Scotland England Green Link 2 - English Onshore Scheme

Environmental Statement: Volume 2

Chapter 11: Hydrology and Land Drainage

May 2022

For: National Grid Electricity Transmission

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11. Hydrology and Land Drainage

11.1 Introduction

This chapter of the Environmental Statement (ES) presents the results of baseline studies and the assessment of the potential impacts on hydrology and land drainage likely to arise as a result of the English Onshore Scheme. The chapter summarises the regulatory and policy framework related to hydrology and land drainage, the methodology followed for the assessment and provides an overview of the existing baseline conditions. The assessment has identified the likely significant impacts to arise during the construction or operational phases of the English Onshore Scheme and identifies any mitigation necessary to avoid or reduce these impacts where possible.

Aspects considered within this chapter relate to surface water resources, surface water quality, water dependent sites, fluvial geomorphology, drainage infrastructure and flood risk.

Hydrological impacts are interrelated with hydrogeology. Potential impacts on groundwater quality due to structures or drainage are assessed separately in **Chapter 10: Geology and Hydrogeology**, as are issues related to contaminated land.

In addition, hydrological impacts are also interrelated with biodiversity. Potential impacts to habitat and species within water dependent habitats are assessed separately in **Chapter 7: Ecology and Nature Conservation**. Whereas impacts to quantity and quality of water to and within these water dependent habitats are considered within this chapter.

The following figures have been prepared in support of the hydrology and land drainage assessment:

- **Figure 11-1**: Study Area; and
- **Figure 11-2**: Flood Zones;
- **Figure 11-3**: Risk of Flooding from Surface Water; and
- **Figure 11-4**: Reservoir Flood Extents.

This chapter should be read in conjunction with the following technical appendices, available in ES Volume 3:

- **Appendix 11A**: Water Framework Directive Compliance Assessment;
- **Appendix 11B**: Flood Risk Assessment;
- **Appendix 11C**: Hydraulic Modelling Technical Note; and
- **Appendix 11D**: List of Licensed Discharges.

11.2 Planning Policy and Applicable Legislation

11.2.1 Introduction

This section of the report sets out the relevant legislative and policy framework for hydrology and land drainage within the UK.

11.2.2 Legislation

The Environmental Statement has complied with the following legislation:

- Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018; make amendments within the environmental and planning related legislation that implement the Environmental Impact Assessment (EIA) Directives so these function effectively after the UK has left the European Union;
- The Environmental Permitting Regulations 2017 (as amended); provide a consolidated system of environmental permitting in England and Wales;

- Flood and Water Management Act 2010; created the Lead Local Flood Authority (LLFA) role which is the local government authority responsible for managing flood risk in their area;
- European Union (EU) Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009; established the publication of Preliminary Flood Risk Assessments (PFRA) and Flood Risk Management Plans (FRMP);
- Water Act 2003; a modification on the previous Water Act (1989) by amending the framework for abstraction licensing;
- EU Water Framework Directive (2000/60/EC) (WFD), as enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003; commits member states to achieve good qualitative and quantitative status on all water bodies. This commits member states to achieve good qualitative and quantitative status on all water bodies. Since the UK left the EU, the EU Water Framework Directive has been revoked and replaced in England, Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Since December 2020, Water Framework Directive 2000/60/EC has been transposed into UK Law;
- Environment Act 1995; established a series of regulatory bodies including the Environment Agency (EA);
- Land Drainage Act 1991 and 1994; set requirements that a watercourse be maintained by its owner in such a condition that the free flow of water is not impeded;
- Habitats Directive 1992; ensures the conservation of a wide range of rare, threatened or endemic animal and plant species to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements;
- Water Resources Act 1991; set out the offence to cause or knowingly permit and poisonous, noxious or polluting material or any solid waste to enter any controlled water with the policing being the responsibility of the EA;
- Environment Protection Act 1990; introduced a system of integrated pollution control for disposal to land, water and air; and
- Control of Pollution Act 1974; provided a registration of carriers of controlled waste with an individual not permitted to knowingly deposit controlled waste.

11.2.3 National Policy

National Planning Policy Framework, Planning Practice Guidance – Flood Risk and Coastal Change

The National Planning Policy Framework (NPPF) (Ref 11-1), latest update July 2021, sets out the UK government's planning policies for England and how these are expected to be applied. Flood risk has been assessed in line with the NPPF and relevant Planning Practice Guidance (PPG-FRCC) (Ref 11-2), latest update August 2021.

The NPPF states that a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving:

- sites of 1 hectare or more;
- land which has been identified by the EA as having critical drainage problems;
- land identified in a strategic flood risk assessment as being at increased flood risk in future; or
- land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

The NPPF also requires the assessment of climate change and how it could potentially affect future flood risk for the design lifetime of the development to be included in this ES to both better assess the future baseline condition as well as helping to minimise vulnerability and provide further resilience from flooding.

Impacts on water quality will also be assessed in line with the NPPF, which states that planning policies and decisions should contribute to and enhance the local environment by preventing new developments from contributing to unacceptable levels of water pollution. It states that development should, wherever possible, help to improve local environmental conditions such as and water quality, taking into account relevant information such as river basin management plans (RBMP).

Overarching National Policy Statement for Energy (EN-1)

This National Policy Statement (NPS) (Ref 11-3) sets out the Government's policy for delivery of major energy infrastructure. Section 5.15 of this NPS covers water quality and recourses and states that '*Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent'.*

Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)

This NPS (Ref 11-4), taken together with EN-1 described above, provides the primary policy for decisions taken by the Secretary of State on applications it receives for electricity networks infrastructure. Section 2.6 of this NPS covers climate change adaption and resilience and states that *'As climate change is likely to increase risks to the resilience of some of this infrastructure, from flooding for example, or in situations where it is located near the coast or an estuary or is underground, Applicants should in particular set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it has been designed to be resilient to:*

- *flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change*
- *the effects of wind and storms on overhead lines*
- *higher average temperatures leading to increased transmission losses*
- *earth movement or subsidence caused by flooding or drought (for underground cables)'*

11.2.4 Local Policy

East Riding Local Plan 2012-2029 (Adopted April 2016)

The East Riding Local Plan (Ref 11-5) is the current version of the local development plan (LDP) adopted in April 2016. It is a portfolio of planning documents that together provide the framework for managing development and addressing key planning issues in the East Riding. It states that any development must not cause deterioration of the WFD status of any water body, or prevent any water body from reaching 'good' ecological status, except where it can be shown that there is an overriding public interest that outweighs WFD requirements. Improvements to water bodies in the East Riding area are dependent upon reducing diffuse pollution from agriculture and discharges from sewage works and storm drains, as well as 're-naturalising' the 'heavily modified' nature of the area's watercourses.

Policies with particular reference and importance to hydrology and land drainage are:

Policy ENV6: Managing Environment Hazards

- "Environmental hazards, such as flood risk, coastal change, groundwater pollution and other forms of pollution, will be managed to ensure that development does not result in unacceptable consequences to its users, the wider community, and the environment.
- The risk of flooding to development will be managed by applying a Sequential Test to ensure that development is steered towards areas of lowest risk. Where development cannot be steered away from Flood Zone 3, the sub-delineation of Zone 3a, will be used to apply the Test, with preference given to reasonably available sites that are in the lower risk/hazard zones. Where necessary, development must also satisfy the Exception Test.
- If, following application of the Sequential Test, it has not been possible to develop in Flood Zone 1, a Sequential Approach will be taken to site layout and design, aiming to steer the most vulnerable uses towards the lowest risk parts of the site.
- Flood risk will be proactively managed by ensuring that new developments:

- limit surface water run-off to existing run-off rates on greenfield sites, and on previously developed land reduce existing run-off rates by a minimum of 30%, or to greenfield run-off rate and incorporate Sustainable Drainage Systems (SuDS) unless demonstrated to be inappropriate;
- do not increase flood risk within or beyond the site;
- do not culvert or otherwise build over watercourses, unless supported by the Risk Management Authority and are adequately set-back from all watercourses including culverted stretches;
- have a safe access/egress route from/to Flood Zone 1 and incorporate high levels of flood resistant and resilient design if located in a flood risk area; and
- Supporting proposals for sustainable flood risk management, including the creation of new and/or improved flood defences and water storage areas, provided they would not cause unacceptable adverse impacts and supporting the removal of existing culverted sections".

Further details are included in paragraphs 8.90 to 8.100 of the East Riding Local Plan.

Policy A2: Bridlington Coastal Sub Area

- The relevant environmental aspects of this policy state that plans, strategies and development decisions in the Bridlington Coastal sub area should:
  - *"Proactively manage the risk of flooding posed from the North Sea and the Gypsey Race catchment, including the risk of surface water and groundwater flooding, having regard to the relevant Strategic Flood Risk Assessment and flood risk management plans and strategies.*
  - *Ensure the integrity of the Burton Agnes, Haisthorpe and Mill Lane Ground Water Source Protection Zones are protected.*
  - *Manage improvements to the Gypsey Race where it would create economic, environmental and recreational opportunities, and does not adversely affect conservation initiatives or the quality of the natural environment."*

Selby District Local Plan 2005 (Adopted February 2005)

The Selby District Local Plan (SDLP) (Ref 11-6) was formally adopted in February 2005. The SDLP develops and underpins many of the aims and objectives of the Council. It provides a comprehensive land-use framework for promoting, co-ordinating and controlling future development. This original SDLP policy of relevance to this chapter, 'ENV5 Development and Flood Risk', expired in February 2008.

Selby District Core Strategy Local Plan (Adopted October 2013)

The SDLP is used in conjunction with the Selby District Core Strategy Local Plan (Ref 11-5), adopted in October 2013, which provided updates for development policies. Policies of relevance to hydrology and land drainage are:

Policy SP15 Sustainable Development and Climate Change

- *"Promoting Sustainable Development*

In preparing its Site Allocations and Development Management Local Plans, to achieve sustainable development, the Council will:

8. *Give preference to the re-use, best-use and adaption of existing buildings and the use of previously developed land where this is sustainably located and provided that it is not of high environmental value;*
9. *Achieve the most efficient use of land without comprising the quality of the local environment;*
10. *Ensure that development in areas of flood risk is avoided wherever possible through the application of the sequential test and exception test; and ensure that where development must be located within areas of flood risk that it can be made safe without increasing flood risk elsewhere;*

11. *Support sustainable flood management measures such as water storage areas and schemes promoted through local surface water management plans to provide protection from flooding; and biodiversity and amenity improvements".*

Policy SP18 Protecting and Enhancing the Environment

The section of this policy relevant to this assessment states that the high quality and local distinctiveness of the natural and manmade environment will be sustained by ensuring that new development protects water quality from all types of pollution.

Selby District Council Local Plan Preferred Options Consultation 2021

The emerging Local Plan (Ref 11-8) is a vision and framework for future growth of the district, identifying where new housing, employment and other development could take place.

Preferred approaches with particular reference and importance to hydrology and land drainage are:

Preferred Approach NE7 – Protect and Enhance Waterways

"This policy will allow the council to protect waterways and their environments including river banks and waterfrontages. This will be achieved for developments within, on top of, adjacent to or near to waterways, by:

- *Taking account of the different existing or potential roles, characteristics and functions of the waterway such as sustainable transport for water borne freight; for recreation use for walking or cycling; and/or for value as a wildlife corridor;*
- *Taking into account the latest priorities and strategies for waterways;*
- *Safeguarding and improve environmental quality and amenity;*
- *Enhancing the local environment and access to and along waterway corridors;*
- *Taking into account the needs of all users; and*
- *Avoiding loss, damage or deterioration of waterways assets and ensure they are an integral part of the development".*

Preferred Approach SG11 – Flood Risk

- *"To enable communities to manage, be resilient and adapt to flood risk, the preferred approach is that development will only be supported where it can be demonstrated that:*
    - *The proposal does not increase the risk of flooding off-site; and*
    - *The site falls within FZ1 or where the site falls within FZ3b, only essential or critical infrastructure that cannot be relocated and water compatible uses that do not impede the functional flood plain, or adversely affect the ability or access to flood defences, or which increase the risk of flooding elsewhere will be allowed;*
    - *The site has been passed through a sequential test as set out in the NPPF; or where necessary the Exception Test has been applied.*
- *If the development is acceptable in principle in terms of flood risk the following will need to be applied where appropriate and practicable to design and layout of the scheme to make it acceptable in detail:*
    1. *Where the development is located in FZ2/3 and does not constitute minor development or a change of use, the sequential approach will be applied;*
    2. *The development is designed to a flood event with a magnitude of a 1% AEP event (fluvial) or 0.5% AEP (tidal) event plus climate change allowance and in the event of a local drainage system failure;*
    3. *The features that manage surface water make a positive contribution to reducing flood risk and that SuDS are incorporated with a management and maintenance plan for the lifetime of the development;*

4. *Floor levels are 300mm above the modelled 1% AEP (fluvial) 0.5% AEP (tidal event) plus climate change allowances and/or 300mm above adjacent highway levels or alternative measures must be investigated where required; and*
5. *Hard surfaces on developments should be permeable where unless proven not to be possible by site investigation; Watercourses are not culverted and any opportunity to remove culverts is taken;*

- *Where required by the NPPF proposals for development should include an FRA with this demonstrating the development is safe for its lifetime, include access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall".*

Further information is provided in paragraphs 4.51 to 4.64 of the Local Plan.

- Water Quality – *"Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. Where development is adjacent or can impact a water body, the development should actively seek to enhance the water body in terms of its hydromorphology, biodiversity and water quality".*

The Humber River Basin Management Plan 2015

The study area is located within the Humber River Basin district which is covered by the Humber River Basin Management Plan. This river basin management plan (Ref 11-9) provides a framework for organisations, stakeholders and communities for protecting and enhancing the benefits provided by the water environment. This information will be used as a baseline for the assessment of impacts to designated water bodies.

Chalk Stream Restoration Strategy 2021

The study area is located in an area that contains chalk streams. The Catchment Based Approach Chalk Stream Restoration Group has published the Chalk Stream Restoration Strategy 2021. This restoration strategy (Ref 11-10) is designed as a road map to achieve restoration of good ecological health in the 283 chalk streams within the UK and the landscapes that support them. The restoration requirements outlined in this strategy include:

- Restoring natural flows;
- Improving water quality through reducing pollution; and
- Restoring the quality of the physical habitat.

11.3 Approach to Assessment

11.3.1 Introduction

This section describes the approach to the identification and assessment of impacts resulting from the construction and operation of the English Onshore Scheme on hydrology and land drainage.

11.3.2 Summary of Consultation

11.3.2.1 Scoping Opinion Review

Scoping opinions were received from relevant stakeholders between April and June 2021. **Table 11-1** summarises the comments raised in these scoping opinions in relation to hydrology and land drainage and outlines how these have been addressed in subsequent sections of this chapter of the ES. Copies of the scoping opinions are included in **Appendix 5B**.

Table 11-1: Scoping Opinion (Hydrology and Land Drainage)

Consultee	Summary of comment	How and where addressed
Environment Agency (EA)	Provided confirmation on Flood Risk Assessment (FRA) requirement. Questioned further need for dewatering and asked for confirmation on assessment of coastline	The approach to assess flood risk and water quality is presented in

Consultee	Summary of comment	How and where addressed
	erosion at landfall. Confirmed authorities which would need to be part of further consultation in development, confirmed requirement of permits and consents for watercourse crossings, requested confirmation of watercourse crossing methods. Highlighted there may be further requirements for modelling, highlighted that climate change allowances will be updated soon and asked for confirmation on the scope of the FRA's extent.	the FRA (**Appendix 11B**) and summarised in this Chapter. Crossing techniques have been discussed and some have been agreed with the relevant Local Planning Authority (LPA), Internal Drainage Boards (IDB) and the EA. Updated Climate Change allowances (as updated October 2021) have been used in the assessment (Section 11.6) where relevant. The risks associated with coastal erosion – both from the English Onshore Scheme to exacerbating erosion, and risk to the cable from exposure due to erosion – have been accounted for within the design by setting the landfall approximately 150 m from MHWS which is outside of the limit of the National Coastal Erosion Risk Mapping and also installing by HDD methods below the backshore and foreshore.
East Riding of Yorkshire (ERYC) Council	Confirmed that FRA will be required as development is >1 ha, considered that the development will be classed as 'Essential Infrastructure'. Stated that during construction, no materials should be stored in Flood Zone 2 or 3 without prior permission. Drainage details for the haulage road should be provided with any future applications.	An outline drainage design has been developed which includes the haul road. In addition, any necessary measures, principles or practices necessary to mitigate identified impacts have been included within Section 11.6 Potential Impacts section and FRA (**Appendix 11B**) which are in accordance with the NPPF.
Natural England	Identified the crossing at River Hull Headwaters Site of Special Scientific Interest (SSSI) as having the potential to have the greatest impact on designated sites. Horizontal drilling should be sufficiently offset from the riverbanks at this location.	The likely effects of the construction and operational phase of the English Onshore Scheme have been assessed within the EIA (Section 11.6). Mitigation measures, where avoidance of receptor was not possible, are included (Section 11.7)
North Yorkshire County Council (LLFA)	Stated that surface water flooding should be addressed through a FRA. Agreement should be obtained with the relevant Land Drainage Authority regarding how rivers, Internal Drain Board (IDB) watercourses and ordinary watercourse are to be crossed and obtain the relevant consents.	The planning application includes an FRA (**Appendix 11B**) addressing surface water flooding.
Selby Area Internal Drainage Board (IDB)	Stated current guidelines and advice for disposal of surface water: via soakaways may be unsuitable due to ground conditions with percolation tests may needed to be required, via mains sewers is acceptable given Water Authority can confirm existing system can accommodate additional flow, via ordinary watercourse then IDB consent will be required and restricted to 1.4 l/s or greenfield runoff rate.	Drainage strategy has been developed in accordance with NPPF. The approach to assess flood risk is presented in the FRA (**Appendix 11B**) and summarised in this Chapter (Section 11.3)

Consultee	Summary of comment	How and where addressed
Selby District Council	Highlighted the need for any subsequent planning application to include the use of the Sequential, and if required, Exception Test.	FRA (**Appendix 11B**) is in accordance with the NPPF.
Yorkshire Water	No comments provided in regard to scoping request though highlighted that developers must contact Yorkshire Water with regard to protecting sewerage and water infrastructure that is laid along the cable route.	Types of river crossings and the risk associated with existing sewage and drainage infrastructure has been assessed (Section 11.6)

11.3.2.2 Additional Consultation

Table 11-2 summarises additional consultation undertaken with relevant statutory and non-statutory consultees in relation to hydrology and land drainage for the Project and outlines how and where this has been addressed in subsequent sections of this chapter of the ES.

Table 11-2: Additional Consultation (Hydrology and Land Drainage)

Consultee	Nature of additional consultation	How and where addressed
Environment Agency – various telephone and email communications	Correspondence to confirm the basis of the design of the English Onshore Scheme and discuss the EA's requirements and expectations of the planning application in particular reference to: the FRA associated with the permanent above ground infrastructure (the proposed converter station) including minimum site levels; and the crossing approach associate with the installation of the underground cable. **Cable crossing methods** EA noted that the watercourses through East Riding are subject to varying types of defenses and future management/ maintenance plans. This may include piling in some locations and therefore a buried electrical asset presents some restrictions. Therefore, the depth of the cable in vicinity to main river and potential defense locations should be agreed with the EA as part of the detailed design. **Converter station FRA** EA requirement for finished floor level to be at least 1:200 + appropriate climate change (CC) uplift Annual Exceedance Probability (AEP) from a tidal source of risk and 1:100 +CC AEP event from a fluvial source of risk, with flood plain compensation requirements (flood plain compensation only required up to the 1:200 +CC AEP (tidal) and 1:100 +CC AEP (fluvial); general requirement for level-for-level, volume-for-volume compensation; requirements may be relaxed where it can be demonstrated that no suitable land to compensate will be available and that not doing so will have negligible impact on flood levels, time of inundation and Hazard rating). EA expressed a preference that the 2020 Humber model to be used in the assessment (as per the Drax BECCS project) and that breach modelling should be undertaken.	Summarised in the FRA and design drawings. The crossing method will be using HDD for all EA maintained watercourses with detailed design to be led by the scheme contractor and to be agreed with the EA, IDB and LLFA as relevant as part of permitting requirements. This will include depth of finished conduit below bed level and include clearance or mitigation for future defence works by others. Flood plain compensation is set out in the FRA including reporting on flood depth, time of inundation and hazard rating.
Ouse and Humber IDB	Supplied mapping with watercourses maintained by the Board on a permissive basis within the area of interest. Stated that a Land Drainage Consent from the Board would be required for construction inside a 9 m	IDB watercourses are identified and listed in this Chapter (Table 11.14, Table 11-18). The crossing method will be using HDD for all IDB maintained

Consultee	Nature of additional consultation	How and where addressed
	maintenance buffer either side of watercourses as well as requiring that cable be laid a minimum of 1.5 m below bed level. Launch and receptor pits should be located 9 m from each watercourse. A discharge rate of 1.4l/s/ha with a minimum pass forward flow rate of 3.5l/s.	watercourses unless specific agreement is reached during the Land Drainage Consent process with the IDB to open cut. For the purpose of this assessment we have assumed a worst-case scenario that IDB maintained watercourses would be open cut. The works contractor will apply for any necessary consents prior to commencement.
Danvm Drainage Commissioners	See above.	See above.
Beverley & North Holderness IDB	Supplied mapping with watercourses maintained by the Board within the area of interest. Stated that a Land Drainage Consent from the Board would be required for construction inside a 9 m maintenance buffer either side of watercourses. All proposed watercourse cable crossings, temporary haul road crossings, new land drainage outfalls and any temporary water extraction will all need a separate consent approval. Proposals to culvert, bridge, fill in or make a discharge to any watercourse will also require prior consent from the Board. Stated that all proposed cable water crossings are preferably directionally drilled under each watercourse at a minimum depth of 1.2 m. Launch and receptor pits should be located 9 m from each watercourse. A discharge rate of 1.4l/s/ha with a minimum pass forward flow rate of 1l/s.	Where permits and consents are required, they will be obtained by the works contractor prior to commencement. The design has been developed noting IDB requirements with continued engagement throughout. The crossing method will be using HDD for all IDB maintained watercourses unless specific agreement is reached during the Land Drainage Consent process with the IDB to cut. For the purpose of this assessment we have assumed a worst-case scenario that IDB maintained watercourses would be open cut.
Selby IBD	Supplied mapping with watercourses maintained by the Board within the area of interest. Stated that a Land Drainage Consent from the Board would be required for construction inside a 7 m maintenance buffer either side of watercourses. Provided flood risk data regarding two pumping stations within the vicinity of Drax. Stated that all proposed cable water crossings are directionally drilled under each watercourse at a minimum depth of 1.2 m. Launch and receptor pits should be located 7 m from each watercourse. A discharge rate of 1.4l/s/ha but this is to be reviewed on a case-by-case basis.	Where permits and consents are required, they will be obtained by the works contractor prior to commencement. The design has been developed noting IDB requirements with continued engagement throughout. The crossing method will be using HDD for all IDB maintained watercourses Unless specific agreement is reached during the Land Drainage Consent process with the IDB to cut. For the purpose of this assessment we have assumed a wort-case scenario that IDB maintained watercourses would be open cut.

11.3.3 Identification of Baseline Conditions

11.3.3.1 Desk Studies

The baseline is informed by collating data on known designated and non-statutory designated site receptors from the following sources:

- River Basin Management Plan Interactive Maps Catchment Data Explorer, EA (Ref 11-11);
- Main River Map, EA (Ref 11-12);

- Magic Maps, Defra (Ref 11-13);
- National River Flow Archive, UK Centre for Ecology & Hydrology (Ref 11-14);
- Internal Drainage Boards Map, Association of Drainage Authorities (Ref 11-15); and
- Defra Data Services Platform (Ref 11-16).

To identify the potential hydrology and land drainage receptors that may be affected by the English Onshore Scheme, data has also been collected for the study area (see section 11.4) from the following sources:

- Mill Dike (Market Weighton) EA Flood Mapping Study (2007) (Ref 11-17);
- Upper Humber Model 2018 (Ref 11-18);
- Humber Tributaries Model 2020 (Ref 11-19);
- Hull and Holderness Drain Flood Mapping Study 2007 (Ref 11-20);
- Flood Map for Planning, EA (Ref 11-21);
- Long Term Flood Risk Map, EA (Ref 11-22);
- Strategic Flood Risk Assessment (SFRA), East Riding of Yorkshire (Ref 11-23); and
- Strategic Flood Risk Assessment, Selby District Council (Ref 11-24).

The WFD Assessment (**Appendix 11A**) and the FRA (**Appendix 11B**) have informed the baseline description of the water environment and were based upon the collection of information from the wide variety of data sources summarised above. It has been assumed that the information contained in these sources is an accurate representation of the water environment within the study area and surrounding area. The baseline was supported by the collection of information during the walkover surveys.

11.3.3.2 Field Studies

Walkover surveys were completed in Summer 2021. These included a geomorphological reconnaissance survey of the watercourses (where accessible) within the study area and of areas with high fluvial and surface water flood risk (according to the EA Flood Risk for Planning Map) located close to urban areas and surface watercourses. The surveys noted key baseline features and pressures including local topography, land drainage and existing infrastructure that informed receptor value. They also noted key features and pressures on watercourses including: riparian vegetation; morphological processes (such as erosion); morphological features (such as deposits); bed substrate; and bank composition.

Due to the number of watercourses crossed by the English Onshore Scheme, a proportionate approach to surveying was undertaken. As a result, not all water bodies were visited during site visits. Site walkovers were conducted for all watercourses considered to be high risk based on their sensitivity value, design, and potential for impact . These criteria were:

- morphological status and potential for significant hydromorphological impacts;
- national or international statutory designations;
- WFD status with susceptibility to pressures that could cause a decline;
- fish passage; and
- crossing design (locations where open cut methodology is prioritised over HDD).

11.3.4 Assessment Method

11.3.4.1 Assessment Guidance

There is no specific guidance in relation to assessing the impact of electricity transmission links on water resources and hydrology. Therefore, the Design Manual for Roads and Bridges (DMRB) Sustainability and Environment LA 113 Road Drainage and the Water Environment (Ref 11-25) has been used where appropriate as it is considered to be the most appropriate methodology for assessing the effects of linear schemes. The assessment of impacts on hydrology and land drainage has been undertaken using a source-pathway-receptor model.

- Source – activities associated with construction and operation of the English Onshore Scheme;
- Pathway – the method or route by which the source could affect the receptor; and
- Receptor – people, property and infrastructure, or a hydrological feature.

As a result of a scoping assessment (completed March 2021), all receptors were scoped into the EIA. The assessment of impacts of the English Onshore Scheme on the water environment specifically considers impacts to the following attributes of the receptors:

- hydrology and flood risk;
- fluvial geomorphology;
- water quality; and
- water dependent biodiversity.

An FRA (**Appendix 11B**) has been undertaken to assess all sources of flooding that may present a risk to, or be impacted by, the English Onshore Scheme, this includes the proposed converter station and English Onshore Scheme the crossings of watercourses of the underground Direct Current (DC) cable route and associated temporary infrastructure. Sources of flood risk assessed include fluvial, tidal, pluvial, groundwater, sewers/drains, residual risk resulting from artificial structures (i.e. reservoirs, canals, defences) and future flood risk as a result of climate change. The FRA has been produced following guidance included in the NPPF, PPG-FRCC and available climate change data. The latter is based on the latest climate change allowances that were supplied by the EA in October 2021.

This chapter assesses any geomorphological changes that could occur as a result of the proposed works and the impacts of these on the WFD classification of the water features, based on a supporting WFD Compliance Assessment found in **Appendix 11A**.

11.3.4.2 Assessment Criteria

Following a review of the baseline information, the magnitude of potential impacts and significance of effects has been determined based on:

- the importance of the receptor, taking into consideration its function, legal and policy framework, protection;
- the magnitude of the impact on the receptor or attribute of a particular receptor; and
- the influence of embedded and additional mitigation measures.

The prediction and evaluation of effects follows the requirements of the DMRB LA 113 assessment process with the exception of the use of the Highways England Water Risk Assessment Tool (HEWRAT). The HEWRAT assessment methodology is not appropriate for the English Onshore Scheme as it is a highways tool and therefore no traffic generated. Whilst the DMRB is not specific to the assessment of hydrology and flood risk of non-road schemes, it provides an accepted approach to the assessment of development impacts, particularly for linear projects. As such, potential impacts were qualitatively assessed using professional judgement.

11.3.4.3 Sensitivity or Value of Receptors

The impacts have been investigated for both the construction and operational phases of the English Onshore Scheme using criteria outlined in Table **11-3** and **Table 11-4** which have been refined from the DMRB guidance to meet the specific needs of the English Onshore Scheme. The main refinements relate to the inclusion of criteria relating to geomorphological impacts, which are not specifically detailed in the DMRB guidance. Additionally, the criteria for assessing flood risk, specifically changes in flood depths, also deviates from the DMRB and has instead followed guidance which has been made in agreement with the EA. Other refinements include receptors taken from the EA flood risk vulnerability classification.

Table 11-3: Sensitivity of Receptors

Sensitivity	Hydrology and flood risk, fluvial geomorphology and water quality[1] criteria
High	Attribute has a high quality and rarity on regional, national or international scale. ***Hydrology and Flood Risk*:** A water feature that poses flood risk or is subject to reservoir flood risk affecting adjacent populated areas including more than 100 residential properties, critical infrastructure or emergency services including Hospitals, Police, Fire, Ambulance and coastguard stations and any other emergency facilities providing shelter during emergency events such as floods, or critical "hub" utility stations that distribute services over large areas to many customers. A water feature with hydrological importance to: • sensitive and protected ecosystems of international status; • critical economic and social uses (e.g. water supply, navigation, recreation, amenity). A water feature or floodplain that provides critical flood alleviation benefits. Hydraulically connected and unrestricted floodplain providing significant amounts of flood storage. ***Fluvial Geomorphology*:** A highly sensitive water feature must display very little or no signs of modification and not be subject to morphological pressures. ***Sediment Regime**:* The water feature is in complete natural equilibrium as a source, transfer or sink of sediment. There is no unnatural or externally forced erosion or deposition and the sediment regime may be critical to supporting protected or rare species by provision of spawning grounds or similar in a delicate ecosystem. ***Channel Morphology*:** The water feature has a natural range of morphological features including pools, riffles, sediment bars or braiding, a natural planform, naturally occurring woody debris dams with no signs of modification. *Natural Fluvial Processes*: A water feature with geomorphology that produces variations in velocity and flow conditions beneficial to biodiversity and as such is highly vulnerable to changes to conditions that may reduce the quality of habitat. ***Water Quality*:** WFD overall status "High" or "Good" and none or limited anthropogenic pressures affecting the classification (i.e. not a heavily modified water body or similar). Provides a Public drinking water supply. A protected chalk stream. ***Water Dependent Biodiversity:*** Water feature and /or surrounding floodplain / riparian zone is protected / designated under European Commission (EU) or UK habitat legislation: Special Area of Conservation (SAC), Special Protection Area (SPA), Special Site of Scientific Interest (SSSI), Water Protection Zones (WPZ), Ramsar site, salmonid water / species protected by EC legislation. The water feature is an EU Designated salmonid / cyprinid fishery. Water quality complies with Environmental Quality Standards (EQS). Water feature widely used for recreation, directly related to its quality (e.g. swimming, salmon fishery).
Medium	Attribute has a high quality and rarity on a local scale. ***Hydrology and Flood Risk***: A water feature that poses flood risk or is subject to reservoir flood risk affecting adjacent populated areas including between 10 and 100 residential or industrial properties. Critical social infrastructure or emergency services are not affected, however, highly vulnerable risk receptors may be at risk including public buildings such as schools, leisure centres and libraries. Vulnerable utility stations that are not deemed critical. A water feature with hydrological importance to: • i) sensitive and protected ecosystems of national designation; • ii) locally important economic and social uses (e.g. water supply, navigation, recreation, amenity). A water feature or floodplain providing significant flood alleviation benefits. Partially hydraulically connected or partially constrained floodplain providing significant amounts of flood storage.

