

# HyNet North West Hydrogen Pipeline

Delivering clean growth



## Chapter 7

### Water Environment

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## 7. Water Environment

### 7.1 Introduction

- 7.1.1 The Draft Environmental Statement (ES) has been produced to fulfil the Applicant's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.
- 7.1.2 This chapter presents the assessment of the likely significant effects of the Project with respect to the water environment, including all inland controlled waters and transitional waters, water resources (abstractions and associated catchment areas) and flood risk (property and infrastructure at risk of flooding), based on the information obtained to date. Following consultation, the assessment will be updated for the final ES that will accompany the Development Consent Order (DCO) application for the Project.
- 7.1.3 This chapter should be read in conjunction with the Project description provided in **Chapter 2: The Project** and with respect to relevant parts of the following chapters:
- **Chapter 5: Biodiversity;**
  - **Chapter 12: Ground Conditions;** and
  - **Chapter 13: Agriculture and Soil Resources.**
- 7.1.4 This chapter describes the following:
- the relevant legislation, policy and technical guidance that has informed the assessment (**Section 7.2**);
  - consultation and engagement that has been undertaken and how comments from consultees relating to the water environment have been addressed (**Section 7.3**);
  - the methods used for baseline data gathering (**Section 7.4**);
  - the overall baseline, including existing and future baseline (**Section 7.5**);
  - embedded environmental measures relevant to the water environment (**Section 7.6**);
  - the scope of the assessment for the water environment (**Section 7.7**);
  - the methodology applied for the assessment (**Section 7.8**);
  - the assessment of water environment effects (**Section 7.9**);
  - the assessment of cumulative (inter-project) effects (**Section 7.10**);
  - additional measures proposed (**Section 7.11**); and
  - the water environment residual effects assessment (**Section 7.12**).
- 7.1.5 This chapter is supported by the following appendices:

- **Appendix 7A – Scoping opinion and statutory consultation;**
- **Appendix 7B – Detailed water environment baseline information;**
- **Appendix 7C – Hydromorphology desk-based study and site survey;**
- **Appendix 7D – Assessment of water environment effects;**
- **Appendix 7E – Water Framework Directive assessment;**
- **Appendix 7F – Flood Risk Assessment; and**
- **Appendix 7G – Hydraulic modelling for hydrogen above-ground installations.**

7.1.6 It is especially important to note that **Appendix 7D** presents an assessment of water environmental (including flood risk) effects due to the construction, operational and decommissioning phases of the Project. The summary of this assessment of water environment adverse effects is given within **Section 7.9**.

## Project overview

- 7.1.7 The Project includes the construction, and operation and eventual decommissioning of approximately 100km of new pipeline to distribute hydrogen to industry in the North West. A number of Hydrogen Above Ground Installations (HAGIs), including Block Valve Installations (BVIs) are required to control the flow and pressure of hydrogen at key points along the proposed pipeline.
- 7.1.8 The Project connects the Hydrogen Production Plant (HPP) at the Stanlow site, as the source of hydrogen, for onward distribution to the network. The pipeline transports hydrogen to the Central Hub at the centre of the network, which then serves as the connection and onward distribution point to the North, East and South corridors, which would extend to St. Helens, Partington and Northwich respectively. Branching off from each main corridor would be pipeline spurs connecting hydrogen customers to the main pipeline. Infrastructure has also been included which supports the potential blending of hydrogen with methane in the existing gas network. The Project would also link to underground hydrogen storage facilities in Cheshire used to balance supply and demand through the network.
- 7.1.9 The presently anticipated maximum extent of land in which the Project may take place, which is assessed in this Draft ES, is defined by the 'Draft Order Limits', land within which is hereafter referred to as 'land within the Draft Order Limits'.
- 7.1.10 A proportionate degree of flexibility has been incorporated into the project design so that unforeseen issues that may be encountered following consent can be sufficiently mitigated. For example, previously unidentified poor ground conditions may require a pipeline section to be re-routed slightly for geotechnical reasons. Therefore, to allow for this, new infrastructure would be constructed within specified Limits of Deviation (LoD) which identify a maximum distance or measurement of variation within which the works must be constructed; further detail is provided on LoD in **Chapter 2: The Project**.

## Limitations and assumptions

- 7.1.11 Final site visits to collect survey data of the River Dane and to determine the location of the proposed Pendlebury Brook crossing were delayed due to ongoing access restrictions. While these visits have now been undertaken the results and interpretation have not been processed in time for consideration in this Draft ES; they will therefore be used to inform the Final ES.
- 7.1.12 The potential impacts of the pipeline on the groundwater temperature have not been assessed in the Draft ES. No concerns have been raised by stakeholders to date and as such, this is currently scoped out of the assessment based on current information.
- 7.1.13 Flood risk modelling has been undertaken for the detailed assessment of flood risk at four HAGI locations (Higher Walton, Rocksavage, the Hydrogen Production Plant (HPP) at Stanlow and the Hydrogen Storage Facility (HSF)). Flood risk modelling is planned for the Higher Walton HAGI Option HWH8, but whilst it is not available for the Draft ES it will be provided in the Final ES should this option be taken forward.
- 7.1.14 Ground Investigation (GI) works for the Project were undertaken during summer/autumn 2022 and will help to inform ground conditions and hydrogeological regimes along specific areas of the pipeline route. This has helped to identify areas of interest during the ES stage of the Project. No GI works have been undertaken since this time.
- 7.1.15 Data were requested from the Environment Agency and, although largely complete, some data have limitations (i.e. consented discharge data did not contain discharge volumes or information on whether the discharges were to surface or ground).
- 7.1.16 Specifications and philosophy around pipeline hydrostatic testing and pre-commissioning indicate that any abstraction is likely to be from larger surface water bodies, such as the River Mersey, River Weaver and/or larger canals.

## 7.2 Relevant Legislation, Planning Policy and Technical Guidance

- 7.2.1 This Section identifies the relevant legislation, planning policy and technical guidance that has informed the assessment of effects with respect to the water environment. Further information on policies relevant to the Project is provided in **Chapter 4: Legislation and policy overview**.

### Legislation

- 7.2.2 A summary of the relevant legislation is given in **Table 7.1**, in approximate chronological order (oldest legislation first).

**Table 7.1 Legislation relevant to the water environment assessment**

| Legislation                                                                                                 | Legislative context                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control of Pollution Act 1974<sup>1</sup></b>                                                            | The Control of Pollution Act 1974 makes further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.                                                                                                                                                                                                                                                                                                                |
| <b>Reservoirs Act 1975<sup>2</sup> (as amended by the Flood and Water Management Act, 2010<sup>3</sup>)</b> | Reservoirs are present within the Project area. The Reservoirs Act 1975 provides regulation for the operation and maintenance of reservoirs to ensure that the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) is undertaken with regard to the condition of the embankments. As such, the chance of them failing and giving rise to flooding problems is remote.                                               |
| <b>Environment Protection Act 1990<sup>4</sup></b>                                                          | The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste, and makes further provision in relation to such waste.                                   |
| <b>Land Drainage Act 1991 and 1994<sup>5</sup></b>                                                          | The Land Drainage Act 1991 and 1994 (as subsequently amended), in combination with the Water Resources Act 1991, stipulates that before work on or near an 'Ordinary Watercourse' is carried out an Ordinary Watercourse Consent (OWC) is required. The Flood Defence Consent regime for 'Main Rivers', which used to be part of this Act, was replaced by Flood Risk Activities Permits (FRAPs) under the Environmental Permitting (England and Wales) Regulations 2016. |

<sup>1</sup> UK Government (1974). Control of Pollution Act 1974. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1974/40> (Accessed August 2024).

<sup>2</sup> UK Government (1975). Reservoirs Act 1975. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1975/23> (Accessed August 2024).

<sup>3</sup> UK Government (2010). The Flood and Water Management Act 2010. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> (Accessed August 2024).

<sup>4</sup> UK Government (1990). Environmental Protection Act 1990. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed August 2024).

<sup>5</sup> UK Government (1994) Land Drainage Act 1994. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1994/25/contents> (Accessed 2 February 2023).

| Legislation                                                                                                                                                       | Legislative context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Countryside and Rights of Way Act 2000<sup>6</sup></b>                                                                                                         | The Countryside and Rights of Way Act 2000 sets out the framework for the notification to Local Planning Authorities (LPAs) of Sites of Special Scientific Interest (SSSIs) and agreements between the Nature Conservancy Council (NCC, now Natural England) and those with interests in such land.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Water Resources Act 1991<sup>7</sup></b><br><b>Water Act 2003<sup>8</sup></b>                                                                                  | The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters <sup>9</sup> . The Water Resources Act 1991 was amended by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Of importance to the Project is the requirement to obtain an abstraction licence post-DCO submission for dewatering of engineering works and to ensure that any impact on the environment can be mitigated.                                                                                                                                |
| <b>Environment Act 1995<sup>10</sup></b>                                                                                                                          | The Environment Act 1995 established the Environment Agency and gave it responsibility for environmental protection and flood defence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>*The EU Water Framework Directive (2000/60/EC) (WFD) as enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales)</b> | <p>The EU Water Framework Directive is enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, which replace the original Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The WFD established a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters and coastal waters) and groundwater throughout the EU.</p> <p>A fundamental requirement of the WFD is to attain 'Good' ecological status, or 'Good' ecological potential, within each defined water body by December 2027 at the latest and to ensure that any deterioration in status is prevented.</p> |

<sup>6</sup> UK Government (2000). Countryside and Rights of Way Act 2000. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2000/37/contents> (Accessed August 2024).

<sup>7</sup> UK Government (1991). Water Resources Act 1991. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> (Accessed August 2024).

<sup>8</sup> UK Government (2003). Water Act 2003. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents> (Accessed August 2024).

<sup>9</sup> The term 'controlled waters' refers to "Rivers, streams, estuaries, lakes, canals, ditches, ponds and groundwater as far out as the UK territorial limit". The statutory definition is provided in Section 104 (1) of the Water Resources Act 1991 and Section 30A (d) of the Control of Pollution Act 1974.

<sup>10</sup> UK Government (1995). Environment Act 1995. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1995/25/contents> (Accessed August 2024).

| Legislation                                                                                                                           | Legislative context                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(Amendment) Regulations 2017<sup>11</sup></b>                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Groundwater (England and Wales) Regulation (2009)<sup>12</sup></b>                                                                 | The Groundwater Regulation outlines rules for the Environment Agency with respect to the granting of permits concerning the pollution of groundwater, namely consenting under a.91(8) Water Resources Act 1991 and the Environmental Permitting (England and Wales) Regulations, with exceptions.                                                                                                         |
| <b>Flood and Water Management Act 2010<sup>3</sup></b>                                                                                | The Flood and Water Management Act 2010 sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. The Act includes consideration and responsibilities for managing flood risk and consideration of drainage, including the use of sustainable drainage systems (SuDS).                                                               |
| <b>*Priority Substances Directive (2008/105/EC) Amending Directive of the Priority Substances Directive (2013/39/EU)<sup>13</sup></b> | The Priority Substances Directive 2008 and its Amending Directive 2013 set out environmental quality standards in the field of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health. |
| <b>The Water Act 2014<sup>14</sup></b>                                                                                                | The Water Act 2014 aims to encourage innovation within the water industry and to increase water supply resilience against natural hazards.                                                                                                                                                                                                                                                                |
| <b>The Water Framework Directive (Standards and Classification) Directions (England</b>                                               | The WFD Directions 2015 set out the environmental standards to be used for the second cycle of river basin plans. Along with the Water Environment (WFD) (England and Wales) Regulations 2003, they transposed Directive                                                                                                                                                                                  |

<sup>11</sup> UK Government (2017). Water Resources, England and Wales, The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. (Online). Available at: [https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi\\_20170407\\_en.pdf](https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi_20170407_en.pdf) (Accessed August 2024)

<sup>12</sup> The Groundwater (England and Wales) Regulations (2009). (Online). <https://www.legislation.gov.uk/ukdsi/2009/9780111480816/contents> (Accessed August 2024)

<sup>13</sup> European Parliament, Council of the European Union (2013). Directive 2013/39/EU of The European Parliament and of The Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. (Online). Available at: <https://www.legislation.gov.uk/eudr/2013/39/contents> (Accessed August 2024).

