Yorkshire GREEN Project

Environmental Impact Assessment

Preliminary Environmental Information Report
Volume two: Chapter 9: Hydrology and Flood Risk

October 2021

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Contents

9. Hydrology and Flood Risk

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9. Hydrology and Flood Risk

9.1 Introduction

9.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Project with respect to hydrology, including the aquatic environment, surface water resources and flood risk. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the Project description provided in **Chapter 3: Description of the Project** and with respect to relevant parts of the following chapters:

- **Chapter 8: Biodiversity** which considers the potential effects to aquatic invertebrates and fish;
- **Chapter 10: Geology and Hydrogeology** which considers the potential effects to groundwater; and
- **Chapter 11: Agriculture and Soils** which will identify areas of contaminated land.

9.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 9.2**);
- consultation and engagement activities that have been undertaken and how comments from consultees relating to hydrology have been addressed (**Section 9.3**);
- the methods used for baseline data gathering (**Section 9.4**);
- the overall baseline hydrology description (**Section 9.5**);
- embedded measures relevant to hydrology (**Section 9.6**);
- the scope of the assessment for hydrology (**Section 9.7**);
- the methods used for the assessment (**Section 9.8**);
- a preliminary assessment of hydrology effects (**Section 9.9, 9.10, 9.11**);
- a preliminary assessment of cumulative (inter-project) effects (**Section 9.12**);
- a summary of the preliminary significance conclusions (**Section 9.13**);
- an integrated WFD assessment (**Section 9.14**)
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 9.15**).

Project overview

9.1.3 In summary Yorkshire GREEN comprises the following new infrastructure within the draft Order Limits:

- Shipton North and South 400kV cable sealing end compounds (CSECs);
- The YN 400kV overhead line (north of proposed Overton Substation);

- Overton 400/275kV Substation;
- Two new sections of 275kV overhead line south of Overton Substation: the XC 275 kV overhead line to the west and the SP 275kV overhead line to the east;
- Tadcaster Tee West and East 275kV CSECs; and
- Monk Fryston 400kV Substation (adjacent to the existing substation).

9.1.4 Works to existing infrastructure within the draft Order Limits would comprise:

- Replacement of one pylon on the 2TW/YR 400kV overhead line;
- Works to the existing XC/XCP Monk Fryston to Poppleton overhead line comprising a mixture of decommissioning, replacement and realignment east of Moor Monkton and reconductoring works south of Moor Monkton. This overhead line would be reconfigured at its southern end to connect into the new substation at Monk Fryston;
- Replacement of one pylon on the Tadcaster Tee to Knaresborough (XD/PHG) 275kV overhead line route;
- Reconfiguration and removal of a short span of the Monk Fryston to Eggborough 400kV 4YS overhead line to connect this overhead line into the new substation at Monk Fryston; and
- Minor works at Osbaldwick Substation comprising the installation of a new circuit breaker and isolator along with associated cabling, removal and replacement of one gantry and works to one existing pylon. All works would be within existing operational land.

9.1.5 Please refer to **Chapter 3: Description of the development** and **Figures 1.1** and **1.2** for an overview of the different components of the Project.

Limitations and assumptions

9.1.6 The information provided in this Preliminary Environmental Information Report (PEIR) is preliminary, the final assessment of likely significant effects will be reported in the ES. The PEIR has been produced to fulfil National Grid Electricity Transmission Plc's (National Grid) consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project, and comment on this during statutory consultation, before the design of the Project is finalised and taken forward to submission of the application for development consent.

9.1.7 The Project has been based on the principal that measures have been 'embedded' into the Project design to remove potential significant effects (**Section 4.6**), for example by the considered placement and choice of infrastructure. This approach is informed by the iterative design process. Additionally, the Project would ensure that standard good practice construction measures are adopted, through the implementation of an Outline Construction Environmental Management Plan (CEMP). The preliminary appraisal of potential effects therefore assumes that both design mitigation and good practice measures are in place.

9.1.8 There are no limitations relating to hydrology that affect the robustness of the preliminary assessment of the potential likely significant effects of the Project.

9.2 Relevant legislation, planning policy and technical guidance

9.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to hydrology. Further information on policies relevant to the Project is provided in **Chapter 5: Legislation and Policy Overview**.

9.2.2 In the vicinity of the Project, there are two key groups of regulators (see **Figure 9.1**):

- the Environment Agency (comprised of individual operational areas) - regulate flood risk with regards to main rivers as well as water quality and Water Framework Directive compliance for all water bodies; and
- Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) – regulate land drainage as well as flood risk from ordinary watercourses and groundwater.

9.2.3 LLFAs are county councils and unitary authorities whereas IDBs are independent public bodies within their district. The Project interfaces with:

- one Environment Agency Area – Yorkshire and north-east;
- three LLFAs – North Yorkshire County, York City and Leeds City; and
- three IDBs – Ainsty, Foss, and Kyle and Upper Ouse.

Legislation

9.2.4 A summary of the relevant legislation is given in **Table 9.1**.

Table 9.1 – Legislation relevant to the hydrology assessment

Legislation	Legislative Context
Control of Pollution Act 1974[1]	An Act to make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.
Reservoirs Act 1975[2]	Reservoirs present a potential flood risk to the Project. The Reservoirs Act 1975 provides regulation for the operation and maintenance of reservoirs to ensure the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) ensures the condition of the embankments. As a consequence, the chance of them failing and giving rise to flooding problems is remote.
Environmental Protection Act 1990[3]	The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other

[1] UK Government. Control of Pollution Act 1974. 1974. (Online) Available from: https://www.legislation.gov.uk/ukpga/1974/40 (Accessed July 2021).
[2] UK Government. Reservoirs Act 1975. 1975. (Online) Available from: https://www.legislation.gov.uk/ukpga/1975/23 (Accessed July 2021)
[3] UK Government. Environmental Protection Act 1990. 1990. (Online) Available from: https://www.legislation.gov.uk/ukpga/1990/43/contents (Accessed July 2021).

Legislation	Legislative Context
	processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste.
Land Drainage Act 1991[4] and 1994[5]	The Land Drainage Act (as amended), in combination with the Water Resources Act, stipulates that before work on or near an 'Ordinary Watercourse[6]' is carried out, an Ordinary Watercourse Consent is required. The Flood Defence consenting regime for 'Main Rivers[7]', which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting Regulations 2016[8].
Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009[9] Water Act 2003[10]	The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter 'Controlled Waters[11]'. The Act was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Important for the Project is the potential requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated. Provisions for the regulation of water discharges to controlled waters are set out in the Environmental Permitting (England and Wales) Regulations 2016. These have replaced provisions in the earlier Acts.
Environment Act 1995[12]	The Environment Act 1995 established the Environment Agency and gave it responsibility

[4] UK Government. Land Drainage Act 1991. 1991. (Online) Available from: https://www.legislation.gov.uk/ukpga/1991/59/contents (Accessed July 2021).
[5] UK Government. Land Drainage Act 1994. 1994. (Online) Available from: https://www.legislation.gov.uk/ukpga/1994/25/contents (Accessed July 2021).
[6] An Ordinary Watercourse is any river, stream, brook, ditch, drain, culvert, pipe and any other passage through which water may flow which is not designated as Main River
[7] Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. The Environment Agency carries out maintenance, improvement and construction work on main rivers to manage flood risk.
[8] UK Government. The Environmental Permitting (England and Wales) Regulations 2016. 2016. (Online). Available from: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed 1 October 2021).
[9] UK Government. The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. 2009. (Online) Available from: https://www.legislation.gov.uk/uksi/2009/3104/contents/made (Accessed July 2021).
[10] UK Government. Water Act 2003. 2003. (Online) Available from: https://www.legislation.gov.uk/ukpga/2003/37/contents (Accessed July 2021).
[11] This includes territorial waters, coastal waters, inland freshwaters and groundwaters (section 104, Water Resources Act 1991).
[12] UK Government. Environment Act 1995. 1995. (Online) Available from: https://www.legislation.gov.uk/ukpga/1995/25/contents (Accessed July 2021).

Legislation	Legislative Context
	for environmental protection and flood defence.
Water Quality (Water Supply) Regulations 2000 (as amended)[13]	This regulation is primarily concerned with the quality of water supplied in England for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality.
Priority Substances Directive (2008/105/EC) Revision of the Priority Substances Directive (2013/39/EU)[14]	Sets out environmental quality standards in the field of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health.
The EU Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009[15]	The EU Floods Directive is enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.
Flood and Water Management Act 2010[16]	The Flood and Water Management Act sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. The Act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of Sustainable Drainage Systems (SuDS).
The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015	Sets out the environmental standards to be used for the second cycle of river basin plans, covering the period 2016-21. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003, they transpose

[13] UK Government. Water Quality (Water Supply) Regulations 2000. 2000. (Online) Available from: https://www.legislation.gov.uk/uksi/2000/3184/contents/made (Accessed July 2021).
[14] European Parliament. Directive 2013/39/EU of the European Parliament and of the Council amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. 2013. (Online) Available from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:226:0001:0017:EN:PDF (Accessed July 2021).
[15] European Parliament. Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. 2007. (Online) Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0060&from=EN (Accessed July 2021).
[16] Uk Government. Flood and Water Management Act 2010. 2010. (Online) Available from: https://www.legislation.gov.uk/ukpga/2010/29/contents (Accessed July 2021).

Legislation	Legislative Context
	Directive 2013/39/EC on environmental quality standards for priority substances.
Private Water Supplies (England) Regulations 2016[17]	The Regulations require Local Authorities to monitor Private Water Supplies.
Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended)[18]	The 2016 Environmental Permitting (England and Wales) (Amendment) (No. 2) Regulations replace the previous 2010 regulations. It provides a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991, and the Control of Pollution Act 1974), and groundwater activities. It also sets out the powers, functions and duties of the regulators.
The European Union (EU) Water Framework Directive (2000/60/EC) (WFD)[19] as enacted into domestic law by the Water Environment WFD (England and Wales) (Amendment) Regulations 2017[20]	The EU WFD is enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. A fundamental requirement of the WFD is to attain Good Ecological Status, or Good Ecological Potential within each defined waterbody, by December 2027 at the latest and to ensure that any deterioration in status is prevented.

Planning policy

9.2.5 A summary of the relevant national and local planning policy is given in **Table 9.2**.

Table 9.2 – Planning policy relevant to the hydrology assessment

Policy	Policy Context
Overarching National Policy Statement for Energy (EN-1)[21]	Section 4.8: Climate change adaptation Sets out how the effects of climate change should be considered. Section 5.7: Flood risk To ensure that flood risk from all sources is considered at all stages in the planning process to avoid inappropriate

[17] UK Government. The Private Water Supplies (England) Regulations 2016. 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2016/618/contents/made (Accessed July 2021).
[18] UK Government. The Environmental Permitting (England and Wales) Regulations 2016. 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed July 2021).
[19] European Parliament. Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. 2000. (Online) Available from: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF (Accessed July 2021).
[20] UK Government. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. 2017. (Online) Available from: https://www.legislation.gov.uk/uksi/2017/407/contents/made (Accessed July 2021).
[21] Department of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1) 2011. (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed 25 June 2021).

Policy	Policy Context
	development in areas at risk of flooding, and to direct development away from areas at highest risk. Section 5.15: Water quality and resources To ensure that all potential adverse effects on water quantity and quality including the ecological effects resulting from physical modifications are considered at all stages of the development.
National Policy Statement for Electricity Networks Infrastructure (EN-5)[22]	Section 2.4 Climate change adaptation: Sets out how the effects of climate change should be considered.
National Planning Policy Framework (NPPF)[23]	Sequential Test To steer new development to areas with the lowest probability of flooding. Exception Test The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. Climate Change To ensure the impact of climate change is taken into account for the expected lifetime of development. Sustainable Drainage Systems (SuDS) A presumption that SuDS will be incorporated into new developments to minimise the impacts of development from any increase in surface runoff.
Local planning policy	
Hambleton Local Development Framework: Core Strategy Development Plan Document, 2007[24]	Policy CP1: Sustainable development. Provides support for proposals where they promote, encourage, protect or enhance the quality of natural resources including water, and the natural drainage of surface water. Policy CP21: Safe response to natural and other forces. Seeks to protect communities and the environment. Proposals must take particular account of the need to ensure protection from, and not worsen the potential for flooding and mitigate development from the consequences of pollution.

[22] Department of Energy and Climate Change. National Policy Statement for Electricity Networks Infrastructure (EN-5) 2011. (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf (Accessed 25 June 2021).
[23] Ministry of Housing, Communities and Local Government. National Planning Policy Framework (NPPF) (2019). (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf (Accessed 25 June 2021).
[24] Hambleton District Council. Hambleton Local Development Framework: Core Strategy Development Plan Document, 2007. (Online) Available from: https://www.hambleton.gov.uk/planning-policy/adopted-local-development-framework/2?documentId=213&categoryId=20061 (Accessed 25 June 2021).

Policy	Policy Context
Hambleton Development Policies Development Plan Document, 2008[25]	Policy DP2: Securing developer contributions. Commits developers to the provision of additional infrastructure whenever there is a need generated by the new development. This could include provision of flood protection measures and SuDS. Policy DP6: Utilities and infrastructure. Covers the provision of additional infrastructure in a sustainable manner, minimising environmental consequences and preventing degradation of services (including surface water and flood risk defences) currently benefiting the community. Policy DP32 xii: General design. Sets out the expectation for new development to be sustainable. This includes, where possible, the inclusion of SuDS. Policy DP33 ii: Landscaping. Describes the approach to landscaping as an integrated part of the design and seeks a sustainable solution', incorporating the potential implications of climate change. Policy DP43: Flooding and floodplains. States "*development proposals will not be permitted where they would have an adverse effect on watercourses or increase the risk of flooding elsewhere*" and goes on to set out further requirements where there is a risk of flooding.
Hambledon Local Plan – Publication Draft, 2019[26]	Policy RM2: Flood Risk Sets out how the Council will manage and mitigate flood risk; including, avoiding development in flood risk areas, where possible, by applying the sequential approach and where this is not possible by mitigating measures in line with national policy. Policy RM3: Surface Water and Drainage Management Sets out the Council's approach with regards ensuring that surface water and drainage are managed in a sustainable manner, promoting the use of SUDS.
Harrogate District Local Plan, 2014 – 2035[27]	Policy CC1: Flood Risk and Sustainable Development. Sets out the requirements for compliance with national policy. Part D states "*all proposals will be expected to include flood mitigation measures to be identified through a site-specific FRA including consideration of the creation of additional sustainable flood storage areas*".

[25] Hambleton District Council. Hambleton Development Policies Development Plan Document, 2008. (Online) Available from: https://www.hambleton.gov.uk/planning-policy/adopted-local-development-framework/3?documentId=213&categoryId=20061 (Accessed 25 June 2021).
[26] Hambleton District Council (2019), Hambleton Local Plan – Publication Draft. Available at: https://www.hambleton.gov.uk/downloads/download/224/local-plan-submission-core-documents Accessed 15 February 2021.
[27] Harrogate Borough Council. Harrogate District Local Plan 2014 – 2035. 2020. (Online) Available from: https://www.harrogate.gov.uk/planning-policy-guidance/harrogate-district-local-plan-2014-2035 (Accessed 25 June 2021).

Policy	Policy Context
	Policy NE4a: Landscape Character. Provisions for the protection and enhancement of the landscape, specifically requiring development to maintain the aesthetic and biodiversity qualities of watercourses, ponds, reservoirs and lakes.
Selby District Core Strategy Local Plan, 2013[28]	Policy SP19: Design Quality. Seeks to protect against risk or adverse effect from pollution or land instability. Policy SP2: Spatial Development Strategy. Sets out the requirement to follow a sequential approach to the assessment of sites, directing development to areas with the lowest flood risk. Policy SP15: Sustainable Development and Climate Change. Ensures a sustainable approach to flood management measures, design (including SuDs) and construction. Policy SP18: Protecting and Enhancing the Environment. Provides for the safeguarding and, where possible, enhancement of the natural and manmade environment.
Selby District Local Plan, 2005[29]	Policy ENV2a : Environmental Pollution and Contaminated Land. Proposals giving rise to unacceptable levels of environmental pollution (including groundwater pollution) will not be permitted unless satisfactory remedial or preventative measures are incorporated as an integral element in the Project.
City of York draft Local Plan – Publication Draft, 2018[30]	Policy DP1 ix: York Sub Area. States "*development within the City of York area will not lead to environmental problems including flood risk*" Policy DP2 iii: York Sub Area and ENV5: Sustainable Drainage. DP2 iii sets out the principles around sustainability all development should align with (including themes such as flood risk, water quality, land remediation, protection of groundwater, sustainable design and low carbon energy resources). ENV5 sets out further specifics for SuDS. Policy DP3 xii: Sustainable Communities, SS1: Delivering Sustainable Growth for York, and ENV4: Flood Risk. Manages flood risk by ensuring development does not contribute to or is not subject to flooding and ensuring flood risk is appropriately managed.

[28] Selby District Council. Selby District Core Strategy Local Plan. 2013. (Online) Available from: https://www.selby.gov.uk/sites/default/files/Documents/CS_Adoption_Ver_OCT_2013_REDUCED.pdf (Accessed 25 June 2021).
[29] Selby District Council. Selby District Local Plan. 2005. (Online) Available from: https://www.selby.gov.uk/selby-district-local-plan-sdlp-2005 (Accessed 25 June 2021)
[30] City of York Council. Local Plan – Consultation Draft. 2018. (Online) Available from: https://www.york.gov.uk/downloads/file/2110/local-plan-publication-draft-2018 (Accessed July 2021).

