roads, the Project requires the crossing of multiple ditches, drains and watercourses. Large or sensitive watercourses, for example those designated as main river, and those with WFD status, would be crossed by

the haul roads using temporary clear span bridges. Soffit heights at clear span crossings would be set on a site specific basis, following more detailed survey and design work by the appointed Main Works Contractor(s). On watercourses achieving High or Good WFD status for aquatic invertebrates, soffit heights would be set as high as practicable above the Q95 water level (indicative of a summer, low flow condition), accounting for site specific constraints

- Surface water runoff from construction sites, haul roads and operational assets would be managed using SuDS techniques appropriate to local conditions (see Appendix C of the FRA (document reference 7.9)).

## Standard Mitigation

12.7.5 Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.

12.7.6 The Outline CoCP (document reference 7.2) (Revision G) contains relevant standard mitigation measures relating to Hydrology, Land Drainage and Flood Risk. Note: measures have been assigned references, for example (GG01). For ease of cross reference, these align with the references provided in Table 6.1 of the Outline CoCP (document reference 7.2) (Revision G).

12.7.7 A number of standard mitigation measures would also serve the Project during its operation and maintenance, for example, commitments to SuDS to serve substations and CSE compounds.

12.7.8 Measures that would control sources of potential pollution and prevent pathways to water environment receptors during construction are included below (but are not limited to), for example:

- GH12: The provision of a drilling fluid breakout method statement, where horizontal directional drilling is proposed at trenchless locations, will be developed by the Main Works Contractor(s) and discussed with the Environment Agency, and will be informed by sufficient appropriate ground investigation and will include:
  - Detailed and appropriate design of all trenchless crossings including demonstration of a suitable drilling profile and depth to mitigate the risk of breakout
  - Description of drilling procedure and demonstration of suitability, including removal of borehole cuttings during drilling
  - Annular pressure monitoring
  - Regular walkovers of the drill path to check for visible evidence of breakouts
  - Measures to limit the volume of the drilling fluid loss
  - Measures to contain the lost drilling fluid
  - Measures to remove the lost drilling fluid
  - Measures to seal the area of the breakout
  - Measures to provide any remediation, if appropriate

  - Assessment of the pollution potential of any additives required and a permit or exclusion obtained as required
  - Drilling clay breakout in areas of archaeological preservation in situ will be managed following methodology defined in **7.5 Outline Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (Revision C).**

- GG21: Fuels, oils, and chemicals will be stored responsibly, away from sensitive water receptors (and trees). Where practicable, they will be stored over 15 m from watercourses, ponds, and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a distance greater than 15 m, additional measures will be identified. All refuelling, oiling, and greasing of construction plant and equipment will take place above drip trays, over 15 m away from any watercourse, and also away from drains as far as is reasonably practicable. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made readily accessible for these activities and a maintenance and inspection regime will be in place to ensure spill kits are maintained with appropriate stock. Potentially hazardous materials will be safely and securely stored including use of secondary containment where appropriate. Stored flammable liquids will be protected either by double-walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby
- GG23: Wash down of vehicles and equipment will take place in designated areas within temporary construction compounds to avoid mud/debris leaving site. Wash water will be collected and prevented from passing untreated into watercourses and groundwater. Any proposed discharges will be made in accordance with the discharge rate and quality conditions of suitable environmental permits, where required. Appropriate measures will include use of sediment traps
- GG32: Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains, including highways drainage systems, or sewers without appropriate treatment and agreement of the appropriate authority. All practicable steps would be put in place to prevent pollution of watercourses in the case of an emergency, with protocols in place to address accidental spills and severe weather events.
- W02: For open cut watercourse crossings and installation of vehicle crossing points, mitigation measures will include but not be limited to:
  - Reducing the working width for open cut crossings of a main or ordinary watercourse whilst still providing safe working and reinstating the riparian vegetation and natural bed of (where practical) the watercourse, using the material removed when appropriate on completion of the works and compacting as required
  - Installation of a pollution boom downstream of open cut works
  - The use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required
  - Have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident

- The use of all static plant such as pumps in appropriately sized spill trays
- Prevent refuelling of any plant or vehicle within 15 m of any watercourse
- Prevent storing of soil stockpiles within 15 m of any watercourse or drain where practicable
- Inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids.

- Reinstating the riparian vegetation and natural bed of the watercourse, using appropriately sized material of similar composition to that removed. As far as practicable, gravel will be retained in-channel. Reinstated material will aim to closely match what is removed, particularly gravel, at between 15 and 40 mm in size to ensure suitability for fish spawning.

12.7.9 They also include measures to reduce the effects of the Project on floodplains and to manage flood risks during construction and operation (and maintenance), for example:

- W07: Where pre-commencement and construction activities take place in Flood Zone 3, temporary construction compounds, laydown areas and other work sites will be laid out in accordance with the sequential approach, ensuring the most vulnerable components are placed in the areas at lowest risk, and incorporate flood resilience measures as required. Material storage areas will be located in Flood Zone 1. In proximity of the River Stour, which has extensive floodplain, additional land has been included within the construction swathe that is outside the flood zone to provide space for materials storage, and no hazardous materials or materials vulnerable to moving in a flood would be stored in Flood Zone 3 of the Stour. Evidence of Environmental Agency Flood Warning Service registration and testing of alert receipt will be retained.
- W09: Where pre-commencement and construction activities take place within surface water flood zones, including statutory undertaker works, prior to works commencing appropriate site drainage will be put in place to reduce the risk of standing water and avoid substantial delays to the construction programme, as well as to prevent offsite increases in surface water flood risk
- W10: Where construction haul roads pass within or cross watercourses and/or their floodplains and key overland flow routes, the haul road design will include flood mitigation/drainage to allow for the flow of water within the floodplain during flood events up to and including the 1% Annual Exceedance Probability event (i.e., ducting). The design of the haul roads themselves will include some resilience to flooding for example, incorporating suitable geo-textiles to stabilise the road surfacing, as well as allowing water to flow within the floodplain. Suitable materials will be used to surface the haul roads. In some cases, bespoke construction methodologies may be used based on site constraints and ground conditions.