[1] Inclusive of biodiversity, water abstraction and discharge

Sensitivity	Hydrology and flood risk, fluvial geomorphology and water quality[1] criteria
	***Fluvial Geomorphology*:** A water feature with some signs of modification and subject to some morphological pressures. This may be heavily modified but managed as a High status morphological regime. ***Sediment Regime*:** The water feature is sensitive and in natural equilibrium (or managed) as a source, transfer or sink of sediment. There is no significant unnatural or externally forced erosion or deposition and the sediment regime may be critical to supporting protected or rare species by provision of spawning grounds or similar in a delicate ecosystem. ***Channel Morphology*:** The water feature has a natural range of morphological features including pools, riffles, sediment bars or braiding, a natural planform, naturally occurring woody debris dams with little or no modification. ***Natural Fluvial Processes*:** A water feature with geomorphology that produces variations in velocity and flow conditions beneficial to biodiversity and as such is highly vulnerable to changes to conditions that may reduce the quality of habitat. ***Water Quality*:** WFD overall status "Moderate". Water quality complies with EQS. Provides a private drinking water supply. *Water Dependent Biodiversity*: Supports water dependent non-statutory designated sites.
Low	Attribute has a medium quality and rarity on a local scale. ***Hydrology and Flood Risk*:** A water feature that poses flood risk or is subject to reservoir flood risk affecting adjacent populated areas including <10 industrial properties or to less populated areas without any critical social infrastructure units such as hospitals, schools, safe shelters and / or utilisable agricultural fields. Less vulnerable risk receptors may be at risk including general industry, employment, mineral extraction sites or waste disposal sites. Floodplain may be hydraulically disconnected and only functions as flood storage during events greater that 1% AEP. ***Fluvial Geomorphology*:** A water feature that is heavily modified and subject to morphological pressures with active restoration attempts. ***Sediment Regime*:** The water feature shows signs of modification and appears to have some natural equilibrium. Erosion and / or deposition may be externally forced and the sediment regime may be importance to some local species or habitats. ***Channel Morphology*:** Variety of morphological features is limited and active features such as gravel bars are rare. ***Natural Fluvial Processes*:** Fluvial processes are limited and heavily influenced by modifications or anthropogenic processes. Water feature deemed to be vulnerable to changes in its vicinity. ***Water Quality*:** WFD overall status "Poor". Likely to exhibit a measurable degradation in water quality as a result of anthropogenic factors. Water feature not widely used for recreation, or recreation use not directly related to water quality, although water supply may be for agricultural or industrial use. ***Water Dependent Biodiversity*:** No species of conservation concern. Surface water fed standing water bodies.
Negligible	Attribute has a low quality and rarity on a local scale. ***Hydrology and Flood Risk*:** Water feature either poses no risk to properties or infrastructure or is in area with water compatible infrastructure such as water and sewage transmission sites or docks, marinas and wharves. It may pass through uncultivated agricultural land not posing any threat to access and egress from commercial or domestic activity. A water feature with minimal hydrological importance to sensitive or protected ecosystems. Floodplain may be completely hydraulically disconnected providing no flood storage. ***Fluvial Geomorphology*:** A water feature that is heavily modified and incapable of naturally reaching a natural equilibrium without active restoration attempts. ***Sediment regime*:** The water feature exhibits a completely unnatural sediment regime, meaning zones of storage and transfer are significantly influenced by anthropogenic

Sensitivity	Hydrology and flood risk, fluvial geomorphology and water quality[1] criteria
	pressures. It is highly unlikely that the water feature supports species sensitive to suspended sediment and turbidity. ***Channel Morphology*:** Morphological diversity is absent, flow is uniform as are the banks and anthropogenic modification is extremely likely such as channelization, bank protection or culverting. It is likely stable in this state and incapable of developing morphological features. ***Natural Fluvial Processes*:** Fluvial processes are limited and heavily influenced by modifications or anthropogenic processes. Water feature unlikely to be influenced by changes in the immediate surrounding environment. ***Water Quality*:** WFD overall status "Bad". Highly likely to be affected by anthropogenic factors. Heavily engineered or artificially modified. Not used for recreation purposes. ***Water Dependent Biodiversity*:** Limited biodiversity; no species of Conservation concern. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability.

11.3.4.4 Magnitude of Change

Potential effects can be either beneficial or adverse, depending upon the criteria within **Table 11-4**.

Table 11-4: Criteria Used to Determine the Magnitude of Change on Water Environment Attributes

Magnitude	Typical Examples
High Adverse	Results in loss of attribute and / or quality and integrity of the attribute. **Hydrology and Flood Risk:** Major changes to flow regime (low, mean and / or high flows – at the site, upstream and / or downstream). An alteration to a catchment area in excess of a 25% reduction or increase. Significant increase in the extent of areas or number of properties at risk from flooding by the 1% or greater Annual Exceedance Probability (AEP) (100-year) flow. An increase in peak flood level during a 1% AEP (100-year) event of >750 mm. **Fluvial Geomorphology:** More than four new water feature crossings or structures (including outfalls) required, significantly increasing the extent of water feature modification which has the potential to resulting in the following changes: **Sediment Regime:** Major change to the natural equilibrium through modification, significantly changing the natural function of the water feature (sediment source, sink or transfer zone). This may arise from a major increase in amount of fine sediment and turbidity. **Channel Morphology:** Major impacts on channel morphology through the removal of a wide range of morphological features and / or replacing a large extent of the natural bed and/or banks with artificial material. Major channel realignment significantly altering the natural channel planform and bank profiles typically in the loss of sinuosity, increased channel gradient and higher stream powers. This poses erosion risk problems due to the higher stream energy. Major realignment impacts on natural channel processes, which has knock-on effects on sediment regime, flow diversity and depositional features. **Natural Fluvial Processes:** Major interruption to fluvial processes such as channel planform evolution or erosion and deposition. **Water Quality**: Major shift away from the baseline conditions. Equivalent to downgrading two WFD classes, e.g. from Good to Poor, or any change that downgrades a site in quality status. Loss or extensive change to a fishery or a designated nature conservation site. Loss of regionally important public water supply. **Water Dependent Biodiversity:** Major alteration to drainage regime within habitat Permanent physical barrier. Major run off or spillage leading to additional water quality reduction (as above).

Magnitude	Typical Examples
Medium Adverse	Results in effect on integrity of attribute, or loss of part of attribute. **Hydrology and Flood Risk:** Moderate shift away from baseline conditions and moderate changes to the flow regime. An alteration to a catchment area in excess of 10% but less than 25%. An increase in peak flood level (for a 1% AEP event) >500 mm resulting in an increased risk of flooding to >100 residential properties or an increase of >50 mm resulting in an increased risk of flooding to 1-100 residential properties. **Fluvial Geomorphology:** One to three additional water feature crossings or structures (including outfalls) required, increasing the extent of water feature modification which has the potential to result in the following changes: **Sediment Regime:** Moderate change to the natural equilibrium through modification, partially changing the natural function of the water feature (sediment source, sink or transfer zone). This may arise from a moderate increase in amount of fine sediment and turbidity. **Channel Morphology:** Moderate impact on channel morphology through the removal of a range of morphological features and / or replacing a medium extent of the natural bed and/or banks with artificial material. Channel realignment resulting in a moderate change in channel planform and bank profiles typically resulting in some loss of sinuosity, increased channel gradient and higher stream powers. Erosion risk may increase as a result of the increased gradient and stream power. The realignment would partially change natural channel processes, including sediment regime, flow diversity and depositional features. **Natural Fluvial Processes:** Moderate interruption to fluvial processes such as channel planform evolution or erosion. **Water Quality:** Moderate shift from the baseline conditions that may be long-term or temporary. Equivalent to downgrading one WFD class, e.g. from Moderate to Poor. Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. **Water Dependent Biodiversity:** Moderate alteration to drainage/hydrology regime within or to the habitat. Temporary (long term) physical barrier. Run off or spillage leading to additional water quality reduction (as above).
Low Adverse	Results in some measurable change in attributes quality or vulnerability. **Hydrology and Flood Risk:** Slight changes to the flow regime. An alteration to a catchment area in excess of 1% but less than 10%. An increase in peak flood level (for a 1% AEP event) >250 mm resulting in an increased risk of flooding to fewer than 10 industrial properties. **Fluvial Geomorphology:** Upgrade to, or extension of, existing water feature crossing or structure or construction of proposed route in close proximity to water feature. This has the potential to result in: **Sediment Regime:** Minor change to the natural equilibrium through modification, locally changing the natural function of the water feature (sediment source, sink or transfer zone). This may arise from a slight increase in amount of fine sediment and turbidity. **Channel Morphology:** Limited impact on channel morphology, through removal of some morphological features and / or replacing a small extent of the natural bed and/or banks with artificial material. Minor realignments, typically localised around structures such as culverts and bridges having limited impact on channel planform, gradient, bank profiles and channel processes. **Natural Fluvial Processes:** Slight change in fluvial processes operating in the river; any change is likely to be highly localised.

Magnitude	Typical Examples
	Water Quality: Minor shift away from the baseline conditions. Impact on WFD attribute resulting in reduction in sub-classification but no reduction in overall classification. Minor effects on water supplies. **Water Dependent Biodiversity:** Minor alteration to drainage/hydrology regime within or to the habitat. Temporary physical barrier. Run off or spillage leading to water quality reduction (as above).
Negligible	The English Onshore Scheme is unlikely to affect the integrity of the water environment. **Hydrology and Flood Risk:** Negligible changes to the flow regime (i.e. changes that are within the monitoring errors). An alteration to a catchment area of less than 1% reduction or increase in area. Negligible change in peak flood level (for a 1% AEP event) <±10 mm. **Fluvial Geomorphology:** No direct engineering impact but potential indirect impact due to proximity of the water feature to the English Onshore Scheme. **Sediment Regime:** Negligible change to the natural equilibrium. Negligible amount of sediment released into the water feature, with no noticeable change to the turbidity or bed substrate. **Channel Morphology:** No significant impact on channel morphology in the local vicinity of the English Onshore Scheme. **Natural Fluvial Processes:** No change in fluvial processes operating in the river; any change is likely to be highly localised. **Water Quality:** No perceptible changes to water quality and no change within the WFD classification scheme. **Water Dependent Biodiversity:** No perceptible changes to water quality or quantity to or at the habitat.
Low Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring. **Hydrology and Flood Risk:** Minor improvement over baseline conditions. It would involve a reduction in peak flood level (for a 1% AEP event) >250 mm. **Fluvial Geomorphology:** Slight improvement of the river channel from baseline conditions as a consequence of the works. Note: beneficial impacts would only arise on impacted/modified/artificial water features. The greatest improvement would occur on water features that have a uniform morphology, acting as a transfer (larger water features) or sink (minor water features with limited flow and overgrown vegetation) of sediment and no signs of active fluvial processes. **Sediment Regime: S**light improvement towards natural equilibrium, which is returning the function of the water feature (sediment source, sink or transfer of sediment) to a natural one. **Channel Morphology:** Limited improvement to morphological diversity. **Natural Fluvial Processes**: Slight change to fluvial processes which results in improved river forms and habitats. **Water Quality**: Minor improvement over baseline conditions. **Water Dependent Biodiversity**: Minor improvement to water quality and quantity within the habitat over baseline conditions.
Medium Beneficial	Results in moderate improvement of attribute quality. **Hydrology and Flood Risk:** A measurable improvement over baseline conditions involving a reduction in peak flood level (for a 1% AEP event) >500 mm.

Magnitude	Typical Examples
	Fluvial Geomorphology: Moderate improvement to a water feature as a result of the works through means of restoration or mitigation. **Sediment Regime:** Moderate improvement towards natural equilibrium, which is returning the function of the water feature (sediment source, sink or transfer of sediment) to a natural one. **Channel Morphology:** Moderate improvement to morphological diversity. **Natural Fluvial Processes:** Moderate change to fluvial processes which results in improved river forms and habitats. **Water Quality:** A moderate improvement over baseline conditions, which may result in the upgrade of quality status in line with the requirements of the WFD. **Water Dependent Biodiversity:** Minor improvement to water quality and quantity within the habitat over baseline conditions.
High Beneficial	Results in major improvement of attribute quality. **Hydrology and Flood Risk:** Major improvement over baseline conditions. The reduction in peak flood level (for a 1% AEP event) of >750 mm. **Fluvial Geomorphology:** Significant improvement to a water feature as a result of substantial restoration or mitigation. This could provide a major improvement from baseline conditions. **Sediment Regime:** Major improvement towards natural equilibrium, returning the function of the water feature (sediment source, sink or transfer of sediment) to a natural one. **Channel Morphology:** Major improvement to morphological diversity. **Natural Fluvial Processes:** Major change to fluvial processes which results in improved river forms and habitats. **Water Quality:** Major improvement over baseline conditions, whereby the removal or likelihood of removal of existing pressures, results in a water feature which meets WFD targets. Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring to a watercourse. **Water Dependent Biodiversity:** Major improvement to water quality and quantity within the habitat over baseline conditions. Removal of physical barriers.

11.3.4.5 Assessing of the Significance of Effects

The significance of potential effects has been determined taking into account the sensitivity of the attributes of each receptor and the magnitude of each impact.

The significance of the effect is determined as per the matrix in **Table 11-5**. For the purposes of this assessment any effect that is **Major** or **Moderate** is considered to be significant. Any effect that is **Minor** or **Negligible** is not significant.

Table 11-5: Matrix Used to Determine the Significance of Potential Effects

Sensitivity of Receptor	Magnitude of Change			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible	**Negligible/Minor**
Low	Negligible	Negligible	Minor	**Moderate**
Medium	Negligible	Minor	Moderate	**Major**
High	**Negligible/Minor**	**Moderate**	**Major**	**Major**

It should also be noted that for impacts associated with low probability major impact events, such as flooding or major spillage, the application of the above assessment methodology could suggest an artificially high significance of the effect on the water environment. Therefore, for qualitative assessments, the output of the assessment has been reviewed using professional judgement, and where considered appropriate, the assessed significance has been reduced to reflect the low probability of occurrence. This is in line with the recommendations within the DMRB.

The mitigation hierarchy, alongside best practice, has been applied to develop measures to mitigate against the potential temporary and permanent impacts of the English Onshore Scheme. Workshops with environmental specialists and engineers have been undertaken to review the DC cable route alignment, converter station design and identify the best possible cable installation methods.

11.3.4.6 Cumulative Effects

The cumulative effect of the English Onshore Scheme in conjunction with other proposed developments in the vicinity of the scheme, and the combined effects of impacts on the surface water dependent statutory designated sites, surface water dependent non-statutory designated sites, and standing water bodies have been assessed. This has been done qualitatively through consideration of any proposed developments with planning consent secured or those identified in the LDP that could have impacts on the local flood risk, water quality, fluvial geomorphology, or aquatic ecology. In addition to this, the planning conditions assigned to any of the proposed developments have also been considered.

11.3.5 Limitations and Assumptions

It has been assumed that publicly available data from the sources listed in Section 11.3.3.1 are an accurate representation of the water environment of the English Onshore Scheme and surrounding area.

The surveys provide a snapshot of the water features and processes occurring at one point in time. However, conditions which vary seasonally (such as vegetation growth, land use, and water levels) can affect fluvial processes and changes to the morphology of the channel. The predominant sediment regime and stability of the water feature was inferred from the features observed. Where bank material was found to be obscured due to vegetation growth and limited access, observations were made at upstream and downstream locations and nearby tributaries to help indicate the boundary conditions.

Due to the number of watercourses crossed by the English Onshore Scheme, a proportionate approach to surveying was undertaken as described in Section 11.3.3.2.

Several water bodies included in this assessment have been categorised under the WFD by the EA. Detailed information available from the EA is summarised in the WFD Compliance Assessment report (**Appendix 11A**) and referred to within this assessment. In addition, information obtained in walkover surveys, surrounding land use and downstream designations have also been taken into account during the assessment. It has been assumed that the information contained in this source is an accurate representation of the water environment within the study area and surrounding area.

The assessments made on flood risk have been based on data from the EA, the ERYC SFRA and Yorkshire Water. There are a number of smaller watercourses within the study area which are small ungauged catchments. Water quality and flood estimation for these is less certain than for larger gauged catchments with long flow records.

An FRA has been provided in **Appendix 11B**. It has been assumed that the information which underpins this FRA such as that provided by the Environment Agency is an accurate representation of the water environment within the Study Area and surrounding area.

The hydrological and land drainage assessment has been based on open cut cable installation being utilised through the majority of the route extending through agricultural land. Trenchless installation methods (likely to be HDD) have been assessed at locations where these are committed, and where there is the potential for watercourse crossings to be HDD or open cut the assessment has assumed the worst case scenario and these have been assessed as open cut crossings. This is as per the design and crossing schedule as described in Chapter 3: Description of the English Onshore Scheme. The proposed Drax converter station will be the only above ground permanent infrastructure for the English Onshore Scheme.

As per the design details outlined in **Chapter 3: Description of the English Onshore Scheme** at the landfall at Fraisthorpe, the transition joint pit (TJP) has been set back approximately 145 m from the current coastline, to account for the predicted retreat of the coastline from ongoing erosion. Trenchless installation (likely to be HDD) at the landfall has been committed to by the English Onshore Scheme beneath the headland and out to a breakout location within the nearshore marine environment to avoid direct disturbance to the existing coastline, prevent cable exposure and potential future damage and also avoid exacerbating current coastal erosion. The depth of the DC cables installed from the TJP will be subject to further ground investigation and engineering surveys undertaken by the appointed Contractor and subject to agreement with ERYC and the MMO and where necessary can be a condition of approval of consent. As such the potential impact to coastal erosion, and secondary or indirect impacts to watercourses have been scoped out of this assessment.

It has been assumed that geogrid material will be placed on top of gravel material/unbound granular material that comprises the proposed roads to ensure that there is no movement of material that may then be deposited in other watercourses or the floodplain as a result of a flooding event.

11.4 Study Area

For the proposed landfall and cable route, the assessment considers the potential for direct hydrological impacts to be within 250 m of the planning application boundary of the English Onshore Scheme (referred to as the direct impact area). Impacts to surface water resource and flood risk receptors crossed by the English Onshore Scheme could result in indirect hydrological effects to other surface water resource and flood risk receptors upstream and/or downstream of the local hydrological area of influence. Therefore, a wider study area is required to identify potentially sensitive high-value receptors beyond the site boundary.

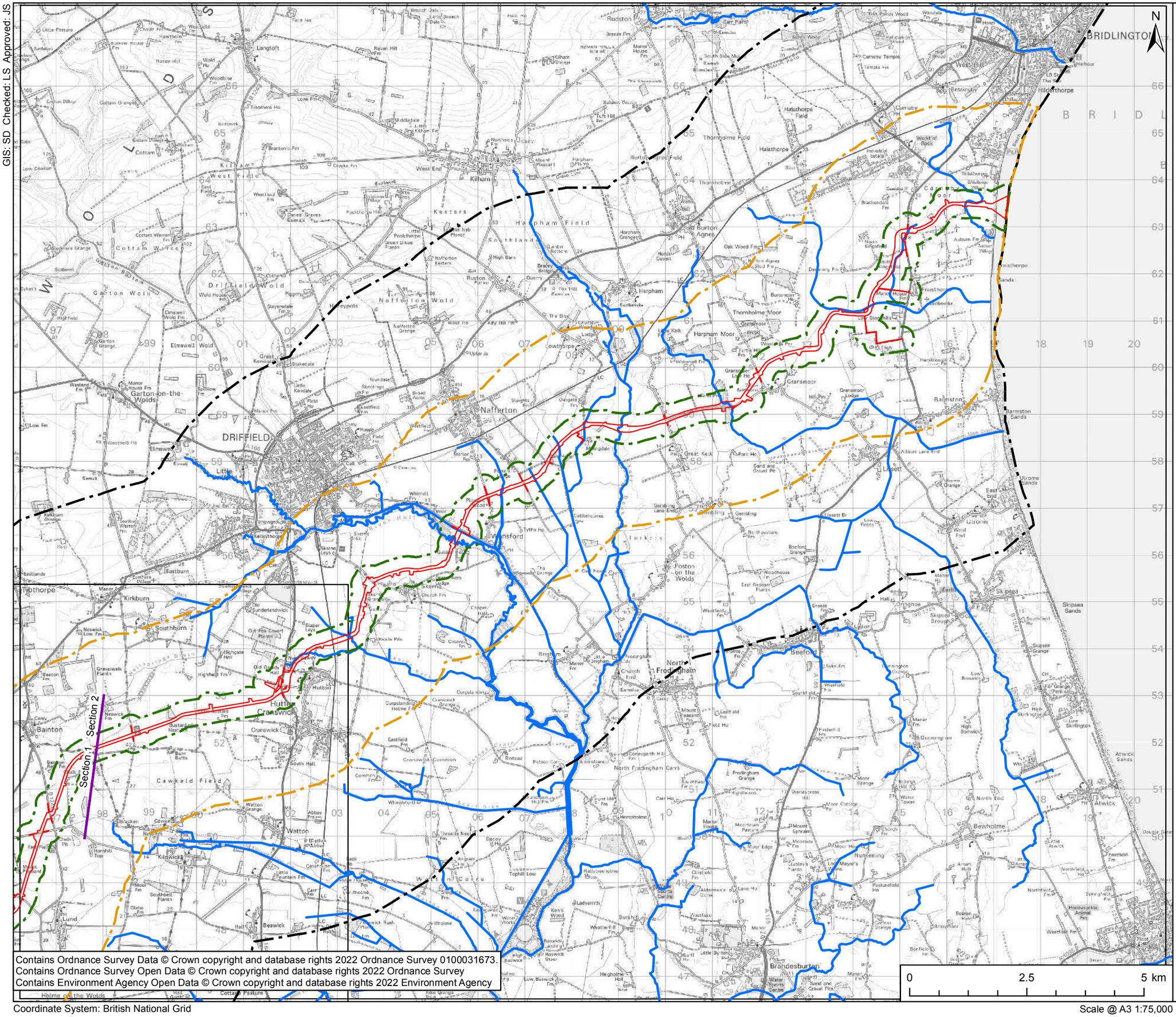
Indirect hydrological impacts associated with the English Onshore Scheme are considered to be negligible to water resource receptors (water bodies and water dependent habitats) located over 2 km away from the English Onshore Scheme. Due to the dilution and in-channel processing that will occur within 2 km, it is difficult to categorically determine the source of impacts to water resources and hydrology beyond this distance. It is considered that 2 km is a sufficient study area for these receptors, taking into account the nature of the development and the rural location of the English Onshore Scheme.

Indirect hydrological impacts associated with the English Onshore Scheme are considered to be negligible to people, property and infrastructure receptors (including flood risk, water supply and discharge) located over 5 km from the English Onshore Scheme. Although the English Onshore Scheme will cross predominantly rural land, there are urban and developed areas close by. As such, 5 km is considered to be a sufficient study area as beyond this it will be difficult to determine the source of impacts. In addition, potential effects are likely to have dissipated through channel storage or dilution. Therefore, only people, property and infrastructure receptors within the 5 km buffer have been assessed.

In summary, the study area (see **Figure 11-1**) for this chapter has considered:

- direct hydrological impacts to receptors within 250m of the English Onshore Scheme (the direct impact area);
- indirect hydrological impacts to water bodies and water dependent habitats within 2 km of the English Onshore Scheme (the 2 km study area); and
- indirect hydrological impacts to people, property and infrastructure within 5 km of the English Onshore Scheme (the 5 km study area).

GIS: SD Checked: LS Approved: JS



Coordinate System: British National Grid

Scale @ A3 1:75,000

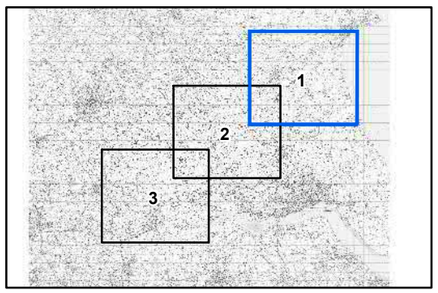
nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Main Rivers and Drains



TITLE

Figure 11-1
Study Area

REFERENCE

SEGL2_T_ES_11-1_v1_20220517

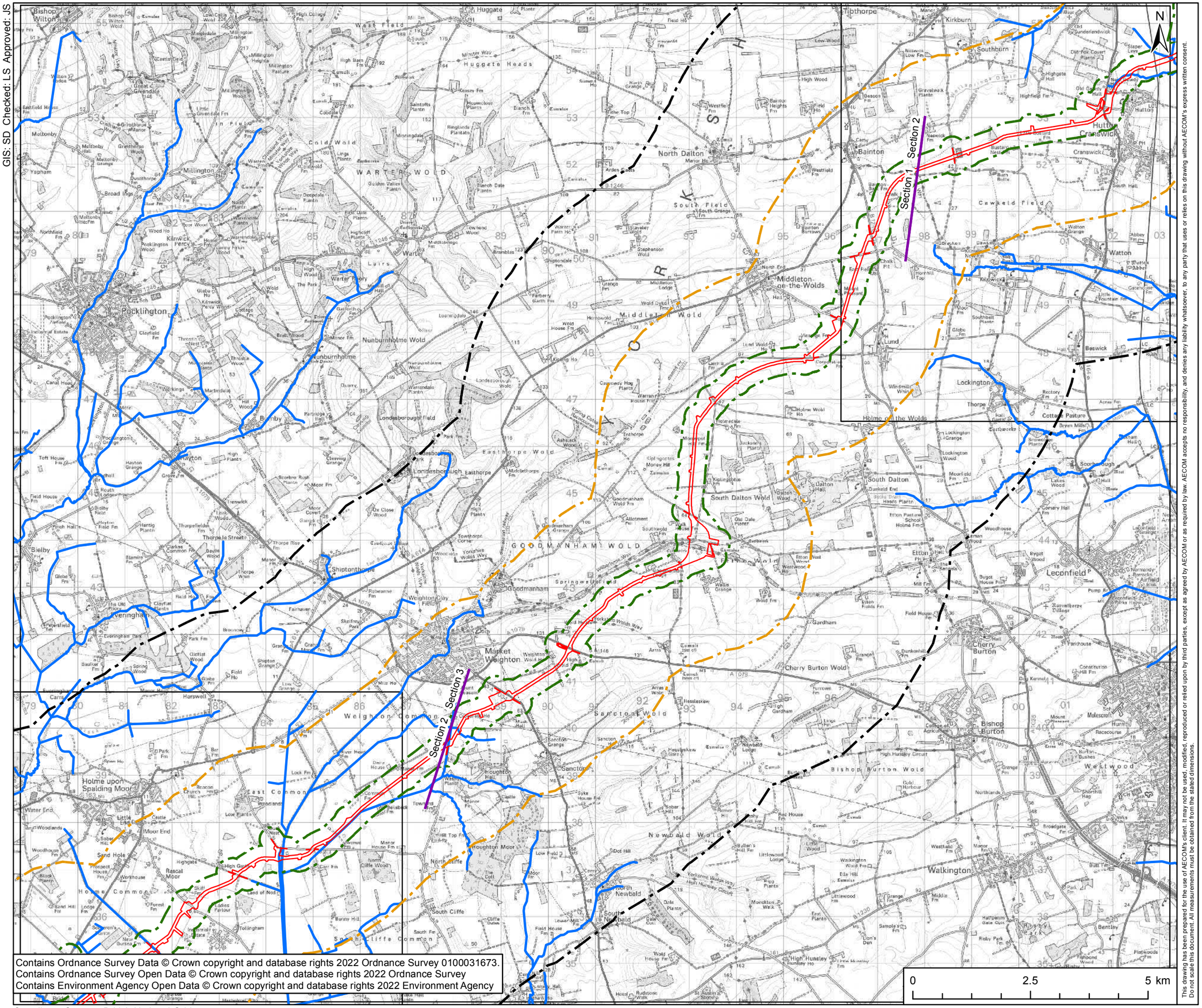
SHEET NUMBER

1 of 3

DATE

17/05/2022

GIS: SD Checked: LS Approved: JS



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Scale @ A3 1:75,000

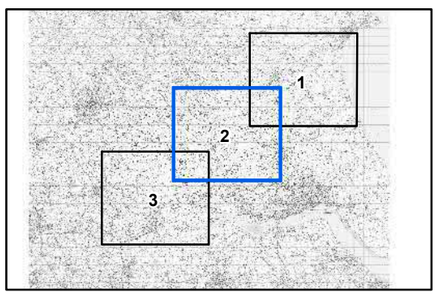
nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Main Rivers and Drains



TITLE

Figure 11-1
Study Area

REFERENCE

SEGL2_T_ES_11-1_v1_20220517

SHEET NUMBER: 2 of 3

DATE: 17/05/2022

GIS: SD Checked: LS Approved: JS

Section 4

Section 3

N

0 2.5 5 km

Scale @ A3 1:75,000

Coordinate System: British National Grid

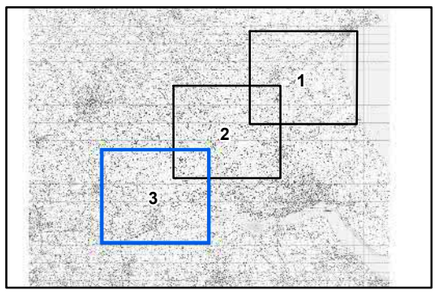
nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Main Rivers and Drains



TITLE

Figure 11-1
Study Area

REFERENCE

SEGL2_T_ES_11-1_v1_20220517

SHEET NUMBER

3 of 3

DATE

17/05/2022

11.5 Baseline Environment

11.5.1 Section 1 – Landfall to Bainton

11.5.1.1 Water Features Crossed by the English Onshore Scheme

There are a total of 44 water features crossed by Section 1 of the English Onshore Scheme which are listed in **Table 11-6**. These lie mainly within the drainage catchment of the River Hull and consist of a mix of main rivers, ordinary watercourses, and minor drains. These catchments are within the East Riding of Yorkshire Local Authority and Beverly and North Holderness IDB. These are shown on **Figure 11-1**.

Potential cable crossing types are described within **Chapter 3: Description of the English Onshore Scheme**. The proposed route will be installed by a combination of open cut and trenchless methods. Open cut methods will be utilised more commonly across the underground cable route as it will be utilised when installing the cables within open agricultural land. Trenchless methods will typically be utilised where obstacles including main rivers and environmentally designated watercourses/sites require to be crossed. A summary of all watercourses crossed in listed in **Table 11-6** below.

In addition, the haul road will also cross separately within the working width (i.e. the temporary area required to facilitate the installation of the underground DC cables). Main rivers Nafferton Beck, Nafferton Drain, and Kelk Beck will be crossed by a clear span temporary bridge, with the remaining watercourses crossed by temporary culvert installation. West Beck (River Hull) and Driffield Canal will not be crossed by a haul road crossing and instead traffic diverted along the existing road network. All crossings will be designed in line with EA, IDB and LLFA requirements in accordance with the Environmental Permitting (England and Wales) Regulations 2016.

Table 11-6: Water Features crossed by Section 1 of the English Onshore Scheme

Name of Water Feature	HDD crossing Ref (if applicable)	NGR	Operators
Auburn Beck from Source to North Sea (GB104026066650)	HDD_001	TA 16412 63510	N/A
Drain in headwaters of Earls Dyke from Source to North Sea GB104026066640	-	TA 14959 62834	N/A
Drain in headwaters of Carr Dyke	-	TA 14566 61832	N/A
The Earl's Dike	HDD_003 (potential to be open cut)	TA 14382 61322	Beverley and North Holderness IDB No. 88
Burton Drain	HDD_004 (potential to be open cut)	TA 13491 60467	Beverley and North Holderness IDB No. 86
Drain in headwaters of Burton Drain	-	TA 12898 60336	N/A
Drain in headwaters of Gransmoor Drain (Burton Agnes to Lissett Area) GB104026066630	-	TA 11879 59686	N/A
Drain in headwaters of Gransmoor Drain (Burton Agnes to Lissett Area) GB104026066630	HDD_006	TA 11452 59204	N/A
Gransmoor Drain (Burton Agnes to Lissett Area) GB104026066630	HDD_006	TA 11361 59213	Beverley and North Holderness IDB No. 82
Tributary of Gransmoor Drain (Burton Agnes to Lissett Area) GB104026066630	HDD_006	TA 11212 59190	N/A

Name of Water Feature	HDD crossing Ref (if applicable)	NGR	Operators
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	-	TA 10655 59098	N/A
Kelk Beck (Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck (GB104026067101))	HDD_008	TA 09226 59271	Main River (EA) Chalk stream (Natural England (NE)) SSSI (NE)
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	HDD_008	TA 08990 58714	N/A
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	-	TA 08665 58701	N/A
Warren Hill Drain	HDD_009 (potential to be open cut)	TA 08257 58729	Beverley and North Holderness IDB No. 51
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	HDD_009 (potential to be open cut)	TA 08055 58660	N/A
White Dike Branch	HDD_010 (potential to be open cut)	TA 07665 58434	Beverley and North Holderness IDB No. 49
White Dike	HDD_010 (potential to be open cut)	TA 07542 58342	Beverley and North Holderness IDB No. 50
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	HDD_011 (potential to be open cut)	TA 07385 57782	N/A
Nafferton Drain In headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	HDD_012	TA 07205 57614	Main River (EA)
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	HDD_013 (potential to be open cut)	TA 06968 57520	N/A
Drain in headwaters of Lowthorpe/Kelk/Foston Bks from Source to Frodingham Beck GB104026067101	-	TA 06773 57415	N/A
Nafferton Beck Nafferton from Source to Driffield Canal (GB104026067090)	HDD_014	TA 06517 57376	Main River (EA) Chalk stream (NE)
Drain in headwaters of Nafferton Beck from Source to Driffield Canal GB104026067090	HDD_014	TA 06497 57349	N/A
Drain in headwaters of Driffield Navigation Water Body GB70410028	-	TA 05640 56519	N/A
Driffield Navigation Water Body (GB70410028)	-	TA 05629 56495	Main River (EA)
Drain in headwaters of West Beck Upper GB104026067080	HDD_015	TA 05569 56370	N/A
West Beck Upper (GB104026067080)	HDD_015	TA 05512 56282	Main River

Name of Water Feature	HDD crossing Ref (if applicable)	NGR	Operators
			Chalk stream (NE) SSSI (NE)
Wanlass Drain	HDD_015	TA 05478 56228	Beverley and North Holderness IDB No. 43
Drain in headwaters of West Beck Upper GB104026067080	HDD_016 (potential to be open cut)	TA 05241 55792	N/A
Drain in headwaters of West Beck Lower to River Hull GB104026067040	-	TA 04311 55683	N/A
Drain in headwaters of West Beck Lower to River Hull GB104026067040	HDD_017 (potential to be open cut)	TA 03748 55429	N/A
Drain in headwaters of Skerne Beck GB104026067041	HDD_018 (potential to be open cut)	TA 03538 54894	N/A
Drain in headwaters of Skerne Beck GB104026067041	HDD_018 (potential to be open cut)	TA 03537 54714	N/A
Tributary of Knorka Dike	HDD_019 (potential to be open cut)	TA 03256 54276	N/A
Knorka Dike (Drain)	HDD_019 (potential to be open cut)	TA 02769 54503	Beverley and North Holderness IDB No. 42
Northfield Beck	HDD_21	TA 02316 53889	N/A
Drain in headwaters of Skerne Beck GB104026067041	HDD_22	TA 01837 53208	N/A
Drain in headwaters of Skerne Beck GB104026067041	HDD_22	TA 01850 52997	N/A
Drain in headwaters of Skerne Beck GB104026067041	-	TA 01132 52987	N/A
Drain in headwaters of Skerne Beck GB104026067041	-	TA 00422 52791	N/A

11.5.1.2 WFD Surface Water Bodies

The EA has provided the most recent WFD classifications for watercourses within the study area. In total, there are 13 designated WFD surface water bodies in Section 1 of the study area, seven of which are crossed by the English Onshore Scheme. Their status is listed in **Table 11-7**.