<sup>14</sup> HM Government (2014). Water Act. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2014/21/contents/enacted> (Accessed August 2024).

| Legislation                                                                                                 | Legislative context                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>and Wales) 2015<sup>15</sup><br/>(WFD Directions)</b>                                                    | 2013/39/EC on environmental quality standards for priority substances.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Water Quality (Water Supply) Regulations 2016 (as amended)<sup>16</sup></b>                              | These regulations are primarily concerned with the quality of water supplied in England for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality.                                                                                                                                                                                                            |
| <b>Private Water Supplies (England) Regulations 2016<sup>17</sup></b>                                       | The Private Water Supplies Regulations require local authorities to monitor private water supplies.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended) (EPR)<sup>18</sup></b> | The EPR replace the previous 2010 Regulations. They provide a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991 and the Control of Pollution Act 1974) and groundwater activities. They also set out the powers, functions and duties of the regulators.                                                                            |
| <b>Conservation of Habitats and Species Regulations 2017<sup>19</sup></b>                                   | The Conservation of Habitats and Species Regulations 2017 were enacted within England and Wales to transpose the EU Habitats Directive (92/43/EEC)* and aspects of the Wild Birds Directive (2009/147/EC)*. The Regulations cover the selection, designation, registration and management of European sites (also known as Natura 2000 sites) and list European protected species of animals and plants. Conservation Objectives must ensure that the European |

<sup>15</sup> UK Government (2015). The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. (Online). Available at:

[https://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d\\_20151623\\_en\\_003.pdf](https://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d_20151623_en_003.pdf) (Accessed August 2024).

<sup>16</sup> UK Government (2016). The Water Supply (Water Quality) Regulations 2016. (Online). Available at: <https://www.legislation.gov.uk/ukxi/2016/614/contents/made> (Accessed August 2024).

<sup>17</sup> UK Government (2016). The Private Water Supplies (England) Regulations 2016. (Online). Available at: <https://www.legislation.gov.uk/ukxi/2016/618/contents> (Accessed August 2024).

<sup>18</sup> UK Government (2016). The Environmental Permitting (England and Wales) Regulations 2016 together with subsequent amendments. (Online). Available at: [https://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi\\_20161154\\_en.pdf](https://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi_20161154_en.pdf) (Accessed August 2024).

<sup>19</sup> UK Government (2017). The Conservation of Habitats and Species Regulations 2017. (Online). Available at: <https://www.legislation.gov.uk/ukxi/2017/1012/contents/made> (Accessed August 2024).

| Legislation                                                                                                                                                                                                                                                                                                          | Legislative context                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                      | protected species identified as qualifying features of a Natura 2000 site remain or reach favourable condition (such as by maintaining the extent and distribution of habitats of qualifying features). This means that where a proposed development may affect a Conservation Objective of a Natura 2000 site, the design will need to include appropriate measures to ensure the Conservation Objectives are not adversely affected. |
| <b>Environment Act 2021</b> <sup>20</sup>                                                                                                                                                                                                                                                                            | The Environment Act 2021 sets out provisions to establish a post-Brexit set of statutory environmental principles and to ensure environmental governance and binding targets on water quality.                                                                                                                                                                                                                                         |
| <p>*EU legislation which applied directly or indirectly to the UK before 31 December 2020 has been retained in UK law through the European Union (Withdrawal) Act (2018)</p> <p><a href="https://www.legislation.gov.uk/eu-legislation-and-uk-law">https://www.legislation.gov.uk/eu-legislation-and-uk-law</a>.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Planning policy

- 7.2.3 The primary national planning policy documents relevant to the consideration of the Project are the Overarching National Policy Statement for Energy (EN-1) and the National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil pipelines (EN-4).
- 7.2.4 Other national and local policies may also provide additional guidance on the water environment topic and could be considered material to the consideration of this Project. Policy potentially relevant to the Project and to the water environment topic is summarised within **Table 7.2**.

<sup>20</sup> UK Government (2021). The Environmental Act 2021. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> (Accessed August 2024).

**Table 7.2 Planning policy relevant to the water environment assessment**

| Policy                                                                                 | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>National planning policy</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Overarching National Policy Statement for Energy (EN-1)<sup>21</sup></b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>4.10 Climate change adaptation and resilience</b>                                   | This includes reference to new renewable energy infrastructure, reduced greenhouse gas emissions and the inclusion of coastal change considerations. The applicant proposals should demonstrate a high level of built-in climate resilience and demonstrate how proposals particularly, for energy infrastructure, can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario. |
| <b>5.8 Flood risk</b>                                                                  | This sets out the minimum requirements of a FRA as well as information on the application of the sequential and exception tests. The amended policy states that projects should aim for climate resilient infrastructure and improve the sustainability of existing infrastructure where possible.                                                                                                                                  |
| <b>5.16 Water quality and resources</b>                                                | This sets out the responsibility of the applicant to demonstrate appropriate surface water management and pollution control.                                                                                                                                                                                                                                                                                                        |
| <b>NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>22</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>2.3 Climate change adaptation</b>                                                   | This sets out generic considerations that applicants and the Infrastructure Planning Commission (IPC) should take into account to help ensure that new energy infrastructure is resilient to climate change, to identify the likely increases in risks to some of this infrastructure from flooding or rising sea levels and to establish an appropriate approach to infrastructure resilience.                                     |
| <b>2.21.34-41, 2.22.9-10 Water</b>                                                     | Where the Project is likely to have effects on water resources or water quality, for example impacts on groundwater recharge or on existing surface water or groundwater abstraction points, or on associated                                                                                                                                                                                                                       |

<sup>21</sup> Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1) (Online). Available at: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1> (Accessed August 2024).

<sup>22</sup> Department for Energy Security and Net Zero (2023). National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Online). Available at: <https://www.gov.uk/government/publications/national-policy-statement-for-natural-gas-supply-infrastructure-and-gas-and-oil-pipelines-en-4> (Accessed August 2024).

| Policy                                                                          | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>quality and resources</b>                                                    | <p>ecological receptors, the applicant should provide an assessment of the impacts in line with Section 5.16 of EN-1 as part of the ES.</p> <p>Mitigation measures to protect the water environment could include techniques for crossing rivers and managing surface water, including the restoring vegetation and using SuDS to control run-off. Impacts during construction should be avoided as much as possible through route selection or mitigation, and ground should be reinstated after construction. Design measures which are typically taken to protect water quality include the following:</p> <ul style="list-style-type: none"> <li>• the avoidance of vulnerable groundwater areas or appropriate use of above ground pipeline facilities;</li> <li>• use of the highest specification pipework and best practice in the storage and handling of pollutants to prevent spillage;</li> <li>• careful storage of excavated material away from watercourses and facilities for the disposal of sewage and waste;</li> <li>• use of sustainable drainage systems; and</li> <li>• careful reinstatement of riverbanks and reed beds.</li> </ul> |
| <b>National Planning Policy Framework (NPPF) <sup>23</sup></b>                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>14. Meeting the challenge of climate change, flooding and coastal change</b> | The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Planning and flood risk: 167-172 sequential test</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>14. Meeting the challenge of climate change, flooding and coastal change</b> | The exception test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available or appropriate, as long as the development can be demonstrated to be safe and provides wider sustainability benefits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

<sup>23</sup> Ministry of Housing, Communities and Local Government (2023). National Planning Policy Framework. (Online). Available at: [https://assets.publishing.service.gov.uk/media/669a25e9a3c2a28abb50d2b4/NPPF Dece mber 2023.pdf](https://assets.publishing.service.gov.uk/media/669a25e9a3c2a28abb50d2b4/NPPF_Dece mber_2023.pdf) (accessed September 2024).

| Policy                                                                               | Policy context                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>Planning and flood risk: 167-174 exception test</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>14. Meeting the challenge of climate change, flooding and coastal change</b>      | This sets out a presumption that SuDS will be incorporated into new developments to minimise the impacts of development from any increase in surface runoff.                                                                                                                                                                                                                                                         |
| <b>Planning and flood risk: 173 - 175 SuDS</b>                                       |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>14. Meeting the challenge of climate change, flooding and coastal change:</b>     | This ensures that the impact of climate change is taken into account for the expected lifetime of a development.                                                                                                                                                                                                                                                                                                     |
| <b>Planning for climate change</b>                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>15. Conserving and enhancing the natural environment</b>                          | This establishes that decisions should contribute to protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils. It prevents new and existing development creating unacceptable risk from water or pollution and helps improve the local environmental conditions such as water quality, taking into account relevant information such as River Basin Management Plans (RBMPs). |
| <b>Cheshire West and Chester Adopted Development Plan, January 2015<sup>24</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ENV1 Flood risk and water management</b>                                          | This seeks to reduce flood risk and to protect and enhance water quality through an appropriate Flood Risk Assessment (FRA) and mitigation and aims to reduce surface water run-off rates via the implementation of SuDS.                                                                                                                                                                                            |

<sup>24</sup> Cheshire West and Cheshire Council (2015). Cheshire West and Chester Adopted Development Plan. (Online). Available at: [http://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/adopted\\_cwac\\_lp/lp\\_1\\_adopted?tab=files](http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?tab=files) (Accessed August 2024).

| Policy                                                                                                                         | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ENV7<br/>Alternative<br/>energy<br/>supplies</b>                                                                            | Cheshire West and Chester Council (CWCC) will support renewable and low carbon energy proposals where there are no unacceptable impacts on water, biodiversity and the natural environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies – adopted July 2019<sup>25</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>15 Flood risk<br/>and water<br/>management</b>                                                                              | <p>This sets out policies associated with directing development to areas at low risk of flooding and the active management and reduction of flood risk, including the following:</p> <p>DM40 (Development and flood risk) states that flood risk must be avoided or reduced by:</p> <ul style="list-style-type: none"> <li>• Locating development within areas of lower flood risk through the application of a borough-wide sequential test and then, where required, applying the exception test in line with the National Planning Policy Framework; and</li> <li>• Ensuring development proposals in flood risk areas are actively managed and reduce flood risk by applying the sequential approach at site level.</li> </ul> <p>DM41 (SuDS) states that “proposals for major development will be required to incorporate SuDS. SuDS must be included in the early stages of the site design and schemes will be required to satisfy technical standards and design requirements having regard to the Council's Draft SuDS Design and Technical Guidance. On greenfield sites, restrictions on surface water runoff from new development should be incorporated into the development at the planning stage and must mimic or improve upon greenfield rates. On brownfield sites, site runoff rates should be reduced to the greenfield rates wherever possible. Where this cannot be achieved a reduction of at least 30% of the actual existing runoff must be provided, unless it can be demonstrated that this is unachievable or hydraulically impractical”.</p> <p>DM42 (Flood water storage) states that “In line with Local Plan .... development within or adjacent to a flood water storage area, as defined on the policies map, which would have a negative impact on its function will not be supported. As the LLFA the Council, in partnership with the Environment Agency, may identify additional</p> |

<sup>25</sup> Cheshire West and Cheshire Council (2019). Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies. (Online). Available at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/adopted\\_cwac\\_lp/parttwo\\_adapted?pointId=5428432](https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/parttwo_adapted?pointId=5428432) (Accessed August 2024).

| Policy                                                           | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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|                                                                  | <p>areas for flood water storage through the Local Flood Risk Management Strategy”.</p> <p>DM43 (Water quality, supply and treatment) states “that development proposals will be supported where it can be demonstrated that the proposal will not cause unacceptable deterioration to water quality or have an unacceptable impact on water quantity (including drinking water supplies) or waste water infrastructure capacity by ensuring that:</p> <ul style="list-style-type: none"> <li>• Sufficient water resources are available, and the proposal does not have a detrimental impact on the flow or quantity of groundwater;</li> <li>• Development does not affect the water quality of surface or groundwater;</li> <li>• Development does not cause unacceptable harm to biodiversity;</li> <li>• Opportunities to improve water quality are used where possible;</li> <li>• Water efficiency methods are optimised; and</li> <li>• Wastewater infrastructure already exists or can be provided in time to serve the development.</li> </ul> <p>The discharge of surface water to combined drainage systems will be regulated in accordance with requirements set by the relevant utility provider”.</p> |
| <b>Cheshire East Local Plan Strategy, July 2017<sup>26</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>SE12 Pollution, land contamination and land instability</b>   | Cheshire East Council (CEC) requires that no development results in a harmful or cumulative impact upon surface water and groundwater quality, soil contamination pollution or any other pollution that would unacceptably affect the natural and built environment, or cause harm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>SE13 Flood risk and water management</b>                      | This ensures that all developments at risk of flooding should be supported by an appropriate FRA to reduce the risk of flooding, taking into account the impacts of climate change in line with the CEC Strategic Flood Risk Assessment (SFRA). In addition, improvements to the current surface water drainage network are sought and should be designed to manage surface water. This should include                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