12.7.10 Several measures are also included to reduce effects on the hydromorphology of watercourses to be crossed by the Project and to manage site drainage and existing land drainage systems (including agricultural drainage) during construction and operation (and maintenance) of the Project:

- W03: Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Culverts in waterbodies will either preserve the

natural bed or be box culverts with inverts sunk a minimum of 300 mm below the hard bed of the watercourse with natural/existing bed material placed across the inside of the culvert to lift the level up to meet that of the existing. New culverts will be as short as practicable and sized to avoid narrowing of natural channel widths. Temporary culverts will be sized to convey flows generated by upstream catchments to maintain the current land drainage regime and during culvert installation, downstream flows would be maintained

- W13: Surface water drainage features, based on Sustainable Drainage System (SuDS) techniques, will be installed at temporary compound sites and laydown areas during construction. These areas will be reinstated after completion of the temporary works, as agreed with the landowner. Access roads and haul roads, as well as areas where impermeable material will be installed where heavy equipment will be used, will also have suitable drainage provisions via appropriate SuDS that will provide attenuation and treatment of runoff
- W14: Once the Project has been constructed, the working areas will be removed. Any stripped topsoil will be reinstated, and the site will be returned to its former use, subject to any planting restrictions or agreements with landowners. Temporary bridges and culverts (associated with the construction haul roads) will only be retained by exception e.g. if the new temporary structure has replaced an existing one in poor repair. When these locations are confirmed, crossings will be designed to reflect their permanence e.g. culvert sizing to accommodate climate change allowance. Replacement drainage schemes will be installed where appropriate. A specialised drainage contractor(s) will review the drainage designs and the relevant LLFA will be consulted on proposals (where it is not simply a replacement of the existing drainage run). The specialist contractor(s) will provide advice to National Grid and the Main Works Contractor(s) during all relevant construction and reinstatement activities. Permanent records of the land drainage locations will be made and passed to the landowners/occupiers.

12.7.11 The Outline CoCP (document reference 7.2) (Revision G) secured by Requirement 4 within the draft DCO (document reference 3.1) (Revision G) requires the Main Works Contractor(s) to prepare the CoCP to discharge the Requirement.

## Additional Mitigation

12.7.12 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this ES (Volume 6 of the DCO application) has identified a requirement to further reduce significant environmental effects.

12.7.13 Any works with the potential to affect the floodplain or flow regime of a main river would be subject to consent under the Environmental Permitting (England and Wales) Regulations 2016. Similarly, works with potential to impede land drainage or the flow regime of any ordinary watercourse would be subject to consent under the Land Drainage Act 1991. Alternatively, powers to undertake such works will be included within the DCO, following agreement of protective provisions with the Environment Agency and other land drainage authorities.

12.7.14 The FRA (document reference 7.9) describes the proposed mitigation measures/commitments to ensure no detrimental effects on flood risk from rivers and the sea or the functioning of flood defences. This includes the provision of compensatory storage for any losses of floodplain storage (up to the 1% annual

chance plus climate change flood event) due to the construction of proposed pylons (commitment W17 in the Outline CoCP (document reference 7.2) (Revision G)) and flood defence monitoring (where established as necessary in consultation with the Environment Agency) to enable detection of any effects on the structural integrity/condition of flood defence assets (as shown on Figure 12.2: Flood Risk Areas (document reference 6.12.F2)) during construction of the Project (commitment W18).

12.7.15 There is an existing abstraction point (AN/036/0018/002) for spray irrigation on the River Stour in the vicinity of the eastern of the proposed River Stour crossings. As per the Outline CoCP (document reference 7.2) (Revision G), the Project would avoid irrigation pipes where possible or provide alternative supplies where temporary interactions are unavoidable (W04).

12.7.16 Additional mitigation noted above will be secured through the Outline CoCP (document reference 7.2) (Revision G).

## 12.8 Residual Effects

12.8.1 The likely significant effects of the Project have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the Project. The residual effects are outlined below. As previously stated, this section assumes that all mitigation – embedded (design measures), standard practice, and any additional mitigation measures – are in place before assessing the effects. This is in accordance with guidance from IEMA as part of preparing a proportional assessment (IEMA, 2024).

### Construction

#### Watercourses – Water Quality and Hydromorphology

12.8.2 During construction, new crossings of watercourses would be required for temporary access and could result in channel bed/bank modifications causing disruption to flow regimes and effects on hydromorphology. There is also an associated risk of pollution from construction traffic using these temporary access routes, for example linked to mud from tyres and other debris entering the watercourses. Other construction activities with a risk of opening pollution pathways to water environment receptors include the dewatering of excavations and drilling for trenchless crossings (with potential for outbreaks of drilling muds, including bentonite[8]).

12.8.3 There are multiple main rivers within the Order Limits, as detailed in Section 12.5. There are also numerous ordinary watercourses within the Order Limits. The proposed watercourse crossings are shown in the crossing schedules included in Appendix 4.2: Watercourse Crossing Details (document reference 6.4.A2) (Revision C). The selection of method for watercourse crossings has depended on several factors (such as location-specific constraints, WFD status and main river designation) and has taken stakeholder feedback (see Table 12.1) into consideration. All watercourse crossing designs would follow the standard mitigation measures set out in the Outline CoCP (document reference 7.2) (Revision G). In addition, the haul roads would be put in place in accordance with conditions set out within the consents

[8] Bentonite is a swelling clay that has the ability to absorb large quantities of water, with this property used to advantage in drilling mud and groundwater sealants.

and permits from the relevant authorities (Environment Agency for main rivers, the LLFA for ordinary watercourses and the IDB as required).