Of the seven crossed water bodies, six are designated heavily modified or artificial. Whereas the WFD water body Lowthorpe/Kelk/ Foston Bks from Source to Frodingham Beck is not designated heavily modified or artificial.

Table 11-7: WFD Surface Water Bodies within the 2 km Study Area of Section 1 of the English Onshore Scheme

WFD ID	Water Body Name	Type	Current Status (2019)			Failing Elements	Reasons for not achieving good status	2027 Ecological Objective
			Ecological	Chemical	Overall			
GB640402491000 (directly crossed)	Yorkshire South	Coastal Water	Moderate	Fail	Moderate	PBDE Benzo(g-h-i)perylene Mercury and its compounds Tributyltin compounds	Physical modification	Good
GB104026066650 (directly crossed)	Auburn Beck from Source to North Sea	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Suspect data	Good
GB104026066640 (not crossed)	Earls Dyke from Source to North Sea	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Land drainage-operational management (physical modification) Trade/industry discharge (point source) Poor nutrient management (diffuse source) Sewage discharge (point source)	Good
GB104026066630 (directly crossed)	Gransmoor Drain (Burton Agnes to Lissett Area)	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Land drainage-operational management (physical modification) Sewage discharge (point source)	Good
GB104026067101 (directly crossed)	Lowthorpe/Kelk/ Foston Bks from Source to Frodingham Beck	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Barriers-ecological discontinuity (physical modification) Poor soil management (diffuse source) Land drainage-operational management (physical modification)	Good
GB104026067090 (directly crossed)	Nafferton Beck from Source to Driffield Canal	Surface Water	Moderate	Fail	Moderate	Cypermethrin (Priority hazardous) PBDE Mercury and its compounds	Poor soil management (diffuse source) Physical modification Sewage discharge (point source) Private sewage treatment (point source)	Moderate (only 2015 objective available for ecology)

WFD ID	Water Body Name	Type	Current Status (2019)			Failing Elements	Reasons for not achieving good status	2027 Ecological Objective
			Ecological	Chemical	Overall			
GB70410028 (directly crossed)	Driffield Navigation Water Body	Canal	Good	Good	Good	N/A	N/A	Met
GB104026067080 (directly crossed)	West Beck Upper	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Land drainage-operational management (physical modification) Trade/industry discharge (point source) Surface water abstraction (flow) Barriers-ecological discontinuity (physical modification) Commercial fin fisheries (physical modification) Riparian/in-river activities (diffuse source) Physical modification	Good
GB104026067040 (not crossed)	West Beck Lower to River Hull	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Physical modification Suspect data	Good (only 2021 objective available for ecology)
GB104026067041 (directly crossed)	Skerne Beck	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Physical modification	Good
GB104026067010 (not crossed)	Scurf Dike from Source to River Hull	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	None given	Good (only 2015 objective available for ecology)
GB104026067031 (not crossed)	Wellsprings Drain/Eastburn Beck/Driffield Trout Stream	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Land drainage-operational management (physical modification) Barriers-ecological discontinuity (physical modification)	Good
GB104026066980 (not crossed)	Middleton on the Wolds and Watton Beck	Surface Water	Moderate	Fail	Moderate	PBDE Mercury and its compounds	None given	Good (only 2015 objective available for ecology)

11.5.1.3 Main Rivers

There are five main rivers crossed by Section 1 of the English Onshore Scheme:

- Driffield Canal;
- Kelk Beck;
- Nafferton Drain;
- Nafferton Beck; and
- West Beck (River Hull).

Within the 2 km study area there are a further two main rivers that are not crossed by the English Onshore Scheme:

- White Dyke; and
- Skerne Beck.

However, both of these watercourses receive flows directly from upstream channels which are crossed (White Dyke ordinary watercourse and Northfield Beck respectively).

11.5.1.4 Standing Water Bodies

There are no standing water bodies crossed in Section 1 of the English Onshore Scheme. However there are 27 standing water bodies[2] within the 2 km study area as shown in **Table 11-8**.

Table 11-8: Surface Water Bodies within the 2 km Study Area of Section 1 of the English Onshore Scheme

ID	Water Body	NGR
1	Pond near East Flashdale Farm	TA 15434 64710
2	Pond near East Flashdale Farm	TA 15357 64624
3	Pond off Lancaster Road	TA 14471 64126
4	Pond near Demming Farm	TA 13942 62149
5	Pond near Burtoncarr Farm	TA 12995 61055
6	Pond near Searchlight Cottage	TA 14232 60519
7	Pond near Searchlight Cottage	TA 13987 60637
8	Pond in Gransmoor Wood	TA 11894 60675
9	Pond on Spring Hill	TA 14739 60114
10	Pond near Tithe Plantation	TA 12532 58474
11	Pond near Tithe Plantation	TA 12875 58752
12	Pond near Tithe Plantation	TA 13151 58753
13	Pond near Tithe Plantation	TA 13269 58635
14	Pond near Gransmoor Drain	TA 11446 58540
15	Reservoir in Gransmoor Quarry	TA 11263 59346
16	Kelk Lake Water	TA 10401 60331
17	Pond near Centre Farm	TA 10012 59131
18	Pond near River Hull	TA 04254 56593
19	Pond off Meggison's Turnpike	TA 03783 54103
20	Pond south of Corpslanding Road	TA 02956 52885
21	Pond near Neswick Farm	SE 98131 52893
22	Pond near Garden Covert	SE 97476 53199
23	Pond near Neswick Gardens	SE 97251 52939

[2] Some standing water bodies are included within the assessment of multiple sections due to the overlap of the 2 km study area.

ID	Water Body	NGR
24	Pond near Neswick Gardens	SE 97212 52918
25	Pond near Neswick Cottage	SE 96943 52449
26	Pond south of Applegarth Lane	SE 96655 52276
27	Pond north of Lockington Road	SE 97254 48384

None of these are associated with surface water dependent designated and non-statutory designated sites.

11.5.1.5 Water Dependent Biodiversity Sites

There are no international sites of nature conservation interest within Section 1 of the English Onshore Scheme and five national statutory protected areas within the 2 km study area:

- Fraisthorpe Bathing Waters;
- Earls Dike from Source to North Sea Nitrate Vulnerable Zone (NVZ) S825;
- Barmston Sea Drain from Skipsea Drain to N Sea NVZ S259;
- River Hull from Arram Beck to Humber NVZ S254; and
- River Hull and Headwaters SSSI.

Surface Water Dependent Statutory Designated Sites

Within the 2 km study area of Section 1 of the English Onshore Scheme there are five surface water dependent designated sites:

- ***Fraisthorpe Bathing Waters*** (located approximately 230 m east of the landfall and crossed by both the English Onshore Scheme and Marine Scheme). This is a rural sandy beach and its bathing water quality is affected by storm, emergency and surface water outfalls flowing from Auburn Beck.
- ***Earls Dyke from Source to North Sea NVZ S825*** (crossed by the English Onshore Scheme). The designation covers the entire Earls Dyke from Source to North Sea surface water body catchment area. The entire catchment is considered to be affected by pollution. The water body is primarily groundwater fed, however the main source of pollution is considered to be from arable agricultural runoff.
- ***Barmston Sea Drain from Skipsea Drain to North Sea NVZ S259*** (crossed by the English Onshore Scheme). This designation covers Gransmoor Drain (Burton Agnes to Lissett Area) WFD surface water body plus additional downstream WFD surface water catchments. The water quality in this area is considered to be improving, however it is still not to standard. Nitrogen pollution is seasonal, and thus attributed mainly to arable agriculture pollution sources although some point source (consented) discharges are contributing to the poor water quality. The surface water body considered to be affected by the pollution from the NVZ area is approximately 5 km downstream of the English Onshore Scheme and therefore it is considered there would be limited hydraulic interaction between the two.
- ***River Hull from Arram Beck to Humber NVZ S254*** (crossed by the English Onshore Scheme). This designation covers the entire Upper Hull Operational Catchment and the northern section of the Lower Hull Operational Catchment. Sources of pollution are split between consented discharges and agriculture. The designated surface water body affected by pollution from this NVZ catchment is the Beverley and Barmston Drain which is approximately 7 km downstream of the English Onshore Scheme and therefore it is considered there would be limited hydraulic interaction between the two.
- ***River Hull Headwaters SSSI*** (crossed by the English Onshore Scheme in two locations). This is the most northerly chalk stream system in Britain. Surface geology influences the character of the river with gravel, sand and silt sediments deposited on the riverbed in varying proportions. This variation in the riverbed sediments is reflected in the species composition of the aquatic vegetation which is abundant throughout the headwaters during the summer. The river valley also supports a diverse breeding bird community. Kelk Beck and West Beck (River Hull) are part of this designation.

Surface Water Dependent Non-Statutory Designated Sites

EA records indicates three chalk streams within the study area, only one of which is not otherwise designated:

- Kelk Beck (designated as a SSSI as part of River Hull Headwaters SSSI);
- Nafferton Beck; and
- West Beck (River Hull) (designated as a SSSI as part of River Hull Headwaters SSSI).

The bedrock underlying the chalk streams comprises the Flamborough Chalk Formation, which provides a high level of water feeding into the chalk streams. As such, the water received from this groundwater aquifer is of high quality. Chalk streams have characteristic features that support special habitats or species which are therefore dependent on this quality.

11.5.1.6 People, Property and Infrastructure

This section of the English Onshore Scheme mainly avoids urban/developed areas with the English Onshore Scheme centreline passing close to Wansford, Skerne and Hutton Cranswick. The section crosses major roads and railways including the A164 and Yorkshire Coast Line near Hutton Cranswick, the B1249 near Wansford and the A165 south of Bridlington.

Abstractions and Discharges

According to Abstraction Licensing data (accessed July 2021) and provided by the EA, there are 18 licensed surface water abstractions[3] within the 5 km study area detailed in **Table 11-9**.

Table 11-9: Abstraction Licences within 5 km of Section 1 of the English Onshore Scheme

Source	Licence Number	Use	Location	Max. Annual Volume (m^3)
Surface Water	2/26/30/039	Spray Irrigation - Direct	GYPSEY RACE	2,100
Surface Water	2/26/30/038	Spray Irrigation - Direct	GYPSEY RACE	2,500
Surface Water	2/26/31/065	Spray Irrigation - Direct	LOWTHORPE BECK	27,276
Surface Water	2/26/31/159	Spray Irrigation - Direct	FOSTON BECK - FOSTON ON THE WOLDS - DRIFFIELD	154,564
Surface Water	2/26/31/137	Spray Irrigation - Direct	NAFFERTON LOWLAND DRAIN	11,455
Surface Water	2/26/31/084	Fish Farm/Cress Pond Throughflow	WEST BECK AT CLEAVES FARM, SKERNE, DRIFFIELD, N HUMBERSIDE	400,000
Surface Water	2/26/31/103	Fish Farm/Cress Pond Throughflow	WEST BECK AT CLEAVES FARM, SKERNE, DRIFFIELD, N HUMBERSIDE	1,200,000
Surface Water	2/26/31/055	Spray Irrigation - Direct	NAFFERTON HIGHLAND DRAIN	11,455
Surface Water	2/26/31/116	Fish Farm/Cress Pond	DRIFFIELD CANAL	22,806,000
Surface Water	2/26/31/064	Spray Irrigation - Direct	DRIFFIELD CANAL	27,276
Surface Water	2/26/31/089	Spray Irrigation - Direct	MAIN DRAIN	13,360
Surface Water	2/26/31/118	Fish Farm/Cress Pond Throughflow	WEST BECK - WHINHILL LOCK DRIFFIELD	46,644,000
Surface Water	2/26/31/168	Spray Irrigation - Direct	SPRING - WHIN MILL LOCK	4,911

[3] Some abstraction licenses are included within the assessment of multiple sections due to the overlap of the 5 km study area.

Source	Licence Number	Use	Location	Max. Annual Volume (m^3)
Surface Water	2/26/31/117	Fish Farm/Cress Pond Throughflow	DRIFFIELD CANAL - WHINHILL LOCK	8,514,000
Surface Water	2/26/32/281	Spray Irrigation - Direct	SKERNE BECK	909
Surface Water	NE/026/0031/017	Spray Irrigation - Direct	DRAIN - HUTTON CRANSWICK	56,000
Surface Water	NE/026/0032/032	Spray Irrigation - Direct	WATTON BECK	43,000
Surface Water	NE/026/0032/031	Spray Irrigation - Direct	CAWKELD SINKS	43,000

The EA has provided a list of all licensed discharges (accessed July 2021) for the study area. The licensed discharges within 5 km of the English Onshore Scheme, have been summarised in **Appendix 11D**. It has been assumed that each discharge is to the nearest watercourse where not explicitly stated.

Historic Flood Risk

This section of the English Onshore Scheme is within the extents of the EA's Historic Flood Map (HFM) which includes the recorded flood extents of previous flood incidents. The HFM within this section is associated with unnamed ordinary watercourses and not designated main rivers.

Flood Alert and Flood Warning Areas

Flood Alert Areas (FAA) are geographical locations where it is possible for flooding to occur, based on previously modelled data, with Flood Warning Areas (FWA) defined as where flooding is expected to occur. Within these locations the EA operates an alerts and warnings service. These areas provide contextual information as to where flooding may occur though the location of these does not directly impact upon the assessment of flood risk.

This section of the English Onshore Scheme overlaps with three FAA:

- The North Sea coast from Bridlington to Barmston;
- North Holderness including Skipsea, Hornsea and Lisset; and
- Upper Hill area including Kilham, Nafferton, Driffield, Bainton, North Dalton, Leconfield, Leven, Brandesburton, North Frodingham and Beeford, North Frodingham and Beeford.

This section of the English Onshore Scheme overlaps with one FWA:

- River Hull and tributaries at Frodingham, Hempholme and Burshill.

Fluvial Flood Risk

This section of the English Onshore Scheme overlaps with the extents of both Flood Zone 2 and Flood Zone 3 from fluvially dominant sources, according to EA mapping and the ERYC SFRA. Flood Map for Planning is included in **Figure 11-2**. Fluvial risk is concentrated along watercourses that cross the English Onshore Scheme. In particular this includes West Beck, River Hull and other ordinary watercourses southwest of Driffield, Gransmoor Drain and Kell Beck near Lowthorpe and ordinary watercourses west of Fraisthorpe.

Modelled flood extents from the EA's River Hull and Holderness Drain Flood Mapping Study (2013) (Ref 11-20) are shown to overlap into the direct impact area and cross the proposed English Onshore Scheme underground DC cable route. The model includes both defended and undefended outputs as well as incorporating fluvial and tidal risk. In this section fluvial is considered the primary risk. In the defended scenario 50% AEP no flooding is shown to occur. The 5% AEP event shows land between the River Hull and Main Drain inundated with this overlapping the proposed underground DC cable route, though flood extents are primarily focused to the west of the English Onshore Scheme proposed underground DC cable route. Flood extents in the 1% AEP event were modelled to be largely the same extent of risk as with the 5% AEP event. Flooding extends to include land east of the underground DC cable route in the 0.1% AEP event. In the undefended scenario, modelled flood extents cover largely

the same areas though to a lesser extent than the defended outlines. This is most notable in the 0.1% AEP event where flooding only extends onto land west of the English Onshore Scheme proposed underground DC cable route and not to the east.

Flood depths and hazard outputs are not available to be provided for this location as these were only modelled for surrounding areas to Northern Hull and Beverley.

Tidal Flood Risk

This section of the English Onshore Scheme is also within the extents of Flood Zone 2 and 3 from tidally dominant sources. These are concentrated at the eastern end of this section as the English Onshore Scheme makes landfall. Tidal risk is focused on the shoreline and along Burton Drain north of Lisset. As such, the TJP is located outside of Flood Zone 2 and 3 at this location.

Surface Water Flood Risk

Flooding from surface water can be caused by rainfall being unable to infiltrate into the natural ground or enter the drainage system due to blockage, or from flows being above design capacity. This can result in temporary localised ponding and flooding. The natural topography and location of buildings/structures can influence the direction and depth of water flowing off impermeable and permeable surfaces.

This section of the English Onshore Scheme is within areas of surface water risk, according to EA mapping (see **Figure 11-3**). Surface water flood risk is very dispersed across the entire length of this section, with numerous pockets of high risk near Skerne, Wansford and north of Barmston. Two major pathways are seen near Fraisthorpe where surface water follows Demming Drain and Stonehills Drain and another follows Northfield Beck and Knorka Dike near Skerne.

Groundwater Flood Risk

Groundwater flooding occurs when the water levels in the ground rise above the surface. It is most likely to occur in low-lying areas underlain by drift and rocks.

When groundwater flooding occurs, it can have a number of different impacts. In low-lying depressions, groundwater can be above the ground surface and cause ponding that can last for long periods of time. Elsewhere, it may result in watercourses flowing where there are normally none and in other areas it may cause waterlogging of the ground. It is difficult to predict how groundwater flooding will affect an area however, groundwater will typically emerge and flow to low points where it will pond or form ‘new’ watercourses. Consequently, existing surface water flooding datasets may in some locations be a suitable proxy for the areas that might be affected within those areas at risk from groundwater flooding.

British Geological Society Mapping shows this area is mostly underlain by chalk bedrock and superficial deposits of glacial till meaning this section is permeable to both infiltration and groundwater. In addition, soilscape mapping of the predominant soil profile supports this.

The ERYC SFRA, using the Areas Susceptible to Groundwater Flooding (AStGWF) dataset which splits land into 1 km^2 tiles shows many of the tiles in this section, between Bridlington and Driffield, having a ≥75% coverage of areas at high risk of groundwater flooding.

Sewer and Drains Flood Risk

Flooding from sewers occurs when the sewer capacity is exceeded due to heavy rainfall, blockage or due to inadequate design. Sewers are generally designed to cope with mid to low order rainfall events (i.e. not to flood during events up to the 1 in 30-year return period).

Data supplied by Yorkshire Water indicated that they had no records of sewers or drains within the study area and therefore no records on the DG5 register (a list of properties that have flooded previously as a result of hydraulic inadequacy of the public sewer network) of hydraulic failure incidents resulting from sewers and drains.

Reservoir Flood Risk

This section of the English Onshore Scheme is not shown to overlap with areas at risk from reservoir flood mapping, according to EA mapping (see **Figure 11-4**).

Residual Flood Risk (Flood Defences)

This section of the English Onshore Scheme is not shown to overlap with the EA Flood Map for Planning's Areas Benefitting from Defences (ABD) layer.

There are assets included in the EA's Spatial Flood Defences layer shown that overlap with this section of the English Onshore Scheme. These mainly include areas of privately owned and operated high ground, presumed to not be formal defences, as well as one area of embankments operated by the EA. The defences are focused in the centre of the section near Driffield and Nafferton.

This section lies outside any recorded Flood Storage Areas (FSA), according to EA mapping.

11.5.2 Section 2 – Bainton to Market Weighton

11.5.2.1 Water Features Crossed by the English Onshore Scheme

There are a total of five water features crossed by Section 2 of the English Onshore Scheme which are listed in **Table 11-10.** These lie mainly within the drainage catchment of the River Hull and River Foulness and consist of minor drains only. These catchments are within the East Riding of Yorkshire Local Authority. These are shown in **Figure 11-1**.

Section 2 is not located within the district area of an IDB.

Assumed underground DC cable crossing types are described within **Chapter 3: Description of the English Onshore Scheme**. All crossings in Section 2 will be crossed by open cut techniques.

In addition, the haul road will also cross separately within the working width by temporary culvert installation.

All crossings will be designed in line with LLFA requirements in accordance with the Environmental Permitting (England and Wales) Regulations 2016.

Table 11-10: Water Features Crossed by Section 2 of the English Onshore Scheme

Name of Water Feature	NGR	Operators
Drain in headwaters of Bowman Drain	SE 88725 40436	N/A
Drain in headwaters of Bowman Drain	SE 88181 40189	N/A
Bowman Drain	SE 88084 39971	N/A
Drain in headwaters of Bowman Drain	SE 87883 39689	N/A
Drain in headwaters of Bowman Drain	SE 87858 39676	N/A

11.5.2.2 WFD Surface Water Bodies

The EA has provided the most recent WFD classifications for watercourses within the study area. In total, there are three designated WFD surface water bodies in the study area, none of which are crossed by Section 2 of the English Onshore Scheme. Their status is listed in **Table 11-11**[4].

[4] Some WFD water bodies are included within the assessment of multiple sections due to the overlap of the 2 km study area.

Table 11-11: WFD Surface Water Bodies within the 2 km Study Area of Section 2 of the English Onshore Scheme

WFD ID	Water Body Name	Current Status (2019)			Failing Elements	Reasons for not achieving good status	2027 Ecological Objective
		Ecological	Chemical	Overall			
GB104026066690 (not crossed)	Foulness from Black Beck to Market Weighton Canal	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Septic tanks (diffuse source) Trade/industry discharge (point source) Poor nutrient management (diffuse source)	Good
GB104026067031 (not crossed)	Wellsprings Drain/Eastburn Beck/Driffield Trout Stream	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Land drainage-operational management (physical modification) Barriers-ecological discontinuity (physical modification)	Good
GB104026066980 (not crossed)	Middleton on the Wolds and Watton Beck	Moderate	Fail	Moderate	PBDE Mercury and its compounds	None given	Good (only 2015 objective available for ecology)

11.5.2.3 Main Rivers

There are no main rivers crossed by Section 2 of the English Onshore Scheme, however the Back Delfin/Market Weighton Canal is located within the 2 km study area. This river is also crossed by Section 3 of the English Onshore Scheme.

11.5.2.4 Standing Water Bodies

The English Onshore Scheme does not cross any standing water bodies, however there are 22 standing water bodies[5] within the 2 km study area, as shown in **Table 11-12**.

Table 11-12: Standing Water Bodies within the 2 km Study Area of Section 2 of the English Onshore Scheme

ID	Water Body	NGR
21	Pond near Neswick Farm	SE 98131 52893
22	Pond near Garden Covert	SE 97476 53199
23	Pond near Neswick Gardens	SE 97251 52939
24	Pond near Neswick Gardens	SE 97212 52918
25	Pond near Neswick Cottage	SE 96943 52449
26	Pond south of Applegarth Lane	SE 96655 52276
27	Pond north of Lockington Road	SE 97254 48384
28	Pond south of Beverley Road	SE 94847 49295
29	Pond south of A614	SE 94936 49671
30	Pond east of Pickering Park Road	SE 94552 49551
31	Pond south of A1079	SE 87692 40698
32	Pond near Crossfield House	SE 87985 40120
33	Pond near the White Lodge	SE 88168 39633
34	South Park Cascade	SE 88446 38778
35	Pond near Castle Farm	SE 88595 38623
36	Pond near Bowman Drain	SE 86644 39961
37	Pond near river Farm	SE 86040 39646
38	Pond near Common Farm	SE 85912 38629
39	Pond near Common Farm	SE 85672 38450
40	Pond near Common Farm	SE 85470 38412
41	Pond near Common Farm	SE 85490 38210
42	Pond near Common Farm	SE 85398 38033

None of these are associated with surface water dependent designated and non-statutory designated sites.

11.5.2.5 Water Dependent Biodiversity Sites

There are no international sites of nature conservation and two national statutory protected areas within the 2 km study area:

- River Hull from Arram Beck to Humber NVZ S254; and
- Market Weighton Canal/Bk from Source to Humber NVZ S250.

Surface Water Dependent Statutory Designated Sites

Within the 2 km study area there are two surface water dependent statutory designated sites.

- ***River Hull from Arram Beck to Humber NVZ S254*** (crossed by the English Onshore Scheme). This designation covers the entire Upper Hull Operational Catchment and the northern section of

[5] Some standing water bodies are included within the assessment of multiple sections due to the overlap of the 2 km study area.

the Lower Hull Operational Catchment. Sources of pollution are split between consented discharges and agriculture. The designated surface water body affected by pollution from this NVZ catchment is the Beverley and Barmston Drain (GB104026067211) which is approximately 7 km downstream of the English Onshore Scheme and therefore it is considered there would be limited hydraulic interaction between the two.

- ***Market Weighton Canal/Bk from Source to Humber NVZ S250*** (crossed by the English Onshore Scheme). This designation falls within the Foulness Operational Catchment. Sources of pollution are split between consented discharges, agriculture, and losses from woodland and urban areas with the majority produced by agricultural runoff. The designated surface water body affected by pollution from this NVZ catchment is the eastern branch of the Foulness from Black Beck to Market Weighton Canal which is crossed by the English Onshore Scheme at Back Delfin south of Market Weighton.

Surface Water Dependent Non-Statutory Designated Sites.

No surface water dependent non-statutory designated sites have been identified within the 2 km study area.

EA records indicate that no chalk streams are present within the 2 km study area.

11.5.2.6 People, Property and Infrastructure

This section of the English Onshore Scheme mainly avoids urban/developed areas, with the English Onshore Scheme centreline passing close to Market Weighton. The section does cross major roads including the A1034 and A1079 near Market Weighton and the B1248 near Bainton.

Abstractions and Discharges

According to Abstraction Licensing data (accessed July 2021) and provided by the EA, there are 18 surface water abstraction licences within the 5 km study area. These are included in **Table 11-13** below.

Table 11-13: Abstraction Licences within 5 km of Section 2 of the English Onshore Scheme

Source	Licence Number	Use	Location	Max. Annual Volume (m^3)
Surface Water	NE/026/0032/031	Spray Irrigation - Direct	CAWKELD SINKS	43,000
Surface Water	2/26/34/151	Spray Irrigation - Storage	BOWMAN DRAIN - HOUGHTON FARMS - SCANTON	273,000
Surface Water	2/26/34/126	Spray Irrigation - Storage	DRAIN - SANCTON	22,728
Surface Water	2/26/34/095	Spray Irrigation - Storage	SHIPTON BECK	68,190
Surface Water	2/26/34/079	Spray Irrigation - Storage	EASTINGS DRAIN	28,770
Surface Water	2/26/34/049	Spray Irrigation - Direct	HOLME ROAD DRAIN	163,656
Surface Water	2/26/34/113	Spray Irrigation - Storage	TRIBUTARY OF EAST INGS DRAIN	18,180
Surface Water	2/26/34/089	Spray Irrigation - Storage	BEILS BECK	29,280
Surface Water	NE/026/0034/039	Spray Irrigation - Direct	BEIL'S BECK - NORTH CLIFFE	16,000
Surface Water	NE/026/0034/040	Spray Irrigation - Direct	BACK DELFIN - AVENUE FARM - NORTH CLIFFE	15,000
Surface Water	2/26/34/081	Spray Irrigation - Direct	BACK DELPHIN - HOLME ON	16,720

Source	Licence Number	Use	Location	Max. Annual Volume (m³)
			SPALDING MOOR	
Surface Water	NE/026/0032/015	Spray Irrigation - Direct	RESERVOIR - NORTH CLIFFE MARKET WEIGHTON	80,130
Surface Water	2/26/34/080	Spray Irrigation - Direct	RESERVOIR - NORTH CLIFFE MARKET WEIGHTON	32,860
Surface Water	2/26/34/118	Spray Irrigation - Storage	LOWMATH DRAIN	36,368
Surface Water	NE/026/0032/031	Spray Irrigation - Direct	CAWKELD SINKS	43,000
Surface Water	2/26/34/151	Spray Irrigation - Storage	BOWMAN DRAIN - HOUGHTON FARMS - SCANTON	273,000
Surface Water	2/26/34/126	Spray Irrigation - Storage	DRAIN - SANCTON	22,728
Surface Water	2/26/34/095	Spray Irrigation - Storage	SHIPTON BECK	68,190

The EA has provided a list of all licenced discharges (accessed July 2021). The licensed discharges within the 5 km study area have been summarised in **Appendix 11D**. It has been assumed that each discharge is to the nearest watercourse where not explicitly stated.

Historic Flood Risk

This section of the English Onshore Scheme is outside the extents of the HFM.

Flood Alert and Flood Warning Areas

This section of the English Onshore Scheme overlaps with one FAA: Upper Hill area including Kilham, Nafferton, Driffield, Bainton, North Dalton, Leconfield, Leven, Brandesburton, North Frodingham and Beeford, North Frodingham and Beeford.

This section of the English Onshore Scheme does not overlap with any FWAs.

Fluvial Flood Risk

This section of the English Onshore Scheme lies mostly outside the extents of Flood Zone 2 and 3 from fluvially dominant sources, see **Figure 11-2**, with small overlaps recorded on Bracken Beck south of Bainton and Bells Beck south of Market Weighton.

Tidal Flood Risk

This section of the English Onshore Scheme does not overlap with extents of Flood Zone 2 and 3 from tidally dominant sources.

Surface Water Flood Risk

This section of the English Onshore Scheme is within areas of surface water risk, according to EA mapping (see **Figure 11-3**). Within this section, surface water risk is mainly contained to existing watercourses which intersect the section. These include Bowman Drain near Market Weighton and Bracken Beck, west of Kilnwick. There are also several additional flow paths of surface water risk which follow roads and paths which also intersect the section. All these pathways are mainly medium and low risk, though the path following Bowman Drain does include areas of high risk.

Groundwater Flood Risk

The ERYC SFRA, using the AStGWF dataset which splits land into 1 km^2 tiles shows many of the tiles in this section between Bainton and Market Weighton, have a <25 % coverage of areas at high risk of groundwater flooding, with the centre of the section having no data available.

British Geological Society Mapping shows this area to be the same as Section 1 and is thus mostly underlain by chalk bedrock and superficial deposits of glacial till meaning Section 2 is permeable to both infiltration and groundwater. Soilscape mapping of the predominant soil profile for the section also supports this.

Sewer and Drains Flood Risk

Flooding from sewers occurs when the sewer capacity is exceeded due to heavy rainfall, blockage or due to inadequate design. Sewers are generally designed to cope with mid to low order rainfall events (i.e. not to flood during events up to the 1 in 30-year return period).

Data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of the English Onshore Scheme and as such there are additionally no records of DG5 hydraulic failure incidents resulting from sewers and drains.

Reservoir Flood Risk

This section of the English Onshore Scheme is not shown to overlap with areas at risk from reservoir flood mapping, according to EA mapping (see **Figure 11-4**).

Residual Flood Risk (Flood Defences)

This section of the English Onshore Scheme is not shown to overlap with the Flood Map for Planning's ABD layer.

This section lies outside any recorded FSA, according to EA mapping.

According to the EA's Spatial Flood Defences layer, this section does not overlap with any recorded flood defences.

11.5.3 Section 3 – Market Weighton to River Ouse

11.5.3.1 Water Features Crossed by the English Onshore Scheme

There are a total of 50 water features crossed by Section 3 of the English Onshore Scheme, which are listed in **Table 11-14**. These lie primarily within the drainage catchment of the River Foulness and River Ouse, and consist of a mix of main rivers, ordinary watercourses, and minor drains. These catchments are within the East Riding of Yorkshire Local Authority, Ouse and Humber, and Selby Area IDBs. These are shown in **Figure 11-1**.

Potential cable crossing types are described within **Chapter 3: Description of the English Onshore Scheme**. Main rivers, larger or sensitive ordinary watercourses, and IDB maintained ordinary watercourses will be crossed via trenchless techniques. Minor drains and ordinary watercourses will be crossed by open cut techniques.

In addition, the haul road will also cross separately within the working width by bridge or temporary culvert installation. Main river Back Delfin/Market Weighton Canal and ordinary watercourse River Foulness will be crossed by a clear span temporary bridge, with the remaining ordinary watercourses and drains crossed by temporary culvert. The haul road will not cross the River Ouse, and instead construction traffic will be diverted along the existing road network.

All crossings will be designed in line with EA, IDB and LLFA requirements in accordance with the Environmental Permitting (England and Wales) Regulations 2016. Early consultation with additional design details for proposed crossing locations will be undertaken with relevant agencies and operators pre-construction.

Table 11.14: Water Features Crossed by Section 3 of the English Onshore Scheme

Name of Water Feature	HDD crossing reference (if applicable)	National Grid Reference (NGR)	Operator
Drain in headwaters of Bowman Drain	-	SE 87530 39443	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 86934 38965	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 85715 37986	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	HDD_027	SE 84669 37267	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	HDD_027	SE 84483 37215	N/A
Back Delfin/ Market Weighton Canal (Foulness from Black Beck to Market Weighton Canal GB104026066690)	HDD_027	SE 84325 37174	Main River (EA)
Market Weighton Canal relic channel	HDD_027	SE 84324 37307	N/A
Egremont Drain	HDD_027	SE 84277 37326	In Ouse & Humber IDB
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 83989 37249	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 83708 37153	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 83414 36851	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 8262 3639	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 8255 3628	N/A
Drain in headwaters of Holme Main Drain	-	SE 82222 36094	N/A
Drain in headwaters of Holme Main Drain	-	SE 81855 35498	N/A
Holme Main Drain	HDD_029 (potential to be open cut)	SE 81608 35316	In Ouse & Humber IDB
Drain in headwaters of Holme Main Drain	HDD_029 (potential to be open cut)	SE 8160 35285	N/A
Drain in headwaters of Holme Main Drain	-	SE 81212 35021	N/A
Drain in headwaters of Holme Main Drain	-	SE 81016 34902	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 80487 34416	N/A
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 80274 34289	N/A

Name of Water Feature	HDD crossing reference (if applicable)	National Grid Reference (NGR)	Operator
Dunn's Drain	HDD_030	SE 79765 33961	In Ouse & Humber IDB
River Foulness (Foulness from Black Beck to Market Weighton Canal (GB104026066690))	HDD_030	SE 79615 33910	In Ouse & Humber IDB
Drain in headwaters of Foulness from Black Beck to Market Weighton Canal GB104026066690	-	SE 79528 33015	N/A
Feathered Drain	HDD_031	SE 78811 32360	In Ouse & Humber IDB
Bishopsoil Drain/Carr Drain	HDD_031	SE 79356 32470	In Ouse & Humber IDB
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 78840 32156	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 78319 31714	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	HDD_032	SE 78213 31622	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 78128 31633	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 77882 31615	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 76029 30828	N/A
Drain in headwaters of Bishopsoil Drain/Carr Drain	-	SE 75507 30682	N/A
Drain in headwaters of Near Drain	HDD_033 (potential to be open cut)	SE 75216 30705	N/A
Drain in headwaters of Black Dyke	-	SE 75026 30690	N/A
Drain in headwaters of Black Dyke	-	SE 74681 30315	N/A
Duck Swang Drain	-	SE 74216 30397	N/A
Drain in headwaters of Black Dyke	-	SE 73249 30179	N/A
Black Dyke	HDD_035 (potential to be open cut)	SE 72562 29637	In Ouse & Humber IDB
New Drain	HDD_036	SE 72193 29188	In Ouse & Humber IDB
Asselby Marsh	HDD_037 (potential to be open cut)	SE 71524 28806	In Ouse & Humber IDB
Asselby Marsh Lane Drain	HDD_037 (potential to be open cut)	SE 71407 28697	In Ouse & Humber IDB
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 70883 27969	N/A
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 70647 27553	N/A
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 70132 27488	N/A

Name of Water Feature	HDD crossing reference (if applicable)	National Grid Reference (NGR)	Operator
Seave Carr	-	SE 69681 27530	In Ouse & Humber IDB
Lowfield Drain	HDD_039 (potential to be open cut)	SE 69624 27439	In Ouse & Humber IDB
Bank Field Lane Drain	HDD_040 (potential to be open cut)	SE 69124 27391	In Ouse & Humber IDB
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	HDD_040 (potential to be open cut)	SE 69034 27378	N/A
River Ouse	HDD_041	SE 68576 27379	Main River (EA)

11.5.3.2 WFD Surface Water Bodies

The EA has provided the most recent WFD classifications for watercourses within the study area. In total, there are three designated WFD surface water bodies[6] in the study area, two of which are crossed by the English Onshore Scheme. Their status is listed in **Table 11-15**.