Policy	Policy Context
	Policy GI2: Biodiversity and Access to Nature. Provisions for conservation and enhancement of York's biodiversity, cultural and historic landmarks through maintaining and enhancing all aspects of the water environment. Policy CC1: Renewable and Low Carbon Energy Generation and Storage. Applications need to consider the impact of the Project on local communities, residential amenity and the environment (including local protected sites and other sites of conservation importance) throughout the lifespan of the development.
Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016-2036[31]	Policy PNP11: Green Belt. Encourages developers to consider the provision of porous surfaces wherever appropriate.
Saved Policies of the York Local Plan, 2005[32]	Policy GP1: Design. Development proposals will avoid the loss of water features that contribute to the quality of the local environment. Policy GP4a: Sustainability and GP4b: Air Quality. Sets out the principles around sustainability all proposals for development should align with. Policy GP15a: Development and Flood Risk. Sets out the expectation regarding development within areas at risk of flooding, the use of SuDS to reduce surface water run-off, discharges from new developments and provision of flood mitigation and defences. Policy NE2: River and Stream Corridors, Ponds and Wetland Habitats and NE3: Water Protection. Considers protection of the water environment. Development likely to have a detrimental impact will not be permitted.
Leeds City Council Saved Unitary Development Plan (UDP), 2001 and Unitary , 2006[33]	Policy N9: All development proposals should respect and where possible enhance the intrinsic value of land in fulfilling a corridor function in terms of access, recreation, nature conservation and visual amenity. States all development proposals should respect and where possible enhance the natural environment. Policy N39a: Applicants for planning permission for development likely to significantly increase run-off of surface water should demonstrate that they have explored the feasibility of incorporating sustainable drainage systems into

[31] Nether Poppleton Parish Council and Upper Poppleton Parish Council. Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016-2036. 2017. (Online) Available from: https://www.york.gov.uk/planning-policy/upper-nether-poppleton-neighbourhood-plan (Accessed 25 June 2021).
[32] City of York Council. Draft Local Plan incorporating the 4th set of changes. 2005. (Online) Available from: https://www.york.gov.uk/downloads/file/2808/the-local-plan-2005-main-document (Accessed 25 June 2021).
[33] Leeds City Council. Leeds Unitary Development Plan. 2006. (Online) Available from: https://www.leeds.gov.uk/planning/planning-policy/adopted-local-plan/unitary-development-plan (Accessed 25 June 2021).

Policy	Policy Context
	their proposals. such systems should be implemented unless demonstrably impracticable or inappropriate, and provision should be made for their future maintenance. Sets out the expectation for the incorporation of SuDS into development proposals. Policy LT6: The tourism potential of the waterways corridor will continue to be recognised. appropriate leisure developments will be promoted, and priority given for environmental improvements. in considering development proposals in the waterways corridor, the likely impact on tourism potential will be an important consideration. Considers the importance of waterways for tourism potential and necessary consideration of the likely impact of any Project. Policy N38a: Development, including changes of use, will not be permitted in the functional floodplain including all washland areas as identified on the proposals map unless it is for: i. appropriate open recreation, sport, amenity and conservation uses, and ii. essential transport and utilities infrastructure which cannot practicably be located elsewhere. development in the indicative flood plain will be assessed in accordance with the sequential test set out in ppg25. all development should ensure that it does not increase the risk of flooding both on-site and elsewhere, catchment-wide. in all cases early developer consultation with the environment agency is encouraged and N38b: Planning applications must be accompanied by a flood risk assessment where consultations with the council or the environment agency have identified a need for such assessment, or where there is other clear evidence that a proposal is likely to be affected by flooding or could increase the risk of flooding elsewhere. where a development is to be delivered in phases planning permission will only be granted for an individual phase where an overall flood risk assessment has been conducted that takes account of the cumulative flood risk and drainage impacts of both current and future phases. Considers development and flood risk, and the requirement for an FRA. Policy GP5: Development proposals should resolve detailed planning considerations (including access, drainage, contamination, stability, landscaping and design). proposals should seek to avoid problems of environmental intrusion, loss of amenity, pollution, danger to health or life, and highway congestion, to maximise highway safety, and to promote energy conservation and the prevention of crime.

Policy	Policy Context
	proposals should have regard to the guidance contained in any framework or planning brief prepared for the site or area. States development proposals should resolve detailed planning considerations (including drainage). Proposals should seek to avoid environmental intrusion or pollution.
Leeds City Council Natural Resources and Waste Local Plan, 2015[34]	Water 1: Water efficiency and Water 7: Surface water run-off. Promotes better management of water, encouraging a reduction in water waste through the use of SuDS, amongst other measures. Water 7 provides further detail specific to SuDS. Water 2: Protection of water quality. Provides for the protection of water quality during the lifetime of the development, including construction. Water 3: Functional flood plain to Water 6: Flood risk assessments. Ensures flood risk is appropriately managed, taking into account the effects of climate change.
Leeds Core Strategy, 2019[35]	Policy EN5: Manging flood risk. Sets out the council's commitments for the management of flood risk.

Technical guidance

9.2.6 A summary of technical guidance relevant to the hydrology topic is given in **Table 9.3**.

Table 9.3 – Technical guidance relevant to the hydrology assessment

Technical Guidance Document	Context
Ministry of Housing, Communities and Local Government (2014): Flood risk and coastal change guidance[36]	Planning practice guidance on Flood Risk and Coastal Change.
Environment Agency (2016) - Flood risk assessments: climate change allowances[37]	Guidance regarding uplifts to be applied to hydrological modelling inputs to be used to help minimise vulnerability and provide resilience to the impacts of climate change.

[34] Leeds City Council. Adopted Natural Resources and Waste Local Plan. 2015. (Online) Available from: https://www.leeds.gov.uk/docs/Adopted%20Consolidated%20NRWLP%20Inc%20Policies%20Mins%2013-14.pdf (Accessed 25 June 2021).
[35] Leeds City Council. Leeds Core Strategy: Leeds Local Plan. 2019. (Online) Available from: https://www.leeds.gov.uk/planning/planning-policy/adopted-local-plan (Accessed 25 June 2021).
[36] Ministry of Housing, Communities and Local Government: Flood risk and coastal change. 2014. (Online) Available from: https://www.gov.uk/guidance/flood-risk-and-coastal-change (Accessed July 2021).
[37] Environment Agency. Flood risk assessments: climate change allowances. 2016. (Online) Available from: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed July 2021).

Technical Guidance Document	Context
Planning Inspectorate Advice Note 18 (2017): The Water Framework Directive[38]	This Advice Note has no statutory status and forms part of a suite of advice notes provided by the Planning Inspectorate.
Construction Industry Research and Information Association (CIRIA) reports	
Report C532: Control of Water Pollution from Construction Sites (2001)[39]	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.
Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)[40]	Guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk.
Report C648: Control of Water Pollution from Linear Construction Projects (2006)[41]	Guidance for clients, consultants, designers, contractors and regulators on how to plan and manage water pollution from linear construction projects.
Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)[42]	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
Report C650: Environmental Good Practice on Site, second edition (2005)[43]	Provides practical guidance about managing construction on-site to control environmental impacts.
Report C651: Environmental Good Practice - Pocket Book (2005)[44]	Contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site, to project completion.
Report C689: Culvert Design and Operation Guide (2010)[45]	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
Report C692: Environmental Good Practice on Site (2010)[46]	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.

[38] The Planning Inspectorate. Advice note eighteen: The Water Framework Directive. 2017. (Online) Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf (Accessed July 2021).
[39] Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors. C532. London: CIRIA.
40 Lancaster, J., Preene, M. and Marshall, C. (2004) Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.
41 Murnane, E., Heap, A. and Swain, A. (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.
42 Murnane, E., Heap, A. and Swain, A. (2006) Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.
43 Charles, P. and Connely, S. (2005) Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.
44 Chant-Hall, G., Charles, P. and Connolly, S. (2005) Environmental good practice on site – pocket book. C651. London: CIRIA.
[45] Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010) *Culvert design and operation guide. C689.* London: CIRIA.
[46] Audus, I., Charles, P. and Evans, S. (2010) Environmental good practice on site (third edition). C692. London: CIRIA.

Technical Guidance Document	Context
Report C698: Site Handbook for the Construction of SuDS (2007)[47]	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.
Report C753: The SuDS Manual (2015)[48]	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.
Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)[49] (both are maintained by NetRegs and provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only. For businesses in England, regulatory guidance is available from GOV.UK instead)	
GPP 1: A general guide to preventing pollution (October 2020)[50]	Guidance document based on relevant legislation and reflects current good practice.
GPP 2: Above ground oil storage tanks (January 2017)[51]	Guidance to support the safety of above ground oil storage tanks and minimise the risk of causing pollution.
PPG 3: Use and design of oil separators in surface water drainage systems (April 2006)[52]	Guidelines to support decision making on whether an oil separator is needed for a site, and if so what size and type of separator is appropriate.
GPP 5: Works and maintenance in or near water (February 2018)[53]	Guidance document based on relevant legislation and setting out current good practice for working in or near water.
PPG 6: Working at construction and demolition sites (2012)[54]	Practical advice and guidance to help prevent pollution from construction and demolition sites. Sets out legislative requirements and good practice measures to reduce the risk of a pollution incident.

[47] Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007) Site Handbook for the Construction of SUDS. C698. London: CIRIA.
[48] Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015) The SuDS Manual. C753. London: CIRIA.
[49] NetRegs. Guidance for Pollution Prevention (GPPs) - Full list. 2021. (Online) Available from: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/guidance-for-pollution-prevention-gpps-full-list/ (Accessed July 2021).
[50] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2020) GPP 1: A general guide to preventing pollution. Available at: https://www.netregs.org.uk/media/1835/gpp-1.pdf (Accessed: 19 February 2021).
[51] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) Above ground oil storage tanks: GPP 2. Available at: https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf (Accessed 19 February 2021).
[52] Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (2006) Use and design of oil separators in surface water drainage systems: PPG 3. Available at: https://www.netregs.org.uk/media/1671/ppg-3.pdf (Accessed 19 February 2021).
[53] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) *Works and maintenance in or near water: GPP 5. Version 1.2.* Available at: https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017 (Accessed: 19 February 2021).
[54] Environment Agency (2012) Working at construction and demolition sites: PPG6. Second edition. Bristol: Environment Agency.

Technical Guidance Document	Context
GPP 8: Safe storage and disposal of used oils (July 2017)[55]	Guidance based on relevant legislation and setting out current good practice for the safe storage and disposal of used oils.
GPP 20: Dewatering underground ducts and chambers (January 2018)[56]	Guidelines for dewatering underground ducts and chambers, based on relevant legislation and setting out current good practice.
GPP 21: Pollution incident response planning (July 2017)[57]	Guidelines setting out current best practice for producing an incident response plan.
GPP 22: Dealing with spills (October 2018)[58]	Guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills, or those responsible for transporting or storing waste from spills.
GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (July 2018)[59]	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.

9.3 Consultation and engagement

Overview

9.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 4.4** of **Chapter 4: Approach to Preparing the PEIR**.

Scoping Opinion

9.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 28 April 2021. A summary of the relevant responses received in the Scoping Opinion in relation to hydrology and confirmation of how these have been addressed within the assessment to date is presented in **Table 9.4**.

[55] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 8 Safe storage and disposal of used oils. Available at: https://www.netregs.org.uk/media/1435/gpp-8-v3-swni.pdf (Accessed: 19 February 2021).
[56] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) *GPP 20 Dewatering underground ducts and chambers*. Available at: https://www.netregs.org.uk/media/1477/gpp-20-publisher-pdf-version.pdf (Accessed: 19 February 2021).
[57] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) *GPP 21: Pollution Incident Response Plans.* Available at: https://www.netregs.org.uk/media/1436/gpp-21-final.pdf (Accessed: 19 February 2021).
[58] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) Dealing with spills: GPP 22. Version 1. Available at: https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf (Accessed: 19 February 2021).
[59] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) *GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs).* Available at: https://www.netregs.org.uk/media/1693/gpp-26-safe-storage-of-drums-and-ibcs.pdf (Accessed: 19 February 2021).

Table 9.4 – Summary of EIA Scoping Opinion responses for hydrology

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate	The Inspectorate also considers that there a number of waterbodies located within and in close proximity to the boundary of the Proposed Development with potential to be impacted (ie via water pollution events due to suspended solids and other pollutants entering controlled waters) during both the construction and operational (and maintenance) phases. Therefore, the Inspectorate does not consider that sufficient information has been provided within the Scoping Report to reasonably conclude that activities associated with the construction and operational phases of the Proposed Development would not give rise to significant water quality effects.	The assessment has considered the potential effects on the water quality and hydromorphology supporting elements of WFD ecological status and the potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites.
Planning Inspectorate	This matter should be assessed within the ES, including consideration of impacts to ecological features eg designated sites and Habitats of Principal Importance (HPI) with freshwater habitats and species associated with freshwater habitats as part of the assessment of biodiversity, where significant effects are likely to occur.	Noted, where significant effects are considered likely to occur within the water environment the biodiversity impacts have been assessed as part of **Chapter 8: Biodiversity**. The appropriate cross references have been made between the two chapters, where appropriate.
Planning Inspectorate	the Inspectorate considers that water quality has the potential to interface with health and wellbeing and appropriate cross-reference should be made within the ES.	Potential impacts on water resources which support human health arising from the Project have been considered in the assessment.
	The Environment Agency (EA) has stated that it holds additional modelling for the area around the proposed York North Substation and existing Osbaldwick Substation. This information should be used within the assessment.	Noted. The York Detailed Model have been requested from the Environment Agency and will be utilised for future assessment work (see **Table 9.5**).
	The EA notes that some of the proposed 400kV OHL around the North west of York site are close to a recent Natural Flood Management Scheme (Whitby Wood). The ES should describe any interaction between the Proposed Development and Whitby Wood.	Noted, flood defence schemes have been discussed as needed with the Environment Agency and the Whitby Wood scheme is considered to be a sufficient distance from the Project that it will not be impacted (see **Table 9.5**).

Consultee	Consideration	How addressed in this PEIR
	Reference is made to known existing flood defences within, and up- and down-stream of, the Scoping red line boundary; the ES should include a description of the flood defences within the baseline where these could be impacted by the Proposed Development.	Noted, these are described in **Section 9.5**.
	The ES should consider the loss of cable oil to ground and then to watercourse via groundwater.	Noted. Embedded measures have been included in the Project design to minimise the potential for harm to the water environment should this type of cabling be utilised as part of the Project (see **Section 9.6**).
	The Inspectorate notes that there may be a requirement for temporary bridges and/ or culverts during the construction period and that the EA expresses a presumption against culverts. The ES should include the location and description of any such temporary infrastructure and where significant effects are likely to occur, scope these matters into the EIA.	Noted. The ES will provide the location of culverts and temporary bridges. **Section 9.6** sets out the embedded measures which will minimize effects from culverts and temporary bridges and this chapter includes preliminary assessment of the potential effects from this infrastructure.
	The Inspectorate notes that the baseline conditions in the Scoping Report are presented by reference to a 500m buffer around the Scoping red line boundary, but there are various references within the text to simply the Scoping red line boundary. The ES should have a clearly defined study area, which includes the extent necessary to assess all receptors that have potential for likely significant effects in relation to hydrology as a result of the Proposed Development.	Noted, the study area is described in **Section 9.4** and indicated on **Figure 9.2.**
	It is not clear from the Scoping Report whether any underground cable will cross below or run close to a main river. This should be confirmed in the ES and, as relevant, the ES should include site- specific assessments for each location to inform cable crossing techniques where significant effects may occur (addressinq risks associated with break out of drilling fluids through the watercourse bed).	Noted. There are no proposed crossings of watercourses with underground cable as part of the Project.
	The Inspectorate notes that the project-wide assessment methodology is cross-referenced at paragraph 9.6.1, but it is indicated this will be modified for application to hydrology. Chapter 9	Details of the assessment methodology are provided in **Section 9.8**

Consultee	Consideration	How addressed in this PEIR
	does not provide alternative criteria, including for classifying sensitivity of receptors, magnitude of change or how significance of effect will be assessed. If a modified assessment methodology is to be applied for the is aspect, the ES should clearly explain what the assessment methodology is and how it is to be applied.	
	It is not clear where waterbodies intercept with the Proposed Development based on the figures provided in the Scoping Report. The ES text and figures should clearly demonstrate this.	Noted, please refer to **Figure 9.3** and **Section 9.5**.

9.3.3 The information provided in the PEIR is preliminary and not all of the Scoping Opinion comments have been addressed at this stage, however all comments will be addressed within the ES, where appropriate.

9.3.4 A key part of the Scoping Opinion, specified in paragraph 4.5.1, stated

> '*On the basis of the baseline data, the fact that all permanent infrastructure (except pylons, which would result in minimal water displacement relative to overall volumes) will be located in Flood Zone 1, and incorporation of the stated embedded environmental measures, the Inspectorate agrees that operational matters in respect of flood risk would not give rise to likely significant effects and can therefore be scoped out of the ES.*'

9.3.5 On this basis, flood risk effects during the operational phase of the Project from the majority of the Project elements are not considered further within this assessment.

Technical engagement

9.3.6 Technical engagement with consultees in relation to hydrology is ongoing. A summary of the technical engagement undertaken to date is outlined in **Table 9.5**.