12.8.4 The standard mitigation measures within the Outline CoCP (document reference 7.2) (Revision G) would reduce pollution risks and the potential negative effects of the temporary watercourse crossings such that a **negligible effect** is assessed on the water quality attributes of watercourses (assigned a value of high to medium). This results in a **negligible significance** of effect, which is **not significant**.

12.8.5 Whilst temporary negative effects (e.g. changes to the bed/bank profiles and flow regimes during culvert installation and removal) on the hydromorphology of the watercourses that are crossed by culverts cannot be avoided, the design of temporary crossings would reduce temporary effects on the watercourses' flow regimes and channel forms. A **minor adverse** impact on the hydromorphology attributes of these watercourses is therefore assessed. For the watercourses assigned medium sensitivity for hydromorphology, this corresponds to a **minor significance** of effect. For the watercourses assigned low sensitivity for hydromorphology, this corresponds to a **negligible significance** of effect. These are **not significant** in EIA terms. For the larger watercourses to be crossed by clear span bridges (for example those with WFD status) a **negligible impact** is assessed on their hydromorphology attributes (assigned high to low value). This results in a **negligible significance** of effect, which is **not significant**.

12.8.6 There would be limited physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses in the overhead line sections or from third party infrastructure works. Very localised disturbances at watercourse haul road crossings are assessed above. In the cable sections, the degree of physical disturbance would depend on the crossing methodology. For example, physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses crossed using a trenchless methodology would be avoided. The River Stour is the only main river that would be crossed by the cable sections, and it would be crossed using a trenchless technique as shown in Table 4.9 in Chapter 4: Project Description (document reference 6.4) (Revision B). The other watercourses that would be crossed by the cables would be ordinary watercourses. The crossing designs would adhere to standard mitigation measures documented in the Outline CoCP (document reference 7.2) (Revision G). **No change** to the hydromorphology of the River Stour (medium sensitivity) is anticipated as a result of cable crossing. For the ordinary watercourses that would be crossed by the cable with an open cut methodology, a temporary **minor adverse** impact is assessed. This corresponds to a **minor adverse significance** of effect or **negligible significance** of effect for watercourses assigned medium or low sensitivity for their hydromorphology attributes respectively, which are **not significant**. Once the cable has been installed the watercourses would be reinstated to their pre-construction condition (commitment W14 of the Outline CoCP (document reference 7.2) (Revision G)) and hence no longer term effects are anticipated.

12.8.7 Soil stripping and the subsequent stockpiling and storage of soil could cause deterioration of surface water quality through generation of silted or polluted runoff. In the cable sections of the Project, the width of soil stripping would be more extensive than in overhead line sections. However, the protocols described in the Outline CoCP (document reference 7.2) (Revision G) would manage worksite runoff and reduce the potential for pollution via this pathway. Material storage areas would be located outside of the fluvial floodplain where practicable.

12.8.8 In the overhead line sections, the amount of topsoil strip would be less than in cable sections, so the potential for surface water quality to deteriorate from receiving silted runoff is comparatively lower. The standard mitigation measures within the Outline CoCP (document reference 7.2) (Revision G) would reduce negative effects associated with pollution risks. A **negligible impact** is therefore assessed which corresponds to a **negligible significance** of effect on surface water receptors (watercourses, ponds, lakes and Ardleigh Reservoir) assigned high to low sensitivity for their water quality attributes. This is **not significant**.

12.8.9 While trenchless crossings would avoid physical disturbance to the flow regime and form of channel and riparian corridors, the technique is not without risk of pollution, associated with inadvertent releases of drilling fluids/muds. Open cut crossings of watercourses could also cause disturbance of bed sediments. The design of the crossing methods would follow standard mitigation measures set out within the Outline CoCP (document reference 7.2) (Revision G), and trenchless crossings would be informed by the Project's ground investigation data to reduce the risks of breakout of drilling muds. The designs would also accord with any conditions set out within secondary consents and permits for the works from the relevant authorities.

12.8.10 The majority of CSE compounds, temporary construction compounds and substation works are not located near watercourses and other surface waterbodies. Therefore, there are no pathways for potential pollutants arising from construction activities at most locations, for example silted runoff, to reach surface water receptors. Where works near to these receptors cannot be avoided, the magnitude of the potential effects on these watercourses would be reduced through the implementation of the good practice pollution prevention and water quality safeguarding measures.

12.8.11 Consequently, for construction works near watercourses (including trenchless crossings), a **negligible impact** is assessed which corresponds to a **negligible significance** of effect which is **not significant**. For construction works not located near watercourses, **no change** to their water quality attributes is expected.

12.8.12 Proposed third party infrastructure works are described in Chapter 4: Project Description (document reference 6.4) (Revision B). The majority of these works are not located in close proximity to watercourses. In the locations where these works are located in close proximity to watercourses, or cross watercourses, there is the potential for similar temporary effects on these receptors to those described above. The works would be subject to the same standard mitigation measures such that effects on water quality and hydromorphology are assessed to be **negligible** and **not significant**.

12.8.13 Interactions with groundwater in the cable sections and where pylon excavations or topsoil stripping is required are assessed in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B).

### Sites Designated for Nature Conservation

12.8.14 Potential pathways for effects during construction on sites designated for nature conservation with a surface water hydrological link (listed in Section 12.5) could occur through changes to water quality, as well as changes to flow in the watercourses and drainage regimes that support the sites.