<sup>26</sup> Cheshire East Council (2017). Cheshire East Local Plan Strategy 2010-2030. (Online). Available at: <https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed August 2024).

| Policy                                                              | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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|                                                                     | appropriate SuDS and must not result in an increase in runoff. Developments should enhance and protect surface water and groundwater quality and comply with the WFD in ensuring with suitable mitigation measures are in place.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Trafford Local Plan Core Strategy, January 2012<sup>27</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>L5 Climate change</b>                                            | This states that any development that has potential to cause adverse pollution of water or ground will not be permitted unless it includes mitigation measures. Trafford Council (TC) will also control development in areas at risk of flooding considering the level of risk, requiring an appropriate FRA at the planning application stage. In addition, surface water run-off should be reduced through the use of appropriate SuDS based on mapping within TC's SFRA.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>R2 Natural environment</b>                                       | This ensures the protection and enhancement of the natural environment biodiversity, designated sites of national, regional and local importance and areas of open water and watercourses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>R3 Green infrastructure</b>                                      | This ensures that high quality and multi-functional green infrastructure enhances flood risk management through water storage or run-off protection, integrates mitigation measures such as SuDS into the design and reduces water pollution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Warrington Local Plan Core Strategy, July 2014<sup>28</sup></b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>QE 4 Flood risk</b>                                              | <p>This states that support will be given where the risk of flooding has been fully assessed and justified by an agreed FRA where:</p> <ul style="list-style-type: none"> <li>• 1 hectare, or greater, of a new development is within Flood Zone 1 and/or Critical Drainage Areas as defined by the SFRA;</li> <li>• new development is within Flood Risk Zones 2 and 3; and</li> <li>• a minor development or change of use (where a more vulnerable use may be susceptible to other sources of flooding) is within Flood Risk Zones 2 and 3.</li> </ul> <p>The policy outlines the requirements to manage surface water run-off to ensure that flood risk is not increased, and the use of SuDS, floodplain compensatory storage and safe design within development proposals. Any development identified as at intermediate and high risk of surface water flooding (greater than 0.5 hectares) should be</p> |

<sup>27</sup> Trafford Council (2012). Trafford Local Plan Core Strategy. (Online). Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf> (Accessed August 2024).

<sup>28</sup> Warrington Borough Council (2014). Local Plan Core Strategy. (Online). Available at: [https://www.warrington.gov.uk/sites/default/files/2019-08/local\\_plan\\_core\\_strategy\\_adopted\\_2014.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf) (Accessed August 2024).

| Policy                                                                                        | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|                                                                                               | supported by a FRA which considers information in Warrington Borough Council's (WBC's) SFRA and Preliminary Flood Risk Assessment (PFRA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>QE 6<br/>Environment<br/>and amenity<br/>protection</b>                                    | <p>This ensures a development presents no adverse impact on the environment, including the following:</p> <ul style="list-style-type: none"> <li>the integrity and continuity of tidal and fluvial flood defences;</li> <li>the quality of water bodies, including canals, rivers, ponds and lakes; and</li> <li>groundwater resources in terms of their quantity, quality and the ecological features they support.</li> </ul>                                                                                                                                                                                                                                                                                                                |
| <b>St Helens Core Strategy, October 2012<sup>29</sup></b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>CP 1 Ensuring<br/>quality<br/>development</b>                                              | <p>This ensures the protection of watercourses from encroachment, modification and degradation and returns modified/degraded water bodies to sustainable, natural environments. It also aims to mitigate against the effects of water pollution including contamination of soil, surface water and groundwater resources.</p> <p>It also states that any development should be located in an area compatible with the identified Flood Zone in the St. Helens SFRA, thereby avoiding adding to the causes and sources of flood risk and ensuring no adverse impact on other sites. In addition, the protection from the risk of flooding through the use of SuDS and/or other appropriate measures and/or flood defences will be required.</p> |
| <b>Halton Core Strategy, April 2013<sup>30</sup> Halton Local Plan, May 2019<sup>31</sup></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>CS19:<br/>Sustainable<br/>development</b>                                                  | This states that development should incorporate appropriate climate change resilience including passive design features, conservation measures and the management of surface water run-off.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

<sup>29</sup> St Helens Council (2012). St Helens Core Strategy 2012. (Online). Available at: <https://new.sthelens.gov.uk/media/3385/sthelens-local-plan-core-strategy-october-2012.pdf> (Accessed August 2024).

<sup>30</sup> Halton Borough Council (2013). Halton's Local Plan Core Strategy April 2013. (Online). Available at: <https://www3.halton.gov.uk/Documents/planning/planning%20policy/CoreStrategy.pdf> (Accessed August 2024).

<sup>31</sup> Halton Local Plan, 2014-2037. Delivery and Allocations Local Plan (incorporating Partial Review of the Core Strategy) (Regulation 19) Proposed Submission Draft May 2019. (Online). Available at: <https://moderngov.halton.gov.uk/documents/s56900/Halton%20Local%20Plan%20-%20PropSubmsn%20Committee%202019-02-28%201831%20r1.pdf> (Accessed August 2024).

| Policy                                        | Policy context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>and climate change</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>CS20: Natural and historic environment</b> | <p>This ensures that a hierarchical approach will be given to the protection, nature conservation and enhancement of biodiversity including the following:</p> <ul style="list-style-type: none"> <li>• sites of international importance including the Mersey Estuary Special Protection Area (SPA) and 'Ramsar' site;</li> <li>• sites of national importance including SSSIs, namely the Mersey Estuary, Flood Brook Clough and Red Brow Cutting; and</li> <li>• sites of local importance including Local Nature Reserves (LNRs), Local Wildlife Sites (LWS) and Ancient Woodland.</li> </ul> |
| <b>CS21: Green infrastructure</b>             | This aims to sustain the protection of internationally important sites for biodiversity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>CS23: Managing pollution and risk</b>      | This aims to control development which may give rise to water pollution and to manage flood risk and not exacerbate existing levels of flood risk or place residents or property at risk. This is to be achieved by predicting the level of flood risk, both at present and taking into consideration the likely effects of climate change and using Halton Borough Council's (HBC's) SFRA in accordance with national planning policy. The requirement of site-specific FRAs for proposals in areas at risk from flooding is identified in the Halton SFRA.                                      |

## Technical guidance

7.2.5 A summary of the technical guidance for the water environment is given in **Table 7.3**.

**Table 7.3 Technical guidance relevant to the water environment assessment**

| Technical guidance document                                                                | Context                                                                                                                                     |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Construction Industry Research and Information Association (CIRIA) reports</b>          |                                                                                                                                             |
| <b>Report C532: Control of Water Pollution from Construction Sites (2001)<sup>32</sup></b> | This provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution. |

<sup>32</sup> Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors. C532. CIRIA; London.

| Technical guidance document                                                                                          | Context                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)<sup>33</sup></b>          | This sets out guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk. |
| <b>Report C648: Control of Water Pollution from Linear Construction Projects (2006)<sup>34</sup></b>                 | This provides guidance for clients, consultant, designers, contractors and regulators on how to plan and manage water pollution from linear construction projects.                                                                                                              |
| <b>Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)<sup>35</sup></b> | This sets out guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.                                                                                                                                             |
| <b>Report C650: Environmental Good Practice on Site, second edition (2005)<sup>36</sup></b>                          | This provides practical guidance with respect to managing construction on-site to control environmental impacts.                                                                                                                                                                |
| <b>Report C651: Environmental Good Practice - Pocket Book (2005)<sup>37</sup></b>                                    | This contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site to project completion.                                                                                                 |
| <b>Report C689: Culvert Design and Operation Guide (2010)<sup>38</sup></b>                                           | This provides comprehensive guidance covering a range of issues pertinent to the management and design of culverts.                                                                                                                                                             |

<sup>33</sup> Lancaster, J., Preene, M. and Marshall, C. (2004) Development and Flood Risk – Guidance for the Construction Industry. C624. CIRIA; London.

<sup>34</sup> Murnane, E., Heap, A. and Swain, A. (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. CIRIA; London.

<sup>35</sup> Murnane, E., Heap, A. and Swain, A. (2006) Control of water pollution from Linear Construction Projects – Site Guide. C649. CIRIA; London.

<sup>36</sup> Charles, P. and Connolly, S. (2005) Environmental Good Practice Site Guide (second edition). C650. CIRIA; London.

<sup>37</sup> Chant-Hall, G., Charles, P. and Connolly, S. (2005) Environmental good practice on site – pocket book. C651. CIRIA; London.

<sup>38</sup> Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010) Culvert design and operation guide. C689. CIRIA; London.

| Technical guidance document                                                                                            | Context                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report C692: Environmental Good Practice on Site (2010)<sup>39</sup></b>                                            | This gives general good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.                                      |
| <b>Report C698: Site Handbook for the Construction of SuDS (2007)<sup>40</sup></b>                                     | This sets out guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.                  |
| <b>Report C753: The SuDS Manual (2015)<sup>41</sup></b>                                                                | This provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments. |
| <b>Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive<sup>42</sup></b>            | This gives the WFD and DCO legal context as well as advice on the process and presentation for a WFD DCO application.                                                           |
| <b>Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)<sup>43</sup></b>      |                                                                                                                                                                                 |
| <b>GPP 1: Understanding your environmental responsibilities- good environmental practices (June 2021)<sup>44</sup></b> | This document is based on relevant legislation and reflects current good practice in pollution prevention.                                                                      |

<sup>39</sup> Audus, I., Charles, P. and Evans, S. (2010) Environmental good practice on site (third edition). C692. CIRIA; London.

<sup>40</sup> Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007) Site Handbook for the Construction of SUDS. C698. CIRIA; London.

<sup>41</sup> Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. CIRIA; London.

<sup>42</sup> HM Government, (2024). Nationally Significant Infrastructure Projects: - Advice on the Water Framework Directive. (Online) Available at: <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive> (Accessed September 2024)

<sup>43</sup> The PPGs and GPPs have been withdrawn by the Environment Agency in England. The guidance remains in place for Northern Ireland, Scotland and Wales and provides suitable guidance for the Project.

<sup>44</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2020). GPP 1: Understanding your environmental

| Technical guidance document                                                                                | Context                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GPP 2: Above ground oil storage tanks (January 2021)<sup>45</sup></b>                                   | This supports the safety of above ground oil storage tanks and aims to minimise the risk of causing pollution.                                                                                                                          |
| <b>PPG 3: Use and design of oil separators in surface water drainage systems (April 2006)<sup>46</sup></b> | This supports decision making on whether an oil separator is needed for a site, and if so what size and type of separator is appropriate.                                                                                               |
| <b>GPP 5: Works and maintenance in or near water (February 2018)<sup>47</sup></b>                          | This is based on relevant legislation and reflects current good practice for working in or near water.                                                                                                                                  |
| <b>PPG 6: Working at construction and demolition sites (2012)<sup>48</sup></b>                             | This provides practical advice and guidance to help prevent pollution from construction and demolition sites. It sets out legislative requirements and good practice measures to reduce the risk of a pollution incident. <sup>49</sup> |

responsibilities- good environmental practices. (Online). Available at: <https://www.netregs.org.uk/media/1898/guidance-for-pollution-prevention-1-2022-update.pdf> (Accessed August 2024).

<sup>45</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2021). Above ground oil storage tanks: GPP 2. Version 2.1. (Online). Available at: <https://www.netregs.org.uk/media/1890/guidance-for-pollution-prevention-2-2022-update.pdf> (Accessed August 2024).

<sup>46</sup> Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (2006). Use and design of oil separators in surface water drainage systems: PPG 3. (Online). Available at: <https://assets.publishing.service.gov.uk/media/5a803da1ed915d74e33f9468/pmho0406biy-l-e-e.pdf> (Accessed August 2024).

<sup>47</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Works and maintenance in or near water: GPP 5. Version 1.2. (Online). Available at: [https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm\\_source=website&utm\\_medium=social&utm\\_campaign=GPP5%2027112017](https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017) (Accessed August 2024).