Table 9.5 – Technical engagement on the environmental aspect assessment

Consultee	Consideration	How addressed in this PEIR
Environment Agency, North Yorkshire County Council (as an affected LLFA) and the York Consortium of IDBs**	A Pre-PEIR consultation was held regarding the approach to the assessment and FRA. A key consideration was the need for flood modelling for the proposed Overton Substation site.	Additional flood mitigation measures have been identified in this chapter that will be sized and located in a modelling study to be undertaken to accompany the Development Consent Order (DCO) submission.
Environment Agency	The flood modelling approach for the proposed Overton Substation, which included	The modelling approach, including the climate change uplifts, set out in the FRA is

Consultee	Consideration	How addressed in this PEIR
	discussion around the appropriate model, the climate change uplifts to be used.	based on the outcome and agreements reached.

**Leeds City Council, York City Council and the Shire Group of IDBs were invited as they are affected by the Project, but did not attend the meeting

9.4 Data gathering methodology

Study Area

9.4.1 The Hydrological Study Area (HSA) identifies the spatial extent for which baseline characterisation, identification of potential receptors and the assessment of water quality, resources, and flood risk effects will be carried out.

9.4.2 For this project the HSA has been defined to include all WFD waterbody catchments intersected by the draft Order Limits for the Project. The HSA is then extended to the boundary of any contiguous Water Framework Directive (WFD) river water bodies in recognition of the WFD being the most overarching applicable regulatory framework for these studies (management and monitoring of the hydrological environment is most commonly assessed at a waterbody scale). This approach also enables data gathering to be consistent with waterbody scale receptors and reporting to satisfy the requirements of the WFD. These WFD waterbodies are shown in **Figure 9.2**.

9.4.3 Within the HSA, a hydrological Zone of Influence (ZoI) is used to identify potential receptors for effects arising from the Project including watercourses, abstractions and discharges and water-dependent conservation sites. This ZoI extends 1.5km upstream and 2.5km downstream of the draft Order Limits. It is anticipated that any effects to receptors beyond these limits would be negligible (not significant) at such distances from the Project, due the inclusion of embedded mitigation and the dispersion and dilution effects of a relatively minor input to significantly larger waterbodies.

9.4.4 For the purposes of the EIA, the draft Order Limits have been divided into six Sections, designated as Sections A to F, which are defined in **Chapter 3: Description of the Project**. The description of the baseline conditions in **Section 9.5** includes specific detail/focus on Sections A to F (see **Figure 9.2**).

Desk study

9.4.5 A summary of the organisations that have supplied data to support this assessment, together with a description of the data provided, is outlined in **Table 9.5**.

Table 9.6 – Data sources used to inform the hydrology assessment

Organisation	Data Source	Data Provided
Met Office UK[60]	The Met Office website	Average climate figures for Linton on Ouse (1981-2010).

[60] Met Office (2021) *UK climate averages at Linton on Ouse.* Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcx57w9fb (Accessed: 04 February 2021).

Organisation	Data Source	Data Provided
Bing maps[61]	Ordnance Survey mapping	OS mapping with topographical contours at 1:50,000 and 1:25,000 scales.
British Geological Survey (BGS)	BGS map viewer[62]	Baseline information on bedrock, superficial and borehole geology data for the Study Area.
Multi-Agency Geographic Information for the Countryside (Magic)	MAGIC natural environment map viewer[63] National Soil Research Institute Soilscapes map viewer[64]	Map providing baseline information on soil and land use characteristics for the Project.
National River Flow Archive	National River Flow Archive[65] website	River flow data.
Environment Agency	The Environment Agnecy's Flood Map for Planning[66].	Map providing baseline information on the flood risk from rivers for the Project.
	The Environment Agency's Risk of Flooding from Surface Water (RoFSW)[67]	Map providing baseline information on the flood risk from surface water for the Project.
	The Environment Agency's Catchment Data Explorer (CDE)[68]	Baseline information on WFD classification of water bodies within HSA.
	Data request made to the Environment Agency for relevant Main river hydraulic modelling.	The York Detailed Model, the 'Cock Beck flood model and Ouse and Wharfe Washlands Optimisation Study Hydraulic Modelling results.
	Data request made to the Environment Agency for all licensed abstractions within 500m of the draft Order Limits	Baseline data of registered licensed abstractions

[61] Microsoft (2021) *Bing maps. Images courtesy of OS*. Available at: https://www.bing.com/maps (Accessed: 04 February 2021).
[62] British Geological Survey (2021) *Geology of Britain viewer (classic).* Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed: 04 February 2021).
[63] Natural England (2021) *MAGIC*. Available at: http://www.magic.gov.uk/MagicMap.aspx (Accessed: 04 February 2021).
[64] Cranfield Soil and AgriFood Institute (2021) *Soilscapes map.* Available at: http://www.landis.org.uk/soilscapes/ (Accessed: 04 February 2021).
[65] UK Centre for Ecology and Hydrology (2021) *National River Flow Archive*. Available at: http://www.ceh.ac.uk/data/nrfa/index.html (Accessed: 04 February 2021).
[66] Environment Agency (2021) *Flood map for planning.* Available at: https://flood-map-for-planning.service.gov.uk/ (Accessed: 04 February 2021).
[67] Environment Agency (2021) *Long term flood risk.* Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (Accessed: 04 February 2021).
[68] Environment Agency (2020) *Catchment Data Explorer*. Available at: https://environment.data.gov.uk/catchment-planning/ (Accessed: 04 February 2021).

Organisation	Data Source	Data Provided
	Data request made to the Environment Agency for all consented discharges within 500m of the draft Order Limits	Baseline data of registered licensed discharges, including location.
Leeds City Council	Private water supplies (PWS) information, including locations.	Leeds CC indicated that it does not hold any records regarding private water abstractions.
City of York Hambleton District Council. Harrogate Borough Council	PWS information, including locations.	No responses have been received as yet.

Survey work

9.4.6 A hydrology and flood risk walkover survey was undertaken by two consultants from Wood, over two days, on 24 and 25 June 2021. The objective of this walkover was to visit sites identified from preliminary desk-based review as having the potential to impact the surface water environment or be at risk of flooding due to the proximity of certain construction and operational activities to watercourses and flood zones. The locations visited during the site visit included:

- the existing Osbaldwick Substation (see **Figure 9.3a**) – visited to try and understand the flood risk at the site and what existing flood mitigation/resilience measures are in place;
- proposed temporary watercourse access track crossing, east of Shipton (see **Figure 9.3b**);
- proposed Overton Substation (see **Figure 9.3b**);
- proposed temporary watercourse access track crossing of Cock Beck, west of Saxton (see **Figure 9.3e**); and
- the proposed Monk Fryston Substation, adjacent to the existing substation (see **Figure 9.3f**).

9.5 Overall baseline

Current baseline

9.5.1 At this stage, the surface water quality, resources, and flood risk baseline has been developed on the basis of a desk-based assessment of existing data, as summarised in **Table 9.5**, supplemented by the walkover described above. The understanding obtained from the baseline data will be supplemented by subsequent consultation with relevant water and flood risk stakeholders. The baseline characterisation will be refined as data become available and the Project becomes more clearly defined.

9.5.2 The following sections provide a description of the baseline environment relevant to the Study Area. For the purposes of describing the Project in further detail, the Project has

been split into Sections A to F. These are described later in this section, with an overall description provided initially to describe the baseline conditions for the entire Project.

Topography

9.5.3 Ordnance Survey (OS) mapping indicates the topography of the area north-west of York is relatively flat varying between 15 and 20m Above Ordnance Datum (AOD), with elevation falling towards the banks of the River Ouse (around 10mAOD).

9.5.4 OS mapping indicates that the topography over the land within the draft Order Limits is relatively flat, with gentle changes in elevations varying between 10mAOD by the River Ouse crossing in the area north-west of York and approximately 60mAOD close to Hazelwood Castle, south-west of Tadcaster.

9.5.5 Further detail regarding the topography baseline is provided for Project Sections A-F in the relevant sub-sections below.

Hydrology

9.5.6 There are a number of larger, principal, watercourses that could be directly affected by the Project, in addition to a number of tributaries and drainage ditches which also interact with the Project (see **Figure 9.3**). The tributaries and drainage ditches largely fall within the wider WFD river catchments and are tributaries of the River Ouse.

9.5.7 Direct impacts to watercourses at the point at which they are intersected by Project infrastructure have the potential to indirectly impact hydrological receptors upstream and downstream of the Project. The hydrological ZoI is defined in **Section 9.4**.

9.5.8 The furthest upstream flow gauge on the River Ouse is located at Skelton (NGR SE568553), adjacent to Nether Poppleton. There are also gauges on the River Nidd, River Kyle and River Wharfe in proximity to the Project. Summary data from these flow gauges are presented in **Table 9.6**, which demonstrates that the River Ouse drains a substantial catchment upstream of York and the River Wharfe drains a substantial area upstream of Tadcaster.

Table 9.7 - Summary of river flows

Gauge Ref.	Gauge Name	Watercourse	NGR	Catchment Area (km^2)	Mean Flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of Record
27009	Ouse at Skelton	River Ouse	SE568553	3315	51.24	126.50	7.79	0.45	1969-2019
27062	Nidd at Skip Bridge	River Nidd	SE482560	516	8.49	19.56	1.64	0.49	1979-2019
27060	Kyle at Newton on Ouse	River Kyle	SE509602	168	12.46	44.20	0.13	0.11	1979-2019
27089	Wharfe at Tadcaster	River Wharfe	SE477441	818	17.32	41.30	2.79	0.41	1991-2019

*Source: National River Flow Archive
[1]Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.
[2]Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.
[3]BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff.

Conservation sites

9.5.9 The statutory and non-statutory nature conservation sites near the Project are described in detail in **Chapter 8: Biodiversity**. There are no statutory nature conservation sites which coincide with the draft Order Limits (see **Figure 9.5**). However, there are two non-statutory conservation sites which are intersected by the draft Order Limits. These are the Overton Borrow Pits, Site of Importance for Nature Conservation (SINC), and the River Ouse Local Wildlife Site (LWS; and candidate SINC).

9.5.10 There are 16 statutory and 17 non-statutory nature conservation sites identified within the HSA. A summary of these sites with a key water dependence and potential hydrological connectivity with the Project is presented in **Appendix 9A**. Details on the conservation sites are also provided in **Chapter 8: Biodiversity**.

9.5.11 Of the 16 statutory sites and 17 non-statutory nature conservation sites only two statutory and three non-statutory conservation sites have been scoped in for further assessment due to their location within the hydrological ZoI and hydrological connectivity to the Project. These are identified as:

- Clifton Ings and Rawcliffe Meadows Site of Scientific Interest (SSSI);
- Sherburn Willows SSSI and Yorkshire Wildlife Trust Site (YWT);
- Overton Borrow Pits SINC;
- Healaugh Marsh SINC; and
- River Ouse LWS and candidate SINC.

9.5.12 These conservation sites are summarised under the relevant Project Sections A-F baseline descriptions below.

9.5.13 The remaining conservation sites have been scoped out of the assessment, on the basis that they are beyond the ZoI and/or have no direct hydrological connection to the draft Order Limits.

Water resources, abstractions and discharges

9.5.14 A Drinking Water Protection Area (Surface Water) and a Drinking Water Safeguard Zone (Surface Water) are present to the north and west of York, intersecting the Project Order Limits. The water resources which are likely to interact with the Project are summarised in **Table 9.7**.

Table 9.8 - Water resources protection designations intersecting with the Project

Name	Reference Number	Designation Type
Ouse from River Nidd to Stillingfleet Beck	GB104027069593	Drinking Water Protected Area (SW).
Humber_SWSGZ6007_Acomb Landing and Moor Monkton	SWSGZ6007	Drinking Water Safeguard Zone (SW).

9.5.15 Within the proposed draft Order Limits, the Swale, Ure, Nidd and Upper Ouse Abstraction Licensing Strategy[69] shows the main channel of the River Ouse and tributaries, have water resource available at least 50% of the time. Wharfe and Lower Ouse Abstraction Licensing Strategy[70] shows the main channel of the River Wharfe and tributaries, have water resource available at least 95% of the time. The main channel of the Lower Ouse and tributaries have water resource available at least 50% of the time.

9.5.16 There are no licensed abstractions identified within the draft Order Limits. Data provided by the Environment Agency indicates that there are 27 licensed abstractions within 500m of the draft Order Limits (See **Figure 9.5**). Of these abstractions, 20 are from groundwater sources and seven are direct abstractions from surface water bodies. Licensed abstractions from watercourses identified from the data provided to date are listed below by Section of the Project (A-F). Further details of the groundwater abstractions are provided in **Chapter 10: Geology and Hydrogeology**.

Water quality and Water Framework Directive status

9.5.17 River Basin Management Plans (RBMPs) have been drawn up for the 11 river basin districts in England and Wales as a requirement of the WFD. The plans for England have been developed by the Environment Agency through consultations with organisations and individuals. The plans are designed to protect and improve the quality of the water environment, by providing information on what needs to be done to tackle water issues, i.e., measures to improve water quality in rivers, lakes, estuaries, coasts and in groundwater. The Study Area is covered by the River Basin Management Plan (RBMP) Environment Agency's Humber River Basin District[71].

9.5.18 The Humber RBMP[71] divides surface water catchments into discrete water bodies. A fundamental requirement of the WFD is to attain good ecological status (GES) within each defined waterbody and to ensure that deterioration in the status is prevented.

9.5.19 Where the physical characteristics of a waterbody have been substantially altered by human activity, the waterbody may be designated as a Heavily Modified Waterbody (HMWB). HMWBs are required to meet Good ecological 'potential' (GEP) rather than 'status'. The ecological potential of a waterbody represents the degree to which the quality of the waterbody's aquatic ecosystem approaches the maximum it could

[69] Environment Agency (2013) Swale, Ure, Nidd and Upper Ouse Abstraction Licensing Strategy, February 2013: A licensing strategy to manage water resources sustainably. Ref LIT 7868. Bristol: Environment Agency.
[70] Environment Agency (2013) Wharfe and Lower Ouse Abstraction Licensing Strategy, February 2013: A licensing strategy to manage water resources sustainably. Ref LIT 7869. Bristol: Environment Agency.
[71] Defra and Environment Agency (2015). Water for life and livelihoods part 1: Humber river basin district River Basin Management Plan (Online). Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RBD_Part_1_river_basin_management_plan.pdf (Accessed 1 October 2021).

achieve, given the heavily modified characteristics of the waterbody that are necessary for the use or for the protection of the wider environment.

9.5.20 Those WFD watercourses that may potentially be affected by the Project are described by Project Section (Section A-F) below and in further detail in **Appendix 9B**. These have been identified on the basis of their direct hydrological connectivity with the draft Order Limits, i.e., where any part of their catchment area coincides with the Project. It has been deemed that there is sufficient distance from the draft Order Limits to waterbodies downstream of those selected within the HSA (see **Figure 9.2**) that the potential for effects is negligible and therefore have not been scoped in.

9.5.21 No WFD standing waterbodies have been identified within the draft Order Limits. The Moor Monkton Reservoir is the only WFD standing waterbody within the HSA. The waterbody achieved an overall status of 'Moderate' in the 2019 WFD classification (Cycle 2). The Moor Monkton Reservoir is located approximately 1.9km upstream of the Project on the banks of the River Ouse. At such distances upstream from the Project any effects would be negligible (not significant) and therefore no effects are predicted. On this basis the Moor Monkton Reservoir is not considered further in this assessment.

Flood risk

Fluvial flood risk

9.5.22 The Environment Agency's Flood Map for Planning[66] provides an indication of the likelihood of flooding from fluvial and tidal sources, with Flood Zones 1 to 3 indicating a Low, Medium and High[72] likelihood of flooding respectively. Flood Zone extents are shown on **Figure 9.6**.

9.5.23 The approach to siting of CSECs and substations is compliant with Section 5.7 of the National Policy Statement for Energy (EN-1)[21] and the NPPF[23] (see **Table 9.2**), in that the sequential approach has been taken to identify potential locations for the new infrastructure, which are preferentially located within Flood Zone 1.

9.5.24 Much of the North West of York Area (**Figure 9.6**, Section B), particularly the northern part, is located within Flood Zone 1. The Tadcaster Area (**Figure 9.6**, Section D) is located entirely within Flood Zone 1.

9.5.25 Known flood defences associated with the River Ouse and River Wharfe are located within the draft Order Limits. In addition, flood defences associated with the River Ouse, River Nidd and River Wharfe are located upstream and downstream of the draft Order Limits. No further details regarding these flood defences are available at this stage but these have been requested from the Environment Agency and will be considered in the FRA.

9.5.26 Further detailed information on fluvial flood risk can be found in Project Sections A-F below.

Surface water flood risk

9.5.27 The Environment Agency's surface water flood risk mapping[67] indicate that the proposed draft Order Limits cross numerous areas classified as being at High, Medium,

[72] Flood Zone 1 (low probability) is defined as land having a less than 0.1% annual probability of river or sea flooding.
Flood Zone 2 (medium probability) is defined as land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Flood Zone 3 (high probability) is defined as land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea flooding.

Low and Very Low[73] likelihood of surface water flooding (see **Figure 9.7**). Generally, these are associated with low-lying areas, areas at risk of fluvial flooding or areas around minor watercourses.

9.5.28 Further detailed information on surface water flood risk can be found in Project Sections A-F below.

Groundwater flood risk

9.5.29 Information on flood risk from groundwater was sourced from a review of North Yorkshire County Council's (NYCC's) (Lead Local Flood Authority) Strategic Flood Risk Assessment (SFRA)[74]. The SFRA includes the Environment Agency's Areas Susceptible to Groundwater Flooding mapping (Map 1 of the SFRA), which presents the risk of groundwater flooding to the majority of North Yorkshire, including the HSA. The majority of the HSA has a low susceptibility (<25%) to groundwater flooding, with minor areas increasing in susceptibility (medium (25 – 50%), high (50-75%) and very high (>75%)). These areas of higher risk are generally low-lying and/or are associated with the Main rivers.