12.8.15 As described above, standard mitigation measures described within the Outline CoCP (document reference 7.2) (Revision G) would be in place during construction. These would safeguard water quality and avoid detrimental impacts to the flow

regimes of watercourses and local land drainage regimes. As only **minor adverse** and **negligible effects** have been assessed on land drainage and the water quality and hydromorphology attributes of watercourses, a **negligible impact** is assessed for the sites designated for nature conservation included as receptors in this chapter (assigned very high to medium sensitivity). This corresponds to a **negligible significance** of effect which is **not significant**. Reference should be made to Chapter 8: Ecology and Biodiversity (document reference 6.8) (Revision C) for a full assessment of effects on sites designated for nature conservation.

### Flood Risk and Drainage

12.8.16 During construction, the majority of the works would take place outside of the floodplain in Flood Zone 1, where the risk of flooding from rivers is defined as very low. At watercourse crossings, particularly at crossings for underground cables, there is a higher risk. There is the potential for the Project to increase flood risk during construction through the creation of soil stockpiles and temporary works areas, which could result in the temporary loss of floodplain storage or could impede flood flows.

12.8.17 The FRA (document reference 7.9) outlines the proposed embedded and standard mitigation measures for where there are locally higher risks, particularly to temporary works within main river floodplains. The measures would also protect construction workers, limit damages to construction equipment and materials and also limit any impacts of the Project on fluvial flood risk.

12.8.18 The River Stour is the only main river that would be crossed by the cable sections of the Project. The effects of the underground cable construction on flood risk and the land drainage regime in the catchment of the watercourses that would be crossed by the cable sections would be reduced by avoiding any large-scale stockpiling or storage of cable trench arisings in the floodplain. Furthermore, effects would also be reduced by adopting a trenchless technique for cabling beneath the River Stour and, as per commitment GG32 in the Outline CoCP (document reference 7.2) (Revision G), all practicable steps would be put in place to prevent pollution of watercourses in the case of an emergency, with protocols in place to address accidental spills and severe weather events.

12.8.19 Effects on flood risk via impacts on flood defences during construction would be mitigated through commitment W18 of the Outline CoCP (document reference 7.2) (Revision G), which would safeguard the integrity of existing flood defences.

12.8.20 Given the embedded and standard mitigation measures described above and in the FRA (document reference 7.9), the change to fluvial and tidal flood risk during construction is assessed to be of **negligible magnitude**. This corresponds to a **minor adverse significance** of effect for the River Stour and a **negligible significance** for the other watercourses included in Table 12.4. These effects are **not significant** in terms of the EIA Regulations.

12.8.21 For the ‘people / existing development within the floodplain’ receptor in Table 12.4 (assigned very high to medium sensitivity in line with the NPPF/PPG flood risk vulnerability classifications), a **negligible magnitude** of effect is assessed. This corresponds to a **minor adverse significance** of effect for the very high and high sensitivity receptors (essential infrastructure, highly vulnerable or more vulnerable development) and a **negligible significance** for the medium sensitivity receptors (less vulnerable development) included in Table 12.4. These are **not significant**.

12.8.22 There would be changes to land surface permeabilities at the substations, CSE compounds and at permanent access tracks which could disrupt the current land drainage regime. The Project would introduce new areas of temporary impermeable land cover, such as temporary construction compounds and haul roads, along the cable section and roads providing access to pylons, along with topsoil stripping and earthworks. This could locally reduce rainfall infiltration rates, increase runoff rates, and induce overland flow during construction. This could contribute to localised changes to the land drainage regime, resulting in ponding of water or waterlogging of soils. Areas with a sloping topography where topsoil has been stripped would be particularly vulnerable to these changes. The works may also disrupt or sever existing field drainage systems. Temporary measures would be put in place to maintain such drainage routes during construction, then the systems would be reinstated post-construction.

12.8.23 Access roads, haul roads and compound areas would have suitable drainage provisions, providing for attenuation of runoff and encouraging infiltration of surface water runoff to ground (for example French drains). Further detail on the proposed measures for managing surface water flood risk during construction of the Project is included in the FRA (document reference 7.9).

12.8.24 Consequently, negative effects on the land drainage regime and rainfall infiltration and runoff patterns would be limited. In addition, works affecting the land drainage regime would be temporary and localised, with land and any existing field drainage systems reinstated on completion of construction works. Considering the nature and footprint of the Project, a **negligible magnitude** of effect is assessed overall which corresponds to a **negligible significance** of effect on the land drainage regime (medium sensitivity), which is **not significant**.

12.8.25 Some of the third party infrastructure works associated with the Project would be located within fluvial floodplains. These works would be subject to the same standard and standard mitigation measures described above, and in the FRA (document reference 7.9). Given this, and that the above ground footprint of these temporary works would be limited, a **negligible magnitude** of impact is assessed. This corresponds to a **negligible significance** of effect on receptors assigned high to low sensitivity for their flood flow storage and conveyance attributes (no third party infrastructure works are proposed in the River Stour's floodplain). This is **not significant** in terms of the EIA Regulations.

12.8.26 As stated in the FRA (document reference 7.9), it is considered that the construction of the Project is unlikely to increase flood risk from groundwater and, given dewatering arrangements that would be in place where required, the Project is anticipated to be at low vulnerability to flooding from groundwater. Effects on groundwater flows and levels from the underground cable are addressed in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Effects on baseline groundwater flood risk are anticipated to be **neutral** and **not significant**.

## Operation (and Maintenance)

### Flood Risk and Drainage

12.8.27 During operation (and maintenance), the reinforcement would generally be elevated (overhead line) or buried (underground cable). The proposed new substations, substation extensions and CSE compounds would be located in Flood Zone 1. One

CSE compound at Wenham Grove is partially situated in Flood Zone 3. However, this CSE would be placed within the defined Limits of Deviation (LoD) to avoid Flood Zone 3, as secured by commitment W19 within the CoCP (document reference 7.2) (Revision G). Permanent above ground infrastructure for the Project in the floodplain would be limited to a small number of the pylons for the overhead line.