Only the River Ouse from River Wharfe to Upper Humber is designated heavily modified.

[6] Some WFD surface water bodies are included within the assessment of multiple sections due to the overlap of the 2 km study area.

Table 11-15: WFD Surface Water Bodies within the Study Area of Section 3 of the English Onshore Scheme

WFD ID	Water Body Name	Current Status (2019)			Failing Elements	Reasons for not achieving good status	2027 Ecological Objective
		Ecological	Chemical	Overall			
GB104026066690 (directly crossed)	Foulness from Black Beck to Market Weighton Canal	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Septic tanks (diffuse source) Trade/industry discharge (point source) Poor nutrient management (diffuse source)	Good
GB104027068311 (not crossed)	Derwent from Elvington Beck to River Ouse	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Physical modification	Good
GB104027064270 (directly crossed)	Ouse from R Wharfe to Upper Humber	Moderate	Fail	Moderate	DDT PBDE PFOS Mercury and its compounds	Sewage discharge (point source) Contaminated water body bed sediments (diffuse source)	Good

11.5.3.3 Main Rivers

There are two main rivers crossed by Section 3 of the English Onshore Scheme:

- Back Delfin; and
- River Ouse.

In addition, within the study area there is the River Derwent (a main river) that is not crossed by Section 3 of the English Onshore Scheme.

11.5.3.4 Standing Water Bodies

There are 44 standing water bodies[7] within the 2 km study area as shown in **Table 11-16**. None of these are crossed by the English Onshore Scheme.

Table 11-16: Standing Water Bodies within the 2 km Study Area of Section 3 of the English Onshore Scheme

ID	Water Body	NGR
38	Pond near Common Farm	SE 85912 38629
39	Pond near Common Farm	SE 85672 38450
40	Pond near Common Farm	SE 85470 38412
41	Pond near Common Farm	SE 85490 38210
42	Pond near Common Farm	SE 85398 38033
43	Pond near Avenue Farm	SE 86084 37877
44	Pond near Avenue Farm	SE 85658 37711
45	Pond near North Cliffe Woods	SE 86725 36775
46	Pond near Carr Farm	SE 85034 37155
47	Pond near Carr Farm	SE 84799 36987
48	Pond near Low Plantation	SE 83342 38148
49	Pond near Low Plantation	SE 83035 38244
50	Pond near Marl Farm	SE 84022 37072
51	Pond near Marl Farm	SE 83729 37365
52	Pond near Marl Farm	SE 83518 37164
53	Pond south of Lock Lane	SE 83679 36738
54	Pond near Tollingham Warren	SE 83642 36046
55	Pond near Tollingham Warren	SE 83458 36201
56	Pond near Tollingham Warren	SE 83050 36399
57	Pond near Skiff Farm	SE 82434 36400
58	Pond near Tollingham Cottages	SE 82509 36184
59	Pond near Ladies Parlour	SE 82836 36046
60	Pond south of Rose-Lea	SE 81677 37109
61	Pond near New Bursea Farm	SE 81229 35723
62	Pond near New Bursea Farm	SE 80879 35683
63	Pond near The Willows	SE 80052 35099
64	Pond near Warham Farm	SE 78575 33956
65	Pond near Oak Tree Farm	SE 76953 33085
66	Pond near Oak Tree Farm	SE 76811 33168
67	Pond near Oak Tree Farm	SE 76717 32647
68	Pond near Brickyard Farm	SE 75265 31051
69	Pond near Brindleys Plantation	SE 74367 31731

[7] Some standing water bodies are included within the assessment of multiple sections due to the overlap of the 2km study area.

ID	Water Body	NGR
70	Pond near Barnhill Farm	SE 73383 28967
71	Pond near Parks Farm	SE 72706 29199
72	Reservoir near Bishop's Meadows	SE 70443 29209
73	Brock Holes	SE 67371 25483
74	Pond south of Wren Hall	SE 66993 26873
75	Pond near Drax Abbey Farm	SE 66985 28229
76	Pond near Hook's Fields	SE 66563 28855
77	Pond near Hook's Fields	SE 66555 28612
78	Pond near Hook's Fields	SE 66206 28455
79	Pond within Drax Power Station	SE 66387 27551
80	Pond within Drax Power Station	SE 66235 26735
81	Pond within Drax Power Station	SE 65992 27449

None of these are associated with surface water dependent statutory designated and non-statutory designated sites.

11.5.3.5 Water Dependent Biodiversity Sites

There is one international site of nature conservation interest and five national statutory protected areas within the 2 km study area:

- Barn Hill Meadows SSSI;
- River Derwent SAC and SSSI;
- South Cliffe Common SSSI;
- Market Weighton Canal/Bk from Source to Humber NVZ S250; and
- Foulness from Black Beck to Market Weighton Canal NVZ S249.

Surface Water Dependent Statutory Designated Sites

There are five surface water dependent designated sites within the study area:

- ***Barn Hill Meadows SSSI*** (850 m south east of the English Onshore Scheme): An ancient hay meadow characterised as a species rich lowland neutral grassland with damp areas associated with the Old Derwent floodplain. Barn Hill Meadows SSSI is located approximately 850 m south east of Section 3 of the English Onshore Scheme, and approximately 1 km downstream of the crossing point with Black Dyke. It is not located within a catchment area for a WFD water body.
- ***River Derwent SAC and SSSI*** (1.4 km north of the English Onshore Scheme): This lowland section of river from mouth to the confluence with the River Ouse supports diverse communities of aquatic flora and fauna, many elements of which are nationally significant. Although not directly crossed, the River Derwent SSSI is located approximately 1.3 km north of Section 3 of the English Onshore Scheme via land and 1.7 km downstream from crossing points on the Asselby Marsh Drain and New Drain. This SSSI is also located within the WFD water body Derwent from Elvington Beck to River Ouse (GB104027068311).
- ***South Cliffe Common SSSI*** (1.3 km south of the English Onshore Scheme): A mixture of heathland and wet acidic grassland. It is important as a remnant of once much more widespread habitats, now substantially reduced by agricultural improvement and conifer planting. It forms one of only six extensive heathlands developed on sand remaining in Humberside. There are several small drains which run through the site. In addition, it is located within the upstream reaches of WFD water body Foulness from Black Beck to Market Weighton Canal (GB1040266690). South Cliffe SSSI is located approximately 1.3 km south from Section 3 of the English Onshore Scheme via land, however only indirectly connected by the drainage channels which confluence with the Market Weighton Canal 1.7 km downstream of the crossing point with the English Onshore Scheme. Therefore, impacts are limited by the natural drainage regime of the catchment.

- ***Market Weighton Canal/Bk from Source to Humber NVZ S250*** (crossed by the English Onshore Scheme). This designation falls within the Foulness Operational Catchment. Sources of pollution include consented discharges, agriculture, and losses from woodland and urban areas with the majority produced by agricultural runoff. The designated surface water body affected by pollution from this NVZ catchment is the eastern branch of the Foulness from Black Beck to Market Weighton Canal which is crossed by the English Onshore Scheme at Back Delfin south of Market Weighton.
- ***Foulness from Black Beck to Market Weighton Canal NVZ S249*** (crossed by the English Onshore Scheme). This designation falls within the Foulness Operational Catchment. Sources of pollution include consented discharges, agriculture, domestic properties and losses from woodland and urban areas. The designated surface water body affected by pollution from this NVZ catchment is the western branch of the Foulness from Black Beck to Market Weighton Canal (GB104026066690) WFD water body which is crossed by Section 3 of the English Onshore Scheme at the River Foulness.

Surface Water Dependent Non-Statutory Designated Sites

No surface water dependent non-statutory designated sites have been identified within 2 km of the English Onshore Scheme.

EA records indicate that no chalk streams are present within 2 km of the English Onshore Scheme.

11.5.3.6 People, Property and Infrastructure

This section of the English Onshore Scheme mainly avoids urban/developed areas, with the English Onshore Scheme passing close to Asselby, Brind and Newsholme. This section of the English Onshore Scheme crosses major roads and railways including the A63 near Newsholme, the Hull Line railway near Howden and the A614 south of Holme-on-Spalding-Moor.

Abstractions and Discharges

According to Abstraction Licensing data (accessed July 2021) as provided by the EA, there are 47 licensed surface water abstractions within the 5 km study area[8], as shown in **Table 11-17** below.

Table 11-17: Abstraction Licences within 5 km of Section 3 of the English Onshore Scheme

Source	Licence Number	Use	Location	Max. Annual Volume (m^3)
Surface Water	2/27/28/083	Potable Water Supply - Direct	RIVER DERWENT - LOFTSOME BRIDGE	30,400,000
Surface Water	2/26/34/151	Spray Irrigation - Storage	BOWMAN DRAIN - HOUGHTON FARMS - SCANTON	273,000
Surface Water	2/26/34/126	Spray Irrigation - Storage	DRAIN - SANCTON	22,728
Surface Water	2/26/34/095	Spray Irrigation - Storage	SHIPTON BECK	68,190
Surface Water	2/26/34/079	Spray Irrigation - Storage	EASTINGS DRAIN	28,770
Surface Water	2/26/34/049	Spray Irrigation - Direct	HOLME ROAD DRAIN	163,656
Surface Water	2/26/34/113	Spray Irrigation - Storage	TRIBUTARY OF EAST INGS DRAIN	18,180
Surface Water	2/26/34/089	Spray Irrigation - Storage	BEILS BECK	29,280

[8] Some abstraction licenses are included within the assessment of multiple sections due to the overlap of the 5 km study area.

Source	Licence Number	Use	Location	Max. Annual Volume (m³)
Surface Water	NE/026/0034/039	Spray Irrigation - Direct	BEIL'S BECK - NORTH CLIFFE	16,000
Surface Water	NE/026/0034/040	Spray Irrigation - Direct	BACK DELFIN - AVENUE FARM - NORTH CLIFFE	15,000
Surface Water	2/26/34/081	Spray Irrigation - Direct	BACK DELPHIN - HOLME ON SPALDING MOOR	16,720
Surface Water	NE/026/0032/015	Spray Irrigation - Direct	RESERVOIR - NORTH CLIFFE MARKET WEIGHTON	80,130
Surface Water	2/26/34/080	Spray Irrigation - Direct	RESERVOIR - NORTH CLIFFE MARKET WEIGHTON	32,860
Surface Water	2/26/34/118	Spray Irrigation - Storage	LOWMATH DRAIN	36,368
Surface Water	2/26/34/043	Spray Irrigation - Storage	RIVER FOULNESS 2	72,720
Surface Water	NE/026/0034/036	Spray Irrigation - Direct	UNNAMED DRAIN - BAR FARM - HOLME UPON SPALDING MOOR	16,002
Surface Water	2/26/34/082	Spray Irrigation - Direct	CATCHPIT - SUPERFICIAL DRIFT - HARSWELL	36,370
Surface Water	2/26/34/058	Spray Irrigation - Direct	RIVER FOULNESS	20,540
Surface Water	2/26/34/132	Spray Irrigation - Storage	OLD COURSE OF RIVER FOULNESS	6,800
Surface Water	2/26/34/098	Spray Irrigation - Direct	TRIBUTARY OF THROLAM DRAIN	36,360
Surface Water	2/26/34/083	Spray Irrigation - Direct	RIVER FOULNESS-HOLME HOUSE-HOLME ON SPALDING MOOR	117,100
Surface Water	NE/026/0034/013	Spray Irrigation - Direct	PLOUGH FURROW DRAIN NORTH	36,160
Surface Water	NE/026/0034/018	Spray Irrigation - Direct	MARKET WEIGHTON CANAL	180,000
Surface Water	2/26/34/183	Spray Irrigation - Direct	HOLME MAIN DRAIN-HOLME-ON-SPALDING MOOR	50,000
Surface Water	2/26/34/140A	Spray Irrigation - Storage	RIVER FOULNESS-SANDHILL	20,000

Source	Licence Number	Use	Location	Max. Annual Volume (m³)
			FARM-NEWPORT 2	
Surface Water	NE/026/0034/003	Spray Irrigation - Direct	RIVER FOULNESS AT SANDHOLME	50,000
Surface Water	2/27/24/326	Spray Irrigation - Storage	RIVER FOULNESS-HASHOLME GRANGE-HOLME ON SPALDING MOOR	47,000
Surface Water	2/26/34/086	Spray Irrigation - Direct	RIVER FOULNESS	30,840
Surface Water	NE/026/0034/027	Spray Irrigation - Direct	RIVER FOULNESS	16,430
Surface Water	2/26/34/086	Spray Irrigation - Direct	RIVER FOULNESS	30,840
Surface Water	2/26/34/084	Spray Irrigation - Direct	POINTS C AND A - RIVER FOULNESS	6,160
Surface Water	NE/027/0024/069	Spray Irrigation - Direct	POINT A - DUNCOATS BECK	80,000
Surface Water	2/27/28/140	Spray Irrigation - Storage	FLEET DYKE - WRESSLE	27,273
Surface Water	NE/027/0028/032	Spray Irrigation - Direct	RIVER DERWENT-DUFFIELD SELBY	13,490
Surface Water	NE/027/0028/048	Spray Irrigation - Direct	RIVER DERWENT NEAR WRESSLE	80,000
Surface Water	NE/027/0028/009/A	Spray Irrigation - Direct	RIVER DERWENT AT BRACKENHOLME	60,000
Surface Water	NE/027/0024/072	Spray Irrigation - Direct	RIVER AIRE AT AIRMYN NEAR GOOLE	18,000
Surface Water	2/27/18/124/R01	Spray Irrigation - Direct	TOWNSHIP DRAIN - GOOLE	36,500
Transitional Water	2/27/24/467/R01	Spray Irrigation - Direct	RIVER OUSE 2 - TIDAL	75,000
Transitional Water	2/27/24/194	Spray Irrigation - Direct	RIVER OUSE - TIDAL	41,000
Surface Water	NE/027/0028/048	Spray Irrigation - Direct	RIVER DERWENT - NEAR WRESSLE	40,000
Transitional Water	2/27/24/155	Boiler Feed	RIVER OUSE - TIDAL - LONG DRAX	96,230,000
Surface Water	NE/027/0024/050/R01	Spray Irrigation - Direct	LENDALL DRAIN AT DRAX ABBEY FARM	45,000

Source	Licence Number	Use	Location	Max. Annual Volume (m³)
Transitional Water	2/27/24/195	Spray Irrigation - Direct	DRAX ABBEY FISH POND - TIDAL	10,000
Transitional Water	2/27/24/194	Spray Irrigation - Direct	CARR DYKE/LENDALL DRAIN - TIDAL	82,000
Transitional Water	NE/027/0024/016	Spray Irrigation - Direct	RIVER OUSE - TIDAL	40,000
Transitional Water	2/27/24/271	Spray Irrigation - Direct	RIVER OUSE - TIDAL	18,180

The EA has provided a list of all licensed discharges (accessed July 2021). The licensed discharges within the 5 km study area have been summarised in **Appendix 11D**. It has been assumed that each discharge is to the nearest watercourse where not explicitly stated.

Historic Flood Risk

This section of the English Onshore Scheme is within the extents of the HFM, associated with the River Foulness, River Derwent, River Ouse, New Drain and other unnamed ordinary watercourses.

Flood Alert and Flood Warning Areas

This section of the Scheme overlaps with three FAA:

- River Foulness and the Market Weighton Canal and their tributaries;
- Local roads and low-lying land around Stamford Bridge, Pocklington, Wressle, Wilberfoss and Elvington; and
- The tidal foreshore and agricultural land adjacent to the river in the Cawood, Kelfield, Wistow and Selby areas; and East Riding of Yorkshire, North Yorkshire, York.

This section of the English Onshore Scheme overlaps with one FWA:

- Villages and properties on both banks of the lower River Derwent, including Thorganby, Bubwith, Menthorpe, Breighton, Wressle, Loftsome Bridge, Brind and Brackenholme, Loftsome Bridge, Brind and Brackenholme.

Fluvial Flood Risk

This section of the English Onshore Scheme overlaps with extents from both Flood Zone 2 and 3 from fluvially dominant sources, see **Figure 11-2**, with the overlaps focused in three main areas. The first is south of Market Weighton on the Market Weighton Canal, East Ings Drain and Bells Beck. The second is along Fleet Drain, a tributary of the River Derwent north of Wressle, though only Flood Zone 2 intersects with the English Onshore Scheme. The third is focused on New Drain northwest of Howden. As there are flood defences that overlap with this section, it should be noted that flood zones represent undefended flood extent scenarios.

Modelled flood extents from the Mill Dike (Market Weighton) EA Flood Mapping Study (2007) (Ref 11-17) are shown to overlap into the direct impact area in the 10% AEP event up to the 0.1% AEP event, with these overlaps focussed on a section of the Market Weighton Canal near Sand Lane. Flooding extends west from the canal to floodplain near Cliffe Lane. In all events, the areas of greatest depth are located within channel with depths on the floodplain 0.9-0.12 m in the 10% AEP event, 0.8-1 m in the 1% AEP event and 1.1-1.2 m in the 0.1% AEP event.

In all modelled events, flood extents do not extend further south towards the English Onshore Scheme than Sand Lane though this is due to that being the modelled extent of the canal rather than a lack of flood risk to this area. The Flood Map for Planning shows areas south of Sand Lane to be within Flood Zone 3 which overlap with the cable route. Therefore, assessments were based on the worst case scenario, using the Flood Map for Planning.

This section of the English Onshore Scheme also overlaps with areas from joint fluvial and tidal sources though only in Flood Zone 2. These areas are along the River Foulness near Welham Bridge and along New Drain near Howden.

Tidal Flood Risk

This section of the English Onshore Scheme overlaps with extents from both Flood Zone 2 and 3 from tidally dominant sources. These overlaps are focused in the centre of this section as it overlaps with the River Foulness east of Spaldington.

Surface Water Flood Risk

This section of the English Onshore Scheme is within areas of surface water risk, according to EA mapping (see **Figure 11-3**). Within this section there are multiple areas shown to be at low risk through these are dispersed across the section. There are three main areas where surface water risk appears to be following existing watercourses:

- Black Dyke near Newsholme;
- the River Foulness and Bishopsail Drain west of Spaldington; and
- Bells Beck, Bowman Drain and the Market Weighton Canal south of Market Weighton. This area includes areas of high risk though this is mainly confined to the channel.

Groundwater Flood Risk

The ERYC SFRA, using the AStGWF dataset which splits land into 1 km^2 tiles shows many of the tiles in this section, between Market Weighton and the River Ouse, have a ≥75% coverage of areas at high risk of groundwater flooding. The area between Market Weighton and Bursea has tiles of <25% coverage of areas at high risk of groundwater flooding from the River Ouse.

British Geological Society Mapping shows this area is mostly underlain by mudstone, siltstone and sandstone with superficial deposits of clay meaning this section is impermeable to both infiltration and groundwater which correlates with the AstGWF dataset. Soilscape mapping near Market Weighton and along the River Ouse includes soils that are naturally wet with high water tables and naturally high groundwater. This is most likely due to the proximity to large watercourses such as the Ouse and Foulness and the large number of field drainage channels and smaller watercourses south of Market Weighton.

Sewer and Drains Flood Risk

Flooding from sewers occurs when the sewer capacity is exceeded due to heavy rainfall, blockage or due to inadequate design. Sewers are generally designed to cope with mid to low order rainfall events (i.e. not to flood during events up to the 1 in 30-year return period).

Data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of the English Onshore Scheme and as such there are additionally no records of DG5 hydraulic failure incidents resulting from sewers and drains.

Reservoir Flood Risk

The EA long term flood risk identifies that this section of the English Onshore Scheme overlaps with areas within reservoir flood risk extents (see **Figure 11-4**). These areas are focused along the River Ouse and Market Weighton Canal. It is not currently clear from the mapping of the source of these reservoir flood extents. It should be noted that these maps do not indicate likelihood of flooding but instead indicate the potential flood extents if a reservoir were to fail.

Residual Flood Risk (Flood Defences)

This section of the English Onshore Scheme is shown to overlap with the Flood Map for Planning's ABD layer, mainly focused at the western end of the section between the River Ouse and the A63.

There are assets included in the Spatial Flood Defences layer shown that overlap with this section of the English Onshore Scheme. These include embankments along the River Ouse, owned and operated by the EA, areas of high ground, presumed to not be formal defences, alongside the River Foulness operated by the Ouse and Humber IDB and high ground along Market Weighton Canal.

This section lies outside any recorded FSA, according to EA mapping.

11.5.4 Section 4 – River Ouse to Drax Substation

11.5.4.1 Water Features Crossed by the English Onshore Scheme

There are a total of 11 water features crossed by Section 4 of the English Onshore Scheme which are listed in **Table 11-18**. These lie mainly within the drainage catchment of the River Ouse and consist of a mix of main rivers, ordinary watercourses, and minor drains. These catchments are within the Selby Local Authority, and Selby Area IDB. These are shown in **Figure 11-1**.

Potential crossing types are described within **Chapter 3: Description of the English Onshore Scheme**. Main rivers, larger or sensitive ordinary watercourses, and IDB maintained ordinary watercourses will be crossed via trenchless techniques. Minor drains and the majority of ordinary watercourses will be crossed by open cut techniques.

In addition, the haul road will also cross separately, with all watercourses in this section crossed by temporary culvert installation with the exception of the River Ouse which will not be crossed by the haul road.

All crossings will be designed in line with EA, IDB and LLFA requirements in accordance with the Environmental Permitting (England and Wales) Regulations 2016.

Table 11-18: Water Features Crossed by Section 4 of the English Onshore Scheme

Name of Water Feature	HDD Crossing Reference (if applicable)	NGR	Operator
River Ouse	HDD_041	SE 68576 27379	N/A
Black Tom Drain	HDD_042 (potential to be open cut)	SE 68094 27200	Selby Area IDB
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 67925 27035	Selby Area IDB
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 67821 26969	N/A
Drain in headwaters of Ouse from R Wharfe to Upper Humber GB104027064270	-	SE 67710 27019	Selby Area IDB
Back Lane Drain	HDD_043	SE 67479 27076	Selby Area IDB

11.5.4.2 WFD Surface Water Bodies

The EA has provided the most recent WFD classifications for watercourses within the study area. In total, there are two designated WFD surface water bodies[9] in the study area, one of which is crossed by the English Onshore Scheme. Their status is listed in **Table 11-19**.

Both are designated heavily modified.

[9] Some WFD surface water bodies are included within the assessment of multiple sections due to the overlap of the 2 km study area.

Table 11-19: WFD Surface Water Bodies within the 2 km Study Area of Section 4 of the English Onshore Scheme

WFD ID	Water Body Name	Current Status (2019)			Failing Elements	Reasons for not achieving good status	2027 Ecological Objective
		Ecological	Chemical	Overall			
GB104027064270 (directly crossed)	Ouse from R Wharfe to Upper Humber	Moderate	Fail	Moderate	DDT PBDE PFOS Mercury and its compounds	Sewage discharge (point source) Contaminated water body bed sediments (diffuse source)	Good
GB104027068311 (not crossed)	Derwent from Elvington Beck to River Ouse	Moderate	Fail	Moderate	PBDE Mercury and its compounds	Physical modification	Good

11.5.4.3 Main Rivers

There is one main river, the River Ouse, that is crossed by Section 4 of the English Onshore Scheme. The River Derwent is not crossed by the English Onshore Scheme but lies within the 2 km study area.

11.5.4.4 Standing Water Bodies

There are no standing water bodies crossed by Section 4 of the English Onshore Scheme, however there are nine standing water bodies[10] within the 2 km study area as shown in **Table 11-20**.

Table 11-20: Standing Water bodies within the 2 km Study Area of Section 4 of the English Onshore Scheme

ID	Water Body	NGR
73	Brock Holes	SE 67371 25483
74	Pond south of Wren Hall	SE 66993 26873
75	Pond near Drax Abbey Farm	SE 66985 28229
76	Pond near Hook's Fields	SE 66563 28855
77	Pond near Hook's Fields	SE 66555 28612
78	Pond near Hook's Fields	SE 66206 28455
79	Pond within Drax Power Station	SE 66387 27551
80	Pond within Drax Power Station	SE 66235 26735
81	Pond within Drax Power Station	SE 65992 27449

None of these are associated with surface water dependent designated and non-statutory designated site sites.

11.5.4.5 Water Dependent Biodiversity Sites

There are no international sites of nature conservation interest and two national statutory protected areas within the study area:

- River Derwent SSSI; and
- Aire from River Calder to River Ouse NVZ S274.

Surface Water Dependent Statutory Designated Sites

There are two surface water dependent sites within the study area:

- ***River Derwent SSSI*** (1.2 km north of the English Onshore Scheme): This lowland section of river from river mouth to the confluence with the Ouse supports diverse communities of aquatic flora and fauna, many elements of which are nationally significant. This SSSI is also located within the WFD water body Derwent from Elvington Beck to River Ouse (GB104027068311). Although not directly crossed, the River Derwent SSSI is located approximately 1.2 km north of Section 4 of the English Onshore Scheme via land and 1.4 km upstream from crossing points on the River Ouse. As such, any impacts are therefore limited due to the natural drainage regime away from the SSSI.
- ***Aire from River Calder to River Ouse NVZ S274*** (located approximately 0.9 km south of the English Onshore Scheme). This designation covers the entire Aire from River Calder to River Ouse WFD water body catchment. Sources of pollution are considered to be primarily from consented discharges with some agricultural input. This catchment is outside of any connected hydrological catchment.

Surface Water Dependent Non-Statutory Designated Sites

No surface water dependent non-statutory designated sites have been identified within the 2 km study area.

EA records indicate that no chalk streams are present within the study area.

[10] Some standing water bodies are included within the assessment of multiple sections due to the overlap of the 2km study area.

11.5.4.6 People, Property and Infrastructure

This section of the English Onshore Scheme mainly avoids urban/developed areas with the English Onshore Scheme passing close to the village of Drax and includes the eastern part of the existing Drax Power Station.

Abstractions and Discharges

According to Abstraction Licensing data (accessed July 2021) as provided by the EA, there are 13 licensed surface water abstractions[11] within the 5 km study area, as shown in **Table 11-21** below.

Table 11-21: Abstraction Licences within 5 km of Section 4 of the English Onshore Scheme

Source	Licence Number	Use	Location	Max. Annual Volume (m^3)
Surface Water	2/27/28/083	Potable Water Supply - Direct	RIVER DERWENT - LOFTSOME BRIDGE	30,400,000
Surface Water	NE/027/0024/072	Spray Irrigation - Direct	RIVER AIRE AT AIRMYN NEAR GOOLE	18,000
Surface Water	2/27/18/124/R01	Spray Irrigation - Direct	TOWNSHIP DRAIN - GOOLE	36,500
Transitional Water	2/27/24/467/R01	Spray Irrigation - Direct	RIVER OUSE 2 - TIDAL	50,000
Transitional Water	2/27/24/194	Spray Irrigation - Direct	RIVER OUSE - TIDAL	41,000
Surface Water	NE/027/0028/048	Spray Irrigation - Direct	RIVER DERWENT - NEAR WRESSLE	40,000
Surface Water	2/27/28/140	Spray Irrigation - Storage	FLEET DYKE - WRESSLE	27,273
Transitional Water	2/27/24/467/R01	Spray Irrigation - Direct	RIVER OUSE 2 - TIDAL	75,000
Transitional Water	2/27/24/155	Boiler Feed	RIVER OUSE - TIDAL - LONG DRAX	96,230,000
Surface Water	NE/027/0024/050/ R01	Spray Irrigation - Direct	LENDALL DRAIN AT DRAX ABBEY FARM	45,000
Transitional Water	2/27/24/195	Spray Irrigation - Direct	DRAX ABBEY FISH POND - TIDAL	10,000
Transitional Water	2/27/24/194	Spray Irrigation - Direct	CARR DYKE/LENDALL DRAIN - TIDAL	82,000
Surface Water	NE/027/0018/004/ R01	Spray Irrigation - Direct	WEIGH BRIDGE DRAIN - CLAYPIT LANE	90,000

The EA has provided a list of all licensed discharges (accessed July 2021). The licensed discharges within the 5 km study area, have been summarised in **Appendix 11D**. It has been assumed that each discharge is to the nearest watercourse where not explicitly stated.

Historic Flood Risk

This section of the English Onshore Scheme is within the extents of the HFM and is associated with the River Ouse.

[11] Some licenses are included within the assessment of multiple sections due to the overlap of the 5km study area

Flood Alert and Flood Warning Areas

This section of the English Onshore Scheme overlaps with two FAA:

- The tidal foreshore and agricultural land adjacent to the river in the Cawood, Kelfield, Wistow and Selby areas; and East Riding of Yorkshire, North Yorkshire, York; and
- River Aire from Temple Hirst to Airmyn.

This section of the English Onshore Scheme overlaps with one FWA:

- Drax including Hales Lane, Main Road, Back Lane and Castle Hill Lane.

Fluvial Flood Risk

This section of the English Onshore Scheme overlaps with the extents of both Flood Zone 2 and 3 from fluvially dominant sources, see **Figure 11-2**. These overlaps are focused on the River Ouse and from ordinary watercourses in the west of the section.

Tidal Flood Risk

This section of the English Onshore Scheme does not overlap with either Flood Zone 2 or 3 from tidally dominant sources.

This section does overlap with Flood Zone 2 and 3 from joint fluvial and tidal sources from the River Ouse.

Surface Water Flood Risk

This section of the English Onshore Scheme is within areas of surface water risk, according to EA mapping (see **Figure 11-3**). Within this section there are multiple areas shown to be at low risk through these are dispersed across the section. The proposed converter station site is mostly outside areas of surface water risk with only small areas overlapping with medium and low risk.

Groundwater Flood Risk

The Selby District Council (SDC) SFRA, using the AStGWF dataset which splits land into 1 km^2 tiles shows many of the tiles in this section between the River Ouse and the Drax Substation, <25% coverage of areas at high risk of groundwater flooding. British Geological Society Mapping shows this area is mostly underlain by sandstone bedrock and superficial deposits of clay and silt, meaning this section is somewhat impermeable to both infiltration and groundwater. Soilscape mapping of the predominant soil profile in this section shows it to be slowly permeable clay-based soils which supports this.

Sewer and Drains Flood Risk

Flooding from sewers occurs when the sewer capacity is exceeded due to heavy rainfall, blockage or due to inadequate design. Sewers are generally designed to cope with mid to low order rainfall events (i.e. not to flood during events up to the 1 in 30-year return period).

Data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of the English Onshore Scheme. Additionally, data taken from the Yorkshire Water DG5 register include in the SDC SFRA, shows no internal sewer flooding records around and in the vicinity of the Drax Power Station with the surrounding area being in the lowest band of 0-2 external sewer records.

Reservoir Flood Risk

The EA long term flood risk identifies that this section of the English Onshore Scheme overlaps with areas within reservoir flood risk extents (see **Figure 11-4**). These areas are focused along the River Ouse. It is not currently clear from the mapping of the source of these reservoir flood extents. It should be noted that these maps do not indicate likelihood of flooding but instead indicate the potential flood extents if a reservoir were to fail.

Residual Flood Risk (Flood Defences)

This section of the English Onshore Scheme is shown to overlap with the Flood Map for Planning's ABD layer.

There are assets included in the Spatial Flood Defences layer that overlap with this section of the English Onshore Scheme. These defences consist of embankments along both banks of the River Ouse, owned and operated by the EA.

This section lies outside any recorded FSA, according to EA mapping.

11.5.5 Receptor Values

The sensitivity values for the receptors within the study area of the English Onshore Scheme described above are listed in **Table 11-22** below.

Table 11-22: Receptor Sensitivity Values

Receptor	Attribute	Sensitivity Value
Main rivers, ordinary watercourses and IDB maintained drains	Water quality and fluvial geomorphology	Medium
Minor drains	Water quality and fluvial geomorphology	Low
Standing water bodies	Water quality	Low
Surface water dependent habitat (statutory designated sites)	Biodiversity (as a function of water quantity or quality)	High
Surface water dependent habitat (non-statutory designated sites)	Biodiversity (as a function of water quantity or quality)	Medium
People, Property and Infrastructure: Surface water abstractions	Water supply	Low
People, Property and Infrastructure: Discharges to surface water	Dilution and Removal of Waste Products	Low
People, Property and Infrastructure: Drainage Infrastructure	Field drainage/ under drainage infrastructure	Low
People, Property and Infrastructure: Floodplain	Flood Risk	High
People, Property and Infrastructure: Urban Areas/Settlements	Flood Risk	High

11.5.6 Future Baseline

It is expected that construction of the English Onshore Scheme will start late 2024 and last for approximately five years to 2029.