9.5.30 NYCC reported there is no substantial evidence of direct groundwater flooding in the majority of North Yorkshire[75]. However, they are aware of specific circumstances where groundwater emergence may exacerbate surface water flooding. For example, it is known to be a cause of flooding to a small number of properties in some areas as a result of natural springs in the hillside next to properties, and, that both groundwater and surface water flooding both pond in the same nearby low-lying areas. However, affected areas are outside the draft Order Limits.

9.5.31 In the Preliminary Flood Risk Assessment (PFRA)[76] , City of York Council concluded there was no significant risk of flooding from groundwater, at present or in the future, and has no record of areas where groundwater emergence is known to be a cause of flooding[77].

9.5.32 NYCC hold no local information providing evidence on future groundwater flood risk; however, they do note that should groundwater flooding occur it is likely to be in low points and depressions where surface water flooding occurs. Leeds City Council identified groundwater flooding within a localised area of North Leeds[78]. This location is outside the draft Order Limits and is therefore not considered further.

Sewer flood risk

9.5.33 Risk of flooding from sewers is not considered as a significant source of flooding due to the predominantly rural setting of the Project.

[73] High risk means that each year this area has an annual probability of surface water flooding of greater than 3.3%.
Medium risk means that each year this area has an annual probability of surface water flooding of between 1% and 3.3%.
Low risk means that each year this area has an annual probability of surface water flooding of between 0.1% and 1%.
Very low risk means that each year this area has an annual probability of surface water flooding of less than 0.1%.
[74] North Yorkshire County Council, City of York Council and the North York Moors National Park Authority (2016). Sustainability Appraisal Strategic Flood Risk Assessment (Online). Available from: https://www.northyorks.gov.uk/strategic-flood-risk-assessment (Accessed 1 October 2021).
[75] North Yorkshire County Council (2017) Preliminary Flood Risk Assessment (addendum)
[76] City of York Council (2011). Preliminary Flood Risk Assessment (Online). Available from: https://democracy.york.gov.uk/mgConvert2PDF.aspx?ID=50981 (Accessed 1 October 2021).
[77] City of York Council (2017) Preliminary Flood Risk Assessment (addendum)
[78] Leeds City Council (2017) Preliminary Flood Risk Assessment (addendum)

Tidal flood risk

9.5.34 Tidal flooding does not pose a risk to the Project due to the height of the land to which the Project relates (>10mAOD).

Artificial flood risk

9.5.35 The Environment Agency's on-line mapping[66] shows that the Main rivers could convey floodwater originating from the failure of upstream reservoirs. Generally, the risk of flooding from reservoir extents are smaller than the fluvial Flood Zones along the same river reaches and no risk of flooding from reservoir failure is identified within any of the proposed locations for the CSEC or substation siting areas.

Section A

9.5.36 Section A of the Project comprises the draft Order Limits around Osbaldwick Substation to the east of York.

Topography

9.5.37 OS mapping indicates that the topography within Section A of the draft Order Limits is relatively flat, particularly to the north of and including Osbaldswick substation, where the elevation is around 15mAOD. The topography rises to around 30mAOD to the southwest, towards Hull Road and Kimberlow Hill.

Hydrology

9.5.38 Section A is wholly located within the Tang Hall Beck/Old Foss Beck WFD catchment (GB104027063500), a tributary of the River Foss (see **Figure 9.2**).

9.5.39 Section A is partially situated within an area served by an extensive network of artificial drainage channels (ordinary watercourses) under the control and management of the Foss Internal Drainage Board (FIDB) (**Figure 9.1**). The IDB system provides a network of arterial watercourses that are used to manage water levels and reduce flood risk within its district.

9.5.40 The FIDB drains discharge into the Osbaldwick Beck approximately 1.4km downstream of the draft Order Limits.

9.5.41 An IDB adopted drain flows to the north of Osbaldwick substation (F90 – Murton Station Dyke). The IDB drain is crossed by Project infrastructure at two locations, one of which is an existing access road connecting to Murton Way and the other an existing section of the 400kV Norton to Osbaldwick (2TW/YR) overhead line.

9.5.42 There are no gauged watercourses within Section A.

Conservation sites

9.5.43 Following the screening assessment of conservation sites presented in **Appendix 9A**, only conservation sites within the ZoI are considered further within this assessment. There are no designated conservation sites within the ZoI of Section A of the Project.

Water quality and Water Framework Directive status

9.5.44 Summary details of the current status for the Tang Hall Beck/Old Foss Beck WFD waterbody are provided in **Table 9.8** with further detail regarding the reasons for not

achieving good status (RNAG) and WFD waterbody objectives provided in **Appendix 9B.**

Table 9.9 - WFD water bodies in direct connectivity with Section A

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody status (2019)[1]
Tang Hall Bk/Old Foss Bk catch, trib of River Foss (GB104027063500)	Heavily modified	Moderate

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.45 The existing Osbaldwick Substation is also located entirely within Flood Zone 1 (see **Figure 9.6**). The substation access road crosses into Flood Zone 2 and 3, associated with the Osbaldwick Beck and located approximately 0.1km north-west of the substation.

Surface water flood risk

9.5.46 The majority of Section A is at very low risk of surface water flooding (**Figure 9.7a**). However, the Environment Agency's surface water flood risk mapping[67] indicates that there is a small area of low risk surface water accumulation located within the Osbaldwick Substation boundary, to the north-west (see **Figure 9.6a**); in addition to areas of High to Low surface water flood risk in close proximity to and in some areas overlapping the draft Order Limits. These are associated with the low-lying areas to the north/north-west and the nearby small watercourses.

Water resources

9.5.47 Based on the available data within the 500m buffer of the draft Order Limits, there are no identified licensed surface water abstractions within or close to Section A of the Project.

Section B

9.5.48 The draft Order Limits for Section B of the Project are located to the north-west of York. Existing overhead lines falling within the draft Order Limits comprise the 400kV Norton to Osbaldwick (2TW/YR) overhead line which runs east-west to the north-east of Shipton by Beningborough and the 275kV Poppleton to Monk Fryston (XC/XCP) overhead line which runs broadly east-west in the south between Moor Monkton and Skelton. The draft Order Limits also include land between these two overhead lines where new infrastructure proposed as part of the Project (proposed Overton Substation, three new overhead lines and two CSECs) would be located in the area between. Further information on the Project description is provided in **Chapter 3: Description of the Project**.

Topography

9.5.49 The topography along both lengths of existing overhead line in this Section and the land in between is relatively flat and in keeping with the surrounding landscape to the north-west of York. According to OS mapping, elevations vary between 10mAOD and 17mAOD, with the lowest elevations being associated with the banks of the River Ouse (which bisects Section B) and the highest elevations located to the west at Overton Wood, near to Shipton.

Hydrology

9.5.50 Section B is located within the Ouse Upper Yorkshire, WFD Operational Catchment.

9.5.51 The existing 275kV Poppleton to Monk Fryston (XC/XCP) overhead line route crosses the River Ouse in two locations and the Foss further to the south-southwest. The River Ouse is a Main river, which flows from the north-west to the south-east, towards York. The Foss is an ordinary watercourse which bifurcates from the River Ouse, it flows to the south where it confluences with the River Wharfe. It should be noted that this Foss, to the north-west of York, is a completely separate watercourse to the River Foss mentioned in Section A, which flows from the north-east and joins with the River Ouse in York city centre.

9.5.52 The majority of Section B is located within the Kyle Upper Ouse IDB (KUOIDB) administrative boundary. The KUOIDB covers a substantial area to the north-west of York. The KUOIDB network discharges to the River Ouse at a number of locations along the rivers reach. However, Section B south of the River Ouse falls within the Ainsty IDB (AIDB) administrative boundary.

9.5.53 The draft Order Limits crosses 10 of the KUOIDB adopted watercourse (Drain IDs 32, 33, 34, 34A, 36, 37, 70, 75, 76 and 79). KUOIDB drain 70 is a tributary to the New Parks Beck, whilst KUOIDB drains 32, 33 and 34 are generally referred to as Hurns Gutter, both of which are WFD designated river water bodies.

9.5.54 The draft Order Limits cross five of the AIDB adopted watercourses (Drain IDs MM050, MM051, MM052, MM053 and MM054. AIDB drain 53 is known as the Foss, a designated WFD surface waterbody.

9.5.55 River flow statistics for the River Ouse and River Nidd are presented in **Table 9.6**.

Conservation sites

9.5.56 There is one statutory conservation site located within Section B of the Project, identified as the Clifton Ings and Rawcliffe Meadows SSSI (see **Figure 9.4**). It is located on the River Ouse which connects it to the Project. Details of the conservation site are provided in **Appendix 9A**; however, in summary, the Clifton Ings and Rawcliffe Meadows SSSI are designated alluvial flood meadows, supporting species rich communities. The site is connected by the River Ouse and is located approximately 2.5km downstream of the draft Order Limits.

9.5.57 The Overton Borrow Pits SINC and River Ouse LWS (and candidate SINC) are also located within the draft Order Limits associated with Section B of the Project. These non-statutory conservation sites are associated with the water dependent wildlife found within the sites. Further information on these designated sites is provided within **Appendix 9A**.

Water quality and Water Framework Directive status

9.5.58 The proposed Overton Substation is located entirely within the Hurns Gutter from Source to River Ouse WFD catchment. In addition to this, the rest of Section B intersects a further four river waterbody catchments, as summarised in **Table 9.9,** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 9B.**

Table 9.10 - WFD water bodies in direct connectivity with Section B

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
New Parks Beck from Source to Huby Burn (GB104027063830)	Not designated artificial or heavily modified	Poor
Hurns Gutter from Source to River Ouse (GB104027063780)	Heavily modified	Moderate
Ouse from River Nidd to Stillingfleet Beck (GB104027069593)	Heavily modified	Moderate
Nidd from Crimple Beck to River Ouse (GB104027068292)	Heavily modified	Moderate
The Foss (GB104027063730)	Not designated artificial or heavily modified	Bad

1 These are the 2019 statuses as obtained from the Catchment Data Explorer.

Flood risk

Fluvial flood risk

9.5.59 The majority of Section B is within Flood Zone 1 (see **Figure 9.6b**), however there is a significant area of Flood Zone 2 and 3, to the south-west, associated with the River Ouse, the Hurns Gutter and other minor watercourses.

9.5.60 The proposed Overton Substation is located entirely within Flood Zone 1 (see **Figure 9.6b**). The nearest areas of Flood Zones 2 and 3 are associated with the Hurns Gutter, which is situated 0.5km to the south-east boundary of the proposed Overton Substation. The Lower Ouse and Wharfe Washland flood model identifies the location of the proposed Overton Substation to be at risk of flooding, based on future climate change modelling for the 1% Annual Exceedance Probability (AEP) + 50% climate change (CC) event.

9.5.61 The Shipton North and South 400kV CSECs are located entirely within Flood Zone 1 (see **Figure 9.6b**). The nearest areas of Flood Zones 2 and 3 are located 0.6km to the south-east of the draft Order Limits and is associated with the Hurns Gutter.

Surface water flood risk

9.5.62 The majority of Section B is classified as being at Very Low risk of surface water flooding (**Figure 9.7b**), according to the Environment Agency's surface water flood risk mapping[67]. There are a number of areas classed as being at High to Low risk of surface water flooding within the draft Order Limits, these are generally associated with low-

lying areas or floodplains of the River Ouse, the Hurns Gutter and other minor watercourses.

9.5.63 Much of the proposed Overton Substation is at Very Low risk of surface water flooding. A surface water flow path associated with Hurns Gutter is located approximately 40m from the south-west boundary of the proposed Overton Substation, running parallel to the ECM railway line. North-west of the proposed Overton Substation where the construction compounds will be located, to the north of the Overton Road railway bridge, an area of surface water accumulation is present. This is classified as High, Medium and Low. Within the rest of the proposed Overton Substation, some isolated areas are classified as Low, Medium and High and are likely associated with localised topography (see **Figure 9.7b**).

9.5.64 There are no identified areas of surface water flood risk within the proposed Shipton North and South CSECs. However, there are several areas of High to Low surface water flood risk within close proximity to the compounds. These tend to be associated with areas of low-lying topography.

Water resources

9.5.65 Based on the available data within the 500m buffer of the draft Order Limits, there are no identified licensed surface water abstractions within or near Section B of the Project.

Section C

9.5.66 The draft Order Limits in Section C run north-south between Moor Monkton in the north and to the west of Tadcaster in the south. The elements of the Project falling within this section comprises a section of the existing 275kV Poppleton to Monk Fryston (XC/XCP).

Topography

9.5.67 The OS mapping indicates that the topography of Section C rises from north to south. To the north the topography is comparatively flat, with elevations ranging between 14mAOD and 15mAOD. Tracking the existing 275kV Poppleton to Monk Fryston (XC/XCP) overhead line route south to Marston Field (SE495516) the topography steepens considerably to between 19mAOD and 49mAOD.

9.5.68 Further south is a valley that encompasses the River Wharfe, which bisects Section C. The lowest elevation within the valley, and subsequently Section C, is 9mAOD which is associated with the banks of the River Wharfe. The highest elevation of 54mAOD is located on the catchment divide between the Wharfe and Cock Beck to the south, near to the Roman Road and Leeds Road intersection (SE464427).

Hydrology

9.5.69 Section C is located across the Ouse Upper Yorkshire and Wharfe Lower, WFD Operational Catchments.

9.5.70 The River Wharfe is crossed by the 275kV Poppleton to Monk Fryston (XC/XCP) overhead line to the north-west of Tadcaster. The watercourse is a statutory Main river that flows in a south-easterly direction to its confluence with the River Ouse, approximately 15km downstream.

9.5.71 Section C crosses the Ainsty IDB (AIDB), located to the west of York. The northern part of the IDB network discharges to the River Ouse at numerous locations, whilst the southern part of the IDB discharges to the River Wharfe.

9.5.72 The draft Order Limits cross six of the AIDB adopted drains, within the Study Area. Five of the crossed watercourses fall within the Marston Moor district of the AIDB network and are identified as MM025, MM038, MM056, MM059, and MM060. AIDB drain MM038 is also referred to as the Sike Beck, a WFD designated surface waterbody and tributary to the River Nidd. The other drain is located within North Wharfe district; identified as NW01 and also the main channel of the Foss, a WFD designated surface waterbody.

9.5.73 River flow statistics for the River Ouse and River Wharfe are presented in **Table 9.6**.

Conservation sites

9.5.74 There are no statutory designated conservation sites within the ZoI of Section C of the Project. However, there is one non-statutory conservation site, identified as Healaugh Meadows SINC.

Water quality and Water Framework Directive status

9.5.75 Section C crosses six WFD river catchments (see **Figure 9.2**), provided in **Table 9.10** with further detail regarding the Reasons for not achieving good status (RNAG) and WFD waterbody objectives provided in **Appendix 9B**.

Table 9.11 - WFD waterbodies in direct connectivity with Section C

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Hurns Gutter from Source to River Ouse (GB104027063780)	Heavily modified	Moderate
Nidd from Crimple Beck to River Ouse (GB104027068292)	Heavily modified	Moderate
The Foss (GB104027063730)	Not designated artificial or heavily modified	Bad
The Foss Catchment (trib of Wharfe) (GB104027063980)	Not designated artificial or heavily modified	Bad
Wharfe from Collingham Beck to Tadcaster Weir (GB104027064255)	Heavily modified	Moderate
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.76 Within Section C, the most significant areas of Flood Zones 2 and 3 are located adjacent to the Foss, the River Nidd and River Wharfe, indicating a Medium and High likelihood of fluvial flooding respectively. The existing 275kV Poppleton to Monk Fryston (XC/XCP) overhead line crosses over the Foss and River Wharfe with a number of the pylons in the immediate vicinity of these watercourses located within the respective Flood Zones 2 and 3 (see **Figure 9.6c**).

Surface water flood risk

9.5.77 The majority of Section C is classified as being at Very Low risk of surface water flooding (**Figure 9.7c**). There are a number of areas that are classed between High to Low risk of surface water flooding, these tend to be associated with watercourse floodplains or low-lying topography.

Water resources

9.5.78 There are five surface water abstractions, permitted under the same licence number, located within the HSA of Section C of the Project. The licensed abstractions are at least 3.4km upstream of the draft Order Limits and are located outside of the ZoI bounds. On this basis these licensed abstractions are scoped out of this assessment.

Section D

9.5.79 The draft Order Limits in Section D are located to the south-west of Tadcaster, south of Toulston Polo Ground and north-east of the A1(M)/A64 junction. The A64 and A659 run through the draft Order Limits and two existing overhead lines (the 275kV Tadcaster Tee to Knaresborough (XD/PHG) overhead line running east-west and 275kV Poppleton to Monk Fryston (XC) overhead line running north-south) fall within the draft Order Limits. The 275kV XC overhead line route continues southwards through Section D (between Section C to the north and Section E to the south), crossing the A64 and passing to the west of the village of Stutton. New infrastructure within this section comprises the Tadcaster Tee East and West 275kV CSECs and the replacement of a pylon (XD001).

Topography

9.5.80 Section D is located across an area of higher elevation, with gently undulating topography rising gradually to the south between 42mAOD and 59mAOD.

Hydrology

9.5.81 Section D is located across the Wharfe Lower, WFD Operational Catchment.

9.5.82 The 275kV XC/XD overhead line within Section D does not cross any statutory Main rivers or IDB adopted watercourses. The Cock Beck is the nearest watercourse, located approximately 1.6km to the east, which is an ordinary watercourse and tributary to the River Wharfe.