12.8.28 The FRA (document reference 7.9) outlines the proposed mitigation measures/commitments to ensure the Project is safe from flooding over its lifetime and that there are no detrimental effects on flood risk from rivers and the sea because of these interactions. The requirements for compensation of loss of floodplain storage associated with the pylons that would be located in the floodplain are addressed in the FRA (document reference 7.9) and secured by commitment W17 in the Outline CoCP (document reference 7.2) (Revision G). There would be no permanent land raising within Flood Zone 3, nor any permanent changes to the channel form of any watercourses, and land would be restored to pre-construction condition and use (commitment W14).

12.8.29 Due to the nature of the third-party infrastructure works no operational or maintenance effects on flood risk are anticipated.

12.8.30 Once the overhead line construction is complete and underground cables have been installed, land and any associated land drainage would be reinstated, and all temporary watercourse crossings would be removed where there would be no benefits to retaining them.

12.8.31 As informed by the FRA (document reference 7.9), there would be no increase in flood risk as a consequence of the Project's operation (and maintenance), subject to implementation of the recommended compensatory storage. Where the new Tilbury North Substation and the eastern of the two CSE compounds for undergrounding of the ZB overhead line (referred to as 'Tilbury North (Tilbury side)') both clash with an overland surface water flow route, it is proposed to install box culverts beneath the substation and CSE compound to maintain the flow route. In line with National Grid requirements, the culverts would be sized to convey flows generated during a 1 in 1,000 (0.1% AEP) storm event. **No impacts** are therefore anticipated on the local land drainage regime nor on the flood flow storage or conveyance attributes of watercourses (assigned very high for the River Stour, high for the remainder of the main rivers and medium to low for the ordinary watercourses). Effects therefore would be **not significant**.

12.8.32 For the 'people / existing development within the floodplain' receptor in Table 12.4 (assigned very high to medium sensitivity in line with the NPPF/PPG flood risk vulnerability classifications), **no change** to flood risk is anticipated during operation (and maintenance) given the proposed mitigation measures/commitments. Effects therefore would be **not significant**.

12.8.33 Surface water runoff from the CSE compounds, substations and any permanent access roads would be drained using appropriate SuDS techniques to meet with LLFA discharge requirements. The CSE compounds would not be permanently staffed and the extensions to the substation are not anticipated to result in an increase in volumes of foul water drainage or change the existing discharge arrangements. The change to the land drainage regime (assigned medium sensitivity) is assessed to be **negligible** and effects would be of **negligible significance** which are **not significant**.

12.8.34 As detailed in the FRA, the Project is considered to be of low vulnerability to groundwater flooding during operation (and maintenance) and is not anticipated to increase risk of flooding from this source. Effects on groundwater flows and levels from the underground cable are addressed in Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9) (Revision B). Effects on baseline groundwater flood risk are anticipated to be **neutral** and **not significant**.

12.8.35 As described in the FRA (document reference 7.9), no operational (or maintenance) flood risk impacts associated with the third party infrastructure works are anticipated.

## 12.9 Monitoring

12.9.1 As no likely significant effects on Hydrology, Land Drainage and Flood Risk receptors are anticipated, no monitoring is proposed.

## 12.10 Sensitivity Testing

12.10.1 Sensitivity testing has been undertaken as described in Chapter 5: EIA Approach and Method (document reference 6.5) (Revision B) to determine if delays or an extension to the construction programme, changes to the design within the Limits of Deviation (LoD) or if any of the design scenarios presented in Table 4.4 in Chapter 4: Project Description (document reference 6.4) (Revision B) would affect the assessment.

### Flexibility in Construction Programme

12.10.2 This chapter assumes the baseline construction schedule described in Chapter 4: Project Description (document reference 6.4) (Revision B) for the purposes of the assessment.

12.10.3 If the construction works were delayed or extended this would not affect the assessment of effects on Hydrology, Land Drainage and Flood Risk receptors or introduce any new significant effects. The commitments in the Outline CoCP (document reference 7.2) (Revision G) ensure adherence to the proposed mitigation and identify the measures required to ensure no significant residual effects on Hydrology, Land Drainage and Flood Risk receptors would arise because of the Project.

### Flexibility in Design

#### Flexibility within the Limits of Deviation

12.10.4 The assessment presented within this chapter has been undertaken on the design as shown on Figure 4.1: Proposed Project Design (document reference 6.4.F1) (Revision B) and Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2) (Revision B). It should be noted that, as described in Chapter 4: Project Description (document reference 6.4) (Revision B), the Project alignment is not fixed and could be subject to change within the defined LoD within the parameters shown on the Works Plans (document reference 2.3) (Revisions A – C) unless commitments have been made otherwise.

12.10.5 With regard to substations and CSE compounds, the defined LoD for these are wholly located in areas at low risk of flooding from rivers, the sea and surface water.

Therefore, changes within the LoD to these features would not change the assessment presented in Section 12.8. The exception is the CSE compound at Wenham Grove, the LoD for which are partly within Flood Zone 3. However, there is a specific commitment within the Outline CoCP (document reference 7.2) (Revision G) to placing the compound to avoid this high risk flood zone.

12.10.6 The assessment assumes the indicative pylon locations shown on Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2) (Revision B). Commitment B07 in the Outline CoCP (document reference 7.2) (Revision G) states that a minimum buffer of 10 m (where practicable) will be retained around biodiversity receptors (including watercourses) to reduce any potential direct or indirect effects on the species and habitats associated with them. Commitment W20 in the Outline CoCP (document reference 7.2) (Revision G) states that pylons would be situated a minimum of 8 m for the top of bank of any designated main river and a minimum of 3.5 m from the top of bank of any ordinary watercourses. Given these measures, the sensitivity testing has shown that there would be no new or different likely significant effects as a result of the pylons being placed in a different location, as they would remain set back these minimum distances from watercourses.