By 2024, there is no anticipated change in WFD status of any water bodies as there are no targets set within this timeframe. However, by 2027, it is expected that the targets to achieve good ecological status through improvement of the chemical and biological quality element status will be achieved in all water bodies although each water body lists these as unachievable due to disproportionate burdens - unfavourable balance of costs and benefits or unrealistic timeframe for ecological recovery.

By 2024 it is assumed that population growth and increased development will have resulted in increased pressure upon surface water features from people, property and infrastructure for water supply and for the dilution and removal of waste products. It is therefore anticipated that water abstractions and discharges will be of slightly larger volumes. However, given that the future baseline year is only three years later than the current baseline, this increased pressure is unlikely to result in a considerable change to the baseline.

The impacts of climate change on the future baseline environment must be investigated in order to assess the risk from flooding for the lifetime of the development. The impact of climate change was assessed from tidal, fluvial and pluvial sources. As such, for the lifetime of the development, impacts of

climate change upon flood risk are expected to result in higher peak flows and higher peak rainfall during storm events. Latest climate change allowances, latest update October 2021 (Ref 11-1), have been applied following the NPPF.

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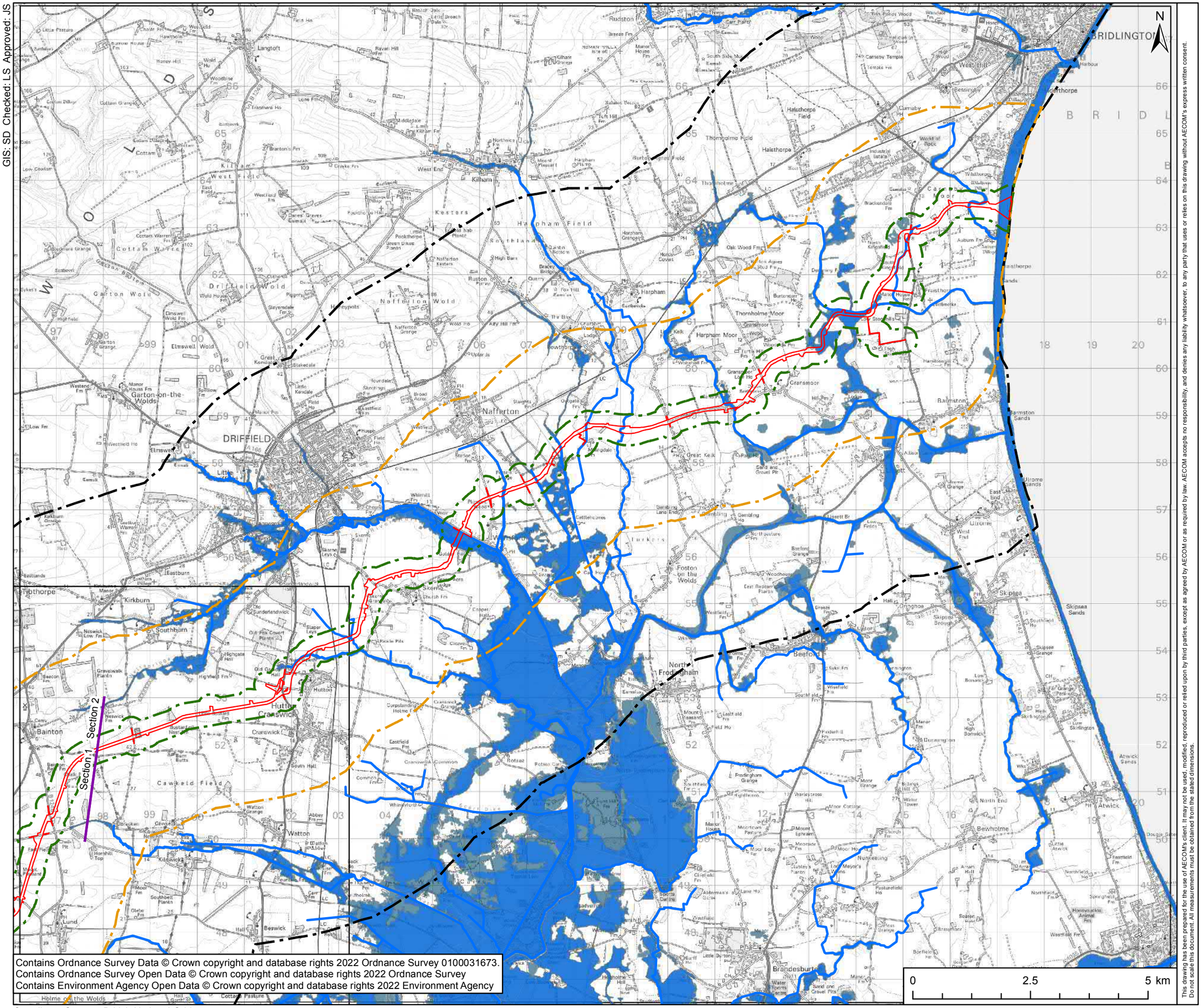

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PROJECT

Scotland England Green Link 2

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- Planning Application Boundary
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Flood Zone 2
- Flood Zone 3
- Main Rivers and Drains

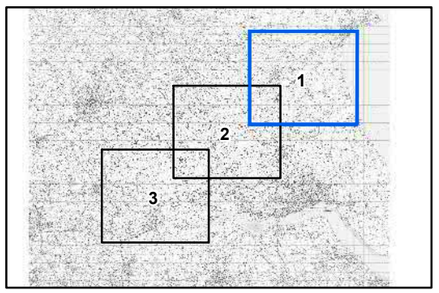

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Figure 11-2
Flood Zones

REFERENCE

SEGL2_T_ES_11-2_v1_20220517

SHEET NUMBER

1 of 3

DATE

17/05/2022

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PROJECT

Scotland England Green Link 2

KEY

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- EL2 Route Section Break
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- 5km Buffer
- Flood Zone 2
- Flood Zone 3
- Main Rivers and Drains

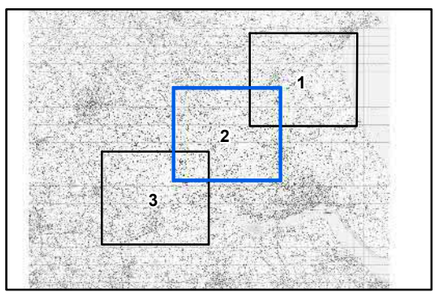

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Figure 11-2
Flood Zones

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2 of 3

DATE

17/05/2022

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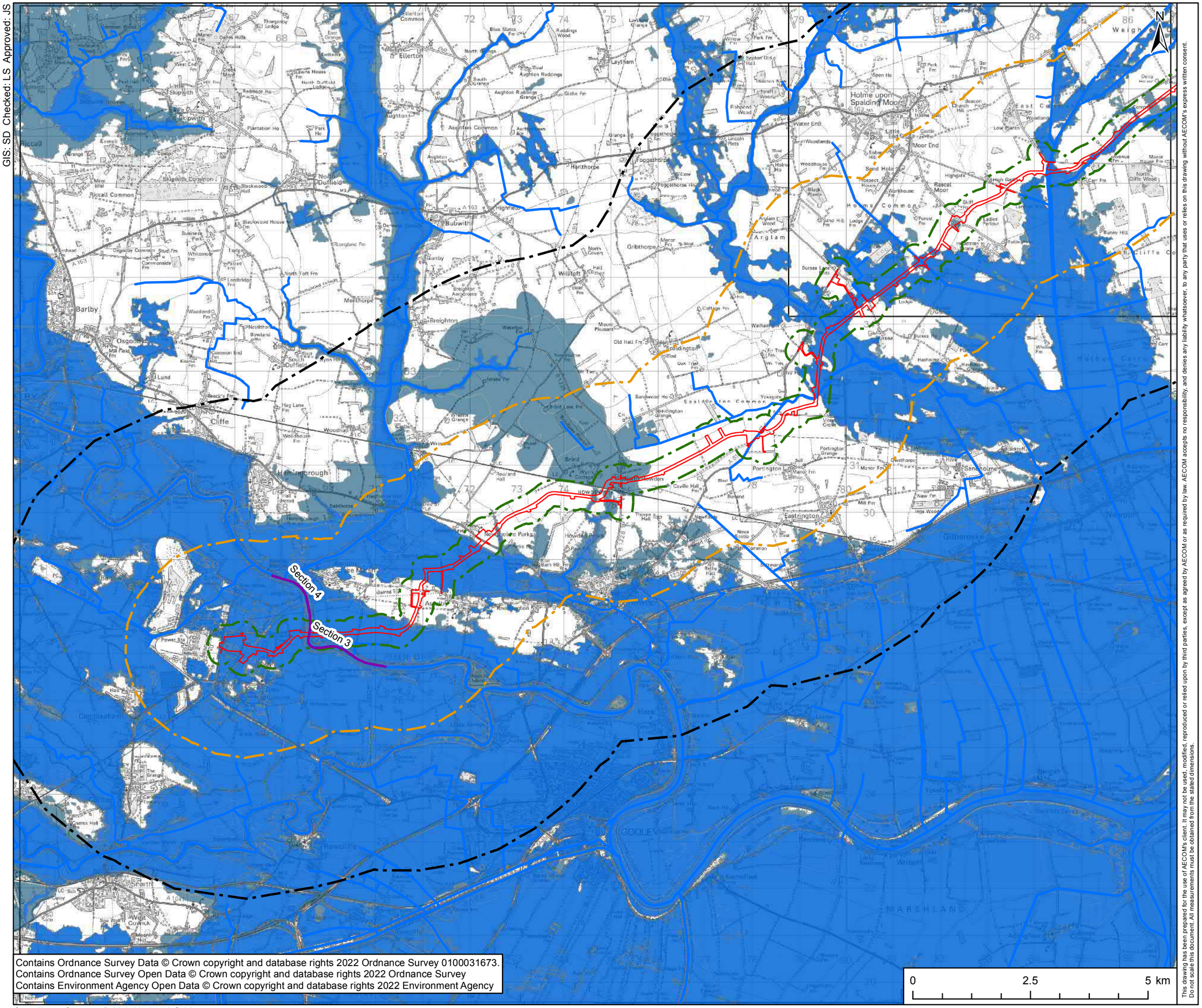

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PROJECT

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- Main Rivers and Drains

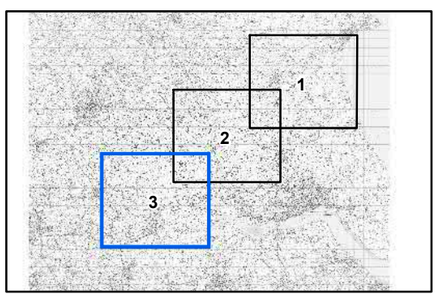

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Figure 11-2
Flood Zones

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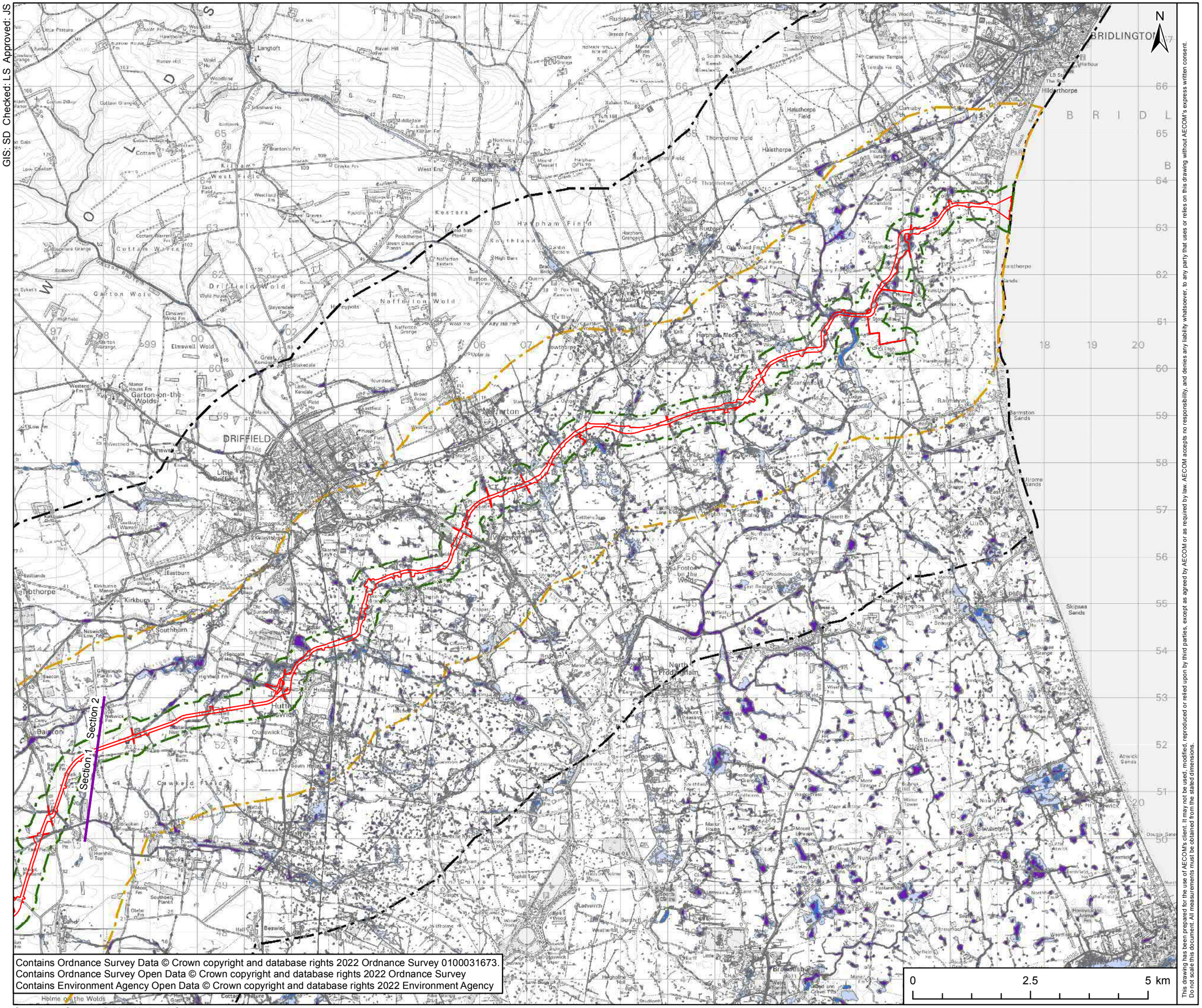

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PROJECT

Scotland England Green Link 2

KEY

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- EL2 Route Section Break
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- Risk of Flooding from Surface Water:Medium Risk
- Risk of Flooding from Surface Water:High Risk

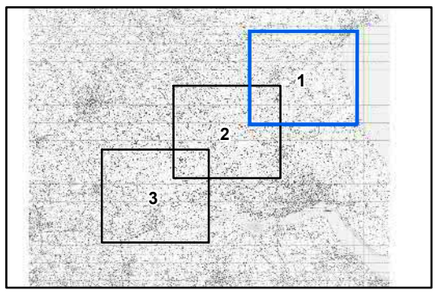

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Figure 11-3
Risk of Flooding from Surface Water

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SHEET NUMBER: 1 of 3

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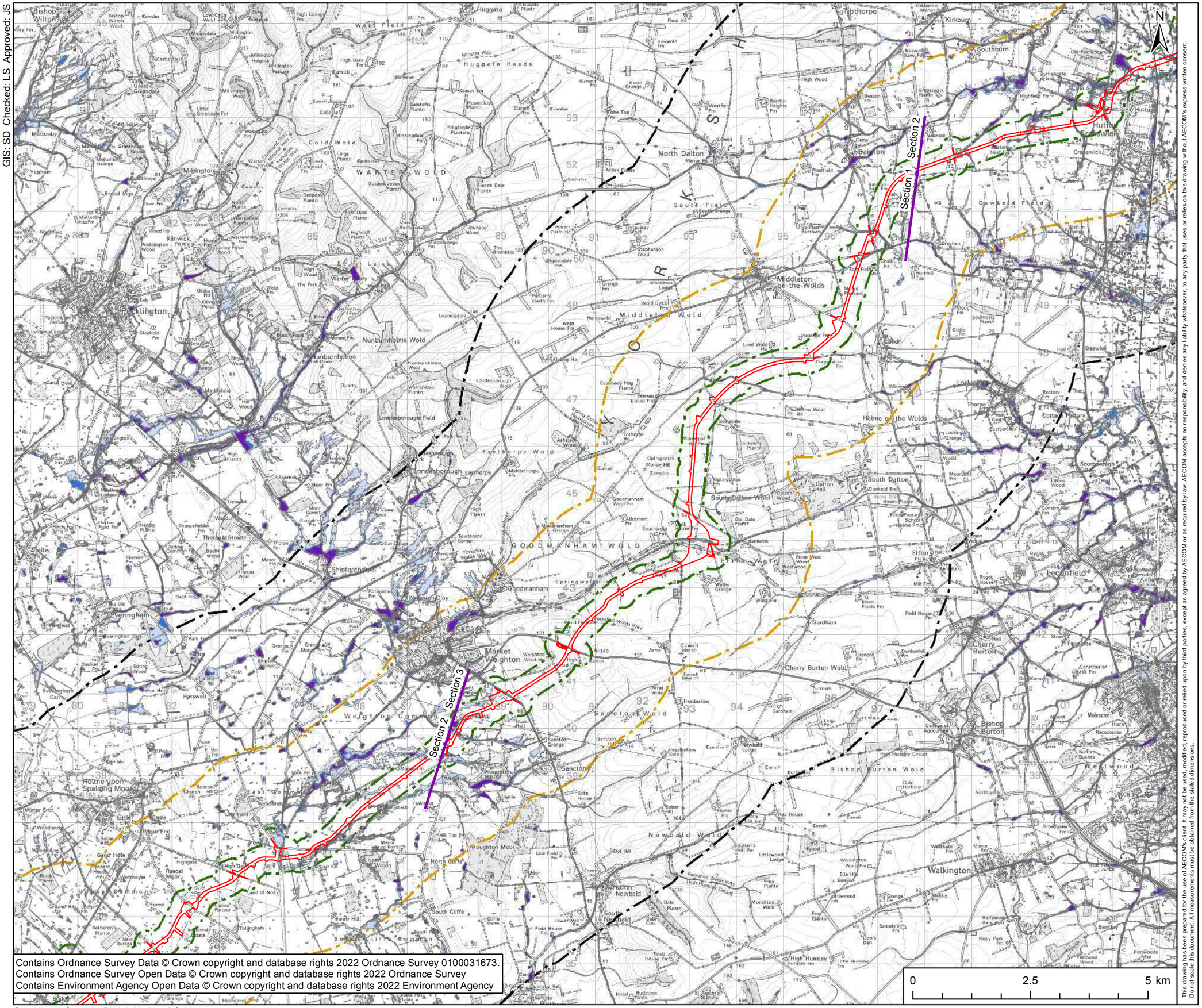

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PROJECT

Scotland England Green Link 2

KEY

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- 2km Buffer
- 5km Buffer
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- Risk of Flooding from Surface Water:Medium Risk
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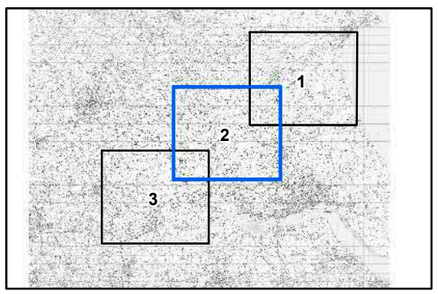

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Figure 11-3
Risk of Flooding from Surface Water

REFERENCE

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SHEET NUMBER

2 of 3

DATE

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Section 4

Section 3

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0 2.5 5 km

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PROJECT

Scotland England Green Link 2

KEY

- Planning Application Boundary
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- 250m Buffer
- 2km Buffer
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- Risk of Flooding from Surface Water:Low Risk
- Risk of Flooding from Surface Water:Medium Risk
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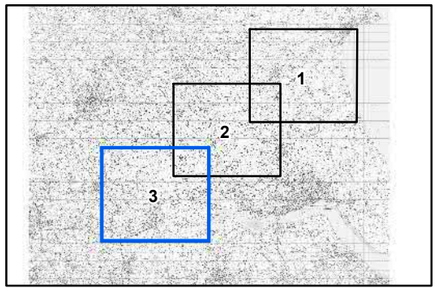

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Figure 11-3
Risk of Flooding from Surface Water

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SHEET NUMBER

3 of 3

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Section 1

Section 2

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PROJECT

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- 250m Buffer
- 2km Buffer
- 5km Buffer
- Reservoir Flood Extents (Wet DayScenario)

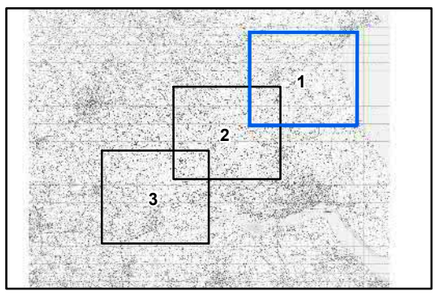

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Figure 11-4
Reservoir Flood Extents (Wet Day Scenario)

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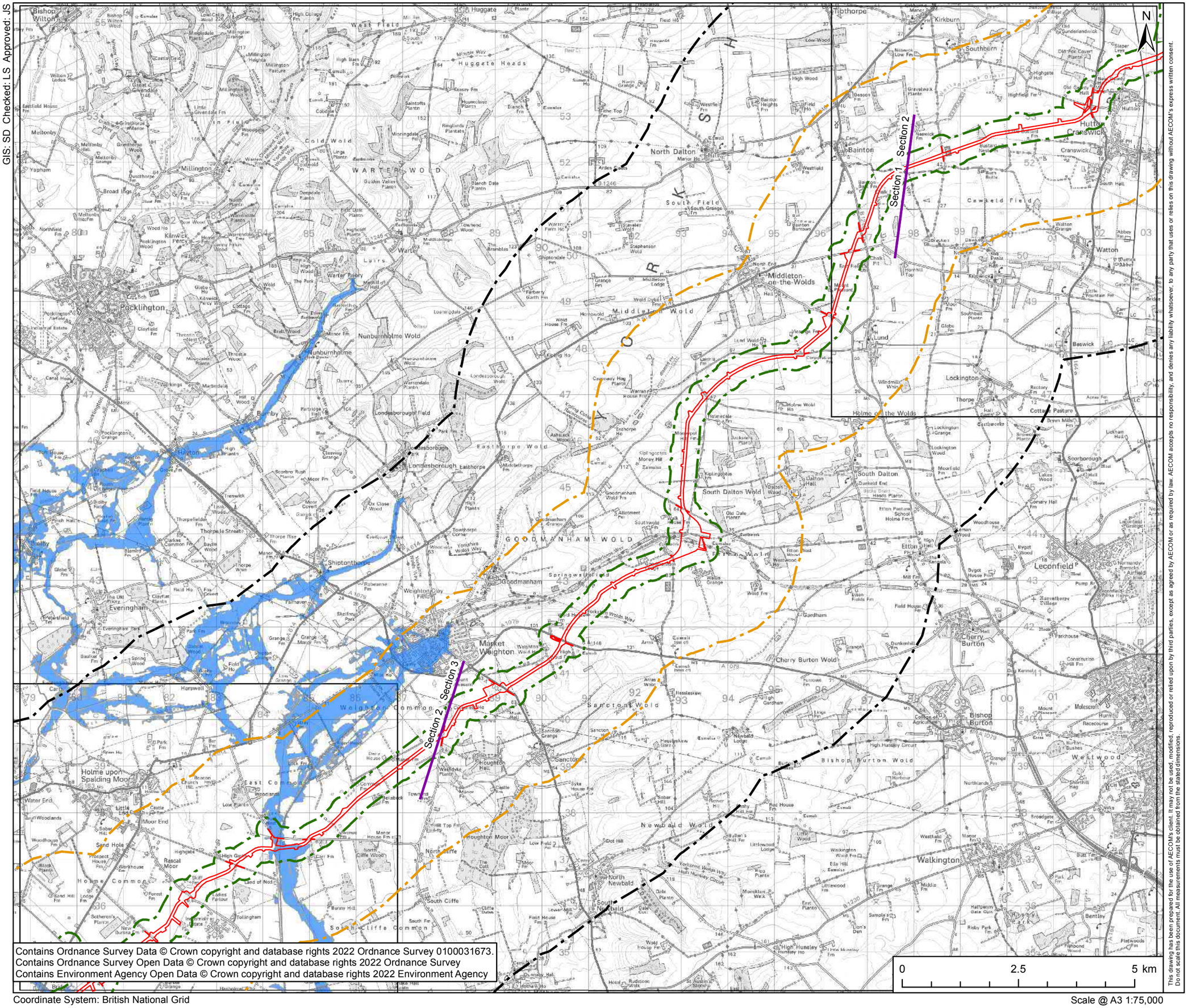

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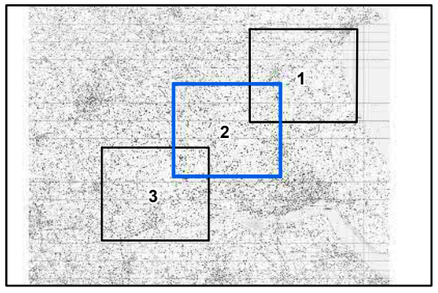
- Planning Application
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Reservoir Flood Extents (Wet DayScenario)



TITLE

Figure 11-4
Reservoir Flood Extents (Wet Day Scenario)

REFERENCE

SEGL2_T_ES_11-4_v1_20220517

SHEET NUMBER

2 of 3

DATE

17/05/2022

GIS: SD Checked: LS Approved: JS

Section 4

Section 3

0 2.5 5 km

Coordinate System: British National Grid

Scale @ A3 1:75,000

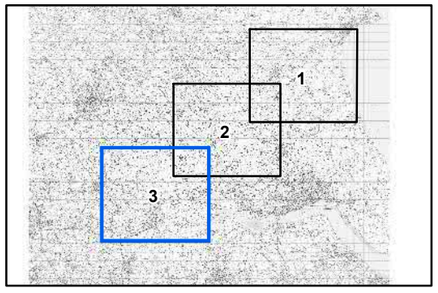
nationalgrid

PROJECT

Scotland England Green Link 2

KEY

- Planning Application
- EL2 Route Section Break
- 250m Buffer
- 2km Buffer
- 5km Buffer
- Reservoir Flood Extents (Wet DayScenario)



TITLE

Figure 11-4
Reservoir Flood Extents (Wet Day Scenario)

REFERENCE

SEGL2_T_ES_11-4_v1_20220517

SHEET NUMBER

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DATE

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11.6 Potential Impacts

11.6.1 Introduction

A range of potential impacts on water resources and hydrology have been identified which may occur during the construction or operation/maintenance of the proposed cable route. Impacts will be varied and include the effects of construction on local fluvial geomorphology due to increased potential for watercourse erosion and destabilisation from temporary culvert and outfall installations. Also, there is potential for increased watercourse pollution due to discharge of entrained sediments and chemicals along cable easements or in runoff from the working area, haul roads and converter station, compacted soils and other impermeable areas. There is also the potential for impact to existing water and wastewater assets during the construction phase of the works, with potentially numerous conflicts with underground sewage and water distribution networks. There is potential for the works to impact flood risk from a range of sources during construction and operation, this includes the potential need for dewatering of HDD tunnelling locations and trenches.

There are no anticipated effects during normal operation of the underground cable. Any repair or maintenance activities required during the operational life of the underground cable will result in impacts similar to those identified during construction but limited to the area of works.

All the effects identified are considered to be negative and adverse, unless stated otherwise. These potential impacts on hydrology and people, property and infrastructure receptors as a result of the English Onshore Scheme are described below.

11.6.2 Mitigation by Design

Where possible embedded mitigation measures, or mitigation by design, have been incorporated into the preliminary scheme design such that they inform its detailed design and/or how it shall be constructed. Through iterative assessment, potential impacts have been predicted and opportunities to mitigate them identified with the aim of preventing or reducing impacts as much as possible. The approach provided the opportunity to prevent or reduce adverse impacts from the outset. Where possible, the design has sought to avoid impacts to hydrology receptors through use of HDD, bridge crossings, considerate placement and design of culverts and construction features to avoid areas at risk of flooding or protected areas or sensitive watercourses including those of good ecological or high morphological status.

Although no drainage strategy has been produced as part of this planning application, an outline drainage design is included with this submission and therefore it is considered that the drainage strategy and surface water management plan are embedded mitigations. These documents will be produced at a later stage during detailed design or by the works contractor. Measures, principles, or practices considered a necessary part of the design or construction methodology for a particular element are outlined below. These would therefore meet the CIRIA SuDS Manual Standards.

The design includes good industry practice for this type of development, in addition to the below measures and assumptions. These will be implemented through the adoption of a Construction Environmental Management Plan (CEMP) which will be finalised in agreement with the relevant local planning authority. The minimum measures to be adopted during construction are set out in **Chapter 18: Outline Construction Environmental Management Plan**.

HHD crossings below watercourses

- All temporary construction compounds (launch and retrieval pits) associated with trenchless techniques will be dammed and on-site water management protocols would be incorporated to manage off site flows/runoff (e.g., mud filters or sediment/pollutant capture mechanism to nearby attenuation ponds). Discharge will be pumped/gravity fed to local watercourse utilising a flow control device or via soakaway into the ground. Thus, ensures all discharge is controlled in terms of quality and volume;
- Surface water abstraction may be required for mixing/cable installation at HDD sites. Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than 28-day duration per water body;

- Depth between hard channel bed level and top of trench/cable bore is to be agreed on a case by case basis with the relevant regulatory stakeholders (EA/IDB/LLFA) and will therefore avoid any potential for obstruction to flow or risk of damage from any typical in-channel maintenance activities;
- There may be a potential need for dewatering operations to be undertaken at HDD locations and trenches in areas identified as being at flood risk from groundwater. Groundwater, if encountered, will be managed through pumping, storage, treatment and then discharged at a controlled rate which is to be agreed with the relevant regulator.

Open cut across watercourses:

- Open cut trenches will be dammed (assuming a complete channel width barrier) and entire flow from the watercourse over-pumped around the trench. Where required, over-pumping capacity will be determined on a case by case basis by the temporary works designer in consultation with the relevant stakeholder as part of the detailed design ensuring flow rates are sufficient to ensure no upstream hydrological regime changes and using fish friendly pumps as needed. On-site water management protocols would be incorporated to manage off site flows/runoff (e.g. mud filter or sediment/pollutant capture mechanism to nearby attenuation ponds) from within the working area. Discharge will be pumped/gravity fed via attenuation ponds to remove sediment and potential contaminants before discharging (to local watercourse or infiltration) at a controlled rate which is to be agreed with the relevant regulator. This ensures discharge is controlled in terms of quality and volume;
- Groundwater encountered while excavating trenches will be managed through suitable pumping arrangements, storage, pollution control measures and a controlled discharge which is to be agreed with the relevant regulator. Temporary dams would also be provided to limit below ground flows via the trench;
- Surface water abstraction may be required at watercourses for mixing/cable installation. Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body;
- Depth between hard channel bed level and top of cable trench is to be agreed on a case by case basis with the relevant regulatory stakeholders (EA/IDB/LLFA) and will therefore avoid any potential for obstruction to flow or risk of damage from any in-channel maintenance activities post works.

Open cut direct lay or ducting on land (near watercourse/flow path/floodplain)

- Open cut trenches will be dammed and any water within pumped/gravity fed via attenuation ponds to remove sediment and potential contaminants before discharging at a pre-agreed controlled rate(to local watercourse or infiltration). This ensures discharge is controlled in terms of quality and volume.

Construction compounds

- Construction compounds and access tracks will increase the impermeable area. An appropriate temporary drainage system would be incorporated to manage off site flow/runoff, ensuring waters are controlled in quality and volume. This will comprise attenuation ponds and/or subbase storage beneath compounds where possible Discharge will be pumped/gravity fed to local watercourse or via soakaway at a controlled rate which is to be agreed with the relevant regulator;
- There will be an independently managed foul drainage system at the construction compounds with the foul water contained on site, regularly pumped, emptied, and transported off site. Therefore, there is no requirement for any formal piped foul drainage on site or any offsite connection;
- Construction compounds will include bunded/sump areas with proprietary treatment for re-fuelling, wheel washing and oil separator areas to prevent runoff of these liquids into surface waters. Any site discharge will be pumped/gravity fed via attenuation ponds to remove sediment and potential contaminants before discharging (to local watercourse or infiltration) at a controlled rate which is to be agreed with the relevant regulator.
- Construction compounds will be placed in area at lowest risk of flooding, were practicable.

Haul road and water crossings

- An appropriate drainage system will be incorporated to manage surface water and sediment runoff. This will include header and filter drains, use of sandbags either side of the haul road at watercourse crossings and ensure runoff is directed into attenuation ponds to remove sediment and potential contaminants before discharging (to local watercourse or infiltration) at a controlled rate which is to be agreed with the relevant regulator;
- In general, the haul road will comprise a circa 0.5 m deep layer of unbound granular material with the potential for geogrid layers to be used for stabilisation. Where the haul road will be built up, pipes will be installed to ensure natural drainage pathways are maintained across the haul road;
- Some temporary accesses will be constructed over a pre-installed culvert pipe in the watercourse. The pipe will be of suitable size to accommodate the natural water regime (volumes and flows), in accordance with DMRB standards. For the majority of watercourses, the temporary culvert will be sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological bar and riffle features. In some cases, temporary culverts may be above hard bed level, however this is limited to channels which are balanced systems with little flow and no concern for fish and eel passage. These will be determined on a case by case basis with the relevant stakeholder;
- All temporary accesses will be removed at the end of the construction programme. It is assumed culverts will be in place for the complete duration of the construction works (up to five years);
- All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading where required and re-vegetating/seeding;
- Some temporary accesses to cross larger or ecologically sensitive watercourses will be via a temporary bridge, thereby avoiding impacts associated with culverting. It is assumed these will be in place for the complete duration of the construction works (up to five years). Temporary bridges will be clear span, with no bed or bank reinforcements, and foundations set well back from the bank edge. The soffits will be >0.6m higher than bank tops with no change to surrounding ground level profiles surrounding the crossing. They will be sited to avoid tree/root loss and cross at straight reaches, perpendicular to flow where practicably possible.