9.5.83 There are no gauged watercourses within Section D.

Conservation sites

9.5.84 Following the screening assessment of conservation sites presented in **Appendix 9A**, only conservation sites within the ZoI are considered further within this assessment. There are no designated conservation sites within the ZoI of Section D of the Project.

Water quality and Water Framework Directive status

9.5.85 Section D lies across two WFD river waterbody catchments as shown in **Figure 9.2** summarised in **Table 9.11** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 9B**.

Table 9.12 - WFD waterbodies in direct connectivity with Section D

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Wharfe from Collingham Beck to Tadcaster Weir (GB104027064255)	Heavily modified	Moderate
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.86 Section D (including the Tadcaster Tee East and West 275kV CSECs) falls entirely within Flood Zone 1 and as such is not at risk of fluvial flooding (see **Figure 9.6d**). The nearest areas of Flood Zones 2 and 3 lie 1.2km to the east and are associated with the Cock Beck.

Surface water flood risk

9.5.87 The majority of Section D is classed as being at Very Low risk of surface water flooding (see **Figure 9.7d**). There are small areas of surface water accumulation mainly associated with the A64 and low-lying topography.

9.5.88 The Tadcaster Tee East and West compounds are at Very Low surface water flood risk.

Water resources

9.5.89 Based on the available data within the 500m buffer of the draft Order Limits, there are no identified licensed surface water abstractions within or near Section D of the Project.

Section E

9.5.90 The draft Order Limits in Section E run north-south between the A64 in the north and the A1(M)/A63 junction (junction 42) in the south. The elements of the Project falling within this section comprises a section of the existing 275kV Poppleton to Monk Fryston (XC), with this overhead line running broadly parallel between the A1(M) to the west and A162 to the east.

Topography

9.5.91 The topography of Section E undulates along the existing 275kV Poppleton to Monk Fryston (XC) north to south overhead line route, comprising steeper slopes associated with the valleys of easterly flowing small watercourses between flatter hill tops. The elevations within Section E vary between 25mAOD and 60mAOD.

Hydrology

9.5.92 Section E is located across the Wharfe Lower, Ouse Lower Yorkshire and Aire Lower, WFD Operational Catchments.

9.5.93 Within Section E, the 275kV XC overhead line crosses three watercourses; Cock Beck, Bishop Dike and Mill Dike. The Cock Beck is a designated Main river, that flows in a north-easterly direction to its confluence with the River Wharfe, approximately 8km downstream of the draft Order Limits. The Bishop Dike and Mill Dike are ordinary watercourses and tributaries of the River Ouse, which they join approximately 14km downstream of the draft Order Limits.

9.5.94 There are no gauged watercourses within Section E.

Conservation sites

9.5.95 Following the screening assessment of conservation sites presented in **Appendix 9A**, only conservation sites within the ZoI are considered further within this assessment. There is one statutory designated conservation site within the ZoI of Section E (**Figure 9.4**). This conservation site is identified as Sherburn Willows SSSI (and YWT). Swamp and wetlands within the SSSI conservation site are supported by the Mill Dike and are therefore water dependent. There are no non-statutory conservation sites in Section E of the project.

Water quality and Water Framework Directive status

9.5.96 Section E crosses five WFD river waterbody catchments, as shown in **Figure 9.2** and summarised in **Table 9.12** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 9B**.

Table 9.13 - WFD waterbodies in direct connectivity with Section E

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad
Dorts Dike Catchment (trib of Wharfe) (GB104027063930)	Heavily modified	Moderate
Bishop Dike (Trib of Ouse) (GB104027063660)	Not designated artificial or heavily modified	Poor
Mill Dike from Source to Bishop Dike (GB104027063640)	Not designated artificial or heavily modified	Poor

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Selby Dam from Conf. Fox Dike and Carr Dike to Ouse (GB104027063620)	Heavily modified	Moderate

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.97 The majority of Section E is located within Flood Zone 1 and therefore has a low likelihood of fluvial flooding (**Figure 9.6e**). The most significant areas of Flood Zones 2 and 3 are located adjacent to the Bishops Dike, Mill Dike and Cock Beck. The EA flood map for planning indicates the Flood Zone 2 and 3 areas associated with these watercourses are contained within close proximity to the river channels, so the extent of fluvial flood risk is very limited within Section E.

Surface water flood risk

9.5.98 Most of Section E is at Very Low risk of surface water flooding (**Figure 9.7e**). There are few small areas of Medium to Low surface water flood risk, that are associated with watercourse and roads. The minor areas classed as being at High risk of surface water are also associated with roads.

Water resources

9.5.99 Two licensed abstractions fall within the ZoI associated with Section E of the Project; these are summarised in **Table 9.13** below. The licensed abstraction on the Cock Beck is located 1.5km downstream of the draft Order Limits, whilst the licensed abstraction on the Newthorpe Beck is located approximately 0.6km upstream of the draft Order Limits. The abstraction from the Newthorpe Beck is scoped out due to the distance upstream of the draft Order Limits and no direct pathway for effect

Table 9.14 - Summary of licensed abstractions within Section E

Licence Number	Abstraction Use	Watercourse	Maximum Daily Abstraction (m^3)
2/27/20/167	Agricultural – Direct spray Irrigation	COCK BECK - SAXTON	45.5
2/27/24/044	Agricultural – Direct spray Irrigation	NEWTHORPE BECK TO MILL DYKE	168

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Section F

9.5.100 The draft Order Limits in Section F are located east of the A1(M), south of the A63 and south-west of the village of Monk Fryston. Existing infrastructure within the draft Order Limits comprises the 275kV Poppleton to Monk Fryston (XC) overhead line, the 400kV

Monk Fryston to Eggborough (4YS) overhead line and the existing Monk Fryston Substation. The new infrastructure in Section F comprises a new substation adjacent to the existing substation at Monk Fryston and the realignment of the XC overhead line.

Topography

9.5.101 The topography of Section F falls from north-west to south-east. Initially the slope is gradual, but towards the railway line (east of Rawfield Lane) the slope increases considerably. The lowest elevation is 20mAOD, located to the south-east, whilst the highest elevation is 50mAOD to the north-west.

Hydrology

9.5.102 Section F is located across the Aire Lower WFD Operational Catchment.

9.5.103 Section F does not cross any main or minor rivers, or IDB adopted watercourses. The Fleet is the nearest watercourse to the draft Order Limits, approximately 1.6km to the south-east. The Fleet is an ordinary watercourse and tributary of the River Aire, with which it confluences 14km downstream from its source.

9.5.104 There are no gauged watercourses within Section F.

Conservation sites

9.5.105 Following the screening assessment of conservation sites presented in **Appendix 9A**, only conservation sites within the ZoI are considered further within this assessment. There are no designated conservation sites within the ZoI of Section F of the Project.

Water quality and Water Framework Directive status

9.5.106 Section F crosses two WFD river waterbody catchments, as shown in **Figure 9.2** summarised in **Table 9.14**, with further detail regarding the RNAG and WFD waterbody objectives provided in **Appendix 9B**.

Table 9.15 - WFD waterbodies in direct connectivity with Section F

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Selby Dam from Conf. Fox Dike and Carr Dike to Ouse (GB104027063620)	Heavily modified	Moderate
Aire from River Calder to River Ouse (GB104027062760)	Heavily modified	Moderate

1 These are the 2019 statuses as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.107 Section F and notably the existing Monk Fryston Substation are located entirely within Flood Zone 1, indicating a low likelihood of fluvial flooding (see **Figure 9.6f**). The nearest areas of Flood Zones 2 and 3 are located 1.6km to the south and are associated with ditches draining to the River Aire.

Surface water flood risk

9.5.108 The majority of Section F is at Very Low risk of surface water flooding. A small area of surface water accumulation/ponding is located within the existing Monk Fryston Substation area towards the south (see **Figure 9.6f**), classified as High, Medium, and Low risk of surface water flooding.

9.5.109 A linear surface water flow path (at Low risk of flooding) runs from west of Pollums House Farm to the north on Main Street (A63) and west of Butt's Lane between the proposed Monk Fryston Substation and overhead line compound.

Water resources

9.5.110 Based on the available data within the 500m buffer of the draft Order Limits, there are no identified licensed surface water abstractions within or near Section F of the Project.

Future baseline

9.5.111 Hydrological baseline conditions may change even if the Project does not proceed, for the following reasons:

- It is likely that climate change will result in increased rainfall seasonality, with generally wetter Winters and drier Summers, and that high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows) and increases in flood risk. Current Environment Agency recommendations for climate change factors to be applied to extreme rainfall and river flows for the Project area are summarised in **Table 9.15**.
- Land use change can affect the permeability of the ground, which can affect surface water run-off. Given that most of the Project area is productive agricultural land outside of established settlement boundaries, it is unlikely that the run-off regime will change significantly within and surrounding the draft Order Limits. The only exception to this could be Osbaldwick Substation in Section A, which is on the eastern edge of York, and where surrounding areas could be subject to further suburban development in the future. However, developers will be obliged by the requirements of the NPPF[23] to ensure that surface runoff is managed within developments so as not to increase flood risk to others.
- The location and rate of surface water abstractions in the area could vary over time and may result in changes to ALS water availability and WFD surface waterbody status.
- Given the current Ecological Status/Potential of all the WFD waterbodies within the draft Order Limits is Less Than Good, it is anticipated the future status will improve, ultimately to one of Good Status/Potential, as required by the WFD. Improvements to WFD waterbody status associated with improvements to individual quality elements (i.e., phosphate reduction) would result in higher-quality, potentially more sensitive aquatic environments in these waterbodies.

Table 9.16 - Climate change allowances for the affected management catchments (source: EA, 2021)

Allowance Category	Potential Change Anticipated for the 2020s	Potential Change Anticipated for the 2050s	Potential Change Anticipated for 2080s
Peak river flows - Swale, Ure, Nidd and Upper Ouse Management Catchment			
Upper end	25%	33%	53%
Higher central	15%	20%	34%
Central	11%	14%	25%
Peak river flows - Wharfe and Lower Ouse Management Catchment			
Upper end	22%	29%	48%
Higher central	14%	18%	31%
Central	11%	13%	23%
Peak river flows - Aire and Calder Management Catchment			
Upper end	24%	31%	51%
Higher central	15%	18%	31%
Central	11%	13%	23%
Extreme rainfall intensity*			
Upper end	10%	20%	40%
Central	5%	10%	20%

*Rainfall intensity values are for the whole of the UK

9.6 Embedded measures

9.6.1 A range of environmental measures have been embedded into the Project as outlined in **Chapter 3: Description of the Project**. **Table 9.16** outlines how these embedded measures will influence the hydrology assessment.

Table 9.17 – Summary of the embedded environmental measures

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Construction Phase (overhead lines and Substations)			
Aquatic environment receptors	Deterioration in the water quality of aquatic environment receptors via generation of	ID1 - Good working practices Good working practices, consistent with best practice guidance summarised in **Table 9.3**, will be implemented during	Outline CEMP

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
	sediment laden water as a result of construction activities, e.g., watercourse crossings and excavations.	construction, with adherence to the Outline CEMP, which will be secured through a DCO Requirement. A monitoring schedule will be implemented by the contractor to ensure that the measures taken to protect the surface water environment are effective. <u>ID2- Stand-off from watercourses</u> Where possible, a minimum stand-off distance from the banktop or landward toe of flood defence embankment of 9m will be provided for all main rivers and ordinary watercourses (both IBD and non-IDB adopted). The only exceptions to this will be watercourse crossings and existing access routes. Consents would be sought as necessary for any construction works within watercourses or within the relevant stand-off distances for main rivers and IDB-maintained ordinary watercourses (which are understood to be 8m and 9m respectively). <u>ID3- Drainage Management Plan</u> Appropriate control of runoff from working areas would be achieved through implementation of a Drainage Management Plan (DMP) for the construction phase. The DMP would use SuDS principles and specify appropriate treatment attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. The DMP would be developed by the	DCO requirement Outline CEMP

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		construction contractor post granting of the DCO and prior to commencement of works and would be secured through a DCO Requirement. For temporary construction land within the proposed construction working area, drainage measures would be phased to be completed before the commencement of earthwork operations, in a specific area, and would be retained until the drainage system of the completed Project is fully operational, or site restoration works are completed. <u>ID4- Water discharges off-site (construction phase)</u> No silty water would be discharged directly into any watercourse. Where practicable, groundwater dewatered from excavations (e.g. pylon foundation excavations) would be discharged to adjacent grassed/vegetated agricultural land, away from watercourses. Where there remains the potential for this silty water to runoff into nearby surface water features or agricultural land used for crops, additional control measures would be put in place, which may include surrounding the discharge area (grassed/vegetated agricultural land) with sediment fencing or passing the silt-laden water through a Siltbuster® or similar. Infiltration is the preferred option for any dewatering discharges. The discharge rate must match the rate of infiltration into the soil which will vary with the soil type, amount of vegetation cover and	Outline CEMP

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		the gradient. If infiltration is not possible, and discharge to a watercourse is required, this may be subject to a consent that would be proactively managed to meet any conditions. However, it is considered as it will be temporary discharge of rainwater or infiltrated groundwater which has collected in the bottom of temporary excavations, they would be exempt. In the unlikely scenario that in-river works are needed to construct a discharge outfall, a consent may be needed. Dewatering will cease if a Flood Alert or Flood Warning has been issued by the Environment Agency for an area downstream. The receipt of the Flood Alert/Warning and actions to be taken will be detailed in the Emergency Response Plan for Flood Events. If groundwater being pumped from excavations is suspected to be contaminated, appropriate measures would be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations[8] to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment. Runoff from access routes/haul road and working areas would be allowed to infiltrate wherever possible. <u>ID5 - Soil stockpiles</u> Areas of exposed ground and stockpiles would be minimised where reasonably practicable to reduce silty runoff. Geotextiles would be used as necessary to	

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		shield stockpiles, and soil stockpiles to be left for more than three months would be seeded[79].	
Aquatic environment receptors	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures ID1 (Good working practices), ID2 (Stand-off from watercourses), ID3 (DMP), ID4 (Water discharges off-site (construction phase)), ID5 (Soil stockpiles) listed above to limit sediment-laden water and ID10 – Surface water infiltration to reduce water balance impacts as a result of new impermeable surfaces. <u>ID6 – Watercourse crossing design</u> Where there is a requirement to install access crossings (assumed to be culverts for all ordinary watercourses) these will be kept to a minimum and ensure minimum change to existing morphology. Where culverts are required, these will either be arch culverts, leaving the natural bed alone, or they would be installed with the invert set below the natural bed level for a semi natural bed to establish within the culvert. The culverts would be removed, and all watercourses would be reinstated on completion of the works. Installation of culverts would be made in a dry channel (isolated from the channel flow) with over pumping of water made as necessary. Over pumping requirements would be minimal in many of the IDB controlled ditches, on account of a lack of significant flow. Given the isolation of construction	DCO requirement Outline CEMP

[79] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. London: DEFRA.

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		works, as far as reasonably practicable, from the wider watercourse, during installation of culverts, it is likely that any disturbance related suspended sediment concentrations would be within the normal range that would be expected within these lowland, agricultural ditches. All Environment Agnecy main rivers would be spanned by a bridge where needed, involving no in channel works.	
Aquatic environment receptors	Potential change to surface water quality affected by chemical leaching of concrete footings (subsurface corrosion of concrete), or concrete or fuel spillages.	See measures ID1 (Good working practices), ID2 (Stand-off from watercourses), ID3 (DMP), ID4 (Water discharges off-site (construction phase)) and ID5 (Soil stockpiles) listed above, and ID9 (Materials Management Plan) listed below, which will generally serve to minimise the risk of contaminated runoff reaching watercourses.	Outline CEMP
		<u>ID7 – Pylon footings</u> Corrosion and pH resistant concrete formulas would be utilised for pylon foundations to minimise the risk of leaching of harmful compounds into soil and groundwater.	Outline CEMP
		<u>ID8 – Fuel, oil, and chemicals storage</u> All fuels, chemicals and oils would be stored within bunded areas in accordance with good practice guidance such as Above Ground Oil Storage Tanks, GPP 2[51]; Use and Design of Oil Separators in Surface Water Drainage Systems, PPG 3[52]; and Safe Storage – Drums and	Outline CEMP

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		Intermediate Bulk Containers, GPP 26[59] . Fuel and chemical storage would be located in Flood Zone 1 and a minimum of 10m away from any watercourse. Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling would be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. Where large, stationary, construction related plant require refuelling in situ, outside of construction compounds, adequate appropriate mitigation will be put in place. This will likely include the use of “plant nappies” (impermeable sheets or absorbent pads) with spill kits available. All water runoff from designated refuelling areas would be channelled to an oil separator or an alternative treatment system prior to discharge. An effective accident response protocol would be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Mobile plant would be maintained in good working order. Larger items of plant such as excavators would undergo recorded inspections by a competent person (usually the operator) for any defects. Where defects are evident, the item or plant shall be removed from the land within the proposed construction working area	

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		immediately and serviced or replaced as soon as possible. Leaking or empty oil drums would be removed from land within the proposed construction working area immediately and disposed of via an appropriately licensed waste disposal contractor. Plant and machinery used during the construction and operation phases would be maintained to minimise the risks of oil leaks or similar. Where practicable all stationary plant used would be fitted with measures such as drip trays to retain any leakage of oil or fuel.	
Aquatic environment receptors	Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g. fuel or oil).	See measures ID1 (Good working practices), ID3 (DMP), ID4 (Water discharges off-site), and ID8 – Fuel, oil and chemicals storage above. ID9 - Materials Management Plan Excavated materials during construction works would be segregated and stored/re-used on-site in accordance with a Materials Management Plan (in compliance with the CL:AIRE Definition of Waste: Code of Practice[80]). Any temporary on-site storage of excavated materials suspected or confirmed to be contaminated would be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile. Materials would be segregated where possible to prevent cross-	Outline CEMP

[80] CL:AIRE (2011). The Definition of Waste: Development Industry Code of Practice Version 2 (Online). Available from: https://www.claire.co.uk/projects-and-initiatives/dow-cop/28-framework-and-guidance/111-dow-cop-main-document (Accessed 1 October 2021).