12.10.7 The assessment presented within Section 12.8 has assumed the locations for temporary access routes and watercourse crossings in cable sections listed in Appendix 4.2: Watercourse Crossing Details (document reference 6.4.A2) (Revision C). Sensitivity testing has been carried out to determine the potential for new or different/more significant effects should alternative crossing locations be chosen. Given the standard mitigation measures set out in the Outline CoCP (document reference 7.2) (Revision G) governing watercourse crossing methods and principles, the sensitivity testing has shown that there would be no new or different likely significant effects as a result of changes to the location of temporary access routes and watercourse crossings.

12.10.8 This chapter has assumed that where required, drill pits are located at either end of each trenchless crossing, as shown on Figure 4.1: Proposed Project Design (document reference 6.4.F1) (Revision B). The assessment presented in Section 12.8 assumes a reasonable worst case that the drill pits could be located within the floodplain. Varying the trenchless construction methodology or drill direction is not likely to result in any new or more significant effects to those identified in Section 12.8 of this chapter, given that standard mitigation measures in the Outline CoCP (document reference 7.2) (Revision G) and embedded design measures would be in place.

12.10.9 Discussions would also be held with the Environment Agency in relation to any required consents and permits necessary for the works, in accordance with commitment W01 in the Outline CoCP (document reference 7.2) (Revision G). The works would subsequently be carried out in accordance with the requirements of these consents, thereby safeguarding water environment receptors.

### Flexibility within the Order Limits

12.10.10 There are 19 locations where design scenarios have been identified within Chapter 4: Project Description (document reference 6.4) (Revision B). The effects of the design scenarios on Hydrology, Land Drainage and Flood Risk receptors in comparison with the Project have been assessed below. Those that would result in different effects from those reported in this chapter are noted.

### Silica sands mineral site east of the proposed new East Anglia Connection Node (EACN) Substation (Section C)

12.10.11 This design scenario provides flexibility to facilitate a swap of the overhead line and underground cable north or south of Little Bromley Road. If the northern option were taken forwards this would result in construction activities closer to Home Farm Reservoir which could increase the risk of pollution to this receptor. However, given the pollution control measures, described in the Outline CoCP (document reference 7.2) (Revision G), that would be in place, no new or different effects are anticipated.

### Chelmsford Bypass east of the A131 and to the west of Lyonshall Wood Ancient Woodland (Section F)

12.10.12 The Chelmsford Bypass design scenario provides an alternative haul road off the proposed Chelmsford Bypass new roundabout, should the bypass progress. This alternative haul road would interact with a greater area of the high risk surface water flood extent and therefore has the potential to cause more disturbance to the existing land drainage regime locally. However, the mitigation measures described in Section 12.7 (such as commitments W09, W10, and W13 documented in the Outline CoCP (document reference 7.2) (Revision G)), would be in place such that the design scenario would not result in any new or different effects.

### Crest Nicholson housing development south of the A127 (Section G)

12.10.13 Two haul road options are presented to provide an alternative haul road should the Crest Nicholson housing development progress. The more northern of the two haul roads interacts more with the high risk surface water flood extent and therefore has the potential to cause more disturbance to the existing land drainage regime locally. However, as above, the mitigation measures described in Section 12.7 (such as commitments W09, W10, and W13 documented in the Outline CoCP (document reference 7.2) (Revision G)), would be in place such that the design scenario would not result in new or different effects.

### BPA pipeline crossing west of Langdon Hills Golf and Country Club (Section H)

12.10.14 This design scenario provides flexibility to enable an alternative overhead line alignment with more angles to facilitate a more perpendicular crossing at the BPA pipeline. Depending on exactly where the alignment could be moved, it is possible that pylon TB239 could move into the high risk surface water flood extent. This has implications for impacts on an existing overland flow route in this location and increasing the risk of disturbance to the existing land drainage regime. However, it is noted that due to its open lattice structure, a pylon would be unlikely to block or cause impediment to a surface water flow path. Given this, and the mitigation measures that would be in place in relation to surface water flood risk (such as commitments W09, W10, and W13 documented in the Outline CoCP (document reference 7.2) (Revision G)), no new or different effects are anticipated as a result of this design scenario.

### River Stour Crossing west of Stratford St Mary (Section C)

12.10.15 The River Stour crossing design scenario provides for a single underground crossing at either the western or eastern crossings rather than two crossings of the River Stour. If either single crossing option were taken forwards following detailed ground investigations it would affect the same receptors as the assessed Project but there would be a reduction in the disturbance to the riparian corridor and there would be reduced pollution risk from breakout of drilling fluid. This would not significantly alter the mitigation measures identified in this location or the findings of the impact assessment. Therefore, the design scenario would not result in any different or additional significant effects.

### South of the proposed new Tilbury North Substation (Section H)

12.10.16 The south of the proposed new Tilbury North Substation design scenario allows for a wider LoD should the Project need to respond to third party developments. The Order Limits are not altered by the design scenario, but the design scenario allows for variable positioning of necessary CSE compounds. As described in Section 12.5, there is a surface water flow path through the land proposed for the Tilbury – Undergrounding/ Tilbury North (Tilbury side) CSE compound. Given the potential for variable positioning of the CSE compounds, it is possible that this design scenario could result in the Tilbury – Undergrounding/ Tilbury North (Tilbury side) CSE compound moving out of the surface water flow path. If this were the case, this would negate the need for the mitigation (box culvert) described in paragraph 12.8.31, and there would be no different or additional significant residual effects.