<sup>48</sup> Environment Agency (2012). Working at construction and demolition sites: PPG6. Second edition (withdrawn in 2015). (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/485215/pmho0412bwfe-e-e.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485215/pmho0412bwfe-e-e.pdf) (accessed August 2024)

<sup>49</sup> PPG6 and PPG7 were withdrawn December 2015. The documents remain a good basis for guidance on pollution prevention.

| Technical guidance document                                                                       | Context                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PPG 7: Safe storage - The safe operation of refuelling facilities (July 2011)<sup>50</sup></b> | This provides guidelines for liquid refuelling facilities, based on relevant legislation and reflecting current good practice.                                                |
| <b>GPP 8: Safe storage and disposal of used oils (Version 1.2 June 2021)<sup>51</sup></b>         | This provides guidance based on relevant legislation and reflects current good practice for the safe storage and disposal of used oils.                                       |
| <b>PPG 18: Managing fire water and major spillages (June 2000)<sup>52</sup></b>                   | This assists in the identification of the equipment and techniques available to prevent and mitigate the damage to the water environment caused by fires and major spillages. |
| <b>GPP 19: Vehicles: service and repair (Version 1.2 June 2021)<sup>53</sup></b>                  | This is aimed at businesses that deal with vehicles (but is applicable to other machinery, plant and equipment).                                                              |
| <b>GPP 20: Dewatering underground ducts and chambers (Version 1.2 June 2021)<sup>54</sup></b>     | This provides guidelines for dewatering underground ducts and chambers, based on relevant legislation and reflecting current good practice.                                   |

<sup>50</sup> Environment Agency, Scottish Environmental Protection Agency and Northern Ireland Environment Agency (2011) The safe operation of refuelling facilities: PPG 7. (online) (withdrawn in 2015). (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/485206/pmho0711btzl-e-e.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485206/pmho0711btzl-e-e.pdf) (Accessed August 2024).

<sup>51</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 8 Safe storage and disposal of used oils. (Online). Available at: <https://www.netregs.org.uk/media/1900/guidance-for-pollution-prevention-8-2022-update.pdf> (Accessed August 2024).

<sup>52</sup> Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (n.d.) Managing fire water and major spillages: PPG18. (Online). Available at: <https://www.netregs.org.uk/media/1674/ppg-18.pdf> (Accessed August 2024).

<sup>53</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 19: Vehicles: Servicing and Repairs. (Online). Available at: <https://www.netregs.org.uk/media/1883/guidance-for-pollution-prevention-19-2022-update.pdf> (Accessed August 2024).

<sup>54</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 20 Dewatering underground ducts and chambers. (Online). Available at <https://www.netregs.org.uk/media/1884/guidance-for-pollution-prevention-20-2022-update.pdf> (Accessed August 2024).

| Technical guidance document                                                                                     | Context                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GPP 21: Pollution incident response planning (Version 1.1 June 2021)<sup>55</sup></b>                        | This sets out current best practice for producing an Incident Response Plan.                                                                                                                                                                                                   |
| <b>GPP 22: Dealing with spills (October 2018)<sup>56</sup></b>                                                  | This provides guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills or those responsible for transporting or storing waste from spills.              |
| <b>GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (Version 1.2 June 2021)<sup>57</sup></b> | This is aimed at site operators and those responsible for the storing and handling of drums and IBCs.                                                                                                                                                                          |
| <b>Sustainable Drainage Systems Non-Statutory Technical Standards for SuDS<sup>58</sup></b>                     | This sets out non-statutory technical standards for sustainable drainage systems, including a consideration of flood risk outside or inside the development, peak flow and volume control, structural integrity and designing for construction and maintenance considerations. |
| <b>The Flood Risk and Coastal Change Planning Practice</b>                                                      | This sets tests to protect people and property from flooding, and in line with national policy where these tests are not met then new development should not be allowed. The steps are                                                                                         |

<sup>55</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 21: Pollution Incident Response Plans. (Online). Available at: <https://www.netregs.org.uk/media/1436/gpp-21-final.pdf> (Accessed August 2024).

<sup>56</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Dealing with spills: GPP 22. Version 1. (Online). Available at: <https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf> (Accessed August 2024).

<sup>57</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs). (Online). Available at: <https://www.netregs.org.uk/media/1885/guidance-for-pollution-prevention-26-2022-updated.pdf> (Accessed August 2024).

<sup>58</sup> Department for Environment, Food and Rural Affairs (March 2015). Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems. (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/415773/sustainable-drainage-technical-standards.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf) (Accessed August 2024).

| Technical guidance document                                                                          | Context                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Guidance supporting NPPF<sup>59</sup></b>                                                         | broad ranging and are designed to ensure that better sites are developed in terms of flood risk and safety.                                                                                                                                                                                                                                                                                      |
| <b>Environment Agency Guidance Regarding FRAs: Climate Change Allowances<sup>60</sup></b>            | This sets out when and how LPAs, developers and their agents should use climate change allowances in FRAs.                                                                                                                                                                                                                                                                                       |
| <b>The Environment Agency's Groundwater Protection Technical Guidance<sup>61</sup></b>               | This advises activities that could lead to the input of substances to ground which could affect the quality or quantity of groundwater. It describes how to assess the discernability of hazardous substances and when geological formations can be determined as permanently unsuitable.                                                                                                        |
| <b>The Environment Agency's Guidance on Abstractions and Impoundment<sup>62</sup></b>                | This outlines the activities which need an abstraction or impounding licence. Details of the licences are included alongside information on how to apply. An impounding licence is required to implement impoundment structures e.g. dam, weir. Three types of abstraction licences are listed for water abstractions above 20m <sup>3</sup> /day, namely a full, transfer or temporary licence. |
| <b>The Environment Agency's Guidance on Dewatering and Discharging to Surface Water<sup>63</sup></b> | This recognises that the Regulatory Position Statement (RPS) 'Temporary dewatering from excavations to surface water' applies when dewatering and discharging to surface water during development. It only applies if the activity takes place for less than three months and the discharged water is                                                                                            |

<sup>59</sup> Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government Guidance Flood risk and coastal change. (Online). Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change> (Accessed August 2024).

<sup>60</sup> Environment Agency, Flood risk assessments: climate change allowances. (Online). Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (Accessed August 2024).

<sup>61</sup> Environment Agency (2017), Groundwater protection technical guidance. (Online). Available at: <https://www.gov.uk/government/publications/groundwater-protection-technical-guidance/groundwater-protection-technical-guidance> (accessed August 2024).

<sup>62</sup> Environment Agency (2014) Apply for a water abstraction or impounding license. (Online) <https://www.gov.uk/guidance/water-management-apply-for-a-water-abstraction-or-impoundment-licence#apply-for-a-licence-for-a-previously-exempt-abstraction> (accessed August 2024)

<sup>63</sup> Environment Agency (2018) Temporary dewatering from excavations to surface water: RPS 261. (Online) Available at: <https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water> (accessed August 2024).

| Technical guidance document                                                     | Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The Environment Agency's Approach to Groundwater Protection<sup>64</sup></b> | <p>uncontaminated. If the requirements of the RPS are not met, a Water Discharge Activity Licence is required.</p> <p>This covers the overarching groundwater protection principles and approaches that will apply to different activities (e.g. installation of infrastructure and the discharge of liquid effluents into the ground). It updates Groundwater Protection: Principles and Practice (GP3) and provides information about the approach to managing (including in terms of flooding from groundwater) and protecting groundwater. The primary aim of all of the position statements is the prevention of pollution of groundwater and the protection of it as a groundwater resource intended for human consumption.</p> <p>It adopts a risk-based approach to the protection of groundwater provides using a hierarchy of source protection zones (SPZs), areas identified as Drinking Water Protected Areas (DrWPAs) and aquifer designations.</p> <p>Position statements are provided for a range of activities, including the following:</p> <ul style="list-style-type: none"> <li>• infrastructure: C5 - pipelines and high voltage fluid-filled cables;</li> <li>• discharge of liquid effluents into the ground: G13 - SuDS; and</li> <li>• managing groundwater resources: N7 - hydrogeological risk assessment; N8 - physical disturbance of aquifers in SPZ1 and N9 - obstruction of flow.</li> </ul> |
| <b>Flood Risk Activities: Environmental Permits<sup>65</sup></b>                | <p>This sets out the requirements under which an environmental permit is required from the Environment Agency for works in an around Main Rivers, flood defence structures, in a floodplain or around a sea defence. It also provides details of those activities which are excluded from regulation. Regulated activities fall into the following three categories: those which are exempt and only require registration, low</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

<sup>64</sup> The Environment Agency's approach to groundwater protection', February 2018 Version 1.2'. The document is available at:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

<sup>65</sup> Environment Agency and Department for Environment, Food & Rural Affairs (2022), Flood risk activities: environmental permits. (Online). Available at:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits> (Accessed August 2024).

| Technical guidance document                                                             | Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                         | impact activities which require a 'standard rules' permit and higher impact activities that require a 'bespoke' permit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Groundwater Activity Exclusions from Environmental Permits<sup>66</sup></b>          | This covers extremely low-risk discharges that are not groundwater activities called exclusions and where an environmental permit or exemption is not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Groundwater Risk Assessment for your Environmental Permit<sup>67</sup></b>           | This explains how to carry out a groundwater risk assessment for activities that could directly or indirectly pollute groundwater. This is for all water underground in the saturation zone (below the water table) and in direct contact with the ground or subsoil.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>CEC – SuDS and Surface Water Management - All Planning Applications<sup>68</sup></b> | <p>This covers all developments in Cheshire East and states that they are required to have SuDS and must include a site-specific Surface Water Drainage Strategy following SuDS guidelines. Consideration is given to sustainable surface water management in terms of material planning, surface water run off rates, drainage hierarchy, critical drainage areas, connecting to highway drains, managing watercourses and culverts and connecting to public sewers.</p> <p>On greenfield sites, surface water run off must be managed to achieve at least no increase in run off rates. Where possible, there should be a reduction in rates. On previously-developed sites, run off proposals should demonstrate a reduction in rates in line with the non-Statutory Technical Standards for SuDS (2015) (or any later replacement standards).</p> |

<sup>66</sup> Environment Agency (2021), Groundwater activity exclusions from environmental permits. (Online). Available at: <https://www.gov.uk/government/publications/groundwater-activity-exclusions-from-environmental-permits/groundwater-activity-exclusions-from-environmental-permits> (Accessed August 2024).

<sup>67</sup> Environment Agency (2018), Groundwater risk assessment for your environmental permit. (Online). Available at: <https://www.gov.uk/guidance/groundwater-risk-assessment-for-your-environmental-permit> (Accessed August 2024).

<sup>68</sup> East Cheshire Council website (Online). Available at: <https://www.cheshireeast.gov.uk/planning/flooding/floods-and-flood-risk/surface-water-management.aspx> (Accessed August 2024).

| Technical guidance document                                  | Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CEC – SuDS Guidance for Cheshire East<sup>69</sup></b>    | This covers how SuDS planning approval applicants can achieve compliance with policy requirements set out in the NPPF and the Cheshire East Local Plan. It states that “ <i>hard engineering solutions are not the preferred approach and are unlikely to deliver integrated environmental and design benefits</i> ”. Instead, applicants should incorporate surface level SuDS with multifunctional benefits, i.e. improvements in biodiversity, and enhance landscape character and quality of place. Only where this is not possible will hard engineering solutions be acceptable as part of a surface-water management strategy.                                                                                                                                                                                                                                                                                                                                               |
| <b>CWCC – Surface Water Management and SuDS<sup>70</sup></b> | This covers sustainable surface water management as a material consideration for planning applications, given that CWCC’s role in managing flood risk is to ensure that major development does not increase the risk of flooding onsite or elsewhere. It provides links to design and technical guidance as well as CWCC specific guidance. It says that SuDS must be included within the early stages of the site design and will be required to satisfy technical standards and design requirements in accordance with the D5 SuDS Design Handbook. For brownfield sites, where current infrastructure may be staying in place, runoff should attempt to mimic that of greenfield rates with betterment of at least 30% as a minimum, unless it can be demonstrated that this is unachievable or hydraulically impractical to do so. In addition, links to appendices of application submission and approval checklist, runoff calculator and sustainability matrix are provided. |
| <b>TC – North West SuDS Pro-forma: Guidance</b>              | This covers what needs to be submitted with a Planning Application for major development or in a Critical Drainage Area. It states that a site-specific FRA should be undertaken where required under the NPPF as well as a Sustainable Drainage Strategy with the appropriate pro-forma. It gives help and advice on completing the Sustainable Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

<sup>69</sup> Cheshire East Council (2022). SuDS Guide. Sustainable Drainage System design guidance for Cheshire East. (Online). Available at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s87179/App%20A%20Consultation%20Draft%20SuDS%20Guide.pdf> (Accessed August 2024).