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		contamination occurring. Such materials would only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan.	
Water resources receptor	Potential change to water quality of a water supply resource which may affect the viability of a surface water abstraction.	See measures ID1 (Good working practices), ID2 (Stand-off from watercourses), ID3 (DMP), ID4 (Water discharges off-site), ID5 (Soil stockpiles), ID8 (Fuel/oil/chemicals storage) and ID9 (Materials Management Plan) listed above to limit sediment-laden water and accidental release of pollutants in the context of aquatic environment receptors.	
Aquatic environment/Water resources receptor	Potential adverse effect on surface runoff pathways through alteration of surface permeability via installation of access roads, construction compounds. Could affect water balance of small watercourses and yield of dependent surface water abstractions.	ID10 – Surface water infiltration All temporary hardstanding for construction (access tracks, crane pads, working areas, construction compounds) would be provided with appropriate drainage measures to promote the infiltration of runoff from these areas. These would be specified as part of the DMP (ID3). Where local infiltration is not possible, appropriate attenuation would be provided prior to ensure any discharge to watercourses occurs at greenfield rates. Appropriate rates would be agreed with the LLFA and IBDs and attenuation requirements set out in the DMP (ID3).	DMP (ID3)
Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground	See measures ID3 (DMP) and ID4 (Water discharges off-site (construction phase) and ID10 (Surface water infiltration) above.	

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
	disturbance and creation of impermeable surfaces.	ID11 - Reinstatement Once constructed, all temporary access route and temporary working area construction material would be removed and the ground reinstated to its pre-construction state (or similar), with the soil stockpile material used to backfill any excavations (to a level slightly above natural ground level to allow for settlement).	Outline CEMP
Flood risk receptors (third party receptors)	Changes to watercourse flow conveyance as a result of new or modified permanent watercourse crossings (e.g., culvert or bridge).	ID12 – Temporary (access) crossings Temporary watercourse crossings to enable access across watercourses would be appropriately sized to maintain existing flow conveyance. Where possible culverts would be installed which are equivalent or better than the existing culvert capacity. Where bridge crossings are required, the bridge would be clear span and not impact the channel capacity or flow conveyance.	Outline CEMP
Flood risk receptors (third party receptors)	Volumetric displacement of flood water associated with the construction of temporary spoil mounds and raised access tracks and hardstanding in floodplain areas	ID13 – Flood plain storage Access roads (and working areas) in the floodplain are to be as close to ground level as possible (a slight raised surface, relative to the adjacent land, is often required to allow for drainage). This is to minimise the loss of floodplain storage volumes associated with raised structures such as raised access roads, working areas and associated topsoil stockpiles (for example Trackway may be used). Cross drainage would be provided as necessary at topographic low points. Stockpiles would be located outside of the floodplain.	

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		Approaches to bridges and culverts in Flood Zones would minimise ramping up to the bridge deck so as not to impede flood flow conveyance.	
Overhead line Operational Phase			
Aquatic environment receptors **Water resources receptors**	Deterioration in the water quality of aquatic environment receptors and dependent surface water abstractions affected by accidental release of pollutants (e.g., oil), arising from periodic maintenance activities.	See measures ID1 (Good working practices), ID2 (Stand-off from watercourses), ID3 (DMP), ID4 (Water discharges off-site), ID5 (Soil stockpiles), ID8 (Fuel/oil/chemicals storage) and ID9 (Materials Management Plan) listed above to limit accidental release of pollutants to the water environment.	
Flood risk receptors (third party receptors)	Volumetric displacement of flood water associated with the permanent infrastructure.	ID14 – Micro siting of infrastructure A high-level optioneering study (the CPRS Study, Chapter 2) has been undertaken to identify the preferred siting of the proposed infrastructure to ensure that, amongst a number of other factors, none of the CSECs or substation siting areas are at risk of flooding from rivers. Surface water flood risk was not considered as part of the CPRS Study, however, the design has been refined to minimise the potential for displacement of flood water and flow paths.	DCO and Order Limits
Substation Operational Phase			
Aquatic environment receptors	Deterioration in the water quality of aquatic environment	ID15 – Drainage Strategy Detailed drainage design for the operational substations, utilising SuDS principles, including	DCO requirement

Receptor Type (as Defined in Table 9.17)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
	receptors by accidental spillage/release of pollutants.	attenuation storage where necessary. This would be secured through a DCO Requirement. The detailed design would be prepared in accordance with the Drainage Strategy for the operational substations, which will accompany the ES. <u>ID16 – Water discharges off-site (operation)</u> For permanent drainage schemes involving attenuation, the generic hydrological design measures will be based on the assumption that pond capacities will be designed to a 1% AEP standard with the upper end (40%) 2080s allowance for rainfall scenarios applied to drainage modelling input data. In designing the drainage scheme the principle of management of runoff by exceedance will be followed; this will ensure that the exceedance of the drainage system does not cause flooding of sensitive aspects of the infrastructure (e.g. a substation) or third party receptors, rather the overflow will be routed to grassed areas within the compound or adjacent agricultural land.	DCO requirement
Decommissioning Phase (overhead line and Substations)			
It is anticipated that similar environmental measures to those embedded into the project design for the construction phase would be implemented at the decommissioning phase.			

9.7 Scope of the assessment

9.7.1 The scope of the assessment is based on a review of baseline information and will be confirmed through review of additional data sources, site visit and further consultation with relevant stakeholders.

Spatial scope

9.7.2 The spatial scope of the hydrology assessment covers the area of the Project, together with the HSA defined in **Section 9.4** and is presented in **Figure 9.2**.

9.7.3 The spatial scope for flood risk receptors includes people, property, and infrastructure whose risk of flooding could be changed by the Project. It should be noted that only flood risk effects on third party receptors are reported in this chapter. Aspects of the development itself that are at risk of flooding are assessed in the FRA (see **Appendix 9D**).

Temporal scope

9.7.4 The temporal scope of the hydrology assessment is consistent with the period over which the Project will be carried out (details provided in **Chapter 3: Description of the Project**). This will be achieved by considering the National Policy Statement for Energy (EN-1)[21] climate change emission scenarios appropriate for the Project's lifetime. The assessment has taken into account potential impacts on current and future water quality and hydromorphology in a way which facilitates assessment of compliance with WFD objectives. The construction period extends over a 4-year period from 2024 to 2028, with some elements of the Project being operational from 2027.

9.7.5 The Project is expected to have a life span of more than 80 years. If decommissioning is required at this point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of one year. Therefore, the likely significance of effects relating to the construction phase assessment will be applicable to the decommissioning phase and decommissioning effects are not discussed further in this chapter.

9.7.6 As noted in paragraph 9.3.4, based on the Scoping Opinion, flood risk effects during the operational phase of the Project from the majority of the Project elements are not considered further within this assessment.

Potential receptors

9.7.7 The baseline characterisation identifies potential Hydrology and Flood Risk receptors within the following three broad receptor types:

- Aquatic environment receptors;
- Water resources receptors; and
- Flood risk receptors (People, property, and infrastructure at risk of flooding).

9.7.8 Each of these receptor types are discussed in this section.

Aquatic environment receptors

9.7.9 Aquatic environment receptors are defined within this assessment as either WFD surface water bodies or water-dependent designated nature conservation sites.

9.7.10 The basic unit for identification of aquatic environment receptors is WFD surface water bodies, as defined in the Environment Agency Cycle 2 RBMPs[81].

[81] Defra and Environment Agency (2021). River basin management plans: 2015 (Online) Available from: https://www.gov.uk/government/collections/river-basin-management-plans-2015 (Accessed 1 October 2021).

9.7.11 The assessment considers the potential effects on the water quality and hydromorphology supporting elements of WFD ecological status. The biological elements of ecological status for river water bodies (macroinvertebrates and fish) will not be assessed directly within the Hydrology and Flood Risk topic. However, the potential for indirect effects on biology elements which could occur as a direct result of changes to the water quality or the hydromorphology of a water feature will be identified within the Hydrology and Flood Risk topic and assessed in the biodiversity assessment if required. Direct effects on fish populations and other water dependent protected species (for example as a result of light, noise or vibration) will also be addressed within the Biodiversity Chapter.

9.7.12 WFD chemical status will also be considered as part of the Hydrology and Flood Risk topic. Whilst it is unlikely that the Project would result in new emissions of priority substances or priority hazardous substances into the environment, it is possible that construction works could lead to the disturbance of existing sources of pollution. If required, the potential effects from such impacts would be reported as appropriate in the **Chapter 11: Agriculture and Soils** and **Chapter 10: Geology and Hydrogeology**.

9.7.13 WFD monitoring and classification data are typically derived from the principal watercourses within the catchment. It should be noted however that within the assessment all watercourses within WFD catchments would be considered to ensure that any potential effects are captured and managed to an acceptable level for all catchment receptors.

9.7.14 The potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites would also be considered. This includes all sites that are internationally and nationally designated for nature conservation purposes (i.e. SAC, SPA, Ramsar Sites, SSSI and National Nature Reserves (NNR)); and local nature conservation designations (i.e. Local Nature Reserves (LNR) and County Wildlife Sites (CWS)). In this context, the potential surface water dependence, and consequent impacts on water quality and hydromorphology arising from the Project are considered in respect of the condition and conservation objectives of each designated site.

Water resources receptors

9.7.15 Water resources receptors are defined within this assessment as surface water abstractions including their associated upstream catchment. The potential for impacts on water quality and water balance/flow regime in the catchments upstream of abstraction locations will be assessed in order to determine potential effects on the abstractions themselves. The assessment of abstractions in the Hydrology and Flood Risk topic will be restricted to those from surface water sources. The potential for effects on groundwater abstractions will be considered in the Hydrogeology and Land Quality topic.

9.7.16 Discharges to surface water will also be considered although there is little scope for effects of the Project on discharges, apart from direct physical impingement, which will be avoided through imposition of suitable stand-off distances between working areas and discharge infrastructure.

Flood risk receptors

9.7.17 Flood risk receptors are defined within this assessment as property and infrastructure that could be at risk of flooding. Their sensitivity is defined in terms of the flood risk vulnerability classification set out in Table 2 of the Planning Practice Guidance (PPG)

on Flood Risk and Coastal Change[36] that supports the NPPF[23]. It is recognised that the primary purpose of the NPPF flood vulnerability classification is to guide flood risk assessment requirements for new development, but it is also considered to be a useful tool for assessing the relative sensitivity of external receptors for flood risk effects from new development. Further detail regarding the identification of flood risk receptors is set out in the FRA (see **Appendix 9D**).

Likely significant effects

9.7.18 The effects on hydrology receptors from the construction and operation of the Project which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 9.17**.

Table 9.18 – Hydrology receptors scoped in for further assessment

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
Construction Phase		
Aquatic environment receptors and water resource receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015[82]	• Deterioration in the water quality of aquatic environment receptors via generation of sediment laden run-off as a result of construction activities, e.g. watercourse crossings and excavations. • Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance (including from new watercourse crossings). • Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g. fuel or oil). • The potential effects noted above for surface water aquatic environment receptors could also have implications for surface water resource availability.

[82] UK Government. The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015. 2015. (Online) Available at: https://www.legislation.gov.uk/uksi/2015/1623/contents (Accessed 1 October 2021).

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
Flood risk receptors (third party receptors)	NPPF[23]	• Changes to fluvial flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. • Changes to fluvial flood risk associated with compartmentalisation of the floodplain. • Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings. This has the potential not only to affect the morphology of aquatic environment receptors, but to increase the risk of flooding to flood risk receptors. • Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.
Operational Phase		
Aquatic environment receptors and water resource receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015[82]	• Deterioration in the water quality of aquatic environment receptors due to a spill or leakage of fuels/chemicals during periodic maintenance and refurb activities. These activities are unlikely to require heavy plant, or excavations or the need to construct new temporary access roads. • The potential effects noted above for surface water aquatic environment receptors could also have implications for surface water resource availability.
Flood risk receptors (third party receptors)	NPPF[23]	• Changes to flood risk associated with loss of floodplain storage and/or

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
		change in floodplain flow conveyance. • Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.

9.7.19 The receptors/effects detailed in **Table 9.18** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 9.19 – Summary of effects scoped out of the hydrology assessment

Receptors	Potential Effects	Justification
Aquatic environment and water resource receptors	Potential effects on the water environment from steelwork delivery, pylon erection, construction, stringing and pulling operations and erection of lattice pylons following foundation installation during construction.	These specific activities would have no interaction with the water environment and are scoped out of further consideration.
Aquatic environment and water resource receptors	Potential effects on water quality receptors (aquatic ecosystem and water resources receptors) during the operational phase resulting from the presence of overhead line infrastructure.	There will be no potential for the water quality of surface water receptors to be affected by the operational phase of the Project. Suitable corrosion and pH resistant concrete formulas will be utilised for pylon footings and there will be no further ground disturbance during the operational phase. Standard procedures will be in place for the operational phase, including adherence to Environment Agency PPG notes[49] and best practice with regards any routine maintenance works required during the operational phase.
Aquatic environment and water resource receptors	Water quantity and hydromorphology effects arising from the presence of overhead line infrastructure, substations,	All new pylons will be located at least 9m from the watercourses where possible and agricultural underdrainage

Receptors	Potential Effects	Justification
	CSECs and short sections of underground cable.	networks will have been diverted around foundations for pylons and substations and the short sections of underground cable. The impact arising from the presence of these infrastructure on water flows and levels, and watercourse morphology is therefore scoped out.
Flood risk receptors (third party receptors)	Effects arising from the presence of overhead line infrastructure on flood risk receptors.	The only potential operational effect of the Project on flood risk would be via the displacement effect that positioning pylons in the floodplain might have on flood levels and extents. However, since the volume of water displaced by these structures would be minimal in comparison with overall flood volumes, the potential effect on flood risk receptors is scoped out.

9.8 Assessment methodology

9.8.1 This section presents the methodology that will be used to undertake the assessment of effects on Hydrology and Flood Risk receptors (as defined in **Section 9.7**). It presents the criteria used to delineate the sensitivity of these receptors and the magnitude of change that they may experience as a result of the Project. Collectively, these sensitivity and magnitude of change criteria provide for an assessment of the significance of effects on Hydrology and Flood risk receptors.

Assessment criteria

9.8.2 **Table 9.19** provides a summary of the methodology used to classify the sensitivity of water receptors that may be subject to potential effects.

Table 9.20 - Summary of value of water features

Sensitivity	Criteria	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution.	Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar sites), where the designation is based specifically on aquatic features.
	Water resources supporting human health and economic activity at a regional scale.	High status WFD water bodies (main 'blue line' watercourse and all smaller tributary watercourses not on 'blue line').
	Features with a very high vulnerability to flooding.	Regionally important public surface water supplies.
		Large-scale permitted discharges (e.g. city-scale waste water treatment works (WWTWs) treated effluent discharges).
		Infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF PPG[36] as 'Essential infrastructure' or the emergency service infrastructure categorised as 'Highly vulnerable'. This includes electricity generating power stations and grid and primary substations as well as essential transport infrastructure. Emergency service infrastructure includes police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
High	Feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution.	Conditions supporting sites with national conservation designations (e.g. SSSI, NNR) where the designation is based specifically on aquatic features.
	Water resources supporting human health and economic activity at a local scale.	Any designated WFD surface waterbody at less than High WFD

Sensitivity	Criteria	Examples
	Features with a high vulnerability to flooding.	Status (main 'blue line' feature within waterbody catchment).
		Local public surface water supplies. Licensed non-public surface water supply abstraction which are large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water.
		Medium-scale permitted discharges (e.g. town-scale WWTW treated effluent discharges).
		Property and infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF PPG[36] defined as 'Highly Vulnerable' and 'More Vulnerable'. Includes all residential premises (including hotels and caravan parks) public buildings (e.g. hospitals, schools, libraries, leisure centres), industrial premises (e.g. power stations, chemical plants, incinerators) and waste disposal sites requiring hazardous substances consent.
Medium	Feature with a medium yield and/or quality at a regional scale, or good quality at a local scale, with some potential for substitution.	Sites with local conservation designations (e.g. LNRs, CWS and SINC's) where the designation is based specifically on aquatic features.
	Water resources supporting human health and economic activity at household/individual business scale.	Smaller tributary watercourses within the WFD waterbody not on main 'blue line' (for water bodies at good status or below)
	Features with a moderate to low vulnerability to flooding.	
		Licensed non-public surface water supply abstractions which are small relative to available resource, or where raw water quality is not important, e.g., cooling water, spray irrigation. Unlicensed potable surface water abstractions, e.g., private domestic water supplies.

Sensitivity	Criteria	Examples
		Small-scale permitted discharges (e.g., village-scale WWTW discharges)
		Property and infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF PPG[36] as 'Less Vulnerable'. Includes general industrial, commercial, and retail premises, car parks, mineral extraction sites, and buildings used for forestry and agriculture.
Low	Feature with a low yield and/or quality at a local scale, with good potential for substitution.	Small, artificial, or heavily modified watercourses with low habitat potential. E.g., Agricultural, forestry or road-side drainage ditches.
	Water resources that do not support human health, and of only limited economic benefit.	
	Features that are resilient to flooding.	Unlicensed non-potable surface water abstractions, (e.g., livestock supplies). Small discharges exempt from permitting subject to adherence to general binding rules (e.g., package plants from small residential developments or commercial premises in rural areas).
		Infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF PPG[36] as 'Water Compatible'. This is infrastructure required in a fluvial, tidal, or coastal location and which is resilient to flooding (e.g., flood control infrastructure, water transmission infrastructure). Also, rural land such as forestry and agricultural land that does not contain any built development.