Outfall and headwall installations:

- Headwall installations will occur at nearest watercourses. Details of individual outfalls and headwall construction will take into account localised catchments and upstream conditions. Precise locations will be determined at detailed design but will in general include:
    - No part of the outfall structure will protrude significantly beyond the existing line of the bank. This includes headwalls, wingwalls and protection aprons;
    - Discharge will be with the direction of flow, ideally the outfall pipe should be angled at 45° to the direction of flow; and
    - Sited to avoid tree loss or banks experiencing significant scour.
- All hard banks and bed added during construction will be temporary and the bankside will be returned to its original state after construction;
- Design details for outfalls into watercourses will need to be reviewed and confirmed through consultation with the respective regulating authority.

Converter station

- An outline drainage design has been produced which includes partial sub-base storage and attenuation pond for flood storage and treatment of site runoff. This will ensure waters are controlled in quality and volume during construction and at operational stage. Discharge will be pumped/gravity fed to a local watercourse at a controlled rate which is to be agreed with the relevant regulator;
- Converter station platform area has been reduced from 6 ha to 5 ha to reduce volume of material introduced into the flood plain. Options to provide flood plain compensation have been explored with the Environment Agency.

General construction

- Areas with prevalent runoff (overland flow) are to be identified and drainage actively managed, e.g. through bunding and/or temporary drainage as part of the development of the drainage strategy;
- All drainage will be consistent with CIRIA guidance (C532) (Ref 11-26) and developed so as to promote effective management of water resources and reduce potential for impacts to the external water environment. The converter station will be provided with permanent surface water drainage designs consistent with local and national regulatory requirements;
- Management of construction works to comply with the necessary standards and consent conditions as identified by the EA;
- Disturbance to areas close to watercourses reduced to the minimum necessary for the work. A minimum 15 m separation will be maintained from watercourses unless where crossed or discharged into;
- During installation of the cable (over land) drainage measures and provision for water management is included within the planning application boundary;
- Stockpiles will have measures in place to prevent erosion, and thus mitigate potential for sediment laden runoff (as per the Soil Management Plan, **Chapter 12: Agriculture and Soils**, **Appendix 12B**);
- All discharges to be attenuated to at most greenfield runoff rates unless otherwise agreed with the relevant regulatory stakeholder;
- Temporary diversions during works may be required where under-drainage infrastructure is directly encountered. These diversions would be short term and only for the duration of the works at that particular location unless otherwise agreed. The most appropriate method is to be proposed for each field and any works will be undertaken in agreement with the appropriate stakeholder;
- The English Onshore Scheme, where possible, has been located in areas at low risk of flooding so as to avoid flood risk;
- Maintenance of the drainage systems will ensure the systems remain effective for the life of the English Onshore Scheme;
- The risk of pollution to the water environment during construction will be reduced through the adoption of good working practice. Although withdrawn in 2015, the Pollution Prevention Guidelines (Ref 11-26) provide environmental good practice guidance. Replacements for certain aspects have subsequently been updated in the form of the Guidance for Pollution Prevention and therefore considered in the creation of the Construction Environmental Management Plan (CEMP). In addition, CIRIA construction guidance also contains details for pollution prevention best practise, specifically CIRIA C532, C648 (Ref 11-26 and Ref 11-28), and C786F (Ref 11-29). The method to be provided for management of construction impacts will be included in the CEMP and will meet the requirements of the DMRB guidelines. As such pollution management may include, but not be limited to:
    - Erosion and sediment control management procedures;
    - Water discharge management;
    - Invasive non-native species procedure;
    - Emergency incident response procedure;
    - Spill kits; and
    - High standards of equipment and vehicle hygiene.

This mitigation by design has been taken into account when evaluating the significance of the potential impacts discussed in Sections 11.6.3 and 11.6.4. Residual impacts described in Section 11.8 are those which remain taking into account any further proposed project specific mitigation as described in Section 11.7. See Section 11.6.2 for further information on the approach to mitigation taken in this document.

11.6.3 Assessment of Potential Impacts: Construction Phase

This section of the report considers the potential effects that the construction of the English Onshore Scheme could have on the water environment. The main potential impacts relating to construction are:

- Increased surface water runoff through increases in impermeable or compacted areas;
- Mobilisation of fine sediment affecting water quality through runoff or scour;
- Temporary impacts to local fluvial geomorphology;
- Mobilisation of oils, cement or other chemicals affecting water quality;
- Displacement of flood water from the introduction of the converter station platform in the floodplain;
- Obstructions from open cut, ducting and culverting affecting flow regime; and
- Severance or disturbance to underground field/land drainage infrastructure.

These impacts are discussed in further detail in the sections below.

11.6.3.1 Section 1 – Landfall to Bainton

Impacts of open cut techniques on water resources

Construction via open cut techniques and associated machinery could lead to an increase in soil erosion creating sediment laden runoff from the construction area, construction vehicles, and access roads. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible.

Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Within Section 1 there are six water bodies that are proposed to be potentially crossed by open cut techniques, all of which are ordinary watercourses maintained by IDBs with an additional 19 water bodies within the study area which may be indirectly affected by runoff (due to open cut construction within their drainage catchments) consisting of main rivers, WFD designated water courses, a coastal water body and IDB maintained channels, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible**, resulting in a **negligible** significance and considered **not significant**. In addition, there are three watercourses within the study area with a receptor sensitivity value of high due to their status as SSSI or a chalk stream including Kelk Beck, Nafferton Beck, and West Beck (River Hull). In consideration of embedded mitigation, indirect runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. Furthermore, there are 19 water bodies proposed to be crossed by open cut techniques, all of which are minor drains with an additional 27 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

Open cut methodologies will also include flow bypasses by over-pumping at temporary dams which have the potential to obstruct fish and eel passage and also alter flow regime and limit sediment transport. Within Section 1 there are 25 watercourses that are proposed or potential to be crossed by open cut techniques, all of which are ordinary watercourses or minor drains and are not designated WFD nor other statutory or non-statutory. Six are IDB maintained ordinary watercourses and therefore have a sensitivity value of medium. Although these works will not be undertaken directly on any water bodies designated under the WFD, these will be undertaken on headwater or feeder channels. In particular, White Dyke and White Dyke branch which are known to contain fish, and form part of the headwater channel network associated with Kelk Beck and the River Hull. This will obstruct fish and eel passage for the duration of the works and lead to a temporary loss of spawning habitat. Over-pumping will alter the flow regime and limit natural sediment transport for the duration of the works and may lead to depletion of coarse sediments downstream and aggradation upstream. Impact will be greatest at White Dyke where morphological diversity was greatest of these six watercourses. Any impoundments

will be temporary (approximately 10 days) and can be further mitigated by measures included in the CEMP (including but not limited to) using fish friendly pumps and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes. Impacts will be short term and normal flow conditions will naturally recover once works are complete and the obstruction is removed. Therefore, obstruction of flows will constitute a **low** magnitude of change which is **minor** significance and considered **not significant**. The remaining 19 minor drains have a sensitivity value of low, resulting in a **low** magnitude of change which is **negligible** significance, and considered **not significant**.

Installation of the below ground cable within agricultural fields via open cut techniques has the potential to cause severance, disturbance, or blockage to the underground field/land drainage infrastructure. These receptors have a sensitivity value of low. Alteration of the drainage infrastructure has the potential to result in drying out or waterlogging of the agricultural fields. Embedded mitigation includes the addition of temporary diversions during works which may be required where under-drainage infrastructure is directly encountered. These diversions would be short term and only for the duration of the works at that particular site/field. The most appropriate method is to be proposed for each field and any works undertaken in agreement with the appropriate stakeholder. This will result in a **low** magnitude of change which is **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor but it is assumed these may be required. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in surface water dependent habitat at Kelk Beck, West Beck (River Hull) and Nafferton Beck. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible/minor** magnitude of change to People, Property and Infrastructure and water dependent habitat and considered **not significant**.

Impacts from trenchless techniques on water resources

Within Section 1 there are 16 watercourses proposed to be crossed by trenchless techniques comprising five main rivers of which three are designated SSSI or chalk streams and four are WFD designated and 11 crossed ordinary watercourses of which three are WFD designated, two are IDB maintained and seven are minor drains.

Trenchless techniques will avoid any direct effect on the structure of the watercourse by drilling beneath the bed. This would also eliminate any longer term affects to fluvial geomorphology as flows, movement of sediment and fish migration will be unaffected. However temporary compounds (including launch and receptor pits) would be required either side of the watercourses, in addition to construction vehicles and access roads nearby. These activities could lead to an increase in soil erosion resulting in sediment laden runoff. This discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect nearby watercourses or standing water quality. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification.

The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Permits would be obtained with agreement with the relevant regulatory stakeholder for depth of cable and distance of excavations from the watercourse edge.

Within Section 1 three watercourses are proposed to be crossed by trenchless techniques with a receptor sensitivity value of high due to their status as a SSSI or a chalk stream including Kelk Beck, Nafferton Beck, and West Beck (River Hull) which are also WFD designated watercourses In consideration of embedded mitigation, fluvial geomorphological and runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. In addition, there are six watercourses proposed to be crossed by trenchless

techniques of which two are main river (Driffield Canal and Nafferton Drain), four are WFD designated water courses and/or IDB maintained channels (Auburn Beck, Gransmoor Drain, Northfield Beck and Wanlass Drain) with a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there are seven water bodies proposed to be crossed by trenchless techniques, all of which are minor drains which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in surface water dependent habitat at Kelk Beck, West Beck (River Hull) and Nafferton Beck. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible/minor** magnitude of change to People, Property and Infrastructure and water dependent habitat and considered **not significant**.

Impacts from haul road, accesses, and watercourse crossings on water resources

Numerous heavy vehicle movements on the haul road have the potential to temporarily mobilise soil, dust and pollutants (from fuel spills, oils, lubricants, wear from tyres and brakes) which would be captured in runoff on the road surface. At sufficient concentration this would lead to a reduction in water quality including effects that could result in the smothering or poisoning of animals and plants within local watercourses and standing water bodies. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation includes a layer of granular material along with geogrids to provide stability and minimise soil erosion from traffic. Silt management measures will be employed to reduce the risk of sediment runoff which will be included within the CEMP. Within Section 1, three watercourses within the study area have a receptor sensitivity value of high due to their status as a SSSI or a chalk stream including Kelk Beck, Nafferton Beck, and West Beck (River Hull). In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. In addition, there are 12 watercourses which are main river, WFD designated and/or IDB maintained channels with a sensitivity value of medium. There are also a further 14 water bodies within the study area which may be indirectly affected by runoff consisting of main rivers, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there are 26 water bodies, all of which are minor drains with an additional 27 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

Nafferton Beck, Nafferton Drain, and Kelk Beck are proposed to be crossed by a temporary bridge. The bridge structures have potential to create a narrowing or constriction of flows during flood flows. Their final designs are to be developed by the appointed contractor, however, will include measures to reduce or eliminate these impacts including clear-span, with soffit above surrounding bank levels. Loss of morphological features is avoided by design by avoiding in-channel supports. The addition of the bridge structure in a location suffering from scour will force additional load onto banks which has the potential to exacerbate destabilisation and bank collapse. Equally, locating the structure on a meander bend may lead to flows directed towards the supports. This may exacerbate fine sediment delivery in the short term into the channel as banks may be destabilised leading to bed structure and substrate changes locally from smothering of bed and morphological features downstream. The precise locations for bridge crossings are to be designed by the appointed Contractor and in consultation with the relevant stakeholder and will be situated to avoid areas of scour and be perpendicular to flow thereby avoiding impacts.

Construction of the bridge structures have potential for disturbance to channel bed and bank, loss of riparian and marginal vegetation resulting in loss of invertebrate and fish spawning habitat. However,

the design of the bridge is such that it will be clear span without bed or bank reinforcement. Temporary bridges were selected over culvert installations so as to avoid any in-channel impacts. Any loss of vegetation on banks will be minimal as placement will be considered to avoid losses within the planning application boundary, in particular bridges will avoid tree loss where possible. In addition, there is potential for shading due to the span of the bridge structure across the channels. Kelk Beck and Nafferton Beck are chalk streams and therefore support fish and invertebrate species. By design, the bridge structures are narrow and sat above bank tops therefore any shading will be minimal and move throughout the day.

In consideration of the embedded mitigation, impacts from temporary bridges will result in a **negligible** magnitude of change. The receptors have a sensitivity value of high, therefore resulting in a **negligible/minor** significance which is **not significant**.

Where temporary bridge crossings are not used, temporary culverts will be installed to cross watercourses. Culverting will result in straightening and hard banks of a section of channel (circa 6 m wide). In addition to the removal of bed substrate, this may also lead to changes in flow dynamics and patterns of erosion at the structure which will also impact the transfer of sediment downstream. It is expected a loss of velocity and reduced sediment transport will lead to material deposition upstream of culvert and material deficit and scour downstream of structure due to velocity increase through/off culvert. However, these channels are already straightened as are designated artificial or heavily modified and works will constitute a very small section of any overall water body. Therefore, impacts are expected to be minor and localised.

The addition of temporary culvert and hard banks will result in the direct loss of habitat within the bed and banks due to loss of natural substrate, and also prevent natural recolonisation while the structure is in place. This will also result in loss of fish spawning habitats and therefore impacts may also be to downstream WFD water bodies as a result of this loss. Fish passage through the structure may be limited reducing access and leading to stranding. However, this bed and bank loss is localised, and the channel bed of all crossed WFD watercourses are classed as heavily modified or artificial. Majority of channel bed sediments observed were silts, receiving large fine sediment inputs from runoff from local areas and erosion to banks. The loss of bed sediments will therefore result in a minor localised reduction in quality of aquatic environment.

During construction, any tree loss may exacerbate fine sediment delivery in the short term into the channel as banks may be destabilised leading to bed structure and substrate changes locally from smothering of bed and morphological features downstream. Post construction, banks would be stabilised which will eliminate these effects.

Embedded mitigation as discussed in Section 11.6.2 includes measures for culvert dimensions to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.

Within Section 1 there are nine watercourses crossed with temporary culverts which are all ordinary watercourses designated WFD or maintained by the IDB. As such these have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**.

Impacts from construction compounds (landfall, primary, secondary, and tertiary compounds) on water resources

Use of construction compounds by heavy machinery and storage of loose material could lead to an increase in soil erosion or increased sediment laden runoff from compacted ground entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water

quality therefore causing a reduction in the WFD classification. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes installation of a temporary drainage system to treat runoff from the site, in addition to bunded areas to prevent runoff of chemicals. The temporary drainage system would manage the quality and volume of water prior to its controlled discharge into nearby watercourses.

Within Section 1, there are 12 water bodies within a 250 m direct hydraulic link of construction compounds. These are main river or ordinary watercourses maintained by the IDB and/or WFD designated, and a coastal WFD water body, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant.** In addition, there are three watercourses within the 2 km study area with a receptor sensitivity value of high due to their status as SSSI or a chalk stream including Kelk Beck, Nafferton Beck, and West Beck (River Hull). In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible/minor** significance and considered **not significant**. Furthermore, there are 53 water bodies within the study area, of which 27 are standing water bodies and 26 minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, indirect runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in main river Driffield Canal, and WFD water bodies Auburn Beck and Gransmoor Drain which are considered medium sensitivity. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is of low sensitivity value and WFD water bodies which is of medium value, and therefore considered **not significant**.

Impacts from outfall and headwall installations in watercourse banks

Outfall and headwall installations are primarily to the nearest ordinary watercourse or minor land drainage water feature and will convey discharges from construction within the working area and construction compounds. These installations will lead to a direct loss of natural banks leading to reduced bank roughness and potential for increased scour downstream of structures thereby negatively impacting fluvial geomorphology locally. Impacts would also result in a direct loss of bankside/riparian habitat in the immediate location of the structure. In addition, increased flow entering the channels collected as runoff, could lead to increased scour to channel banks and bed that would lead to additional fine sediment transferred downstream. Details of individual outfalls and headwall construction will take into account localised catchments and upstream conditions, as such embedded mitigation includes installation in-line of the bank to reduce the risk of turbulence and localised scour. Discharge will be with the direction of flow, ideally angled at 45° to the direction of flow. Outfalls will be sited to avoid any tree loss and avoid bank areas under existing scour. Installations will also be small, less than <300 mm. These impacts would be temporary, and as a worst case for the duration of the construction phase only, and the bankside will be returned to its original state after drainage is no-longer required.

There are two outfalls located in Nafferton Beck, which has a receptor sensitivity value of high due to its status as a chalk stream. In consideration of embedded mitigation, this would result in a **negligible** magnitude of change resulting in a **negligible/minor** significance, which is considered **not significant**.

There are seven outfalls entering three watercourses with a receptor sensitivity value of medium. One of these is designated WFD and two are IDB maintained watercourses (Auburn Beck, Earl's Dyke and Burton Drain). In consideration of embedded mitigation, this would result in a **negligible** magnitude of change resulting in a **negligible** magnitude of change which is considered **not significant**.

In addition, there are 38 outfalls into watercourses with a receptor sensitivity value of low in Section 1. These have potential to convey fluvial geomorphological impact downstream to more sensitive water bodies. In consideration of embedded mitigation, this would limit any impacts at source and therefore result in a **negligible** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Impacts which may affect flood risk

Locations for any temporary culvert installation have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor, therefore this assessment has been completed on the assumption that installation will be included for watercourses and surface water flood paths caused by haul roads. There are 41 watercourses, including five main rivers, identified as being crossed by the English Onshore Scheme English Onshore Scheme in Section 1 of which 35 will be crossed with temporary culverts. The installation of temporary culverts may impact upon the existing flow regime and may cause an increase in flows with risk of flooding to the surrounding land. People, property and infrastructure has a low sensitivity value. With embedded mitigation, such as suitable culvert pipe size to accommodate natural flow regimes, magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

There are three proposed temporary bridge crossings of watercourses within Section 1. Currently exact locations of these watercourse crossings are not known though the structures will be placed within the planning application boundary. These temporary bridge crossings have the potential to impact on existing flow regimes and thus cause flooding to surrounding land. Of these crossings, two are located within the extents of Flood Zone 3. These receptors have a sensitivity of medium. Embedded mitigation would result in a **low** magnitude of change resulting in a **negligible** impact which would be **not significant**.

The crossing of field drains, included in the 44 watercourses proposed to be crossed by the English Onshore Scheme in Section 1, could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors. These receptors are considered to have a sensitivity value of low. Embedded mitigation would result in a **low** magnitude of change resulting in **a negligible** impact which would be **not significant**.

Installation of the below ground DC cable has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure. Though data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of Section 1 of the English Onshore Scheme. The sensitivity of these receptors is low. Embedded mitigation would result in a **low** magnitude of change, resulting in a **negligible** impact which would be **not significant**.

The English Onshore Scheme English Onshore Scheme cable route intersects with areas of Flood Zone 3 at 13 locations within Section 1. Approximate lengths of intersection are 40 m, 145 m, 700 m, 560 m, 50 m, 60 m, 20 m, 40 m, 15 m, 30 m, 40 m, 310 m and 70 m respectively. There is a risk of flooding at these locations though these crossings are located in predominantly rural areas and so the people, property and infrastructure receptors sensitivity is considered to be low. Embedded mitigation would result in a **low** magnitude of change, resulting in **a negligible** impact which would be **not significant**.

Three of the eight proposed construction compounds within Section 1; compounds 1, 2 and 6 overlap with areas of high risk surface water and may result in an increase in surface water runoff, compound 4 is an area of medium risk and compounds 5, 7 and 8 are at low risk of surface water flooding. The areas at risk are mostly small proportions of these construction compounds and are not shown to affect a majority of the compound area. These compounds have a low sensitivity value, with embedded mitigation meaning magnitude of change is **negligible** resulting in **a negligible** impact which would be **not significant**.

None of the proposed construction compounds in Section 1 overlap with Flood Zone 2 or 3.

Two of the committed HDD pits are within areas at high risk of surface water flooding; the entry pit of HDD 14 and the exit pit of HDD 21. Two of the committed HDD pits are in areas at medium risk of surface water flooding; the exit pit of HDD 20 and the entry pit of HDD 21. Two confirmed HDD pits are in areas at low risk of surface water flooding; the entry pits of HDD 12 and HDD 20.

Four of the committed HDD pit locations are shown to be partially within areas of Flood Zone 3. These are; the exit pits of HDD 14,15 and both the entry and exit pits of HDD 21. Two HDD pit locations overlap Flood Zone 2, the entry pits of HDD 12 and HDD 14.

Six of the HDD pits with potential to open cut watercourses are in areas at high risk of surface water flooding. These are; the exit pits of HDD 1 and HDD 4, both the entry and exit pits of HDD 6, the exit pit of HDD 13 and the entry pit of HDD 17. Two HDD pits with the potential to open cut watercourses are in areas at medium risk of surface water flooding; the exit pit of HDD 9 and the exit pit of HDD 19. Four of this type of HDD pit are located in areas at low risk of surface water flooding; the entry pit of HDD 3 and HDD 10, and both the entry and exit pits of HDD 16.

Two of the HDD pit locations with the potential to open cut watercourses are shown partially within Flood Zone 3; the entry pit of HDD 3 and the exit pit of HDD 4. Three pit locations are in Flood Zone 2; the entry and exit pits of HDD 1, and the entry pit of HDD 4

The maximum sensitivity values for the HDD pits are medium. With embedded mitigation, magnitude of change is **negligible** resulting in a **negligible** impact which would be **not significant**

Two proposed joint bays are located within areas at medium risk of surface water flooding and two in areas of low risk of surface water flooding. Additionally, one of the proposed joint bays is located in Flood Zone 3. The location of these joint bays is to be finalised at the detailed design stage and so the locations currently given are only indicative of their location. As the infrastructure of these joint bays is to be buried; with soil and grass placed on the concrete pad, the sensitivity value is low. With embedded mitigation meaning magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

11.6.3.2 Section 2 – Bainton to Market Weighton

Impacts of open cut techniques on water resources

Construction via open cut techniques and associated machinery could lead to an increase in soil erosion leading to sediment laden runoff from the construction area, construction vehicles, and access roads. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible.

Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Within Section 2 there are five water bodies proposed to be crossed by open cut techniques, all of which are ordinary watercourses considered as minor drainage channels with an additional 22 standing water bodies and numerous other minor drainage channels within the study area that may be indirectly affected. None of these are maintained by IDBs or are WFD designated and therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there are four water bodies within the study area which may be indirectly affected by runoff consisting of a main river and WFD designated water courses, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**.

The crossed channels are minor drains and not within 2 km upstream to a WFD water body and therefore considered to be **no impact** to flow regime or fish passage.

Installation of the below ground cable within agricultural fields via open cut techniques has the potential to cause severance, disturbance, or blockage to the underground field/land drainage infrastructure. These receptors have a sensitivity value of low. Alteration of the drainage infrastructure has the potential to result in drying out or waterlogging of the agricultural fields. Embedded mitigation includes the addition of temporary diversions during works which may be required where under-drainage infrastructure is directly encountered. These diversions would be short term and only for the duration of the works at that particular site/field. The most appropriate method is to be proposed for each field and any works undertaken in agreement with the appropriate stakeholder. This will result in a **low** magnitude of change which is **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading reduced water quantity available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity and considered **not significant**.

Impacts from trenchless techniques on water resources

Within Section 2, there are no watercourses proposed to be crossed by trenchless techniques, however there are other infrastructure proposed to be crossed by trenchless techniques in the vicinity of several hydrology receptors.

Construction via trenchless techniques could lead to an increase in soil erosion resulting in sediment laden runoff from the construction area, construction vehicles, temporary compounds (launch and receptor pits), and access roads. This discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect nearby watercourses or standing water quality, entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification.

The impacts from indirect runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Permits would be obtained with agreement with the relevant regulatory stakeholder for distance of excavations from the watercourse edge.

Within Section 2 there are four water bodies within the study area which may be indirectly affected by runoff consisting of main rivers and WFD designated water courses, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there are five water bodies, all of which are minor drains with an additional 22 standing water bodies that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading reduced water quantity available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity, and considered **not significant**.

Impacts from haul road, accesses, and watercourse crossings on water resources

Numerous heavy vehicle movements on the haul road have the potential to temporarily mobilise soil, dust and pollutants (from fuel spills, oils, lubricants, wear from tyres and brakes) which would be captured in runoff on the road surface. At sufficient concentration this would lead to a reduction in water quality including effects that could result in the smothering or poisoning of animals and plants within local watercourses and standing water bodies. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation includes a layer of granular material along with geogrids to provide stability and minimise soil erosion from traffic. Silt management measures will be employed to reduce the risk of sediment runoff which will be included within the CEMP. Within Section 2, there are four watercourses within the study area which are a main river and WFD designated channels, which have a receptor sensitivity value of

medium. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**. Furthermore, there are five water bodies, all of which are minor drains with an additional 22 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

Temporary culverts will be installed to cross the five ordinary watercourses. Culverting will result in straightening and hard banks of a section of channel (circa 6 m wide). In addition to the removal of bed substrate, this may also lead to changes in flow dynamics and patterns of erosion at the structure which will also impact the transfer of sediment downstream. It is expected a loss of velocity and reduced sediment transport will lead to material deposition upstream of culvert and material deficit and scour downstream of structure due to velocity increase through/off culvert. However, these channels are already straightened or modified and works will constitute a very small section of any overall water body. Therefore, impacts are expected to be negligible as they are highly localised.

The addition of culvert and hard banks will result in the direct loss of habitat within the bed and banks due to loss of natural substrate, and also prevent natural recolonisation while the structure is in place. The crossed channels are minor drains and not within 2 km upstream to a WFD water body and therefore considered to be **no impact** to flow or fish passage.

Embedded mitigation as discussed in Section 11.6.2 includes measures size to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.

Within Section 2 there are five watercourses crossed with temporary culverts which are all minor drains. As such these have a sensitivity value of low. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**.

Impacts from construction compounds (primary, secondary, and tertiary compounds) on water resources

Use of construction compounds by heavy machinery and storage of loose material could lead to an increase in soil erosion or increased sediment laden runoff from compacted ground entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes installation of a temporary drainage system to treat runoff from the site, in addition to bunded areas to prevent runoff of chemicals. The temporary drainage system would manage the quality and volume of water prior to its controlled discharge into nearby watercourses.

Within Section 2, there are no water features proposed to be crossed by a construction compound, however there are four water bodies which are main river or ordinary watercourses and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant.** Furthermore, there are 31 water bodies within the study area, of which 22 are standing water bodies and five minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, indirect runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading reduced water quantity available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is of low sensitivity, and considered **not significant**.

Impacts from outfall and headwall installations in watercourse banks

Outfall and headwall installations are primarily to the nearest ordinary watercourse or minor land drainage water feature and will convey discharges from construction within the working area and construction compounds. These installations will lead to a direct loss of natural banks leading to reduced bank roughness and potential for increased scour downstream of structures thereby negatively impacting fluvial geomorphology locally. Impacts would also result in a direct loss of bankside/riparian habitat in the immediate location of the structure. In addition, increased flow entering the channels collected as runoff, could lead to increased scour to channel banks and bed that would lead to additional fine sediment transferred downstream. Details of individual outfalls and headwall construction will take into account localised catchments and upstream conditions, as such embedded mitigation includes installation in-line of the bank to reduce the risk of turbulence and localised scour. Discharge will be with the direction of flow, ideally angled at 45° to the direction of flow. Outfalls will be sited to avoid any tree loss and avoid bank areas under existing scour. Installations will also be small, less than <300 mm. These impacts would be temporary for the duration of the construction phase only, as the bankside will be returned to its original state after drainage is no-longer required.

There are seven outfalls into watercourses with a receptor sensitivity value of low in Section 2. In consideration of embedded mitigation this would result in a **negligible** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Impacts which may affect flood risk

Locations for any temporary culvert installation have not yet been confirmed with the scheme design, therefore this assessment has been completed on the assumption that installation will be included for watercourses and surface water flood paths caused by haul roads. There are five watercourses identified as proposed to be crossed by culverts in Section 2 of the English Onshore Scheme. The installation of temporary culverts may impact upon the existing flow regime and may cause an increase in flows with risk of flooding to the surrounding land. People property and infrastructure has a low sensitivity value. Magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

The crossing of field drains, included in the five watercourses proposed to be crossed by the English Onshore Scheme in Section 2, could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors. These receptors are considered to have a sensitivity value of low. Embedded mitigation would result in a **low** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Installation of the below ground DC cable has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure. Though data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of Section 2 of the English Onshore Scheme. The sensitivity of these receptors is low. Embedded mitigation would result in a **low** magnitude of change, resulting in a **negligible** impact with would be **not significant**.

The English Onshore Scheme cable route does not intersect with areas of either Flood Zone 3 or 2 within Section 2. The sensitivity value of property, people and infrastructure at these crossings is low. Magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

None of the proposed construction compounds overlap with areas identified as being Flood Zone 2 or 3. One of the proposed construction compounds; compound 11 is located partially in an area at high risk of surface water flooding. Two of the proposed construction compounds; compounds 9 and 12 are located in areas at low risk of surface water flooding. These compounds have a low sensitivity value, with embedded mitigation meaning magnitude of change is **negligible** resulting in a **negligible** impact which would be **not significant**.

None of the HDD pit locations, committed or with the potential to open cut watercourses are shown to be within areas of Flood Zone 3 or 2. Similarly none of the HDD pits are at risk of surface water flooding.

None of the proposed joint bays within section 2 are located within Flood Zone 2 or 3 or within areas of surface water risk.

11.6.3.3 Section 3 – Market Weighton to River Ouse

Impacts of open cut techniques on water resources

Construction via open cut techniques and associated machinery could lead to an increase in soil erosion leading to sediment laden runoff from the construction area, construction vehicles, and access roads. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible.

Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Within Section 3 there are seven water bodies proposed or potential to be crossed by open cut techniques, all of which are ordinary watercourses maintained by IDBs (Holme Main Drain, Black Dyke, Asselby Marsh Drain, Asselby Marsh Lane Drain, Seave Carr, Lowfield and Bank Field Drains) with an additional 21 water bodies within the study area which may be indirectly affected by runoff (due to open cut construction within their drainage catchments) consisting of main rivers, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. In addition, there are two receptors within the study area with a sensitivity value of high due to their status as SSSI (River Derwent SSSI and Black Dyke at Barn Hill Meadows SSSI). In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. Furthermore, there are 31 water bodies proposed to be crossed by open cut techniques, all of which are minor drains with an additional 44 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

Open cut methodologies will also include flow bypasses by over-pumping at temporary dams which have the potential to obstruct fish and eel passage and also alter flow regime and limit sediment transport. Within Section 3 there are 38 watercourses proposed to be crossed by open cut techniques, all of which are ordinary watercourses or minor drains and are not designated WFD nor other statutory or non-statutory. Seven are IDB maintained ordinary watercourses and therefore have a sensitivity value of medium. However, these watercourses proposed to be crossed by open cut technique are all headwater channels that are part of WFD water body catchments and impacts therefore not directly to the WFD water bodies but may indirectly lead to temporary obstruction and loss of spawning habitats. Over-pumping will alter the flow regime and limit natural sediment transport for the duration of the works and may lead to depletion of coarse sediments downstream and aggradation upstream. Any impoundments will be temporary (approximately 10 days) and can be further mitigated by measures included in the CEMP (including but not limited to) using fish friendly pumps and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes. Impacts will be short term localised to these headwater and feeder channels and normal conditions will naturally recover once works are complete and the obstruction is removed. Therefore, obstruction of flows will constitute a **low** magnitude of change which is **minor** significance and considered **not significant**. The remaining 31 minor drains have a sensitivity value of low, resulting in a **low** magnitude of change which is **negligible** significance, and considered **not significant**.

Installation of the below ground cable within agricultural fields via open cut techniques has the potential to cause severance, disturbance, or blockage to the underground field/land drainage infrastructure. The sensitivity value of these receptors is low. Alteration of the drainage infrastructure has the potential to result in drying out or waterlogging of the agricultural fields. Embedded mitigation includes the addition of temporary diversions during works which may be required where under-drainage infrastructure is directly encountered. These diversions would be short term and only for the duration of the works at

that particular site/field. The most appropriate method is to be proposed for each field and any works undertaken in agreement with the appropriate stakeholder. This will result in a **low** magnitude of change which is **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in surface water dependent habitat at River Derwent and Barn Hill Meadows at Black Dyke. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity, and water dependent habitat which is high sensitivity, and therefore considered **not significant**.

Impacts from trenchless techniques on water resources

Within Section 3 there are 12 watercourses proposed to be crossed by trenchless techniques comprising two main rivers and six ordinary watercourses that are IDB maintained channels. Of these, three are also WFD designated. These are described in further detail within this section.

Trenchless techniques will avoid any direct effect on the structure of the watercourse by drilling beneath the bed. This would also eliminate any longer term affects to fluvial geomorphology as flows, movement of sediment and fish migration will be unaffected. However temporary compounds (including launch and receptor pits) would be required either side of the watercourses, in addition to construction vehicles and access roads nearby. These activities could lead to an increase in soil erosion resulting in sediment laden runoff. This discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect nearby watercourses or standing water quality. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification.

The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Permits would be obtained with agreement with the relevant regulatory stakeholder for depth of cable and distance of excavations from the watercourse edge.