<sup>70</sup> Cheshire West and Chester Council (2020). Surface water management and Sustainable Drainage Systems (SuDS) (Online). Available at: <https://www.cheshirewestandchester.gov.uk/your-council/policies-and-performance/council-plans-policies-and-strategies/planning-policy/surface-water-management-and-sustainable-drainage-systems-suds> (Accessed August 2024).

| Technical guidance document                                                          | Context                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>for Completing your Pro-forma<sup>71</sup></b>                                    | <p>Strategy and SuDS Pro forma and covers impermeable area and existing drainage, peak runoff rates, discharge volume storage, water quality protection and operation and maintenance.</p> <p>It states that if you are proposing to install a new drainage system for surface water management on your development site then your drainage system must be designed to 'greenfield' standards, even if the land has been previously developed.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Warrington Borough Council – SuDS Design and Technical Guidance<sup>72</sup></b>  | <p>This covers SuDS and their applicability to the Warrington area. It provides detailed guidance with respect to the approval process, SuDS components and design consideration, SuDS suitability for the Warrington area, general design requirements, technical design requirements and maintenance.</p> <p>It states that for low rainfall there should be no discharge to a surface water body or sewer that results from the first 5mm of any rainfall event. In low permeability soils where this is not achievable, the developer shall demonstrate to WBC that infiltration has been encouraged through the SuDS Management Train. For high rainfall approaches must be used to manage the surface runoff discharge unless peak flow rate and volume targets do not apply and different approaches are set out.</p> |
| <b>TAG Unit A3 Environmental Impact Appraisal – Impacts on the Water Environment</b> | <p>This informs business cases with respect to the environmental impacts of transport schemes. Whilst the Project is not a transport scheme, this guidance is used in absence of non-transport projects guidance.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Design Manual for Roads and Bridges (LA113) (2019)</b>                            | <p>This outlines the requirements for managing road project environmental impacts. Although the Project is not a transport</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

<sup>71</sup> Trafford Council (2020). North West SuDS Pro-forma: Guidance for completing your pro-forma (Online). Available at: <https://www.trafford.gov.uk/planning/planning-for-householders/docs/Validation-checklist-NW-SuDS-Pro-forma-guidance.pdf> (Accessed August 2024).

<sup>72</sup> Warrington Council (2019). Flood Risk Assessment/SuDS Requirements for new developments – checklist (Online). Available at: [https://www.warrington.gov.uk/sites/default/files/2019-10/suds\\_guidance\\_approved\\_document\\_0.pdf](https://www.warrington.gov.uk/sites/default/files/2019-10/suds_guidance_approved_document_0.pdf) (Accessed August 2024).

| Technical guidance document                              | Context                                                                                                                                     |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          | project, this guidance is useful for assessing water environment impacts from infrastructure projects.                                      |
| <b>Sankey Catchment Action Plan (2018)</b> <sup>73</sup> | This document provides a long-term integrated water management framework for the Sankey catchment.                                          |
| <b>Lower Mersey Catchment Plan (2023)</b> <sup>74</sup>  | This outlines the framework for the management plan for the Lower Mersey Catchment. The challenges objectives and action plan are outlined. |

## Permit/licence considerations

7.2.6 A summary of the Project's potential permit/licence requirements from various regulators is outlined below (**Table 7.4**). The Ordinary Watercourse consents are regulated by the relevant Lead Local Flood Authority (LLFA). The Project's Zone of Influence (Zoi) spans across six LLFA boundaries, each with their own Ordinary Watercourse requirements.

**Table 7.4** Summary of potential permit/licence requirements

| Activity                                          | Further Project information                                                                                                                                                                | Relevant permit/licence                 | Permit/licence requirements                                                                                                  |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Potential dewatering trench of excavations</b> | The Drainage and Water Management Plan (DWMP) would outline treatment and measures for the discharge of dewatered groundwater. Dewatered groundwater would be treated appropriately before | Regulatory Position Statement (RPS).    | The RPS applies where temporary (short term) discharge of uncontaminated water from excavation to surface water is required. |
|                                                   |                                                                                                                                                                                            | Water Discharge Activity Permit (WDAP). | The WDAP applies where the water discharge does not comply with the RPS, the discharge is from quarry                        |
|                                                   |                                                                                                                                                                                            | Water Abstraction or                    |                                                                                                                              |

<sup>73</sup> Sankey Catchment Action Plan (2018)

[https://www.sthelens.gov.uk/media/1999/FLO002-Sankey-Catchment-Action-Plan-2018/pdf/FLO002\\_Sankey\\_Catchment\\_Action\\_Plan\\_2018.pdf?m=637793965913030000](https://www.sthelens.gov.uk/media/1999/FLO002-Sankey-Catchment-Action-Plan-2018/pdf/FLO002_Sankey_Catchment_Action_Plan_2018.pdf?m=637793965913030000) (Accessed August 2024).

<sup>74</sup> Lower Mersey Catchment Plan (2023). (Online) Available at:

[https://www.merseyrivers.org/images/Management\\_Catchment\\_Plan\\_Lower\\_Mersey\\_March\\_2023\\_FINAL.pdf](https://www.merseyrivers.org/images/Management_Catchment_Plan_Lower_Mersey_March_2023_FINAL.pdf) (Accessed August 2024).

| Activity                                                  | Further Project information                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Relevant permit/licence         | Permit/licence requirements                                                                                                                                                                   |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           | <p>discharged to land (e.g. silt management measures). See measure C-18 (<b>Table 7.16</b>) for further details.</p> <p>Abstraction rates would be kept to a minimum. Temporary cut-off drains would be installed to reduce surface water and groundwater ingress into excavations and pipeline trenches. Appropriate treatment for dewatered groundwater would be installed before discharge to surface or land. See measure C-18 (<b>Table 7.16</b>) for further details.</p> | Impoundment Licence.            | <p>activities or from 'pump and treat'.</p> <p>A Water Abstraction or Impoundment Licence may be required where more than 20m<sup>3</sup> is abstracted per day.</p>                          |
| <b>Fluming or damming method for open cut watercourse</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Impounding licence.             | This is required if an impoundment structure is created such as a flume or a dam.                                                                                                             |
| <b>Nutrients</b>                                          | <p>Parameters other than nutrients may deteriorate from welfare facilities, including ammonia and dissolved oxygen, and so it is advisable that these elements are referenced.</p> <p>Depending on the location and the size of the discharge to minimise the impact</p>                                                                                                                                                                                                        | Environmental discharge permit. | An environmental discharge permit would control any additional nutrients (phosphate or nitrate) or physio-chemical elements (ammonia and Biological Oxygen Demand (BOD)) to the watercourses. |

| Activity                                             | Further Project information                                                                                                              | Relevant permit/licence | Permit/licence requirements                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      | to the receiving environment, there may be a need for treatment above standard secondary treatment.                                      |                         |                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>All activities near Main River</b>                | All activities near an Environment Agency Main River would need to be considered for FRAP. This includes all crossings near Main Rivers. | FRAP.                   | A FRAP is required if the works are within 8m of a Main River; 16m of a tidal Main River; within 8m of a culverted Main River or flood defence structure (16m if the river is tidal); excavation or quarrying within 16m of a flood defence, culvert or Main River; located on a floodplain over 8m from the culvert, flood defence or river bank (16m for tidal) and have not received planning permission. |
| <b>Activities within UK marine area<sup>75</sup></b> |                                                                                                                                          | Marine licence.         | Required for activities within the UK marine area <sup>76</sup> . The following activities may need a marine licence: dredging; deposit of any substance or object; removal of any substance or object; incineration of any substance or object; scuttling of any vessel/floating container; explosives; construction (including alteration/improvement of                                                   |

<sup>75</sup> No marine licence is expected since the HDD trenchless crossing under the River Mersey is likely to be at a depth of between 40 to 60 m and will have no effect on the river bed.

<sup>76</sup> Marine and Coastal Access Act (2009) Open Government License <https://www.legislation.gov.uk/ukpga/2009/23/section/42> (accessed August 2024).

| Activity | Further Project information | Relevant permit/licence | Permit/licence requirements                                         |
|----------|-----------------------------|-------------------------|---------------------------------------------------------------------|
|          |                             |                         | existing structures, laying cables and maintenance) <sup>77</sup> . |

## 7.3 Consultation and Engagement

- 7.3.1 The assessment has been informed by consultation responses and statutory and technical engagement. An overview of the approach to consultation is provided in **Section 3.7 of Chapter 3: Approach to preparing the Draft ES**.
- 7.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 08 March 2022. Subsequently, statutory consultation supported by a Preliminary Environmental Information Report (PEIR) was undertaken between 12 September and 10 November 2022 in accordance with the Planning Act 2008<sup>78</sup>. A summary of the relevant responses received with regard to the Scoping Opinion and statutory consultation, together with any subsequent discussions held with the Environment Agency, United Utilities and Local Authorities in relation to the water environment and confirmation of how these have been considered within the assessment to date, are presented in **Appendix 7A**.

## 7.4 Data Gathering Methodology

### Study Area

- 7.4.1 The spatial scope of the water environment Study Area can be defined with reference to three distinct boundaries (**Figure 7.1**), as discussed below.
- 7.4.2 Firstly, the Draft Order Limits for the Project, as defined in **Chapter 2: The Project**, is the area where direct effects may occur on the water environment by construction activities and works.
- 7.4.3 Secondly, the Study Area has been defined to include all WFD surface water body catchments intersected by the Draft Order Limits, in recognition of the WFD being the most overarching applicable regulatory framework for these studies (management and monitoring of the hydrological environment is most commonly assessed at a water body scale). The Study Area identifies the spatial extent for which baseline characterisation and the identification of potential WFD water body receptors (and groundwater abstractions) for the water environment assessment have been carried out. It also defines the Study Area for the WFD compliance assessment in **Appendix 7E**.

<sup>77</sup> Marine Licence (2023) (Online). Available at: <https://www.gov.uk/guidance/do-i-need-a-marine-licence> (accessed August 2024).

<sup>78</sup> UK Government (2008). Planning Act 2008. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents> (Accessed August 2024).

- 7.4.4 Following the submission of the PEIR in 2022 which was based on Cycle 2 WFD water bodies, the Cycle 3 North West River Basin District RBMP was issued which included updates to the extents of WFD water bodies in the Study Area. As such the Study Area for this assessment has been updated to reflect the most up-to-date Cycle 3 WFD water body areas. However, these changes can be considered to be very minor and have therefore only resulted in a minor change in extent of the Study Area compared to that within the PEIR (2022).
- 7.4.5 Thirdly, a hydrological Zol has been defined to identify potential receptors for direct effects arising from the Project via a surface water pathway on watercourses, surface water abstractions/discharges and water-dependent conservation sites. For surface water bodies and other surface receptors, this Zol extends 500m upstream and 2.5km downstream of the intersection with the Draft Order Limits. The buffer upstream is to capture any possible 'backing up' influences that may occur during works. The zone downstream of the Draft Order Limits is considered to be a reasonable distance over which effects might be expected to occur via transmission in river flows traversing and runoff arising from the Draft Order Limits. Beyond this distance downstream, it is considered that effects would become negligible by virtue of dilution, dispersion and degradation effects within watercourses.
- 7.4.6 The Study Area and Zol were agreed at Scoping and PEIR stage with only minor changes being applied for the Draft ES. A screening exercise for potential receptors (covering WFD water bodies, water dependent conservation sites and abstractions) based on this Study Area and Zol and other relevant factors is presented in **Appendix 7B**.

### Desk study

- 7.4.7 Data collection has been undertaken to obtain information on the baseline water environment within the Study Area and Zol defined above. The current baseline conditions presented in **Section 7.5** are based primarily on a desk-study exercise undertaken in May 2022 for the PEIR chapter and supplemented with additional information for the Draft ES chapter in mid-2024.
- 7.4.8 A summary of the organisations that have supplied data, together with the nature of that data, is outlined in **Table 7.5**.