# Abbreviations

| Abbreviation | Full Reference |
|---|---|
| AEP | Annual Exceedance Probability |
| AIMS | Asset Information and Maintenance |
| BPA | British Pipeline Agency |
| CoCP | Code of Construction Practice |
| CSE | Cable Sealing End |
| CWS | County Wildlife Sites |
| DCO | Development Consent Order |
| Defra | Department for Environment, Food and Rural Affairs |
| DESNZ | Department for Energy Security and Net Zero |
| DMRB | Design Manual for Roads and Bridges |
| d/s | Downstream |
| EACN | East Anglia Connection Node |
| EC | European Commission |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| EU | European Union |
| FRA | Flood Risk Assessment |
| FSA | Flood Storage Area |
| IDB | Internal Drainage Board |
| IEMA | Institute of Environmental Management and Assessment |
| LLFA | Lead Local Flood Authority |
| LNR | Local Nature Reserve |
| LoD | Limits of Deviation |
| LWS | Local Wildlife Sites |
| MAGIC | Multi-Agency Geographic Information for the Countryside |
| NPPF | National Planning Policy Framework |
| NPS | National Policy Statement |
| NVZ | Nitrate Vulnerable Zone |

| Abbreviation | Full Reference |
|---|---|
| PAR | Primary Access Route |
| PBDE | Polybrominated Diphenyl Ethers |
| PFOS | Perfluorooctane Sulphonate |
| PPG | Planning Practice Guidance |
| RNAG | Reasons For Not Achieving Good |
| RBMP | River Basin Management Plan |
| SAC | Special Area for Conservation |
| SFRA | Strategic Flood Risk Assessment |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| SuDS | Sustainable Drainage Systems |
| SWSGZ | Drinking Water Safeguard Zones (Surface Water) |
| u/s | Upstream |
| UK | United Kingdom |
| WaLOR | Waveney and Little Ouse Recovery |
| WFD | Water Framework Directive |

# Glossary

| Term | Description |
|---|---|
| Cable Sealing End | Structures used to transfer transmission circuits between underground cables and overhead lines. |
| Code of Construction Practice | A code of construction practice (CoCP) sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential effects of construction works. |
| Compensatory Storage | The volume of storage that is lost for floodwaters is recreated by locally lowering ground levels. |
| County Wildlife Site | Non-designated areas of land important for their wildlife and nature conservation value. |
| Culvert | A channel or pipe that carries water below the level of the ground. |
| Dewatering | The removal of groundwater (e.g. by pumping) to keep a below-ground works area dry. |
| Environmental Impact Assessment (EIA) | An assessment of the likely effects of a development project on the environment, which is reported in an Environmental Statement that is publicised and consulted on and taken into account in the decision on whether a project should proceed. |
| Environmental Statement | The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects. |
| Environmental topic | A subject area covered within the EIA, for example landscape and visual or biodiversity. |
| Flood Risk Assessment | An assessment of the risk of flooding, particularly in relation to residential, commercial and industrial land use. In England, the Environment Agency requires a Flood Risk Assessment to be submitted alongside planning applications in areas that are known to be at risk of flooding. |
| Flood Zone 1 | Areas that have a less than 1 in 1000 (0.1%) annual probability of flooding from rivers in any given year. |
| Flood Zone 2 | Areas that have between a 1 in 1000 (0.1%) and 1 in 100 (1%) annual probability of flooding from rivers in any given year. |
| Flood Zone 3 | Areas that have a 1 in 100 (1%) or greater annual probability of flooding from rivers in any given year. |

| Term | Description |
|---|---|
| Groundwater | Water that is in the ground. This is usually referring to water in the saturated zone below the water table. |
| Limits of Deviation | LoD allow for adjustment to the final positioning of the permanent features for example to avoid localised constraints or unknown or unforeseeable issues that may arise. This could include, previously unidentified poor ground conditions may require a pylon to be moved slightly for geotechnical reasons, such as ground stability. The horizontal LoD define the parameters within which the position on the ground of proposed permanent features may deviate from the position shown on the plans. This applies to both linear (for example overhead line and underground cables) and non-linear (for example the new EACN Substation and CSE compounds) proposed infrastructure. Vertical LoD limit the maximum vertical height, or the depth below ground, of any new infrastructure. |
| Order Limits | The maximum extent of land within which the authorised development may take place. |
| Overhead line | Conductor (wire) carrying electric current, strung from pylon to pylon. |
| Permanent access | Access required to infrastructure during the operational phase of the Project, for operational and maintenance purposes. |
| Piling | Engineering process of installing elongated structural elements, known as piles, into the subsoil. This technique is employed to transfer structural loads to deeper, more competent strata, thereby providing stable foundations for construction projects. Essentially, it addresses situations where surface soils lack sufficient bearing capacity to support intended structures. |
| Pylon | Structures that support the overhead line (conductors). |
| Standard mitigation measures | Comprise management activities and techniques, that would be implemented throughout construction of the Project to limit effects through adherence to good site practices. |
| Substation | Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses. |
| Trenchless crossing | A crossing installation method that has limited above ground disturbance which is used to avoid a sensitive feature such as an environmental feature. |
| Temporary construction compounds | Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins). |

| Term | Description |
| --- | --- |
| Underground cable | An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds. |
| Water Framework Directive | The Water Framework Directive (2000/60/EC) commits European Union member states to achieve good qualitative and quantitative status of all waterbodies. |
| Working area | Working area required to construct elements of the Project, such as pylons, underground cables, CSE compounds, etc. |

# Bibliography


Centre for Ecology and Hydrology (2021) *Flood Estimation Handbook webservice*. Available at: https://fehweb.ceh.ac.uk/ https://fehweb.ceh.ac.uk/ (Accessed October 2024)

CIRIA (2001) *Control of water pollution from construction sites. Guidance for consultants and contractors* (C532).