9.8.3 The magnitude of change acting on water environment receptors is independent of the value of the feature. This is a largely qualitative assessment, which relies on professional judgement, although it may be informed by quantitative information and

analysis where data are available and where appropriate. **Table 9.20** provides examples of how various magnitudes of change will be determined with respect to water features.

Table 9.21 - Examples of water environment magnitude of change

Magnitude	Criteria	Examples of Negative Change
High	Results in major change (scale or duration) to feature, of sufficient magnitude to affect its use/integrity.	Deterioration in river flow regime, morphology, or water quality, leading to sustained, permanent, or long-term breach of relevant conservation objectives (CO), long-term downgrading of WFD status (including downgrading of individual WFD elements), or resulting in the inability of the waterbody to attain Good status in line with the measures identified in the RBMP. Long-term, complete loss of resource or severely reduced resource availability to water users. Change in flood risk resulting in potential loss of life or major structural damage to property and infrastructure.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	Deterioration in river flow regime, morphology or water quality that may lead to periodic, short-term, and reversible breaches of relevant CO, or potential temporary downgrading of WFD status (including potential temporary downgrading of individual WFD elements) but would not affect the ability to achieve future WFD objectives). Moderate reduction in licensed water resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights on a temporary basis or for limited periods with no longer–term impact on the purpose for which

Magnitude	Criteria	Examples of Negative Change
		the water is used. Moderate reduction in non–licensed water resource availability and/or quality with no longer-term impact on associated users and no cessation of drinking water supply to associated users.
		Change in flood risk resulting in potential for moderate/internal damage to property and infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Measurable impact on river flow regime, morphology, or water quality, but remaining generally within CO, and with no change to WFD status (of overall status or element status).
		Minor reduction in resource availability and/or quality, but unlikely to affect the ability of water users to exercise licensed rights.
		Change in flood risk resulting in potential for minor/external damage to property and infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity.	No measurable impact on river flow regime, morphology or water quality and no consequences in terms of CO or WFD designations.
		No measurable change in licensed water resource availability or quality and no change in ability of water users to exercise licensed rights. No measurable change in licensed water resource availability or quality.
		Increased frequency of flood flows, but which does not pose an increased risk to people, property, and infrastructure.

9.8.4 The EIA Regulations require that a final judgement is made about whether or not each effect is likely to be significant. The significance of potential and residual effects is derived by considering both the value of the feature and the magnitude of change. In this assessment, effects are considered to be Significant or Not Significant according to the matrix in **Table 9.21**. with 'Major' and 'Moderate' effects taken to be 'Significant' and 'Minor' and 'Negligible' taken to be 'Not Significant'.

Table 9.22 - Derivation of significance of potential effects

Magnitude of Change	Value of Receptor			
	Very High	**High**	**Medium**	**Low**
High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not Significant)
Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not Significant)	Minor (Not Significant)
Low	Moderate (Potentially significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)
Very Low	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

Approach to assessment of WFD compliance

9.8.5 At this stage a standalone WFD assessment has not been undertaken. Rather, an integrated WFD assessment will be completed within the following hydrological impact assessment. Within the following assessment the advice and guidance provided with the Environment Agency's 'Clearing the Waters for All[83]' and the Planning Inspectorate 'Advice Note 18[38]' are incorporated. In both guidance notes, the following three stage approach is recommended:

- Stage 1 – WFD screening – to determine if there are any activities associated with the Project that do not require further consideration, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.
- Stage 2 – WFD scoping – to identify risks of the Project's activities to receptors based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each waterbody).
- Stage 3 – WFD impact assessment – a detailed assessment of water bodies and their quality elements that are considered likely to be affected by the Project, identification of any areas of non-compliance; consideration of mitigation measures, enhancements, and contributions to the RBMP objectives.

[83] Environment Agency (2017). Water Framework Directive assessment: estuarine and coastal waters (Online). Available from: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

9.8.6 This approach aligns with the assessment undertaken within this Chapter, to assess the impacts to hydrology as a result of the Project. As a result, Stages 1 and 2 of the WFD assessment approach have been undertaken and are reported within this Chapter.

9.8.7 The hydrology baseline identifies the WFD waterbody catchments and associated WFD designated water bodies that are potentially affected by the Project, these are screened through the use of the ZoI, defined in **Section 9.5**. Any WFD waterbody outside of the bounds of the ZoI is considered to have no or negligible potential effects and is therefore screened out of this assessment.

9.8.8 Stage 2 considers the Project activities that pose a potential risk to the WFD water bodies. The assessment will consider the role of embedded measures in mitigating the potential risks from Project activities to the WFD waterbody receptors. Where the potential effects are not suitably mitigated and a significant residual risk remains to any of the WFD water bodies, a standalone WFD assessment will be produced to support the ES. However, if the integrated assessment concludes there are no significant risks to the WFD water bodies, following effective mitigation, then the WFD assessment will continue to be integrated for the ES.

9.9 Preliminary assessment of effects: aquatic environment receptors

9.9.1 This section provides a preliminary assessment of effects to aquatic environment receptors and will be reviewed in light of statutory consultation feedback, further stakeholder engagement and evolution of the detailed design of the Project.

9.9.2 The overhead lines are located across 13 WFD waterbody catchments. Overhead line construction and upgrading works would require approximately 20 watercourse crossings that fall within these wider WFD waterbody catchment boundaries. At this stage of the design and for this assessment , 13 will likely use existing crossings and, as a result, will not require changes to the watercourse channels. This will be kept under review as more information regarding the existing watercourse crossings becomes available. However, seven of these are assumed to require new crossing construction. The majority of the new access crossings will require the installation of culverts, however, to ensure compliance with the WFD regulations and objectives the crossing of the Cock Beck will involve the construction of a clear span bridge, with no need for in channel works (ID 6). The remaining crossings are associated with IDB adopted watercourses, or other small non-IDB watercourses or ditches that fall within the wider WFD waterbody catchments.

9.9.3 The proposed Overton Substation is located within the Hurns Gutter (Source to River Ouse) WFD waterbody catchment and at minimum is 0.2km from the Hurns Gutter, which joins the River Ouse approximately 2.5km downstream of the substation.

9.9.4 The proposed Monk Fryston Substation will fall across two WFD waterbody catchments; the Selby Dam (from confluence with Fox Dike and Carr Dike to Ouse) and the Aire (from River Calder to River Ouse). The substation is located 2.1km west of the Fleet watercourse and 2.1km east of a tributary to the River Aire. Neither of these watercourses are WFD blue line watercourses and with the combined effect of distance to the proposed Monk Fryston Substation and the incorporation of the embedded environmental measures the potential for effect on aquatic environment receptors is negligible so not considered further.

9.9.5 **Table 9.22** summarises the aquatic environment receptors taken forward in this assessment. The sensitivity of each receptor has been determined in accordance with **Table 9.19**.

Table 9.23 - Identified potential receptors and associated value/sensitivity – aquatic environment receptors

Receptor ID	Receptor	Value	Rationale
WC1	River Ouse	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Project at three instances, near to Overton. Large Main River. Supports numerous nationally designated sites, the nearest (Clifton Ings and Rawcliffe Meadows SSSI) is located 2.1km downstream from the Project.
WC2	River Wharfe	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Project, near to Tadcaster. Large Main River. Supports numerous nationally designated sites, the nearest (Bolton Percy Ings SSSI) is located 8.2km downstream from the Project. Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC3	River Nidd	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. 0.08km north of the draft Order Limits, near Moor Monkton. Large Main River. Supports a nationally designated site (Aubert Ings SSSI), located approximately

Receptor ID	Receptor	Value	Rationale
			15km upstream from the Project.
WC4	Cock Beck	High	A WFD designated surface waterbody, supporting Bad status in the Cycle 2 classifications. Intersected by the Project, near to Saxton. Main River. Supports a nationally designated site (Sutton Ings SSSI) and a local nature conservation site (Aberford Osiers LWS). Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC5	Foss Drainage Channel	High	A WFD designated surface waterbody, supporting Bad status in the Cycle 2 classifications. Intersected by the Project, near to Wighill. Ordinary watercourses. Is not shown to support any nature conservation sites.
WC6	Bishop Dike	High	A WFD designated surface waterbody, supporting Poor status in the Cycle 2 classifications. Intersected by the Project, near to Sherburn in Elmet. Ordinary watercourses. Is not shown to support any nature conservation sites.
WC7	Mill Dike	High	A WFD designated surface waterbody, supporting Poor status in the Cycle 2 classifications. Intersected by the Project, near to Newthorpe. Ordinary watercourses. Supports a nationally designated site (Sherburn Willows SSSI), located 1.6km downstream; and a local nature conservation site

Receptor ID	Receptor	Value	Rationale
			(Hartley Wood and Castle Hill LWS), located 2km upstream. Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC8	Osbaldwick Beck	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Project, near Osbaldwick. Comprises a network of ordinary watercourses. Supports a local nature conservation site (St Nicholas Fields LNR), located 2.3km upstream.
WC9	AIDB adopted drains; MM025, MM038, MM050, MM051, MM052, MM053 (The Foss), MM054, MM56, and NW01 (The Foss).	High Medium	Extensive network of heavily modified or artificial drainage channels (ordinary watercourses) which discharge into the River Ouse and the River Wharfe. Includes WFD designated waterbody, the Foss, which supports Bad status under the Cycle 2 classifications. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the AIDB. The Moor Monkton network drains discharge into the River Ouse about 0.2km downstream of the Project. Whilst the North Wharfe network drains the River Wharfe 10.5km downstream from the Project.
WC10	KUOIDB adopted drains; 32, 33, and 34 (Hurns Gutter).	High	Includes WFD designated waterbody, the New Parks Beck and Hurns Gutter, which support Poor and Moderate

Receptor ID	Receptor	Value	Rationale
	34A, 36, 37, 70 (New Parks Beck), 75, 76 and 79.	Medium	status (respectively) under the Cycle 2 classifications. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the KUOIDB. The New Parks Beck network drains discharge into the River Ouse about 10.8km downstream of the Project. Whilst the Hurns Gutter discharges to the River Ouse approximately 0.1km downstream of the Project.
WC11	FIDB adopted drain; 90 (Murton Station Dyke).	Medium Medium	Not designated as WFD surface waterbody. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the FIDB. The drains discharge into the River Ouse about 1.6km downstream of the Project.
CS1	Clifton Ings and Rawcliffe Meadows SSSI	High	Site with a national nature conservation designation (SSSI), where the designation is based specifically on aquatic features.
CS2	Sherburn Willows SSSI	High	Site with a national nature conservation designation (SSSI), where the designation is based specifically on aquatic features. The draft Order Limits cross a watercourse (Mill Dyke) that flows through a swamp area of the site. There are no watercourse crossings on this channel.
CS3	Overton Borrow Pits SINC	Medium	A pylon is to be dismantled within this SINC which comprises two linear borrow

Receptor ID	Receptor	Value	Rationale
			pits with a small area of fen-meadow.
CS4	Healaugh Marsh SINC	Medium	This site is downstream of the draft Order Limits and there is a hydrological connection between the Foss and the site. There are no new watercourse crossings of the Foss.
CS5	River Ouse LWS and candidate SINC	Medium	The draft Order Limits cross the River Ouse itself. Though there are no new access track watercourse crossings over the Ouse there will be one new watercourse crossing of a small ditch which is linked to an upstream tributary via the Hurns Gutter.

Construction Phase

Deterioration in water quality of aquatic environment receptors via generation of sediment laden run-off.

9.9.6 During the construction phase of the overhead line and substations there is potential to generate sediment laden run-off which could, in the absence of appropriate embedded measures, adversely affect the aquatic environment receptors (or water resources receptors). Activities that could potentially produce sediment-laden runoff include:

- construction and removal of access routes (including topsoil stripping) and other working areas;
- runoff from installed access routes, temporary construction compounds and working areas;
- foundation excavation for overhead line pylons and in the unlikely event required, dewatering activities;
- Excavation works associated with substation foundations and subsequent dewatering activities. Across the substation sites, where the water table is shallow, there is likely to be some degree of excavation required below the water table. Therefore, it is anticipated that short-term excavation dewatering will be required. This water could contain elevated concentrations of suspended sediment;
- underground cabling between CSECs installed by direct burial/trenching;
- direct sediment disturbance by in-channel works for the construction of access crossings; and
- the use and management of soil stockpiles.

9.9.7 The assignment of significance to suspended sediment-related effects is considered precautionary, given that the watercourses across the Study Area are likely to experience baseline variation in suspended sediment due to agricultural practice in the area.

9.9.8 The proposed embedded measures to limit sediment-laden runoff are set out in **Table 9.16.** These include implementation of good working practices with adherence to the Outline CEMP (**ID1**), maintaining minimum stand-off distance between the works and the edge of Main Rivers, Ordinary Watercourses and IDB adopted drains (**ID2**), development and implementation of the DMP (**ID3**) for the construction phase, design and construction of temporary watercourse (access) crossings, and management of soil stockpiles (**ID5**).

9.9.9 Taking account of the proposed embedded measures, the magnitude of change from the potential effects of sediment-laden runoff on aquatic environment receptors is **Very Low** for the River Ouse, River Wharfe, River Nidd, Clifton Ings and nature conservation sites, and **Low** for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and Foss Catchment. The magnitude of change is higher for the IDB adopted drains and smaller watercourses because of the limited dilution available and proximity of the overhead lines (and associated access), compared to the Main Rivers, which have a large dilution capacity.

9.9.10 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this preliminary assessment, at most Minor and therefore **Not Significant**.

Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance during the installation of culverted crossings

9.9.11 Any potential increases in sediment-laden runoff could also result in increased silt deposition within the watercourse network affecting the hydromorphology of the watercourses, however, those measures described above limit the supply of sediment-laden runoff preventing deposition (**ID1, 2, 3 and 5**).

9.9.12 All works in and around the watercourses, where there is a requirement to install access crossings (assumed to be culverts for all watercourses), will be kept to a minimum and ensure minimum change to existing morphology and flow conveyance by adhering to embedded environmental measures (**ID6**). Any disturbance related suspended sediment concentrations will likely be within the normal range that would be expected within these agricultural ditches. The effect would also be local to the crossing and be negligible in scale when compared to the overall WFD waterbody scale. Taking account of the proposed embedded measures the changes to watercourse hydromorphology would be such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is **Very Low** for the River Ouse, River Wharfe, and River Nidd and, for the reasons mentioned above, **Low** for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and Foss Catchment.

9.9.13 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this preliminary assessment, at most Minor and therefore **Not Significant**.

Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil or accidental spillage of pollutants

9.9.14 The construction works have the potential to further affect water quality conditions and therefore aquatic environment receptors (and water resources receptors) within associated water features via:

- accidental spillage of fuel, oil or other chemicals used during construction;
- mobilisation/leaching of contaminants from historical soil contamination during excavation works; and
- contaminated water pumped from excavations.

9.9.15 The proposed embedded measures to prevent surface water pollution are set out in **Table 9.16** and include implementation of good working practices with adherence to the Outline CEMP (**ID1**), development and implementation of the DMP (**ID3**) for the construction phase, fuel and oil storage design (**ID8**) including an accident response protocol and development and implementation of a Materials Management Plan (**ID9**) to manage potentially contaminated excavated material.

9.9.16 The magnitude of change from all identified potential effects of accidental spillage of pollutants on aquatic environment receptors, taking account of embedded measures, is **Very Low** for the River Ouse, River Wharfe, River Nidd, Clifton Ings and nature conservation sites and ponds, and, as reasoned above, low for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and Foss Catchment.

9.9.17 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this preliminary assessment, Minor and therefore **Not Significant**.

9.9.18 The issue of contaminated land and associated mobilisation of contaminants in groundwater and subsequently surface water is addressed in detail in **Chapter 10: Geology and hydrogeology**. In summary, the Chapter finds that given the specifics of the construction activities together with the nature of the previous land use, the risk of the Project causing significant contamination of groundwater and thereby surface water (e.g. by mobilising old contamination due to ground disturbance) is at most **Minor** and can be managed to Negligible through embedded measures. Therefore, in this preliminary assessment, the risk of mobilisation of ground contaminants is **Not Significant**.

Operational phase

Deterioration in the water quality by accidental spillage/release of pollutants.

9.9.19 The operation of the substations has the potential to affect water quality conditions and therefore aquatic environment receptors within associated water features via the introduction of contaminants.

9.9.20 The proposed embedded measures to prevent surface water pollution are set out in **Table 9.16** and include the development and implementation of a Drainage Strategy for the operational substations (**ID15**).

9.9.21 Given the anticipated effectiveness of the embedded environmental measures, the magnitude of effect on the aquatic environment receptors with respect to release of contaminants is **Very Low** for the River Ouse and Clifton Ings and Rawcliffe Meadows SSSI and **Low** for the KUOIDB adopted drains including the Hurns Gutter. The magnitude of change is higher for the KUOIDB drains because of the limited dilution

available and proximity to the proposed Overton Substation compared to the River Ouse which has a large dilution capacity and is located 2.5km downstream of the substation. Consideration of the sensitivity of the aquatic environment receptors (**High** to **Medium**) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment receptors is, in this preliminary assessment, Minor and therefore **Not Significant**.