Within Section 3, there are 12 watercourses proposed to be crossed by trenchless techniques of which two are main rivers (Back Delfin/Market Weighton Canal and River Ouse) that are also WFD designated, in addition to a further six ordinary watercourses that are IDB maintained channels (River Foulness, Egremont Drain, Dunns Drain, Featherbed Drain, Carr/Bishopsoil, and New Drain) of which only River Foulness is also WFD designated, and therefore have a sensitivity value of medium. There are also a further 14 water bodies within the study area which may be indirectly affected by runoff consisting of main river, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. In consideration of embedded mitigation, fluvial geomorphological and runoff impacts would therefore result in a **negligible** magnitude of change which is **negligible** significance and considered **not significant**. Within the study area there are two receptors with a sensitivity value of high due to SSSI designations (River Derwent and Barn Hill Meadows at Black Dyke). Downstream conveyance of runoff impacts, in consideration of embedded mitigation will have a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. Furthermore, there are four water bodies proposed to be crossed by trenchless techniques, all of which are minor drains with an additional 44 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within

the study area has the potential to result in downstream loss of water quantity leading to habitat loss in surface water dependent habitat at River Derwent and Barn Hill Meadows at Black Dyke. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions.

Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity, and water dependent habitat which is high sensitivity, and therefore considered **not significant**.

Impacts from haul road, accesses, and watercourse crossings on water resources

Numerous heavy vehicle movements on the haul road have the potential to temporarily mobilise soil, dust and pollutants (from fuel spills, oils, lubricants, wear from tyres and brakes) which would be captured in runoff on the road surface. At sufficient concentration this would lead to a reduction in water quality including effects that could result in the smothering or poisoning of animals and plants within local watercourses and standing water bodies. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation includes a layer of granular material along with geogrids to provide stability and minimise soil erosion from traffic. Silt management measures will be employed to reduce the risk of sediment runoff which will be included within the CEMP. Within Section 3, two receptors within the study area with a receptor sensitivity value of high due to their status as a SSSI including River Derwent and Barn Hill Meadows at Black Dyke which are water dependent habitats. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible/minor** significance and considered **not significant**. In addition, there are 16 water bodies which are main river, WFD designated and/or IDB maintained channels with a sensitivity value of medium. There are also a further 10 water bodies within the study area which may be indirectly affected by runoff consisting of main rivers, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there are 35 water bodies, all of which are minor drains with an additional 44 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**.

River Foulness and Back Delfin/Market Weighton Canal are proposed to be crossed by a temporary bridge. The bridge structures have potential to create a narrowing or constriction of flows during flood flows. Their final designs are to be developed by the appointed contractor, however will include measures to reduce or eliminate these impacts including clear-span, with soffit above surrounding bank levels. Loss of morphological features is avoided by design by avoiding in-channel supports. The addition of the bridge structure in a location suffering from scour will force additional load onto banks which has the potential to exacerbate destabilisation and bank collapse. Equally, locating the structure on a meander bend may lead to flows directed towards the supports. This may exacerbate fine sediment delivery in the short term into the channel as banks may be destabilised leading to bed structure and substrate changes locally from smothering of bed and morphological features downstream. The precise location for bridge crossings are to be designed by the appointed Contractor and in consultation with the relevant stakeholder, and will be situated to avoid areas of scour and be perpendicular to flow thereby avoiding impacts.

Construction of the bridge structures have potential for disturbance to channel bed and bank, loss of riparian and marginal vegetation resulting in loss of invertebrate and fish spawning habitat. However, the design of the bridge is such that it will be clear span without bed or bank reinforcement. Temporary bridges were selected over temporary culvert installations so as to avoid any in-channel impacts. Any loss of vegetation on banks will be minimal as placement will be considered to avoid losses within the limit of deviation, in particular bridges will avoid tree loss where possible. In addition, there is potential for shading due to the span of the bridge structure across the channels. By design, the bridge structures are narrow and sat above bank tops therefore any shading will be minimal and move throughout the day.

In consideration of the embedded mitigation, impacts from temporary bridges will result in a **negligible** magnitude of change. The sensitivity value of the receptors is medium, resulting in a **negligible** significance which is **not significant**.

Where temporary bridge crossings are not used, temporary culverts will be installed to cross watercourses. Culverting will result in straightening and hard banks of a section of channel (approximately 6 m wide). In addition to the removal of bed substrate, this may also lead to changes in flow dynamics and patterns of erosion at the structure which will also impact the transfer of sediment downstream. It is expected a loss of velocity and reduced sediment transport will lead to material deposition upstream of culvert structure and material deficit and scour downstream of structure due to velocity increase through/off culvert. However, these channels are already straightened or modified for drainage and works will constitute a very small section of any overall water body. Therefore, impacts are expected to be minor and localised.

The addition of culvert and hard banks will result in the direct loss of habitat within the bed and banks due to loss of natural substrate, and also prevent natural recolonisation while the structure is in place. Although these works will not be undertaken directly on any water bodies designated under the WFD, these will be undertaken on headwater or feeder channels. This may result in loss of fish spawning habitats.

During construction, any tree loss may exacerbate fine sediment delivery in the short term into the channel as banks may be destabilised leading to bed structure and substrate changes locally from smothering of bed and morphological features downstream. Post construction, banks would be stabilised which will eliminate these effects.

Embedded mitigation as discussed in Section 11.6.2 includes measures size to accommodate the natural water regime, with the culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.

Within Section 3 there are 10 watercourses crossed with temporary culverts which are all ordinary watercourses maintained by the IDB and form part of the headwaters or drain within the catchment of designated WFD water bodies. As such these have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**.

Impacts from construction compounds (primary, secondary, and tertiary compounds) on water resources

Use of construction compounds by heavy machinery and storage of loose material could lead to an increase in soil erosion or increased sediment laden runoff from compacted ground entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes installation of a temporary drainage system to treat runoff from the site, in addition to bunded areas to prevent runoff of chemicals. The temporary drainage system would manage the quality and volume of water prior to its controlled discharge into nearby watercourses.

Within Section 3, there are no water features proposed to be crossed by a construction compound, however there are four within a 250 m hydraulic link and impacts of runoff would be direct. These four water bodies are main river Back Delfin/Market Weighton Canal and Black Dyke, New Drain and River Foulness ordinary watercourses maintained by the IDB and/or WFD designated and therefore have a sensitivity value of medium. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** magnitude of change which is **negligible** significance and considered **not significant.** In addition, there are two water features within the 2 km study area with a receptor sensitivity value of high due to their status as SSSI including River Derwent and Barn Hill Meadows at Black Dyke. In consideration of embedded mitigation, runoff impacts would therefore result in a

negligible impact which is a **negligible/minor** significance and considered **not significant**. Furthermore, there are 89 water bodies within the study area, of which 44 are standing water bodies and 35 minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, indirect runoff impacts would therefore result in a **negligible** magnitude of change which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in main river Back Delfin/Market Weighton Canal, and WFD water body River Foulness, which are considered medium sensitivity. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity, and WFD water bodies which is medium sensitivity, and therefore considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to habitat loss in surface water dependent habitat at River Derwent and Barn Hill Meadows at Black Dyke. In addition, reduced water quantity may be available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible/minor** magnitude of change to People, Property and Infrastructure which is low sensitivity, and water dependent habitat which is high sensitivity, and therefore considered **not significant**.

Impacts from outfall and headwall installations in watercourse banks

Outfall and headwall installations are primarily to the nearest ordinary watercourse or minor land drainage water feature and will convey discharges from construction within the working area and construction compounds. These installations will lead to a direct loss of natural banks leading to reduced bank roughness and potential for increased scour downstream of structures thereby negatively impacting fluvial geomorphology locally. Impacts would also result in a direct loss of bankside/riparian habitat in the immediate location of the structure. In addition, increased flow entering the channels collected as runoff, could lead to increased scour to channel banks and bed that would lead to additional fine sediment transferred downstream. Details of individual outfalls and headwall construction will take into account localised catchments and upstream conditions, as such embedded mitigation includes installation in-line of the bank to reduce the risk of turbulence and localised scour. Discharge will be with the direction of flow, ideally angled at 45° to the direction of flow. Outfalls will be sited to avoid any tree loss and avoid bank areas under existing scour. Installations will also be small, less than <300 mm. These impacts would be temporary for the duration of the construction phase only, as the bankside will be returned to its original state after drainage is no-longer required.

There are 13 outfalls entering seven water bodies with a receptor sensitivity value of medium. Two of these water bodies are designated WFD (Back Delfin/Market Weighton Canal and River Foulness), and the remaining 11 are IDB maintained watercourses. In consideration of embedded mitigation, this would result in a **negligible** magnitude of change resulting in a **negligible** impact which is considered **not significant**.

In addition, there are 53 outfalls into watercourses with a receptor sensitivity value of low in Section 3. These have potential to convey fluvial geomorphological impact downstream to more sensitive water bodies. In consideration of embedded mitigation, this would limit any impacts at source and therefore result in a **negligible** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Impacts which may affect flood risk

Locations for any temporary culvert installation have not yet been confirmed with the scheme design, therefore this assessment has been completed on the assumption that installation will be included for watercourses and surface water flood paths caused by haul roads. There are 45 watercourses proposed as being crossed by culverts in Section 3. The installation of temporary culverts may impact upon the existing flow regime and may cause an increase in flows with risk of flooding to the surrounding land. People property and infrastructure has a low sensitivity value. Embedded mitigation means magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

There are two proposed temporary bridge crossings of watercourses within Section 3. Currently exact locations of these watercourse crossings are not able to be provided though the structures will be placed within the planning application boundary. These temporary bridge crossings have the potential to impact on existing flow regimes and thus cause flooding to surrounding land. These areas of within the extent of Flood Zone 3 with one also being within areas of flow surface water risk. Flood risk receptors have a sensitivity of medium. Embedded mitigation would mean magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

The crossing of field drains, included in the 50 watercourses crossed by the English Onshore Scheme in Section 3, could cause flow to back up on surrounding field rains and in turn increase risk to people, property and infrastructure flood risk receptors. These receptors are considered to have a sensitivity value of low. Embedded mitigation would result in a **low** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Installation of the below ground DC cable has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure. Though data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of the English Onshore Scheme in Section 3. The sensitivity of these receptors is low. Embedded mitigation would result in a **low** magnitude of change, resulting in a **negligible** impact with would be **not significant**.

The English Onshore Scheme cable route intersects with areas of Flood Zone 3 at 14 locations within Section 3, approximate lengths of intersection are 65 m, 527 m, 8 m, 330 m, 340 m, 145 m, 325 m, 860 m, 127 m, 2.1 km, 95 m, 30 m, 1.5 km and 2.2 km. These intersections are located within predominantly rural areas away from major population centres though there are isolated farms within near proximity to these crossings. The intersections are, in some locations, extensive and include the width of the planning application boundary. People, property and infrastructure has a medium sensitivity value here, with embedded mitigation meaning magnitude of change is **low** here resulting in a **negligible** impact which would be **not significant**.

One of the proposed construction compounds, compound 13 is partially within Flood Zone 3. Compound 14 is located in Flood Zone 2. All other proposed compounds in this Section are entirely outside of Flood Zones. Both of these compounds and compound 15 are also partially within areas at low risk of surface water flooding, meaning that these locations are at potential risk of flooding. Additionally compound 13, 16 and 17 are also within the maximum extents for Environment Agency “wet day” reservoir inundation flood mapping, which assumes a worst case scenario of reservoirs failing on a “wet day” when local rivers had already overflowed their banks. The data represents a credible worst case scenario, however it is unlikely that any flood would be as large as shown and the data gives no indication of likelihood or probability of such an occurrence. These compounds have a low sensitivity value, with embedded mitigation meaning magnitude of change is **negligible** resulting in a **negligible** impact which would be **not significant**.

Six of the committed HDD pit locations are located in Flood Zone 3; the exit pit of HDD 27, the entry and exit pits of HDD 30, the entry pit of HDD 31, and the entry pit of HDD 41. Three committed HDD pit locations are located in Flood Zone 2; the entry pit of HDD 27 and the entry and exit pit of HDD 34. Additionally, one of the committed HDD pit locations; the entry pit of HDD 30 at medium risk of surface water flooding. Three committed HDD pits are at low risk of surface water flooding; the entry pit of HDD 30 and the entry and exit pits of HDD 34. Additionally, eleven of the committed HDD pit locations are shown to be at risk of flooding from “wet day” reservoir failure. These are the entry and exit pits of HDD 27, HDD 30, HDD 32, HDD 34 and HDD 38 as well as the entry pit of HDD 4. The maximum sensitivity values of the HDD pits are medium. With embedded mitigation magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

Eight of the HDD pit locations with the potential to open cut watercourses are located in areas of Flood Zone 3; the entry and exit pits of HDD 29, HDD 37, HDD 39 and HDD 40. Similarly, four of these type of HDD pit locations are in Flood Zone 2; the exit pit of 28, the entry and pits of HDD 33 and the entry pit of HDD 35. Additionally, two of these type of HDD pit locations I areas at low risk of surface water flooding; the entry pits of HDD 28 and HDD 39. Additionally, ten of these type of HDD pit locations are shown to be at risk of flooding from "wet day" reservoir failure. These are; the entry and exit pits of HDD 33, HDD 35, HDD 37, HDD 39 and HDD 40. The maximum sensitivity values of the HDD pits are medium. With embedded mitigation magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

Seven of the proposed joint bays within Section 3 are located within Flood Zone 3 with three within Flood Zone 2. Additionally, two of the bays are within areas of low surface water. Seven of the joint bays are located in areas at risk of flooding due to reservoir failure. The location of these joint bays is to be finalised at the detailed design stage and so the locations currently given are only indicative of their location. As the infrastructure of these joint bays is to be buried; with soil and grass placed on the concrete pad, the sensitivity value is low. With embedded mitigation meaning magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

11.6.3.4 Section 4 – River Ouse to Drax Substation

Impacts of open cut techniques on water resources

Construction via open cut techniques and associated machinery could lead to an increase in soil erosion leading to sediment laden runoff from the construction area, construction vehicles, and access roads. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible.

Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Within Section 4 there are three water bodies crossed by open cut techniques which are ordinary watercourses maintained by IDBs with an additional 43 water bodies within the study area which may be indirectly affected by runoff (due to open cut construction within their drainage catchments) consisting of main rivers, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. The magnitude of change will be **negligible** which is **negligible** significance and considered **not significant**. Furthermore, there is one water body crossed by open cut techniques, which is a minor drain, with an additional 9 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**.

Open cut methodologies will also include flow bypasses by over-pumping at temporary dams which have the potential to obstruct fish and eel passage and also alter flow regime and limit sediment transport. Within Section 4 there are four watercourses crossed by open cut or ducting techniques, all of which are ordinary watercourses or minor drains and are not designated WFD nor other statutory or non-statutory. Three are IDB maintained ordinary watercourses and therefore have a sensitivity value of medium. Although these works will not be undertaken directly on any water bodies designated under the WFD, these will be undertaken on headwater or feeder channels and may indirectly lead to temporary obstruction and loss of spawning habitats. Over-pumping will alter the flow regime and limit natural sediment transport for the duration of the works and may lead to depletion of coarse sediments downstream and aggradation upstream. Any impoundments will be temporary (approximately 10 days) and can be further mitigated by measures included in the CEMP (including but not limited to) using fish friendly pumps and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes. Impacts will be short term localised to these headwater and feeder channels and normal conditions will naturally recover once works are complete and the obstruction is removed. Therefore obstruction of flows will constitute a **low** magnitude of change which is **minor** significance and considered **not significant**. The remaining drain has a sensitivity value of low, resulting in a **low** magnitude of change which is **negligible** significance, and considered **not significant**.

Installation of the below ground DC cable within agricultural land via open cut techniques has the potential to cause severance, disturbance, or blockage to the underground field/land drainage infrastructure. The sensitivity value of these receptors is low. Alteration of the drainage infrastructure has the potential to result in drying out or waterlogging of the agricultural fields. Embedded mitigation includes the addition of temporary diversions during works which may be required where under-drainage infrastructure is directly encountered. These diversions would be short term and only for the duration of the works at that particular site/field. The most appropriate method is to be proposed for each field and any works undertaken in agreement with the appropriate stakeholder. This will result in a **low** impact which is **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to reduced water quantity may be available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure which is low sensitivity and considered **not significant**.

Impacts from Trenchless Techniques on water resources

Within Section 4, there are two watercourses proposed to be crossed by trenchless techniques of which one is main river (River Ouse) and is also WFD designated, in addition to Back Lane Drain ordinary watercourses that is IDB maintained channel with a sensitivity value of medium.

Trenchless techniques will avoid any direct effect on the structure of the watercourse by drilling beneath the bed. This would also eliminate any longer term affects to fluvial geomorphology as flows, movement of sediment and fish migration will be unaffected. However temporary compounds (including launch and receptor pits) would be required either side of the watercourses, in addition to construction vehicles and access roads nearby. These activities could lead to an increase in soil erosion resulting in sediment laden runoff. This discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect nearby watercourses or standing water quality. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification.

The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes measures to ensure that incidental release of sediments or runoff is minimised and that surface water discharge is fully controlled in terms of water quality and volume before entering the receiving water feature. Permits would be obtained with agreement with the relevant regulatory stakeholder for depth of cable and distance of excavations from the watercourse edge.

There are also a further 43 water bodies within the study area which may be indirectly affected by runoff consisting of main river, WFD designated water courses and IDB maintained channels, and therefore have a sensitivity value of medium. In consideration of embedded mitigation, fluvial geomorphological and runoff impacts would therefore result in a **negligible** magnitude of change which is **negligible** significance and considered **not significant**. Furthermore, there are an additional 44 standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to reduced water quantity may be available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure, which is low sensitivity, and considered **not significant**.

Impacts from haul road, accesses, and watercourse crossings on water resources

Numerous heavy vehicle movements on the haul road have the potential to temporarily mobilise soil, dust and pollutants (from fuel spills, oils, lubricants, wear from tyres and brakes) which would be captured in runoff on the road surface. At sufficient concentration this would lead to a reduction in water quality including effects that could result in the smothering or poisoning of animals and plants within local watercourses and standing water bodies. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation includes a layer of granular material along with geogrids to provide stability and minimise soil erosion from traffic. Silt management measures will be employed to reduce the risk of sediment runoff which will be included within the CEMP. Within Section 4, 46 water features within the study area which are a main river or IDB maintained channels with a receptor sensitivity value of medium. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**. Furthermore, there are nine standing water bodies and numerous other minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**.

Culverts will be installed to cross the four ordinary watercourses. Culverting will result in straightening and hard banks of a section of channel (circa 6 m wide). In addition to the removal of bed substrate, this may also lead to changes in flow dynamics and patterns of erosion at the structure which will also impact the transfer of sediment downstream. It is expected a loss of velocity and reduced sediment transport will lead to material deposition upstream of culvert and material deficit and scour downstream of structure due to velocity increase through/off culvert. However, these channels are already straightened or modified for drainage and works will constitute a very small section of any overall water body. Therefore, impacts are expected to be minor and localised.

The addition of culvert and hard banks will result in the direct loss of habitat within the bed and banks due to loss of natural substrate, and also prevent natural recolonisation while the structure is in place. This may result in loss of fish spawning habitats and therefore impacts may also be to downstream WFD water bodies as a result of this loss.

During construction, any tree loss may exacerbate fine sediment delivery in the short term into the channel as banks may be destabilised leading to bed structure and substrate changes locally from smothering of bed and morphological features downstream. Post construction, banks would be stabilised which will eliminate these effects.

Embedded mitigation as discussed in Section 11.6.2 includes measures size to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.

Within Section 4 there are three watercourses crossed with temporary culverts which are all ordinary watercourses maintained by the IDB and form part of the headwaters or drain within the catchment of designated WFD water body River Ouse. As such these have a sensitivity value of medium. The impact will be **negligible** which is **negligible** significance and considered **not significant**.

Impacts from construction compounds on water resources

Use of construction compounds by heavy machinery and storage of loose material could lead to an increase in soil erosion or increased sediment laden runoff from compacted ground entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or

surrounding water features physico-chemical water quality elements. The impacts from runoff are predicted to be of local spatial extent, short term duration, intermittent occurrence and highly reversible. Embedded mitigation as discussed in Section 11.6.2 includes installation of a temporary drainage system to treat runoff from the site, in addition to bunded areas to prevent runoff of chemicals. The temporary drainage system would manage the quality and volume of water prior to its controlled discharge into nearby watercourses.

Within Section 4, there are no water features directly crossed by a construction compound, however there are five within a 250 m hydraulic link and impacts of runoff would be direct. These five water bodies are the River Ouse (main river) and four ordinary watercourses maintained by the IDB (Black Tom Drain, Unnamed drains and Back Lane Drain) and therefore have a sensitivity value of medium. In addition, there are also a further 41 water bodies in the study area that are also maintained by the IDB and have a sensitivity value of low. In consideration of embedded mitigation, runoff impacts would therefore result in a **negligible** impact which is **negligible** significance and considered **not significant.** Furthermore, there are 10 water bodies within the study area, of which nine are standing water bodies and one minor drainage channels that are not designated nor maintained by the IDB which therefore have a sensitivity value of low. In consideration of embedded mitigation, indirect runoff impacts would therefore result in a **negligible** impact which is a **negligible** significance and considered **not significant**.

There may also be impacts from water abstraction from nearby watercourses to use onsite. Locations of potential abstractions have not yet been confirmed as they are subject to the findings of the ground investigation and the design of the appointed Contractor. Over abstraction from watercourses within the study area has the potential to result in downstream loss of water quantity leading to reduced water quantity may be available for licensed/unlicensed surface water abstractions. Embedded mitigation includes permitting in agreement with appropriate regulator in accordance with the Catchment Abstraction Management Strategy. As such, the impact will result in a **negligible** magnitude of change to People, Property and Infrastructure, which is low sensitivity, and considered **not significant**.

Impacts from outfall and headwall installations in watercourse banks

Outfall and headwall installations are primarily to the nearest ordinary watercourse or minor land drainage water feature and will convey discharges from construction within the working area and construction compounds. These installations will lead to a direct loss of natural banks leading to reduced bank roughness and potential for increased scour downstream of structures thereby negatively impacting fluvial geomorphology locally. Impacts would also result in a direct loss of bankside/riparian habitat in the immediate location of the structure. In addition, increased flow entering the channels collected as runoff, could lead to increased scour to channel banks and bed that would lead to additional fine sediment transferred downstream. Details of individual outfalls and headwall construction will take into account localised catchments and upstream conditions, as such embedded mitigation includes installation in-line of the bank to reduce the risk of turbulence and localised scour. Discharge will be with the direction of flow, ideally angled at 45° to the direction of flow. Outfalls will be sited to avoid any tree loss where possible and avoid bank areas under existing scour. Installations will also be small, less than <300 mm. These impacts would be temporary for the duration of the construction phase only, as the bankside will be returned to its original state after drainage is no-longer required.

There are six outfalls entering six water bodies with a receptor sensitivity value of medium. One of these is main river and designated WFD (River Ouse), and the remaining five are IDB maintained watercourses. In consideration of embedded mitigation, this would result in a **negligible** magnitude of change resulting in a **negligible** impact which is considered **not significant**.

Impacts from installation of the converter station

Runoff from construction of the converter station and associated machinery on the construction site could lead to an increase in sediment laden runoff from the construction area, construction vehicles, temporary compounds, and access roads entering nearby water bodies through existing surface water flow paths. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality therefore causing a reduction in the WFD classification. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water features physico-chemical water quality elements. At sufficient concentration, pollution will result in reduced water quality within local watercourses and standing water bodies.

Embedded mitigation will include a surface water management plan which will manage runoff volume and treat sediment and pollutant laden surface water. The temporary drainage system would manage the quality and volume of water prior to its controlled discharge into nearby watercourses.

Back Lane Drain is the receiving watercourse, which is an IDB maintained drain and therefore of medium sensitivity. In consideration of embedded mitigation, this would result in a **negligible** of impact resulting in **negligible** significance which is considered **not significant**.

Impacts which may affect flood risk

Locations for any temporary culvert installation have not yet been confirmed with the scheme design, therefore this assessment has been completed on the assumption that installation will be included for watercourses and surface water flood paths crossed by haul roads. There are six watercourses, including one main river (River Ouse), crossed by Section 4 of the English Onshore Scheme, however the River Ouse will not be crossed by the haul road. The installation of temporary culverts may impact upon the existing flow regime and may cause an increase in flows with risk of flooding to the surrounding land. People property and infrastructure has a low sensitivity value. Magnitude of change is **low** resulting in a negligible impact which would be **not significant**.

The crossing of field drains, included in the six watercourses crossed by Section 4 of the English Onshore Scheme, could cause flow to back up on surrounding field rains and in turn increase risk to people, property and infrastructure flood risk receptors. These receptors are considered to have a sensitivity value of low. Embedded mitigation would result in a **low** magnitude of change resulting in a **negligible** impact which would be **not significant**.

Installation of the below ground cable (both AC and DC) has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure. Though data supplied by Yorkshire Water indicated that they had no records of sewers or drains in the near vicinity of Section 4 of the English Onshore Scheme. The sensitivity of these receptors is low. Embedded mitigation would result in a **low** magnitude of change, resulting in a **negligible** impact with would be **not significant**.

The English Onshore Scheme cable route within Section 4 is entirely within Flood Zone 3. The cable passes through rural areas of land. The sensitivity value of property, people and infrastructure at these crossings is medium. With embedded mitigation meaning magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

Both of the proposed construction compounds; compounds 18 and 19 are within Flood Zone 3 It is not possible to locate these particular compounds in an alternative location at lower risk of flooding. Additionally, this location benefits from the presence of flood defences. Compound 18 also partially overlaps an area at low risk of surface water flooding. Similarly, both compounds are shown to be at risk of flooding due to reservoir failure. These compounds have a low sensitivity value, with embedded mitigation meaning magnitude of change is **negligible** resulting in a **negligible** impact which would be **not significant**.

All five of the proposed HDD pit locations, both committed and potential to open cut watercourses included in Section 4 are wholly within Flood Zone 3. The exit pit of HDD 41 is also at low risk of surface water flooding. Similarly all HDD pit locations are at risk of flooding from reservoir failure. The maximum sensitivity values of the HDD pits is medium. With embedded mitigation magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

The single proposed joint bay within Section 4 is located within both Flood Zone 3 and areas of low surface water risk, as well as being at risk of flooding due to reservoir failure. The location of these joint bays is to be finalised at the detailed design stage and so the locations currently given are only indicative of their location. As the infrastructure of these joint bays is to be buried; with soil and grass placed on the concrete pad, the sensitivity value is low. With embedded mitigation meaning magnitude of change is **low** resulting in a **negligible** impact which would be **not significant**.

11.6.4 Assessment of Potential Impacts: Operational Phase

This section of the report considers the potential effects that the operation of the English Onshore Scheme could have on the water environment. The main potential impact relating to operation is increased surface water runoff through increases in impermeable or compacted areas resulting from the converter station in Section 4. Otherwise, there are no anticipated effects during normal operation of the underground cable. Any repair or maintenance activities required during the operational life of the

underground cable will result in impacts similar to those identified during construction but limited to the area of works.

11.6.4.1 Section 4 – River Ouse to Drax Substation

Impacts from the converter station to water quality

The converter station and associated access roads will increase the hardstanding in the area, impacting local receptors through an increase in runoff. Runoff may lead to increased sedimentation, and pollution entering the watercourses. Discharge of fine sediments will reduce light penetration of the water column and reduce dissolved oxygen by smothering aerating morphological features thus negatively impacting local fluvial geomorphology, ecological and physio-chemical water quality. The discharge could also contain spillages or leaks of fuels and oils, or other pollutants that could affect water bodies directly crossed or surrounding water features physico-chemical water quality elements. At sufficient concentration, pollution will result in reduced water quality within local watercourses and standing water bodies. Embedded mitigation will include a drainage strategy which will manage runoff volume and treat sediment and pollutant laden surface water. In addition, the platform will be partially permeable as stone chippings will be used as a base layer in some areas which will provide some mitigation through storage and filtration. Final layout and discharge rate is to be agreed with the LLFA and IDB.

Unnamed minor drainage channel of Back Lane Drain and Carr Lane Drain are the receiving waterbodies to this discharge and are IDB maintained drains and therefore have a medium sensitivity value. In consideration of embedded mitigation, runoff would result in a **negligible** magnitude of change resulting in **negligible** significance which will be **not significant**.

Impacts which may affect flood risk

Following the installation of the buried cables, no impacts on flood risk and people, property and infrastructure are anticipated. See **Appendix 11B** Flood Risk Assessment for further information.

The proposed converter station is within the modelled fluvial flood extents from nearby watercourses and is currently located within Flood Zone 3. Proposed ground raising at this location has the potential to increase risk elsewhere due to the fluvial source of flood risk to the converter station. The sensitivity of the receptor is medium. With embedded mitigation the magnitude of change is **low** resulting in a **negligible** impact which may be considered **not significant**.

The change in ground topography around the proposed converter station may affect the existing surface water pathways and areas of pooling thereby impacting on the existing level of surface water risk. With embedded mitigation the magnitude of change is **low** resulting in a **negligible** impact which may be considered **not significant**.

11.6.5 Assessment of Potential Impacts: Decommissioning Phase

The scale and nature of activities undertaken during decommissioning would be similar to those described previously for construction, and they would be temporary during the period of decommissioning activities on site. Following the removal of the structures and the reinstatement of the land there would be no further potential effects on hydrology and land drainage. The potential effects from decommissioning should therefore be regarded as the same as construction as described in greater detail above.

11.7 Project Specific Mitigation

11.7.1 Construction Phase Mitigation

The ground level at the proposed converter station in Section 4 is to be raised to ensure that the Finished Floor Level (FFLs) are at a level of 6.18 mAOD, which is the maximum modelled flood level in the 0.1% + 50% Climate Change AEP event. This is to ensure that the structure remains outside the modelled flood extents and depths from nearby watercourses to the 1% + 39% Climate Change AEP event, as required by the Environment Agency. In addition, this has potential to displace flood water into other areas if not mitigated, which result in an increase in local flood depths, hazards and time of inundation. Hydraulic modelling was undertaken to quantify this displaced flood water. This determined a de minimis (negligible) impact as a result of the development. As such is it expected that floodplain compensation will not be required for this scheme. High level calculations were undertaken to determine

the available floodplain storage which was determined to be a 0.17% reduction. However, level-for-level volume-for-volume floodplain compensation requirements up to the 1% AEP + 50% CC event have been calculated should this be required by the regulator at 63,254m^3. As set out in the Hydraulic Modelling Technical note (Appendix 11-C) high-level calculations show that the baseline flood plain volume for the 1% AEP + 50% CC fluvial dominated event is 187,932,406m^3. The volume of the proposed land raising below the 1% AEP + 50% CC is 63,254m^3 as noted in the table above. This represents 0.03% of the available floodplain storage

11.7.2 Operational Phase Mitigation

No operational phase mitigation is proposed for Hydrology and Land Drainage due to the temporary nature of the construction phase impacts, and embedded mitigation within the scheme design as describe in Section 11.6.2.

11.8 Residual Effects

Due to the embedding of design, construction and operational mitigation into the planning application boundary the residual effects of the English Onshore Scheme will remain unchanged from the potential impacts outlined in Section 11.6 above. This is because all mitigation has been taken into account when assessing potential effects.

11.8.1 Assessment of Residual Effects: Construction Phase

The residual impacts during the construction phase are shown in **Table 11-23**. Residual effects of with a significance of moderate or above are considered significant.