CIRIA (2014) *Containment systems for the prevention of pollution* (C736F).

CIRIA (2023) *Environmental good practice on site guide* (fifth edition) (C811).

Department for Agriculture, Environment and Rural Affairs (2014) *River Hydromorphology Assessment Technique Training Manual.* Available at: https://www.daera-ni.gov.uk/publications/river-hydromorphology-assessment-technique-training-manual (Accessed October 2024)

Department for Energy Security and Net Zero (2024a) *Overarching National Policy Statement for energy (EN-1)*. Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 (Accessed October 2024)

Department of Energy Security and Net Zero (2024b) *National Policy Statement for electricity networks infrastructure (EN-5).* Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5 (Accessed October 2024)

Department for Environment, Farming and Rural Affairs (2024a) *MAGIC Maps.* Available at: https://magic.defra.gov.uk/MagicMap.html (Accessed October 2024)

Department for Environment, Farming and Rural Affairs (2024b) *Hydrology Data Explorer.* Available at: https://environment.data.gov.uk/hydrology/landing (Accessed October 2024)

Environment Agency (2022a) *River Basin Management Plans*. Available at: https://www.gov.uk/guidance/river-basin-management-plans-updated-2022 (Accessed October 2024)

Environment Agency (2022b) *Consented Discharge to Controlled Waters.* Available at: https://www.data.gov.uk/dataset/55b8eaa8-60df-48a8-929a-060891b7a109/consented-discharges-to-controlled-waters-with-conditions1 (Accessed October 2024)

Environment Agency (2022c) *Recorded Flood Outline dataset.* Available at: https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1 (Accessed October 2024)

Environment Agency (2023) *Water Quality Data Archive*. Available at: https://www.data.gov.uk/dataset/a0e6f23e-d631-4584-9ea2-7053620e4af2/water-quality-archive (Accessed October 2024)

Environment Agency (2024a) *Statutory Main Rivers*. Available at: https://environment.data.gov.uk/dataset/25dde009-ba7d-40de-8380-c5c3bb32ccdc (Accessed October 2024)

Environment Agency (2024b) *Catchment Explorer Database*. Available at: https://environment.data.gov.uk/catchment-planning/ (Accessed October 2024)

Environment Agency (2024c) *Spatial Data Flood Defences*. Available at: https://www.data.gov.uk/dataset/cc76738e-fc17-49f9-a216-977c61858dda/aims-spatial-flood-defences-inc-standardised-attributes (Accessed October 2024)

Environment Agency (2024d) Asset Information and Maintenance Database. Available at: https://environment.data.gov.uk/asset-management/index.html (Accessed October 2024)

Environment Agency (2025a) *Flood Maps for Planning*. Available at: https://flood-map-for-planning.service.gov.uk/ (Accessed April 2025)

Environment Agency (2025b) *Long term flood risk map*. Available at: https://www.gov.uk/check-long-term-flood-risk (Accessed February 2025)

Environment Agency (2025c) *Risk of Flooding from Surface Water map.* Available at: https://environment.data.gov.uk/dataset/b5aaa28d-6eb9-460e-8d6f-43caa71fbe0e (Accessed February 2025)

Essex County Council (2018) *Local Flood Risk Management Strategy*. Available at: https://flood.essex.gov.uk/our-strategies-and-responsibilities/our-local-flood-risk-management-strategy/ (Accessed October 2024)

Essex County Council (2020a) *Sustainable Drainage Systems Design Guide.* Available at: https://www.essexdesignguide.co.uk/pdf/SuDS_Design_Guide_2020.pdf (Accessed October 2024) Essex County Council (2020b) Essex Green Infrastructure Strategy. Available at: https://www.essexdesignguide.co.uk/supplementary-guidance/essex-green-infrastructure-standards/essex-green-infrastructure-strategy-2020/ (Accessed October 2024)

Essex County Council (2022) *Essex Green Infrastructure Standards: Technical Guidance*. Available at: https://www.essexdesignguide.co.uk/media/2637/essex-gi-standards-technical-guidance.pdf (Accessed October 2024)

Institute of Environmental Management and Assessment (2022) *Launch of New EIA Guidance on Land and Soils.* Available at: https://www.iema.net/resources/blogs/2022/02/17/iema-launch-of-new-eia-guidance-on-land-and-soils-february-2022/ (Accessed October 2024)

Ministry of Housing, Communities and Local Government (2024) *Planning Practice Guidance for Flood Risk and Coastal Change*. Available at: https://www.gov.uk/government/collections/planning-practice-guidance (Accessed October 2024)

Ministry of Housing, Communities and Local Government (2025) *National Planning Policy Framework*

National Highways (2022) *LA 113 Road drainage and the water environment*

Norfolk County Council (2015) *Local Flood Risk Management Strategy*. Available at: https://norfolk.citizenspace.com/consultation/draft-local-flood-risk-management-strategy/supporting_documents/02_Norfolk%20LFRMS_SEA_Environmental_Report_DraftforConsultation_April2015.pdf (Accessed October 2024)

Norfolk County Council (2021) *Local Flood Risk Management Strategy Policy Review*. Available at: https://www.norfolk.gov.uk/article/39041/Local-Flood-Risk-Management-strategy (Accessed October 2024)

Planning Inspectorate (2024) *Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive.* Available at: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive (Accessed October 2024)

Sear, D., Newson, M., Thorne, C., Soar, P. and Skinner, K. (2009) *Guidebook of Applied Fluvial Geomorphology*

Suffolk County Council (2023) *Local Flood Risk Management Strategy*. Available at: https://www.greensuffolk.org/flooding/flood-risk-management-strategy/ (Accessed October 2024)

Woodland Trust (2025) *Ancient Woodland Inventory*.

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