**Table 7.5 Data sources used to inform the water environment assessment**

| Source               | Date           | Summary                                                                            |
|----------------------|----------------|------------------------------------------------------------------------------------|
| Ordnance Survey (OS) | 27 August 2024 | Identification of topography, watercourses, springs, lakes and other watercourses. |

| Source                                                                         | Date           | Summary                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                |                | OS topographic maps 1:25,000 and 1:50,000 scale <sup>79</sup>                                                                                                                                                                                                                                                                                                                                                            |
| National Library of Scotland                                                   | 27 August 2024 | Identification of topography, watercourses, springs, lakes and other watercourses.<br>Side-by-side georeferenced maps viewer <sup>80</sup>                                                                                                                                                                                                                                                                               |
| LinHistoric England                                                            | 27 August 2024 | Historic aerial imagery from 20th century used to assess river channel changes over time <sup>81</sup>                                                                                                                                                                                                                                                                                                                   |
| Meteorological Office (Met. Office)                                            | 27 August 2024 | Rainfall data, climate averages and locations of stations <sup>82</sup>                                                                                                                                                                                                                                                                                                                                                  |
| Environment Agency, Department for Environment, Food and Rural Affairs (Defra) | 27 August 2024 | Environment Agency spatial datasets available from the Data Services Platform <sup>83</sup> . Data includes the following:<br>Flood Map for planning;<br>Statutory Main River Map;<br>WFD groundwater bodies;<br>WFD surface water bodies;<br>WFD transitional and coastal catchments;<br>Canal water bodies;<br>Groundwater Dependent Terrestrial Ecosystems (GWDTEs);<br>SPZs; and<br>Long term flood risk service and |

<sup>79</sup> Microsoft (2024). Bing maps. Images courtesy of OS. (Online) Available at: <https://www.bing.com/maps> (Accessed 27 August 2024).

<sup>80</sup> National Library of Scotland. (Online). Available at: <https://maps.nls.uk/geo/explore/side-by-side/> (Accessed 27 August 2024).

<sup>81</sup> Historic England (2024). Aerial photo explorer. <https://historicengland.org.uk/images-books/archive/collections/aerial-photos/> (Accessed 27 August 2024).

<sup>82</sup> Met. Office (2024). UK climate averages. (Online) Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/qcx57w9fb> (Accessed 27 August 2024).

<sup>83</sup> Environment Agency (2024). Data.gov portal. (Online). Available at <https://environment.data.gov.uk/> (Accessed 27 August 2024).

| Source                                        | Date                       | Summary                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |                            | Lidar topography data                                                                                                                                                                                                                                                                                                  |
|                                               |                            | WFD water body status from the Environment Agency Catchment Data Explorer <sup>84</sup>                                                                                                                                                                                                                                |
| <b>Centre for Ecology and Hydrology (CEH)</b> | 27 August 2024             | Summary river flow statistics for Environment Agency flow gauges and catchment rainfall maps from the online National River Flow Archive (NRFA) <sup>85</sup> and information on catchment spatial extents and characteristics <sup>86</sup>                                                                           |
| <b>British Geological Survey (BGS)</b>        | 27 August 2024             | Geological mapping and observation borehole data from the BGS Geology of Britain Viewer, the BGS Onshore GeoIndex, BGS Memoirs and the 1:625,000 <sup>87</sup> , 1:50,000 <sup>88</sup> , 1:10,000 <sup>89</sup> scale Hydrogeological Map of England and Wales<br>Hydrogeological map of Clwyd and the Cheshire Basin |
| <b>Groundsure</b>                             | Website accessed July 2024 | Environmental and GIS data including information on geohazards, 1:10,000 and 1:50,000 historical mapping <sup>90</sup>                                                                                                                                                                                                 |

<sup>84</sup> Environment Agency (2024). Catchment Data Explorer. (Online). Available at: <https://environment.data.gov.uk/catchment-planning/> (Accessed 27 August 2024).

<sup>85</sup> CEH (2024). NRFA. (Online). Available at: Search Data | National River Flow Archive (ceh.ac.uk) (Accessed 27 August 2024).

<sup>86</sup> CEH (2024). Flood Estimation Handbook Web Service (Online). Available at: <https://fehweb.ceh.ac.uk/Map> (Accessed 27 August 2024).

<sup>87</sup> British Geological Survey (2024) Geology of Britain viewer (classic). (Online). Available at: <https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/> (Accessed 27 August 2024).

<sup>88</sup> British Geological Survey (2024). BGS Geology 50K. (Online). Available at: <https://www.bgs.ac.uk/datasets/bgs-geology-50k-digmapgb/> (Accessed 27 August 2024).

<sup>89</sup> British Geological Survey (2024). BGS Geology 10K (Online). Available at: <https://www.bgs.ac.uk/datasets/bgs-geology-10k/> (Accessed 27 August 2024).

<sup>90</sup> GroundSure EnviroGIS Report references GSIP-2021-12402-9275, GSIP-2021-12402-9276, GSIP-2021-12402-9281 and GSIP-2021-12402-9282, all dated 02 April 2022.

| Source                      | Date           | Summary                                                                                                                                                                                                                                                                     |
|-----------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Defra</b>                | 27 August 2024 | Interactive maps from the Multi-Agency Geographic Information for the Countryside (MAGIC) natural environment map viewer <sup>91</sup> including statutory and non-statutory designated nature conservation sites, aquifer designations and groundwater vulnerability maps. |
| <b>Cranfield University</b> | 27 August 2024 | Landis Soils Map <sup>92</sup> information on soil types                                                                                                                                                                                                                    |
| <b>Rivers Trust</b>         | 27 August 2024 | Mapping indicates position of river barriers <sup>93</sup>                                                                                                                                                                                                                  |
| <b>Natural England</b>      | 27 August 2024 | Priority Habitat mapping for England <sup>94</sup>                                                                                                                                                                                                                          |

## Survey work

7.4.9 Three field surveys have been undertaken in order to support desk studies and baseline development.

7.4.10 An initial site visit was undertaken between 25 and 27 October 2022, with the focus of the survey on areas of known flood risk, areas that were to be part of detailed hydraulic model builds. Several important watercourse crossing areas were also visited at this time in order to feedback on initial proposed construction methods and detailed design considerations. This reconnaissance survey also helped to identify areas where further hydromorphological surveys were to be undertaken. Land access was arranged along the Gale Brook and Puddinglake Brooks as these areas were identified as being the main flood risk sources to the HPP and HSF HAGIs, and the visit was required to provide information for hydraulic modelling. The results of the of the survey of these watercourses are

<sup>91</sup> Defra (2024) MAGIC. (Online). Available at: <http://www.magic.gov.uk/MagicMap.aspx> (Accessed 27 August 2024).

<sup>92</sup> Cranfield Soil and AgriFood Institute (2024). Soils Map. (Online). Available at: <http://www.landis.org.uk/soilsmap/> (Accessed 27 August 2024).

<sup>93</sup> Rivers Trust (2024), River Obstacles map (Online). Available at: [https://data.catchmentbasedapproach.org/datasets/feb273222476423b88b61bd4164d1f15\\_0/explore?location=49.167957%2C5.199933%2C6.11](https://data.catchmentbasedapproach.org/datasets/feb273222476423b88b61bd4164d1f15_0/explore?location=49.167957%2C5.199933%2C6.11) (Accessed 27 August 2024).

<sup>94</sup> Natural England (2024) Priority River Habitat Mapping. (Online). Available at: [https://naturalengland-defra.opendata.arcgis.com/datasets/7e5dd3c72f424fd5bc6f013d18dd770c\\_0/explore?location=53.286290%2C-2.598334%2C10.33](https://naturalengland-defra.opendata.arcgis.com/datasets/7e5dd3c72f424fd5bc6f013d18dd770c_0/explore?location=53.286290%2C-2.598334%2C10.33) (Accessed 27 August 2024).

shown in **Appendix 7G: Hydraulic modelling for hydrogen above-ground installations**.

- 7.4.11 A second survey was undertaken between 07 and 11 August 2023, to fourteen proposed pipeline crossings of Environment Agency Main Rivers. A third survey, at locations which previously inaccessible, was undertaken between 20 and 21 August 2024, at three proposed pipeline crossings of EA Main Rivers. Details of the survey including the methodology and results are given in **Appendix 7C: Hydromorphology Desk Based Study and Site Survey**.

## 7.5 Overall Baseline

### Current baseline

#### Climate

- 7.5.1 The Met Office website holds the latest set of 30-year rainfall averages, covering the period 1991-2020. The two climate stations closest to the Study Area are the Hawarden Airport climate station<sup>95</sup>, 13km west of the Study Area, and the Woodford climate station<sup>96</sup>, 12km east of the Study Area. The key variables from 1991-2020 for these stations are listed in **Table 7.6**.

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<sup>95</sup> Hawarden (Flintshire) UK climate averages – Met. Office. (Online). Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcmys019j> (Accessed 22 August 2024).

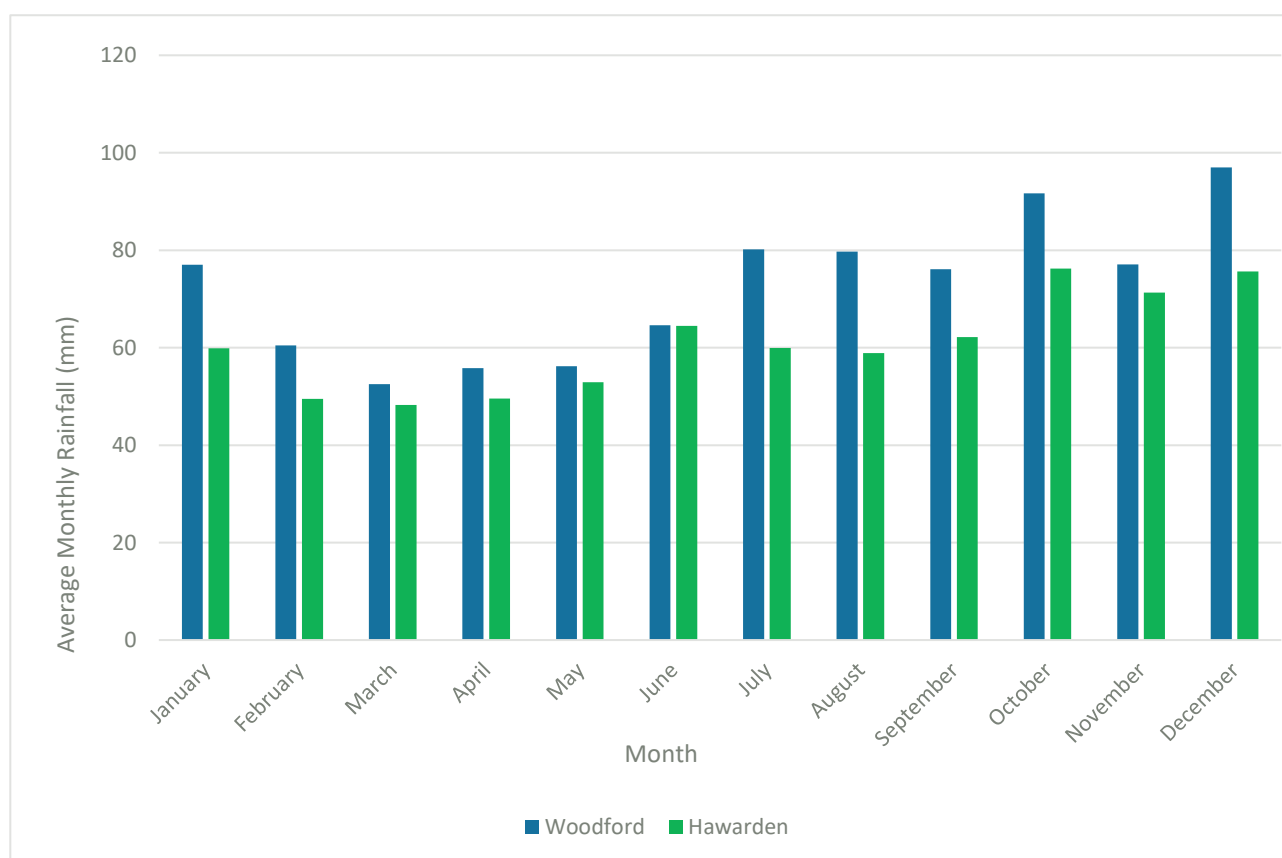
<sup>96</sup> Woodford (Greater Manchester) UK climate averages – Met. Office. (Online). Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcqrqyr80> (Accessed 22 August 2024).