Table 11-23: Assessment of Residual Impacts: Construction Phase

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Route Section 1							
Surface water dependent habitat designated sites and chalk streams (West Beck [River Hull], Kelk Beck, Nafferton Beck)	High	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor
	High	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Low	Negligible/ Minor
	High	Impacts from water abstraction.	Negligible	Negligible/ Minor	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible/ Minor
	High	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
	High	Temporary bridge crossings causing bed and bank disturbance.	Negligible	Negligible/Minor	Temporary bridges will be clear span, with no bed or bank reinforcements, and foundations set well back from the bank edge. The soffits should be >0.6 m higher than bank tops with no change to surrounding ground level profiles surrounding the crossing. They will be sited to avoid tree/root loss and cross at straight reaches, perpendicular to flow where practicably possible.	Negligible	Negligible/ Minor
	High	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor
	High	Outfall and headwall installation at Nafferton Beck will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible/Minor	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible/ Minor
Main rivers and ordinary watercourses - WFD designated and IDB maintained (Auburn Beck, Gransmoor Drain, Northfield Beck, Nafferton	Medium	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Runoff from the construction via trenchless techniques may lead to pollution due	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Drain, Driffield Canal, Warren Drain, Burtons Drain, White Dyke, White Dyke Branch, Knorka, Earl's Dyke, Wanlass Drain and Yorkshire South Coastal WFD water body)		to increased sedimentation, fuel spills, oils and lubricants.			CEMP employing general pollution prevention measures.		
	Medium	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Installation of temporary culverts will result in the loss of natural banks, loss of bed, change in flow dynamics, erosion patterns and lead to destabilsation of banks resulting in fine sediment deposition within the channel. This may lead to loss of morphological features and spawning habitat.	Negligible	Negligible	Embedded mitigation as outlined in section 11.6.2 includes measures for culvert dimensions to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.	Negligible	Negligible
	Medium	Temporary damming of flow for open cut and culvert installations leading to fish and eel	Low	Minor	Impacts will be short term and normal flow conditions will naturally recover once works are complete and the obstruction is removed.	Low	Minor

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		passage obstruction and altering the normal flow regime.			In addition, measures included in the CEMP include using fish friendly pumps where necessary and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes.		
	Medium	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
WFD designated and IDB maintained Drains (Auburn Beck, Earls Dyke, Burton Drain)	Medium	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
Standing Water Bodies and Minor Drains	Low	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the haul and access road surfaces	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.			controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.		
	Low	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
Minor drains	Low	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
People, property and infrastructure: surface water abstraction	Low	Reduced availability of water for abstraction within surface water bodies due to abstraction for construction activities associated with installation of the cable	Negligible	Negligible	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible
People, property and infrastructure: Floodplain	Low	Installation of temporary culverts included for haul road watercourse crossings and paths caused by haul roads. May result in change to the existing flow regime and potential increase of	Low	Negligible	No further specific mitigation. Embedded mitigation includes the inclusion of a pre-installed culvert of suitable size to accommodate the water volumes and flows necessary through agreement with the landowner and LLFA.	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		flooding to the surrounding land.					
	Medium	Placement of temporary bridge crossings (expected to be in place for maximum of four years) could affect existing flow regimes of watercourses as well as increase flood risk to surrounding land.	Low	Minor	**Embedded** mitigation includes the assumption construction of bridge soffit levels at least 0.6m higher than the top of the bank on both sides of the watercourse following standard guidance for flood risk activity permits.	Low	Minor
	Low	Crossing of field drains by the proposed cable route could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors.	Low	Negligible	Embedded mitigation includes the incorporation of a temporary drainage strategy following the removal or disruption of field drainage channels that were affected during the cable construction process.	Low	Negligible
	Low	Installation of below ground DC cables has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure.	Low	Negligible	No further specific mitigation. Embedded mitigation includes: the addition of temporary diversions during works where underground drainage infrastructure is directly encountered. The most appropriate method to be proposed for each field and any works is to be undertaken in agreement with the appropriate stakeholder.	Low	Negligible
	Low	Crossings of cable route through areas identified as being within Flood Zone 3.	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible
	Low	Three of the proposed construction compounds; compounds 1, 2 and 6	Low	Negligible	No further specific mitigation. Embedded mitigation involves the inclusion of temporary drainage systems to capture additional runoff	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		overlap with areas of high risk surface waterand thus may produce an increase on surface water runoff.			and to ensure the run-off rates and discharge to the surrounding water environment are maintained at the current greenfield runoff rate or as otherwise agreed. Numbers of attenuation ponds, storage areas and storage volumes will be subject to final design and compound configuration., If there are no nearby watercourses present the drainage solution will be agreed with the relevant stakeholder		
	Medium	Two HDD pit locations with the potential to be open cut are shown to partially overlap with areas of Flood Zone 3; the entry pit of HDD 3, and exit pit of HDD 4. Three pit locations are in Flood Zone 2, the entry and exit pits of HDD 1 and the entry pit of HDD 4. Additionally six HDD pits with the potential to open cut watercourses are in areas at high risk of surface water flooding; the exit pits of HDD 1 and HDD 4, both the entry and exit pits of HDD 6, the entry pit of HDD 13 and the exit pit of HDD 17. Two are at medium risk, the exit pits of HDD 9 and HDD 19 Four committed HDD pits overlap Flood Zone 3; the	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		exit pits of HDD 14 and HDD 15 and bot the entry and exit pits of HDD 21. Two HDD pit locations overlap Flood Zone 2, the entry pits of HDD 12 and HDD 14. Two of the committed HDD pits are in areas at high risk of surface water flooding, The entry pit of HDD 14 and the exit pit of HDD 21. Two are at medium risk, the exit pit of HDD 20 and the entry pit of HDD 21.					
	Low	One of the proposed joint bays within Section 1 is located within Flood Zone 3. Additionally, two of these bays are within areas of medium surface water risk, and two in areas of low risk.	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible
Route Section 2							
Ordinary watercourses - Minor drains	Low	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the construction via trenchless techniques may lead to pollution due	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		to increased sedimentation, fuel spills, oils and lubricants.			CEMP employing general pollution prevention measures.		
	Low	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Installation of temporary culverts will result in the loss of natural banks, loss of bed, change in flow dynamics, erosion patterns and lead to destabilsation of banks resulting in fine sediment deposition within the channel. This may lead to loss of morphological features and spawning habitat.	Negligible	Negligible	Embedded mitigation as discussed in Section 11.6.2 includes measures size to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.	Negligible	Negligible
	Low	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
	Low	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
Standing Water Bodies	Low	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Low Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Main rivers and ordinary watercourses - WFD designated	Medium	Indirect runoff from construction of open cut cable, haul road and construction compounds may lead to pollution due to increased sedimentation.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
People, property and infrastructure: surface water abstraction	Low	Reduced availability of water for abstraction within surface water bodies due to abstraction for construction activities associated with installation of the cable	Negligible	Negligible	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible
People, property and infrastructure: Floodplain	Low	Installation of temporary culverts included for haul road watercourse crossings and paths caused by haul roads. May result in change to the existing flow regime and potential increase of flooding to the surrounding land.	Low	Negligible	No further specific mitigation. Embedded mitigation involves the Inclusion of a pre-installed culvert of suitable size to accommodate the water volumes and flows necessary through agreement with the landowner and LLFA.	Low	Negligible
	Low	Crossing of field drains by the proposed cable route could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors.	Low	Negligible	No further specific mitigation. Embedded mitigation includes the incorporation of a temporary drainage strategy following the removal or disruption of field drainage channels that were affected during the cable construction process.	Low	Negligible
	Low	Installation of below ground DC cables has the potential to cause severance, disturbance,	Low	Negligible	No further specific mitigation. Embedded mitigation includes the addition of temporary diversions during works where underground drainage infrastructure is directly	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		or blockage to the underground field/drainage infrastructure.			encountered. The most appropriate method to be proposed for each field and any works is to be undertaken in agreement with the appropriate stakeholder.		
Route Section 3							
Surface water dependent habitat designated sites (River Derwent SSSI and Barn Hill Meadows SSSI)	High	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor
	High	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor
	High	Impacts from water abstraction.	Negligible	Negligible/ Minor	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible/ Minor
	High	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible/ Minor

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
					Emergency incident response procedure with appropriate remediation.		
	High	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible/ Minor	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures. Emergency incident response procedure with appropriate remediation.	Negligible	Negligible/ Minor
Main rivers and ordinary watercourses - WFD designated and IDB maintained (Back Delphin/ Market Weighton Canal, River Foulness, River Ouse, Egremont Drain, Holme Main Drain, Dunns Drain, Featherbed Drain, Carr/Bishopsoil, Black Dyke, New Drain, Asselby Marsh Drain, Asselby Marsh Main Drain,	Medium	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Temporary bridge crossings causing bed and bank disturbance.	Negligible	Negligible	Temporary bridges will be clear span, with no bed or bank reinforcements, and foundations set well back from the bank edge. The soffits	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Seave Carr Drain, Lowfield Drain, Bank Field Lane Drain)					should be >0.6m higher than bank tops with no change to surrounding ground level profiles surrounding the crossing. They will be sited to avoid tree/root loss and cross at straight reaches, perpendicular to flow where practicably possible.		
	Medium	Installation of temporary culverts will result in the loss of natural banks, loss of bed, change in flow dynamics, erosion patterns and lead to destabilsation of banks resulting in fine sediment deposition within the channel. This may lead to loss of morphological features and spawning habitat.	Negligible	Negligible	Embedded mitigation as outlined in section 11.6.2 includes measures for culvert dimensions to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.	Negligible	Negligible
	Medium	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
	Medium	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
	Medium	Temporary damming of flow for open cut and culvert installations leading to fish and eel passage obstruction and altering the normal flow regime.	Low	Minor	Impacts will be short term and normal flow conditions will naturally recover once works are complete and the obstruction is removed. In addition, measures included in the CEMP include using fish friendly pumps where necessary and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes.	Low	Minor
Standing Water Bodies and Minor Drains	Low	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the construction via trenchless techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		and wear from tyres and brakes.					
	Low	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
Minor Drains	Low	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
People, property and infrastructure: surface water abstraction	Low	Reduced availability of water for abstraction within surface water bodies due to abstraction for construction activities associated with installation of the cable	Negligible	Negligible	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible
People, property and infrastructure: Floodplain	Low	Installation of temporary culverts included for haul road watercourse crossings and paths caused by haul roads. May result in change to the existing flow regime and potential increase of flooding to the surrounding land.	Low	Negligible	No further specific mitigation. Embedded mitigation involves the inclusion of a pre-installed culvert of suitable size to accommodate the water volumes and flows necessary through agreement with the landowner and LLFA.	Low	Negligible
	Low	Placement of temporary bridge crossings	Low	Negligible	Embedded mitigation includes the construction of bridge soffit levels at least 0.6	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		(expected to be in place for maximum of four years) could affect existing flow regimes of watercourses as well as increase flood risk to surrounding land.			m higher than the top of the bank on both sides of the watercourse following standard guidance for flood risk activity permits.		
	Low	Crossing of field drains by the proposed cable route could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors.	Low	Negligible	No further specific mitigation: Embedded mitigation includes the incorporation of a temporary drainage strategy following the removal or disruption of field drainage channels that were affected during the cable construction process.	Low	Negligible
	Low	Installation of below ground DC cables has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure.	Low	Negligible	No further specific mitigation. Embedded mitigation includes the addition of temporary diversions during works where underground drainage infrastructure is directly encountered. The most appropriate method to be proposed for each field and any works is to be undertaken in agreement with the appropriate stakeholder.	Low	Negligible
	Medium	Crossings of cable route through areas identified as being within Flood Zone 3. These intersections are located within predominantly rural areas away from major population centres though there are isolated farms within near proximity to these crossings. The intersections are, in some locations, extensive and	Low	Minor	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Minor

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		include the entire width of the planning boundary					
	Low	One construction compound, compound 13 is located within Flood Zone 3. Another construction compound, compound 14 is located within Flood Zone 2, meaning there is a potential risk of flooding to these areas.	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible
	Medium	Eight HDD pit locations with the potential to open cut watercourses overlap with Flood Zone 3, the entry pits of HDD 29, 37, 39 and 40. Four of this type of HDD pit are located in Flood Zone 2, the exit pit of HDD 28, the entry and exit pits of HDD 33 and the entry pit of HDD 35. potential to open cut Additionally, 10 of these type of HDD pits are at risk of flooding from reservoirs Six committed HDD pit locations are located in Flood Zone 3, the exit pit of HDD 27, the entry and	Low	Minor	Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible. **Project specific mitigation includes:** Supervisory personnel of the construction compound should sign up to receive advance flood warnings from reservoirs in case of a flood incident.	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		exit pits of HDD 30, and the entry pits of HDD 31 and HDD 41. Three committed HDD pits are located in Flood Zone 2, the entry pit of HDD 27 and both the entry and exit pits of HDD 34. Additionally eleven committed HDD pit locations are shown to be at risk of reservoir flooding.					
	Low	Seven of the proposed joint bays within Section 3 are located within Flood Zone 3 with three within Flood Zone 2. Additionally, the two of the bays are within areas of low surface water risk. Seven of the joint bays are in areas at risk of surface water flooding	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible
Route Section 4							
Main rivers and ordinary watercourses - WFD designated and IDB maintained IDB drains (River Ouse, Back Tom Drain, Unnamed	Medium	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Runoff from the construction via trenchless techniques may lead to pollution due	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Drains, Back Lane Drain)		to increased sedimentation, fuel spills, oils and lubricants.			CEMP employing general pollution prevention measures.		
	Medium	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Medium	Installation of temporary culverts will result in the loss of natural banks, loss of bed, change in flow dynamics, erosion patterns and lead to destabilsation of banks resulting in fine sediment deposition within the channel. This may lead to loss of morphological features and spawning habitat.	Negligible	Negligible	Embedded mitigation as outlined in section 11.6.2 includes measures for culvert dimensions to accommodate the natural water regime, with the temporary culvert sat at hard bed level and orientated with flows to limit obstruction and potential for scour. These will allow free passage for fish and eels and be sited to avoid spawning habitat/morphological features where present. In some cases, temporary culverts may be sat above hard bed level, however this is limited to channels which are balanced systems with little flows so would be unlikely to be used by fish and eel. These will be determined on a case-by-case basis with the relevant stakeholder (EA, LLFA, IDB). All hard banks and bed added during construction will be temporary and the bankside will be returned to its original stabilised state after construction, including re-grading were required and re-vegetating/seeding to replace any lost habitat and vegetation or trees.	Negligible	Negligible
	Medium	Runoff from construction compounds may lead to pollution due to increased	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		sedimentation, fuel spills, oils and lubricants.			CEMP employing general pollution prevention measures.		
	Medium	Outfall and headwall installations will cause loss of natural banks within the drains could lead to reduced bank roughness, that may increase scour downstream of structures.	Negligible	Negligible	Implementation of embedded mitigation measures which includes no part of the outfall structure protruding beyond the line of the bank, this includes headwalls, wingwalls and protection aprons.	Negligible	Negligible
	Medium	Temporary damming of flow for open cut and culvert installations leading to fish and eel passage obstruction and altering the normal flow regime.	Low	Minor	Impacts will be short term and normal flow conditions will naturally recover once works are complete and the obstruction is removed. In addition, measures included in the CEMP include using fish friendly pumps where necessary and ensuring over-pumping flow rates are sufficient to ensure no upstream hydrological regime changes.	Low	Minor
	Medium	Runoff from construction of the converter station may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
Standing Water Bodies and Minor Drains	Low	Runoff from the construction via open cut techniques may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from the construction via trenchless techniques	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site	Negligible	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.			management, and implementation of the CEMP employing general pollution prevention measures.		
	Low	Runoff from the haul and access road surfaces may lead to pollution due to increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
	Low	Runoff from construction compounds may lead to pollution due to increased sedimentation, fuel spills, oils and lubricants.	Negligible	Negligible	An appropriate drainage strategy as outlined in section 11.6.2 will ensure that runoff is controlled in quality, in addition to good site management, and implementation of the CEMP employing general pollution prevention measures.	Negligible	Negligible
People, property and infrastructure: surface water abstraction	Low	Reduced availability of water for abstraction within surface water bodies due to abstraction for construction activities associated with installation of the cable	Negligible	Negligible	Where abstraction is necessary, permits will be obtained in agreement with the appropriate regulator in accordance with the Catchment Abstraction Management Strategy and be for less than a 28-day duration per water body.	Negligible	Negligible
People, property and infrastructure: Floodplain	Low	Installation of temporary culverts included for haul road watercourse crossings and paths caused by haul roads. May result in change to the existing flow regime and potential increase of flooding to the surrounding land.	Low	Negligible	No further specific mitigation. Embedded mitigation includes the inclusion of a pre-installed culvert of suitable size to accommodate the water volumes and flows necessary through agreement with the landowner and LLFA.	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
	Low	Crossing of field drains by the proposed cable route could cause flow to back up on surrounding field drains and in turn increase risk to people, property and infrastructure flood risk receptors.	Low	Negligible	No further specific mitigation. Embedded mitigation includes the incorporation of a temporary drainage strategy following the removal or disruption of field drainage channels that were affected during the cable construction process.	Low	Negligible
	Low	Installation of below ground cable (both AC and DC) has the potential to cause severance, disturbance, or blockage to the underground field/drainage infrastructure.	Low	Negligible	No further specific mitigation. Embedded mitigation includes the addition of temporary diversions during works where underground drainage infrastructure is directly encountered. The most appropriate method to be proposed for each field and any works is to be undertaken in agreement with the appropriate stakeholder.	Low	Negligible
	Medium	The entirety of the cable route within Section 4 intersects with areas identified as being within Flood Zone 3. These intersections are located within predominantly rural areas away from major population centres.	Low	Minor	No further specific mitigation. Embedded mitigation include that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Minor
	Low	Both proposed construction compounds, compounds 18 and 19 within this section are within Flood Zone 3. Both are also in areas at risk of reservoir flooding. One of the compounds, compound 17 overlaps with an area of low surface water risk.	Low	Negligible	No further specific mitigation. Embedded mitigation includes: • Temporary drainage systems to capture additional runoff and to ensure the run-off rates and discharge to the surrounding water environment are maintained at the current greenfield runoff rate. Numbers of attenuation ponds, storage areas and storage volumes will be subject to final design and compound configuration .If there are no nearby watercourses present the	Low	Negligible

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
					dranage solution will be agreed with the relevant stakeholder . The scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.		
	Medium	HDD pit locations are wholly within Flood Zone 3. The exit pit of HDD 41 is an area of low surface water flood risk. All HDD locations are in areas at risk of reservoir flooding.	Low	Minor	No further specific mitigation. Embedded mitigation includes: • The scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible. • Additionally, there is a potential for temporary drainage systems to capture additional runoff and to ensure the run-off rates and discharge to the surrounding water environment are maintained at the current greenfield runoff rate.	Low	Minor
	Low	The single proposed joint bay within Section 4 is located within both Flood Zone 3, areas of low surface water risk and in an area of reservoir flood risk.	Low	Negligible	No further specific mitigation. Embedded mitigation includes that the scheme designs, where possible, have been located in areas at low risk of flooding so as to avoid flood risk where possible.	Low	Negligible
	Medium	Location for proposed converter station is within the modelled flood extents from nearby watercourses and is currently located within Flood Zone 3. Proposed ground raising at this location to ensure the Finished Floor Level (FFLs) are placed at 6.18mAOD), which is the maximum modelled flood level in the 0.1% + 50%	Low	Minor	SuDS in the form of an attenuation pond has been included in the design of the proposed converter station to manage surface water runoff and storage which would be adopted by the formal drainage strategy. Inclusion of compensatory flood plain storage is considered as not required as less than 1% floodplain storage is lost. However, policy compliant floodplain compensation storage estimates have been prepared. To compensate the scheme up to the 1% AEP event + 50% CC an estimated 63,254m^3 of floodplain compensation would need to be provided.	Low	Minor

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
		CC AEP event, and greater than the raising required to be above the level of the 1% + 39% CC AEP, as required by the EA. which has the potential to increase flood risk elsewhere by displacing flood water into other areas if not mitigated. This can result in an increase in local flood depths, Hazard, and time of inundation. The change in ground topography also has the potential to affect existing surface water runoff pathways and areas of pooling.					

11.8.2 Assessment of Residual Effects: Operational Phase

The residual impacts during the operational phase are shown in **Table 11-24**. Residual effects of with a significance of moderate or above are considered significant.

Table 11-24: Assessment of Residual Impacts: Operational Phase

Receptor Description	Value/ Sensitivity	Description of Potential Impact	Magnitude	Significance	Mitigation Measure(s)	Residual Effect	
						Magnitude	Significance
Route Section 4							
IDB maintained Drain (Unnamed Drainage channel of Back Lane Drain and Carr Lane Drain)	Medium	Runoff from the increased hard standing associated with the converter station and access road may lead to increased sedimentation, and pollution entering the watercourses.	Negligible	Negligible	Implementation of a SUDS compliant drainage scheme which will manage runoff volume and treat sediment and pollutant laden surface water. In addition, the platform will be partially permeable as stone chippings will be used as a base layer in some areas which will provide some mitigation through storage and filtration. Final layout and discharge rate is to be agreed with the LLFA and IDB.	Negligible	Negligible
People, Property and infrastructure: Floodplain	Low	The change in ground topography around the proposed converter station may affect the existing surface water pathways and areas of pooling thereby impacting on the existing level of surface water risk.	Low	Negligible	No further specific mitigation. Embedded mitigation SuDS in the design for the proposed converter station to manage surface water runoff and storage.	Low	Negligible

11.9 Combined and Cumulative Effects

This section considers the combined and cumulative effects of the English Onshore Scheme on water resources and hydrology in conjunction with other projects or developments.

11.9.1 Assessment of Intra-Project Cumulative Effects

As outlined in **Chapter 1: Introduction**, the English Onshore Scheme forms one element of the wider Project, along with the Marine Scheme and Scottish Onshore Scheme. Due to the distances of separation between the English Onshore Scheme and the Scottish Onshore Scheme, intra-Project cumulative effects to individual receptors will not occur, for example no property or ecological site would experience effects from both the English Onshore Scheme and Scottish Onshore Scheme. Similarly, although there is a slight overlap of the English Onshore Scheme and Marine Scheme in the intertidal area between Mean High Water Springs and Mean Low Water Springs (as shown in Figure 1-2), as the HVDC cable reaches the landfall site (part of the English Onshore Scheme) via HDD, the works which could give rise to environmental impacts are physically separated and hence no significant intra-Project cumulative effects to individual receptors are predicted to occur.

The separate EIA/EA reports produced for the English Onshore Scheme, Marine Scheme and Scottish Onshore Scheme provide an environmental assessment of each topic area for which potential environmental effects could arise from that element. Once the assessment of the other elements of the Project is complete, a Bridging Document will be prepared which summarises the main interactions of these three individual environmental assessments. The Bridging Document will be made available as soon as it is available, but as highlighted above, there are no significant in-combination impacts between the English Onshore Scheme, Marine Scheme or Scottish Onshore Scheme. This section, therefore, provides an assessment of the combined and cumulative effects relating to the English Onshore Scheme only. For full definitions of terminology and details of other projects considered in this assessment see **Chapter 17: Cumulative and In-Combination Assessment**.

Combined effects are those effects occurring in combination with the proposed DC and AC cable route, converter station, temporary construction works and access roads including cross-boundary/section impacts between Sections 1 and 2, Sections 2 and 3, and Section 3 and 4 where receptors within the study area overlap these sections. All impact pathways will be the same as identified in Section 11.6 however works will be completed transitionally across the route and therefore limiting activities surrounding each hydrology receptor. In addition, mitigation measures outlined within this chapter will be incorporated into the construction and operation of the components reducing or preventing impacts. Therefore, it has been determined that no in combination cumulative effects on water resources and hydrology receptors are likely and any potential effects will be not significant.

11.9.2 Assessment of Inter-Project Cumulative Effects

The approach to cumulative assessment is set out in **Chapter 17: Cumulative and In-Combination Effects**.

There are a number of proposed developments that have been granted or are pending planning permission. The construction dates of many of these other developments are unknown; therefore, it has been assumed that all developments have potential to be constructed simultaneously so as to present a worst case scenario:

- There are three large energy infrastructure projects involving the installation of onshore cables or pipelines that have been granted or have pending planning permission: Hornsea Project Four Offshore Windfarm and associated onshore export cables in Section 1, Continental Link Multi-Purpose Interconnector comprising an underground high voltage direct current (HVDC) electricity interconnector in Section 2, and Humber Low Carbon Pipelines by National Grid Carbon in Section 4. The construction of these would increase construction traffic locally, and there is the potential for adverse cumulative impacts to arise from runoff mobilising pollution (increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes) from the individual haul routes combining into the same surface water receptors. This would lead to reduced water quality within the local watercourses. It is assumed that each of these developments would be subject to an EIA or environmental assessment where impacts would be appropriately mitigated, and the projects will

have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;

- There are six energy infrastructure projects that have been granted or have pending planning permission: Drax Bioenergy with carbon capture and storage in Section 4, EIA scoping opinion for a 50 mw battery storage system (BESS) on land off Barlow Common Road in Section 4, development of an energy storage facility (including battery storage containers; substations; power conversion systems; transformers and associated switchgear; HVAC equipment; communications and grid compliance equipment; temporary construction compound; CCTV; fencing; infrared lighting; access, drainage and landscaping works and associated development) in Section 4, construction of a battery energy storage system in Section 2, EIA Screening opinion request for five wind turbines in Section 2, and development of a secondary battery storage facility, associated infrastructure, access and grid connection in Section 4, may increase the hardstanding within the area. The construction of these would increase construction traffic locally, and there is the potential for adverse cumulative impacts to arise from runoff mobilising pollution (increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes) from the individual haul routes combining into the same surface water receptors. This would lead to reduced water quality within the local watercourses. It is assumed that each of these developments would be subject to an environmental assessment where impacts would be appropriately mitigated, and the projects will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;
- Demolition of Drax Power Ltd Flue Gas Desulphurisation (FGD) plant and associated restoration works, which will not result in a notable increase in the hardstanding within the area as this comprises demolition of an existing development. This project will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;
- eight residential and holiday developments are currently in planning; construction of 28 chalets at South Shore Holiday Village, change of use of land for siting of 46 static caravans, erection of 40 dwellings and associated access, parking, landscaping and infrastructure, erection of holiday park, artisan workshops with associated retail, artisan bakery, delicatessen, boulangerie, offices, craft pods, workshop, café/tearooms, farm shop, tackle shop display, exhibition and fishing lake, 470 dwellings in Kingsgate, 175 dwellings at Howden Parks, 600 dwellings near Goole and 45 dwellings at Camblesforth. The construction of these would increase construction traffic locally, and there is the potential for adverse cumulative impacts to arise from runoff mobilising pollution (increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes) from the individual haul routes combining into the same surface water receptors. This would lead to reduced water quality within the local watercourses. These projects will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;
- Four solar farms with associated infrastructure are currently in planning. The construction of all of these developments will increase the hardstanding in the area. However, it is highly likely that the respective projects will undertake a detailed assessment of potential impacts of the proposed development and provide appropriate mitigation to reduce the risk of any significant impacts, including respective surface water management strategies. The projects will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;
- There are two commercial developments in planning: the development of an existing horticultural facility for indoor farming and agri-tech, including the construction of three halls with associated process, service and administration buildings which will not result in a notable increase in the hardstanding within the area as this comprises alteration of an existing development, and construction of a HGV park and welfare building and warehouse to serve existing Sedamyl UK Ltd plant in Section 4. The construction of these would increase construction traffic locally, and there is the potential for adverse cumulative impacts to arise from runoff mobilising pollution (increased dust, fuel spills, oils, lubricants, soil and wear from tyres and brakes) from the individual haul routes combining into the same surface water receptors. This would lead to reduced water quality within the local watercourses. These projects will have to comply with national and local planning policy

and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;

- EIA scoping for excavation to Barlow Ash Mound in Section 4. It is likely this will lead to additional traffic in the area. However, it is highly likely that the respective projects will undertake a detailed assessment of potential impacts of the proposed development and provide appropriate mitigation to reduce the risk of any significant impacts, including respective surface water management strategies. The project will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects;
- The planning application for the extension of excavation area to Gransmoor Quarry was approved in September 2020. The construction of this project has the potential to increase pollution through the mobilisation of sedimentation and from runoff from the haul roads. This development is hydraulically linked to the English Onshore Scheme, located 400m downstream. An Environmental Statement with mitigation has been provided with this committed development and concluded no significant effects to water receptors. Therefore on this basis, there are not considered to be any significant cumulative effects; and
- The planning application for the creation of access from Driffield Canal and a marina for mooring leisure boats with access and car park is pending consideration. The construction of this project has the potential to increase pollution through the mobilisation of sedimentation and pollution from runoff from the haul roads. This development is hydraulically linked to the English Onshore Scheme, located 2 km downstream. It is highly likely that this project will undertake a detailed assessment of potential impacts of the proposed development and provide appropriate mitigation to reduce the risk of any significant impacts, including respective surface water management strategies. The project will have to comply with national and local planning policy and any specific conditions stipulated by statutory consultees. On this basis there are not considered to be any significant cumulative effects

It has been determined that no cumulative impacts on water resources and hydrology receptors are likely from the remaining committed developments identified within the study area, as there is either no pathway from the proposed developments to either the proposed landfall, the DC cable route, the converter station, the construction compounds, or the potential impacts will be mitigated within the planning process.

It is assumed, these developments will run in accordance with the NPPF and Planning Practice Guidance ID7 – Flood Risk and Coastal Change and therefore any new development is required to attenuate surface water run-off, where practicable, to the greenfield runoff rate and provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the local drainage network.

Any works undertaken within close proximity to a watercourse/flood defence or Flood Zone 3 will require consent from the EA, LLFA and/or IDB's. They will be required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable. Therefore, the cumulative impacts on water resources and hydrology are predicted to not be significant.

11.10 Summary of Assessment

There are a total of 100 surface water features proposed to be crossed by the English Onshore Scheme, which are a mixture of main river and ordinary watercourses, WFD designated, IDB maintained channels and minor drains. These surface water courses all have an overall WFD status of Moderate. EA records also indicate three Chalk Streams and numerous surface water abstraction and discharge licenses present within the study area. There are a number of SSSIs present within the study area, two of which are proposed to be crossed by the English Onshore Scheme (West Beck SSSI and Kelk Beck SSSI).

Parts of Section 1 of the English Onshore Scheme are located within areas of high surface water risk, parts of Section 2 and 3 within areas of medium surface water risk and parts of Section 4 within areas of low surface water risk.

Parts of Sections 1, 3 and 4 of the English Onshore Scheme are within areas of Flood Zone 2 and 3, the overall flood risk from groundwater, residual sources, historic risk and sewers to the English Onshore Scheme is low.

The main potential impacts relating to construction include increased surface water runoff and changes to existing runoff rates through increases in impermeable areas. There are also temporary impacts to local hydromorphology, impacts from the mobilisation of fine sediment to water features effecting water quality through run off or scour, and mobilisation of oils, cement or other chemicals effecting water quality. Impacts during construction also include severance or disturbance to underground field/land drainage infrastructure, changes to the existing flow regime of watercourses as a result of crossings and potential increase in flood risk elsewhere due to available compensatory land storage being displaced.

The main potential impacts relating to operation include increased surface water run off through increases in impermeable areas, severance or disturbance to underground field/land drainage infrastructure and mobilisation of oils, cement or other chemicals effecting water quality contained within run off.

With the incorporation of embedded design mitigation and operational specific mitigation for flood risk, the significance of residual effects for the English Onshore Scheme are a defined as minor to negligible adverse and therefore not significant.

In addition, the ground level at the proposed converter station (the only permanent above ground infrastructure proposed for the English Onshore Scheme) in Section 4, in SDC, is to be raised to ensure that the FFL is at a level of 6.18 mAOD. This is to ensure that the structure remains outside the modelled flood extents and depths from nearby watercourses to the 0.1% + 50% CC AEP event, although the EA only require the converter station to be free from flooding in the 1% + 39% CC AEP event. Compensatory storage is not anticipated to be required. Any requirement for compensatory storage will require consultation and agreement with the EA.

With the incorporation of appropriate mitigation measures, the significance of residual effects for the English Onshore Scheme are defined as minor to negligible adverse and therefore not significant.

11.11 References

Ref 11-1 Ministry of Housing, Communities and Local Government. National Planning Policy Framework, revised July 2021. Available online at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

Ref 11-2 Ministry of Housing, Communities and Local Government. Planning Practice Guidance – Flood Risk and Coastal Change. March 2014. Available online at: https://www.gov.uk/guidance/flood-risk-and-coastal-change

Ref 11-3 Department of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Ref 11-4 Department for Business, Energy & Industrial Strategy. Draft National Policy for Electricity Networks and Infrastructure (EN-5). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

Ref 11-5 East Riding of Yorkshire Council. East Riding Local Plan (2012-2029).

Ref 11-6 Selby District Council. Selby District Local Plan 2005. Available online at: https://www.selby.gov.uk/selby-district-local-plan-sdlp-2005

Ref 11-7 Selby District Council. Selby District Core Strategy Local Plan. Available online at: https://www.selby.gov.uk/selby-district-core-strategy-local-plan

Ref 11-8 Selby District Council. Selby District Council Local Plan Preferred Options Consultation 2021. Available online at: https://www.selby.gov.uk/sites/default/files/Local_Plan_Preferred_Options_29-01-2021_%28Web%20Version%29.pdf

Ref 11-9 DEFRA and the Environment Agency (2015). Water for life and Livelihoods Part 1: Humber river basin district River basin management plan. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RBD_Part_1_river_basin_management_plan.pdf

Ref 11-10 Catchment Based Approach (2021). Chalk stream Restoration Strategy 2021. Available online at: CaBA CSRG Strategy MAIN REPORT FINAL 12.10.21 (catchmentbasedapproach.org)

Ref 11-11 Environment Agency. Catchment Data Explorer. Available online at: https://environment.data.gov.uk/catchment-planning/

Ref 11-12 Environment Agency. Main River Map. Available online at: https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386

Ref 11-13 Defra. Magic Maps. Available online at: https://magic.defra.gov.uk/MagicMap.aspx

Ref 11-14 UK Centre for Ecology & Hydrology. National River Flow Archive. Available online at: https://nrfa.ceh.ac.uk/

Ref 11-15 Association of Drainage Authorities. Internal Drainage Boards Map. Available online at: https://www.ada.org.uk/member_type/idbs/

Ref 11-16 Environment Agency. Defra Data Services Platform. Available online at: https://environment.data.gov.uk/dataset/5ed5e8e1-d465-11e4-ab5e-f0def148f590

Ref 11-17 Environment Agency. Mill Dike (Market Weighton) EA Flood Mapping Study (2007)

Ref 11-18 Environment Agency. Upper Humber Model 2018

Ref 11-19 Environment Agency. Humber Tributaries Model 2020

Ref 11-20 Environment Agency. Hull and Holderness Drain Flood Mapping Study 2013

Ref 11-21 Environment Agency. Flood Map for Planning. Available online at: https://flood-map-for-planning.service.gov.uk/

Ref 11-22 Environment Agency. Long Term Flood Risk Map. Available online at: http://apps.environment-agency.gov.uk/wiyby/cy/151367.aspx

Ref 11-23 Assessment (2020). Available online at: https://www.selby.gov.uk/strategic-flood-risk-assessment

Ref 11-24 DMRB. LA 113 - Road drainage and the water environment. Available online at: https://www.standardsforhighways.co.uk/dmrb/search/d6388f5f-2694-4986-ac46-b17b62c21727

Ref 11-25 UK Government. Flood risk assessments: climate change allowances, updated October 2021. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Ref 11-26 CIRIA. CIRIA C532 Control of Water Pollution from Construction Sites 2001. Available online at: https://www.ciria.org/ProductExcerpts/C532.aspx

Ref 11-27 Environment Agency. Pollution Prevention Guidelines 2007 (withdrawn 2015). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485199/pmho1107bnkg-e-e.pdf

Ref 11-28 CIRIA. CIRIA C648 Control of water pollution from linear construction projects. Available online at: https://www.ciria.org/ProductExcerpts/C648.aspx

Ref 11-29 CIRIA. CIRIA C786F Culvert, Screen and outfall manual. Available online at: https://www.ciria.org/ItemDetail?iProductCode=C786F&Category=FREEPUBS