9.10 Preliminary assessment of effects: water resource receptors

9.10.1 The draft Order Limits, which includes the proposed Overton Substation, north of Bilton in Ainsty, falls within a regionally important Drinking Water Safeguard Zone (Humber_ SWSGZ6007_ Acomb Landing and Moor Monkton) and intersects the Ouse from the River Nidd to Stillingfleet Beck WFD waterbody catchment, which is a regionally important Drinking Water Protection Area. The draft Order Limits are also within proximity of a downstream licensed surface water abstraction from the Cock Beck (1.5km downstream).

9.10.2 A further data request has been made to confirm any further surface water abstractions, which will be confirmed within the ES. An assessment of any groundwater abstractions is provided in **Chapter 10: Geology and Hydrogeology**.

9.10.3 **Table 9.23** summarises the water resource receptors taken forward in this assessment. The sensitivity of each receptor has been determined in accordance with **Table 9.19**.

Table 9.24 - Identified potential receptors and associated value/sensitivity – water resource receptors

Receptor ID	Receptor	Sensitivity	Rationale
WR1	Ouse from River Nidd to Stillingfleet Beck	Very High	Regionally important designated surface water Drinking Water Protection Area.
WR2	Humber_SWSGZ6007_ Acomb Landing and Moor Monkton	Very High	Regionally important designated surface water Drinking Water Safeguard Zone.
WR3	Licensed abstractions from the Cock Beck	Medium	Local licensed abstraction, downstream of the draft Order Limits, which is minor compared to available water resources.

Construction phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

9.10.4 Those activities with the potential to affect the water resources receptors via potential changes to the water quality of watercourses (potential for increases in sediment laden runoff for example), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above. The potential for soil and groundwater contamination to affect surface water quality is also presented in the aquatic environment receptors section above. Suitable materials will be used during pylon construction (such as corrosion resistant concrete formulas for pylon foundations to ensure no water quality changes to receiving watercourses (**ID7**)). Groundwater dewatered from excavations (e.g. pylon foundation excavations) would be discharged to adjacent grassed/vegetated agricultural land, away from watercourses as far as possible.

9.10.5 All works in and around the watercourses, where there is a requirement to install access crossings (assumed to be culverts for all watercourses, except the Cock Beck Main river, which will be a clear span bridge), will be kept to a minimum and ensure minimum change to existing morphology and flow conveyance by adhering to embedded environmental measures (**ID6**). The magnitude of change for these effects would be **Very Low**, on account that there would be no flow pathway between the watercourse crossings and the water resources receptors. The magnitude of change relating to other effects for water resources is also considered to be **Very Low**.

9.10.6 Consideration of the sensitivity of all water resource receptors (**High** to **Medium**) in combination with the potential magnitude of change acting upon them (**Very Low**), derives that the significance of effects on water resource receptors is, in this preliminary assessment, at most Minor and therefore **Not Significant**.

Operational phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

9.10.7 Those activities with the potential to affect the water resources receptor via potential changes to the water quality of watercourses upstream of the receptor (potential for change in water quality via accidental spillage/release of pollutants), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above.

9.10.8 The magnitude of change from all identified potential effects on the water resource receptor, taking account of embedded measures is **Very Low**. Consideration of the sensitivity of the water resource receptor (**High**) in combination with the potential magnitude of change acting upon it, concludes that the significance of effects on the water resource receptor from the operational phase of the substations, in this preliminary assessment, is Minor and therefore, **Not Significant**.

9.11 Preliminary assessment of effects: flood risk receptors

Assessment of effects on flood risk receptors

9.11.1 As already noted, this assessment concentrates only on the impacts of the Project on flood risk to external (third party) receptors. The risk of flooding to the Project itself is assessed in the FRA (see **Appendix 9D**). The sensitivity of these receptors has been identified in accordance with the criteria outlined in **Table 9.20** and range from High to Medium as listed below:

- **High** - Identified as 'Essential Infrastructure' with a higher vulnerability to flooding.
- **Medium** - Infrastructure designated as 'Less Vulnerable'.

Construction phase

9.11.2 There are 17 new overhead line pylons located within Flood Zones 2 and 3, in addition to their associated construction compounds, scaffolding areas, temporary access routes and seven new temporary watercourse crossings. The overhead line also coincides with a number of minor areas of surface water accumulation and areas of high groundwater susceptibility.

9.11.3 The potential mechanisms which may have an effect on third party receptors that are at risk of fluvial flooding are discussed below:

- loss of floodplain storage and/or change in floodplain flow conveyance;
- compartmentalisation of the floodplain; and
- change in watercourse flow conveyance.

9.11.4 It was concluded within the FRA (see **Appendix 9D**) that the loss of floodplain storage as a result of the overhead line construction would be minimal, as the volumes of flood storage displaced, would be insignificant. Thus, any flooding which occurred would be minor and localised to the Project.

9.11.5 The construction of access routes, stockpiles, watercourse crossings and working areas has the potential to compartmentalise the floodplain by obstructing water flow. It was noted in the FRA (see **Appendix 9D**) that this would likely result from similar activities to those impacting flood storage displacement. It is restated that any resultant flood displacement from these activities would be localised and temporary, in the first instance, whilst construction activities take place. If left unmitigated then flooding has the potential to impact third party receptors.

9.11.6 Furthermore, the construction of watercourse crossings has the potential to impact fluvial flow conveyance. There are seven new temporary watercourse crossings proposed within the draft Order Limits, which have the potential to impact river flows. If not mitigated for, crossings could impact flow conveyance which can cause flooding upstream of the watercourse crossing, which has the potential to effect third party receptors.

9.11.7 The potential effects described above are discussed in further detail in the FRA (see **Appendix 9D**), in addition to the appropriate flood mitigation measures (**ID12** and **ID13**) for the construction phase. On the basis that the embedded mitigation measures will be effective in mitigating the potential flood risk effects the magnitude of impact is considered to be **Very Low**. This, combined with the receptor sensitivities (**Very High** to **Low**) derives that the significance of effects on flood risk receptors during the

construction phase is, in this preliminary assessment, Minor and therefore **Not Significant**.

Operational Phase

9.11.8 Following the Scoping Opinion (see paragraph 9.3.4) operational flood impacts were scoped out of the assessment. However, whilst the proposed Overton Substation is currently located entirely within Flood Zone 1, the York Detailed Model, flood model, identifies the southern boundary of the proposed Overton Substation is at risk of flooding, based on future climate change modelling in the 1% AEP + 50% climate change event, but not the 1% AEP + 30% climate change event (see **Figure 9.8**). The National Grid design criteria[84] requires substations to be resilient to flooding up to and including a 1 in 1,000-year (0.1% AEP) flood event with an allowance for climate change. To ensure the substation achieves the required flood resilience there may potentially need to be some land raising in the area, or the construction of a flood wall. If this were the case, local compensation flood storage may be required to offset the displaced flood water for 1% AEP + climate change event so that flood risk is not increased to third party receptors.

9.11.9 The climate change allowances used in the York Detailed Model scenarios have recently (July 2021) been updated to +34% and +53% for the Higher Central and Upper End allowances respectively. Based on the latest Environment Agency climate change guidance[37], compensatory flood storage would be required if there were displacement of flood water in the 1% AEP + 34% climate change event (Higher Central allowance). However, the new Environment Agency guidance[37] states that if the new climate change allowances are not significantly different from those previously modelled then no re-modelling is required. In pre PEIR consultation, the Environment Agency clarified that their view of 'not significant' is within +/- 10%. Based on this information we have used the existing York Detailed Model output, 1% AEP +30% climate change event, to determine that there will be no requirement for compensatory storage should land raising of a flood wall be required to ensure the National Grid design standard is met (0.1% AEP +34% CC). The flood modelling of the 0.1% AEP +34% climate change event is yet to be performed.

9.11.10 The potential effects described above are discussed in further detail in the FRA (see **Appendix 9D**), in addition to the appropriate flood mitigation measures (**ID15** and **ID16**) for the operational phase. On the basis that the embedded mitigation measures will be effective in mitigating the potential flood risk effects the magnitude of impact is considered to be **Very Low**. This, combined with the receptor sensitivities (**Very High** to **Low**) derives that the significance of effects on flood risk receptors during the operational phase is, in this preliminary assessment, Minor and therefore **Not Significant**.

9.12 Preliminary assessment of cumulative (inter-project) effects

9.12.1 In accordance with Planning Inspectorate Advice Note 17[85] a long list of 'other development', including allocations, has been reviewed and screened to establish those other developments which could result in significant effects in cumulation with the Project. The process followed is described in **Section 4.9** and a long list of

[84] National Grid (2016). General electricity and substation design manual for civil, structural and building engineering, Section No:13; Flood defences for electricity for substations (TS 2.10.13, Issue 2)
[85] Planning Inspectorate (2019) Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects [online]. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/ (Accessed 13 October 2021).

developments considered is provided in **Appendix 4C** of the PEIR. **Table 4.5** lists all the short listed developments identified to date, which will be kept under review as the Project progresses.

9.12.2 A detailed assessment of the likely significant cumulative effects will be provided in the ES. At this stage of the Project the other developments which have the potential for significant effects in cumulation with the Project in relation to Hydrology comprise the following:

- An agricultural unit in Shipton by Beningborough (20/01004/FUL).
- Various developments close to the existing Monk Fryston Substation (proposed motorway services on the A1(M) near Lumby (2019/0547/EIA), potential minerals development (NY/2020/0204/SCO), a gas peaking plant (2020/0594/FULM) and energy storage projects (2021/0633/FULM, 2021/0789/FULM).
- Proposed developments near Osbaldwick Substation (an energy storage project (19/01840/FULM) and office/industrial development (21/00092/FULM).
- Extensions or additional works at existing quarries at Jackdaw Quarry, Stutton (NY/2021/0098/A27), Newthorpe Quarry (NY/2017/0268/ENV) and Stutton (NY/2018/0009/FUL).
- Proposed housing allocation at Tadcaster (TAD2 105 dwellings).

9.13 Preliminary significance conclusions

9.13.1 A summary of the results of the preliminary hydrology assessment is provided in **Table 9.26**.

Table 9.25 – Preliminary summary of significance of effects

Receptor and summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Construction Phase				
Aquatic environment receptors WC1-11, CS1-5 Water resource receptors WR1-3 Predicted effect: increase in sediment laden runoff	Low to High	Very Low to Low	Not significant (Negligible to Minor)	Embedded environmental measures would render effects on aquatic environment receptors and water resources receptors as **Not Significant**.
Aquatic environment receptors WC1-11, CS1-5	Low to High	Very Low to Low	Not significant (Negligible to Minor)	The implementation of the embedded measures designed to prevent silt-laden runoff would ensure the effect on

Receptor and summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Predicted effect: changes on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance				hydromorphology and flow conveyance of aquatic environment receptors is **Not Significant.**
Aquatic environment receptors WC1-11, CS1-5 Water resource receptors WR1-4 Predicted effect: deterioration in the water quality due to mobilisation of contaminants from contaminated soil or accidental spillage of pollutants	Low to High	Very Low to Low	Not significant (Negligible to Minor)	The implementation of the embedded measures designed to prevent surface water pollution (for example implementation of good working practices with adherence to the Outline CEMP) would ensure the effect on aquatic environment receptors and water resources receptors is **Not Significant.**
Flood risk receptors External, third party receptors Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance	Medium to High	Very Low	Not significant (Negligible to Minor)	Implementation of the flood management measures listed in the FRA (see **Appendix 9D**) , in addition to water minimal displacement from pylons would ensure the effects to flood risk receptors are **Not Significant.**
Flood risk receptors External, third party receptors Predicted effect: Compartmentalisation of the floodplain.	Medium to High	Very Low	Not significant (Negligible to Minor)	Implementation of the flood management measures listed in the FRA (see **Appendix 9D**) , in addition to water minimal displacement from pylons, would ensure the effects to flood risk receptors are **Not Significant.**

Receptor and summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Flood risk receptors External, third party receptors Predicted effect: Change to surface water flood risk.	Medium to High	Very Low	Not significant (Negligible to Minor)	A DMP will be prepared for the construction phase, utilising SuDS principles. Consents will be obtained for any discharges to watercourses. With the specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk receptors is **Not Significant.**
Flood risk receptors External, third party receptors Predicted effect: Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings.	Medium to High	Very Low	Not significant (Negligible to Minor)	A range of construction phase embedded environmental measures have been specified to ensure any temporary watercourse crossings are appropriately sized and to control silt-laden run-off from working areas and minimise direct channel disturbance. With the specified embedded environmental measures in place, the effect of changes on watercourse flow conveyance on the flood risk receptors is **Not Significant**.
Flood risk receptors External, third party receptors Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance	Medium to High	Very Low	Not significant (Negligible to Minor)	Implementation of the flood management measures, in particular those providing provisional flood storage where existing storage has been displaced, in addition to an effective flood management plan would ensure the effects to flood risk receptors is **Not Significant** under

Receptor and summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
				current climatic conditions.
Flood risk receptors External, third party receptors Predicted effect: Compartmentalisation of the floodplain.	Medium to High	Very Low	Not significant (Negligible to Minor)	Implementation of the flood management measures listed in the FRA (see **Appendix 9D**) would ensure the effects to flood risk receptors are **Not Significant.**
Flood risk receptors External, third party receptors Predicted effect: Change to surface water flood risk, due to temporary impermeable surfaces.	Medium to High	Very Low	Not significant (Negligible to Minor)	A DMP will be prepared for the construction phase, utilising SuDS principles. Consents will be obtained for any discharges to watercourses. With the specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk receptors is **Not Significant.**
Proposed Overton Substation – Operational Phase				
Flood risk receptors External, third party receptors Predicted effect: Loss of floodplain storage and/or change in floodplain flow conveyance	Medium to High	Very Low	Not significant (Negligible to Minor)	Implementation of the flood management measures listed in the FRA (see **Appendix 9D**) would ensure the effects to flood risk receptors are **Not Significant.**.
Flood risk receptors External, third party receptors Predicted effect: Change to surface water flood risk, due to temporary impermeable surfaces.	Medium to High	Very Low	Not significant (Negligible to Minor)	A DMP will be prepared for the construction phase, utilising SuDS principles. Consents will be obtained for any discharges to watercourses. With the specified embedded environmental measures in place (ID 15 and 16),

Receptor and summary of Predicted Effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
				the effect of changes to surface water flood risk on the flood risk receptors is **Not Significant.**

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 9.8** and is defined as Low, Medium, High and Very High.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 9.8** and is defined as very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 9.8**.

9.14 Integrated WFD Assessment

9.14.1 As was set out in **Section 9.8**, an approach has been adopted in which the WFD assessment has been integrated. As set out, the first two stages of the recommend WFD assessment process, are incorporated as follows:

- Stage 1: Screening of the activities, and their potential for effects to the water environment including surface water WFD elements, has been undertaken in **Table 9.17** and **Table 9.18** with the screening out of activities performed in **Table 9.18**. The WFD surface water catchments scoped into the study are summarised in Appendix B, which includes the waterbodies status and objectives.
- Stage 2: The WFD scoping has been undertaken in the assessment in **Sections 9.9** to **9.10**, which considered the role of embedded measures in mitigating the potential risks from Project activities to the WFD waterbody receptors.

9.14.2 As determined in the assessment of hydrology effects (**Sections 9.9** to **9.11**), the impacts of the Project to the aquatic environment can be suitably mitigated by the effective implementation of embedded measures. Thereby, reducing the potential effects to water quality and hydrogeomorphology to **Not Significant**. Consequently, the embedded measures are effective in supporting the WFD waterbody objectives. On this basis, and as there are no residual effects, a standalone WFD assessment for individual WFD surface water bodies is not proposed to be undertaken at the ES stage.

9.14.3 In **Chapter 10: Geology and Hydrogeology**, it was concluded, that in relation to groundwater bodies, the Project has been determined to have no effects that are likely to cause deterioration in WFD status or prevent waterbodies from achieving their WFD objectives, provided that best practice and established guidance is adhered to, in accordance with the embedded measures in **Table 10.8** of **Chapter 10: Geology and Hydrogeology** and the Outline CEMP. Following consideration of the specifics of the construction activities together with the nature of the previous land use, the risk of the Project causing significant contamination of groundwater (e.g., by mobilising old contamination due to ground disturbance) is determined to be minor **(Not Significant)**.

On this basis, it is concluded that the integrated WFD assessment is sufficient for assessing the potential effects to WFD designated groundwater bodies.

9.15 Further work to be undertaken

9.15.1 The information provided in this PEIR is preliminary, the final assessment of likely significant effects will be reported in the ES. This section describes the further work to be undertaken to support the hydrology assessment presented in the ES.

Baseline

9.15.2 Additional baseline information will be gathered via specific non-statutory pre-application consultations with the EA and the Ainsty, Foss, and Kyle and Upper Ouse IDBs (see paragraphs 9.3.1 to 9.3.3).

9.15.3 Additional information on IDB-maintained ordinary watercourses (e.g. flow, control measures, maintenance regimes) will be gathered from the IDBs during non-statutory pre-application consultation.

9.15.4 Details of private water supplies and any flood risk issues associated with surface water and non-IDB (riparian) ordinary watercourses have been requested from the LLFAs.

9.15.5 At this stage it is assumed that no hydrological monitoring of flows or sampling for water quality, will be required to further characterise the baseline hydrology.

Assessment

9.15.6 Hydraulic flood modelling is to be undertaken to ensure the proposed Overton Substation is resilient to flooding and identify the flood resilience measures required.

Environmental measures

9.15.7 The current suite of environmental measures is considered sufficient to mitigate for any of the potential effects identified. However, this will be continually reviewed as the Project design is refined and following consultation feedback.

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