**Table 7.6** Annual climate information for the Hawarden Airport and Woodford climate stations

| Climate station  | Location (National Grid Reference, NGR) | Distance from Study Area (km) | Altitude (metres Above Ordnance Datum, mAOD) | Annual mean rainfall (mm) | Annual days of rainfall $\geq$ 1mm | Annual mean maximum temperature (°C) | Annual mean minimum temperature (°C) | Annual mean wind speed (knots) |
|------------------|-----------------------------------------|-------------------------------|----------------------------------------------|---------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------|
| Hawarden Airport | SJ 34192 64553                          | 13                            | 10                                           | 729                       | 137                                | 14.3                                 | 6.4                                  | 7.1                            |
| Woodford         | SJ 89843 82578                          | 12                            | 88                                           | 868                       | 156                                | 13.6                                 | 5.9                                  | 7.6                            |

- 7.5.2 **Table 7.6** suggests that the Woodford climate station located east of the Study Area has higher average annual rainfall than the Hawarden Airport climate station west of the Study Area. This is likely to reflect increased ground elevations in the east, as the topography rises towards the Pennines.
- 7.5.3 Rainfall from the NRFA based on Met. Office Standard Average Rainfall data<sup>97</sup> also shows that the upland areas to the north and east of the Study Area and Greater Manchester have greater average annual rainfalls (1,400 - 3,000mm) than the central, western and lowland areas of the Study Area (650 - 850mm).
- 7.5.4 The following graphic displays the average monthly rainfall recorded at Hawarden Airport climate station and Woodford climate station.

**Graphic 7.1 Average monthly rainfall at each of the Environment Agency climate stations during 1991-2020**



- 7.5.5 The graphic above indicates that the periods of highest rainfall in a typical year are expected between October and January, with the lowest between February and May.

<sup>97</sup> CEH (2022). Home Page. (Online) Available at: <https://nrfa.ceh.ac.uk/> (Accessed 16 May 2022).

### Topography

- 7.5.6 OS 1:25,000<sup>98</sup> mapping indicates that the Study Area covers a range of elevations. The lowest ground elevations are present in the west of the Study Area along the West Corridor at Frodsham Marsh, at around 5mAOD. The areas within the Study Area adjacent to the Manchester Ship Canal and Weaver Navigation are around 5mAOD to 10mAOD. However, elevations rise steeply up from these lows to areas within Runcorn, up to 70mAOD on Runcorn Hill, and also along the South Corridor which continues south-east towards Northwich and rises to 50mAOD in parts. For the parts of the Study Area to the west of Northwich, between Winnington and Barnton, ground levels drop to around 12mAOD in the centre of the town adjacent to watercourses but rise up to between 40mAOD and 50mAOD in the areas surrounding Northwich.
- 7.5.7 Within Warrington, the Study Area is mostly adjacent to the Manchester Ship Canal and therefore also at low elevations of around 5mAOD to 10mAOD. The North Corridor to the west of Warrington, which heads north to St Helens, rises from lows of 10mAOD adjacent to the Manchester Ship Canal up to highs of 70mAOD in St Helens. The Partington Gas Works is at 15mAOD to 20mAOD within the northern extent of the North Corridor, and the North Corridor remains at similar elevations as it continues south before rising to 50mAOD south of the Bridgewater Canal. It then continues to rise to a high point of 70mAOD adjacent to High Legh before falling as it continues to the south-west down to 40mAOD in Partington.

### Watercourses

- 7.5.8 The Draft Order Limits extend over three WFD Management Catchments, namely the Mersey Upper, the Mersey Lower and the Weaver Goway catchments (**Figure 7.1**), and covers 21 WFD river water body catchments (**Figure 7.2**) including multiple Main Rivers, Ordinary Watercourses and canals.

#### Mersey Upper Management Catchment

- 7.5.9 The watercourses within the Bollin Dean Mersey Upper Operational Catchment generally flow west or north-west into the Upper Mersey and Manchester Ship Canal, mainly via the Dean, Bollin or Sinderland Brook.

#### Mersey Lower Management Catchment

- 7.5.10 Within the Mersey Lower Management Catchment, the two main 'operational catchments' that are intersected by the Draft Order Limits are the Sankey and the Glaze. Within the Sankey Operational Catchment, the main watercourse is Sankey Brook, into which most of the operational catchment's watercourses flow before discharging into the Mersey. Within the Glaze Operational Catchment, the watercourses generally flow south towards Warrington and discharge into the Manchester Ship Canal or the Upper Mersey.

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<sup>98</sup> Microsoft (2021). Bing maps. Images courtesy of OS. (Online) Available at: <https://www.bing.com/maps> (Accessed: 22 August 2024).

### Weaver Gowy Management Catchment

- 7.5.11 Within the Weaver Gowy Management Catchment there are four operational catchments, namely the Dane, Gowy, Weaver Lower and Weaver Upper. The Weaver Lower Operational Catchment is the most prominent operational catchment within the Draft Order Limits, with much of the area south of the River Mersey located within its boundary. Throughout this operational catchment the watercourses generally flow northwesterly towards the Mersey and the Manchester Ship Canal, except for the watercourses in the north-east of the catchment, which initially flow south towards Northwich before turning to flow northwestwards.
- 7.5.12 The Draft Order Limits are also intersected by the Gowy Operational Catchment at the western end of the West Corridor. Within this operational catchment, the watercourses generally flow northwards into the River Gowy and discharge into the Mersey.
- 7.5.13 Sections of the South Corridor are within the Weaver Upper Operational Catchment. Within this operational catchment, the watercourses generally flow north and into the River Weaver towards Northwich.
- 7.5.14 The South Corridor is also within the Dane Operational Catchment, in which the watercourses generally flow north-east into Northwich.

### WFD surface water bodies

- 7.5.15 The WFD surface water body catchments defining the Study Area are summarised in **Table 7.7** with details from the WFD water body layer in the Environment Agency Catchment Explorer<sup>99</sup>. The majority comprise river water bodies, but there is also a transitional water body (the Mersey) and a number of canal water bodies. The key Main Rivers within the Draft Order Limits are the Rivers Weaver, Dane, Bollin and Mersey and the Manchester Ship Canal, sections of which are classified as a Main River.
- 7.5.16 **Appendix 7B** contains full details of the current (2023 Cycle 3) status of all the WFD water bodies within the Study Area, covering both surface and groundwater WFD bodies. This further information includes details regarding the WFD condition, supporting elements, objectives and reasons for not achieving a 'Good' status. This is summarised briefly below.
- 7.5.17 There are 21 WFD river water bodies within the Study Area (see **Figure 7.2** and **Appendix 7B – Table 7B.1**). Eight of the water bodies are designated as being Heavily Modified Water Bodies (HMWBs). None of the river water bodies are currently attaining 'Good' status or potential, with all classed at 'Moderate' or 'Poor' status or potential. The most common reasons for not achieving 'Good' status or potential<sup>100</sup> are urbanisation, continuous sewage discharges and poor soil, livestock and nutrient management.

<sup>99</sup> Environment Agency (2024). WFD Catchment Explorer. (Online). Available at: <https://environment.data.gov.uk/catchment-planning> (Accessed 24 July 2024).

<sup>100</sup> Where WFD water bodies are deemed to be artificial or heavily modified water bodies, then under WFD they need to achieve 'Good' ecological potential, rather than 'Good' ecological status.

Table 7.7 WFD surface water bodies in the Study Area

| Name                                                              | Reference ID   | Type                                                  | Upstream water body                                               | Downstream water body                     | Crosses DOL* at                                               | Length (km) | Catchment area (km²) | Comment                                                                                                                                                                                                            |
|-------------------------------------------------------------------|----------------|-------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WFD surface water bodies                                          |                |                                                       |                                                                   |                                           |                                                               |             |                      |                                                                                                                                                                                                                    |
| Manchester Ship Canal                                             | GB71210004     | Canal (artificial)                                    | N/A                                                               | N/A                                       | North Corridor SJ 58953 85680                                 | 38.688      | N/A                  | N/A                                                                                                                                                                                                                |
| River Mersey                                                      | GB531206908100 | Transitional Water (heavily modified)                 | Mersey (Bollin confluence to Howley Weir) including Padgate Brook | N/A                                       | North Corridor SJ 56298 86572                                 | N/A         | N/A                  | N/A                                                                                                                                                                                                                |
| Mersey (Bollin confluence to Howley Weir) including Padgate Brook | GB112069061012 | River (heavily modified)                              | Bollin (Ashley Mill to Manchester Ship Canal)                     | Mersey                                    | N/A                                                           | 16.826      | 19.601               | N/A                                                                                                                                                                                                                |
| Sankey Canal                                                      | GB71210055     | Canal (artificial)                                    | N/A                                                               | N/A                                       | North Corridor SJ 56227 86644                                 | 12.954      | N/A                  | Also known as the St. Helens Canal. Officially closed in 1963 but still contains water and is currently undergoing restoration to make the water body navigable. The Canal is truncated and shown as two sections. |
| Bridgewater Canal                                                 | GB71210001     | Canal (artificial)                                    | N/A                                                               | N/A                                       | North Corridor SJ 58939 84776<br>East Corridor SJ 71648 86650 | 60.978      | N/A                  | The Canal splits into two limbs north-east of Stretford. The eastern limb goes to central Manchester and the western limb goes to Leigh before connecting to the Leeds and Liverpool Canal Leigh Branch.           |
| River Weaver (Barnet to Valley Brook)                             | GB112068060461 | River (not designated artificial or heavily modified) | Weaver (Marbury Brook to Barnett Brook)                           | Weaver (Valley Brook to Winsford Flashes) | N/A                                                           | 33.42       | 61.61                | N/A                                                                                                                                                                                                                |
| River Weaver (Valley Brook to Winsford Flashes)                   | GB112068060462 | River (not designated artificial or heavily modified) | Weaver (Barnet to Valley Brook)                                   | Weaver (Winsford Flashes to Dane)         | N/A                                                           | 20.59       | 45.27                | N/A                                                                                                                                                                                                                |

| Name                                                          | Reference ID   | Type                                                  | Upstream water body                       | Downstream water body                           | Crosses DOL* at                                                                  | Length (km) | Catchment area (km²) | Comment |
|---------------------------------------------------------------|----------------|-------------------------------------------------------|-------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------|-------------|----------------------|---------|
| River Weaver (Winsford Flashes to Dane)                       | GB112068060463 | River (heavily modified)                              | Weaver (Valley Brook to Winsford Flashes) | Weaver (Dane to Frodsham)                       | South Corridor SJ 64289 70718                                                    | 9.58        | 19.74                | N/A     |
| River Weaver (Dane to Frodsham)                               | GB112068060500 | River (heavily modified)                              | River Weaver (Winsford Flashes to Dane)   | Mersey                                          | South Corridor SJ 52463 79132 SJ 59805 76178                                     | 29.847      | 61.276               | N/A     |
| Trent and Mersey Canal (Summit to Preston Brook Tunnel Water) | GB71210247     | Canal (artificial)                                    | N/A                                       | N/A                                             | West Corridor SJ 59190 77291<br><br>South Corridor SJ 59986 76586 SJ 68046 69410 | 49.23       | N/A                  | N/A     |
| West Corridor WFD surface water bodies                        |                |                                                       |                                           |                                                 |                                                                                  |             |                      |         |
| Peckmill Brook                                                | GB112068060330 | River (not designated artificial or heavily modified) | N/A                                       | Mersey                                          | SJ 47803 75707                                                                   | 7.712       | 26.42                | N/A     |
| North Corridor WFD surface water bodies                       |                |                                                       |                                           |                                                 |                                                                                  |             |                      |         |
| Sutton Brook                                                  | GB112069061170 | River (heavily modified)                              | N/A                                       | Sankey Brook (Hardshaw Brook to Rainford Brook) | SJ 50217 91242 SJ 50837 90977                                                    | 10.566      | 18.791               | N/A     |
| Whittle Brook (Mersey Estuary)                                | GB112069060990 | River (heavily modified)                              | N/A                                       | Mersey                                          | N/A                                                                              | 9.769       | 14.594               | N/A     |
| Hardshaw (Windle) Brook                                       | GB112069061210 | River (heavily modified)                              | N/A                                       | Sankey Brook (Hardshaw Brook to Rainford Brook) | N/A                                                                              | 3.659       | 25.086               | N/A     |
| Keckwick Brook                                                | GB112068060520 | River (heavily modified)                              | N/A                                       | Mersey                                          | N/A                                                                              | 5.748       | 24.629               | N/A     |
| East Corridor WFD surface water bodies                        |                |                                                       |                                           |                                                 |                                                                                  |             |                      |         |

| Name                                                                  | Reference ID   | Type                                                  | Upstream water body                                                | Downstream water body                                                 | Crosses DOL* at                  | Length (km) | Catchment area (km²) | Comment |
|-----------------------------------------------------------------------|----------------|-------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------|-------------|----------------------|---------|
| Mersey/Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin) | GB112069061011 | River (heavily modified)                              | Irwell/Manchester Ship Canal (Irk to confluence with Upper Mersey) | Manchester Ship Canal                                                 | N/A                              | 6.524       | 15.39                | N/A     |
| Sinderland Brook                                                      | GB112069060980 | River (not designated artificial or heavily modified) | Sinderland Brook (Fairywell Brook and Baguley Brook)               | Mersey/Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin) | SJ 73027 90517                   | 8.319       | 15.956               | N/A     |
| Sinderland Brook (Fairywell Brook and Baguley Brook)                  | GB112069061270 | River (heavily modified)                              | N/A                                                                | Sinderland Brook                                                      | N/A                              | 15.552      | 25.767               | N/A     |
| Bollin (Ashley Mill to Manchester Ship Canal)                         | GB112069061382 | River (not designated artificial or heavily modified) | Bollin (River Dean to Ashley Mill)                                 | Mersey (Bollin confluence to Howley Weir) including Padgate Brook     | SJ 71791 87906<br>SJ 71778 87879 | 20.971      | 29.254               | N/A     |
| Arley Brook (Source to Gale Brook)                                    | GB112068060420 | River (not designated artificial or heavily modified) | N/A                                                                | Smoker Brook (Gale Brook to Wincham Brook)                            | SJ 65417 81247                   | 9.972       | 20.164               | N/A     |
| Cogshall Brook                                                        | GB112068060510 | River (not designated artificial or heavily modified) | N/A                                                                | Wade Brook                                                            | N/A                              | 5.404       | 27.64                | N/A     |
| Gale Brook                                                            | GB112068060430 | River (not designated artificial or heavily modified) | N/A                                                                | Smoker Brook (Gale Brook to Wincham Brook)                            | N/A                              | 3.984       | 13.482               | N/A     |
| South Corridor WFD surface water bodies                               |                |                                                       |                                                                    |                                                                       |                                  |             |                      |         |
| Bogart Brook                                                          | GB112068060540 | River (not designated artificial or                   | N/A                                                                | Weaver (Marbury Brook to Dane)                                        | N/A                              | 2.032       | 12.434               | N/A     |

| Name                                       | Reference ID   | Type                                                  | Upstream water body          | Downstream water body           | Crosses DOL* at | Length (km) | Catchment area (km²) | Comment |
|--------------------------------------------|----------------|-------------------------------------------------------|------------------------------|---------------------------------|-----------------|-------------|----------------------|---------|
|                                            |                | heavily modified)                                     |                              |                                 |                 |             |                      |         |
| River Dane (Wheelock to Weaver)            | GB112068060470 | River (not designated artificial or heavily modified) | Dane (Cow Brook to Wheelock) | Weaver (Dane to Frodsham)       | SJ 67766 69366  | 15.102      | 12.85                | N/A     |
| Puddinglake Brook                          | GB112068060220 | River (not designated artificial or heavily modified) | N/A                          | River Dane (Wheelock to Weaver) | SJ 68821 69771  | 6.508       | 13.382               | N/A     |
| Wade Brook                                 | GB112068060370 | River (not designated artificial or heavily modified) | N/A                          | Weaver (Dane to Frodsham)       | N/A             | 27.545      | 52.804               | N/A     |
| Cuddington Brook (Source to Crowton Brook) | GB112068060480 | River (not designated artificial or heavily modified) | N/A                          | Crowton Brook                   | N/A             | 5.325       | 24.502               | N/A     |

Note: \* Draft Order Limits

- 7.5.18 There are five WFD canal water bodies within the Study Area, also shown on **Figure 7.2**. **Appendix 7B – Table 7B.2** contains details of the classification of the canals, with all of them being at 'Moderate' potential.
- 7.5.19 There is one WFD transitional water body within the Study Area, the Mersey. Its location is again shown in **Figure 7.2**. The Mersey transitional water body is at 'Moderate' status, with full classification details included in **Appendix 7B – Table 7B.3**. The main reasons for not achieving 'Good' status are contaminated land and contaminated water body bed sediments.
- 7.5.20 There are three WFD lake water bodies within the Study Area ( **Table 7.8**), as shown on **Figure 7.2**, and **Appendix 7B – Table 7B.4** contains details of the classification of the lakes, with all of them being at 'Moderate' status.
- 7.5.21 Within the Study Area, there is a 136.6km<sup>2</sup> area of land which is not classified as a WFD water body of any kind under the Cycle 3 WFD classifications. This area is referred to as a non-reportable water body by the Environment Agency. While this area is not reportable under the WFD, it is still legally protected from pollution, modification and abstraction. There are three 'non-reportable' coastal catchments also within the Study Area, also shown on **Figure 7.2**. No WFD classification information is available for these as they are not routinely monitored by the Environment Agency.
- 7.5.22 With regards to the WFD groundwater bodies, five are present within the Study Area, as shown on **Figure 7.5**. **Appendix 7B – Table 7B.5** contains details on the classification of the groundwater bodies. All five are at 'Poor' status. The predominant issues preventing the attainment of 'Good' Status are poor nutrient and livestock management, with also abandoned mines, saline intrusion and private sewage treatment.

### River flow gauges

- 7.5.23 There are a number of flow gauges for the watercourses that intersect the Study Area, as summarised in Table 7.9. Gauges are located on the River Bollin, Sinderland Brook and the River Mersey.

### Hydromorphology

- 7.5.24 **Appendix 7C** full details of the approach to developing a baseline understanding for hydromorphological conditions of watercourses within the Study Area. The proposed pipeline route crosses 113 watercourses, of which 31 are designated as Environment Agency Main Rivers.
- 7.5.25 Eight of the 21 WFD river water bodies within the Study Area (**Figure 7.2**) and **Appendix 7B – Table 7A.1** are designated as being HMWBs, as a result of anthropogenic physical modifications that have substantially changed the character of the watercourses to such an extent they can no longer meet 'Good' ecological status. All water bodies have a flow regime *which "supports Good status or ecological potential"*, and additionally seven water bodies have a hydromorphology designation which *"support Good Status"*.

Table 7.8 WFD lake water bodies

| Name               | Reference ID | Type | Area (ha) | Location (NGR) | Comment         |
|--------------------|--------------|------|-----------|----------------|-----------------|
| Petty Pool         | GB31233344   | Lake | 11.32     | SJ 61865 70080 | Designated SSSI |
| Appleton Reservoir | GB31232665   | Lake | 7.35      | SJ 60133 84265 | N/A             |
| Oakmere            | GB31233474   | Lake | 18.35     | SJ 57453 67761 | Designated SSSI |

**Table 7.9** Flow gauges within the Study Area

| Gauge number                                                                                                                                        | Gauge name            | Watercourse      | NGR        | Catchment area (km <sup>2</sup> ) | Mean flow (m <sup>3</sup> /s) | Q <sub>95</sub> (m <sup>3</sup> /s) | Record start and end date |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|------------|-----------------------------------|-------------------------------|-------------------------------------|---------------------------|
| <b>68003</b>                                                                                                                                        | Rudheath              | River Dane       | SJ 667 718 | 407.1                             | 5.182                         | 0.991                               | 1949-2020                 |
| <b>69006</b>                                                                                                                                        | Dunham Massey         | River Bollin     | SJ 726 875 | 257.6                             | 4.330                         | 1.178                               | 1955-2002                 |
| <b>69045</b>                                                                                                                                        | Bollington Mill Total | River Bollin     | SJ 730 870 | 256.7                             | 4.101                         | 1.280                               | 2009-2020                 |
| <b>69013</b>                                                                                                                                        | Partington            | Sinderland Brook | SJ 725 904 | 44.8                              | 0.519                         | 0.17                                | 1976-2020                 |
| <b>69037</b>                                                                                                                                        | Westy                 | River Mersey     | SJ 628 883 | 2030                              | 36.772                        | 9.082                               | 1986-2020                 |
| Note: Data is from CEH (2021), NRFA. (online). Available at: <a href="https://nrfa.ceh.ac.uk/">https://nrfa.ceh.ac.uk/</a> (Accessed 25 July 2024). |                       |                  |            |                                   |                               |                                     |                           |

## Geology

- 7.5.26 The following sections provide a summary of the bedrock and superficial deposits which the Study Area overlies and are supported by **Figure 7.3** (bedrock geology) and **Figure 7.4** (superficial geology). BGS mapping (at 1:625,000, 1:50,000 and 1:10,000 scales) has been used to support this description.
- 7.5.27 The rockhead geology underlying the Study Area is predominantly of Triassic age, with that beneath much of the central part of the Study Area comprising the Bollin Mudstone Member of the Mercia Mudstone Group. The Permo-Triassic Sherwood Sandstone Group comprising (from youngest to oldest) the Helsby, Wilmslow, Chester and Kinnerton Sandstone Formations is also common throughout the Study Area.
- 7.5.28 The upper surface of the Permo-Triassic Sherwood Sandstone bedrock was deeply incised during the Quaternary glaciation, with thick accumulations of superficial deposits infilling a series of broadly north-trending buried channels between Ellesmere Port and Frodsham (West Corridor) and along the route of the Mersey (West Corridor).
- 7.5.29 Much of the Study Area is overlain by superficial deposits of Till – Diamicton. The mapping also indicates large areas of alluvium (clay, silt sand and gravel), blown sand (known as the Shirdley Hill Sand Formation) and river terrace deposits (glaciofluvial deposits of Devensian sand and gravel) surrounding the River Mersey and its tributaries, including the River Weaver and the River Bollin. Other glacial sands and gravels (glaciofluvial deposits) are also present in scattered clusters throughout the central area of the Study Area.
- 7.5.30 Peat occurs within the north-east of the Study Area and at multiple other locations, including the West and East Corridors, and is sometimes interbedded with other superficial deposits in some areas.

## West Corridor

- 7.5.31 The underlying geology of the West Corridor consists of the Bollin Mudstone and the Tarporley Siltstone Formation of the Mercia Mudstone Group and the Helsby, Wilmslow, Chester and Kinnerton Sandstone Formations of the Sherwood Sandstone Group.
- 7.5.32 The Bollin Mudstone underlies the Draft Order Limits in the eastern area of the West Corridor, also the Runcorn/Rocksavage Spur. Around Frodsham, several faults are present near the confluence of the River Weaver and the Manchester Ship Canal, trending generally north-south and displacing areas of Tarporley Siltstone, Wilmslow Sandstone and Helsby Sandstone Formations. Further to the south-west at Helsby, a fault intersects the Wilmslow Sandstone and Chester Sandstone (including Chester Pebble Beds) Formations. The Kinnerton Sandstone Formation is located further west, separated from an area of Chester Pebble Beds Formation underlying the westernmost area of the West Corridor.
- 7.5.33 The superficial geology of the West Corridor is made up of areas of alluvium consisting of clay, silt, sand and gravel associated with the River Weaver, Devensian glaciofluvial deposits comprising sand and gravel, and Devensian Till Diamicton. The Runcorn/Rocksavage Spur and areas to the east of the Draft

Order Limits in this area have little superficial geology, other than patches of Devensian Diamicton. Towards the coast to the west of Frodsham the superficial geology is predominantly a mix of alluvium, river terrace deposits and Devensian Till Diamicton in the western most area of the Draft Order Limits. Devensian Till Diamicton forming the base of superficial deposits is in the area south of the Ince Marshes on top of the weathered Sherwood Sandstone Group (Chester Formation)<sup>101</sup>. These deposits may be interbedded with peat in this area, but this is to be confirmed during ground investigation (GI) works.

### *North Corridor*

- 7.5.34 The predominant bedrock beneath the North Corridor south of the River Mersey crossing is the Bollin Mudstone as well as the Tarporley Siltstone, Helsby Sandstone and Wilmslow Sandstone Formations. The Triassic sandstones occur north of the River Mersey along with various strata of Permian and Carboniferous age.
- 7.5.35 Several faults are present across the North Corridor, with a predominantly north-south orientation. The 1:10,000 mapping shows several faults within the Draft Order Limits directly south of the River Mersey crossing, intersecting the Wilmslow Sandstone, Helsby Sandstone, Tarporley Sandstone and Bollin Mudstone. The bedrock geology of the Warrington Spur comprises Wilmslow and Helsby Sandstones.
- 7.5.36 Directly to the north of the River Mersey crossing Wilmslow Sandstone and Chester Pebble Beds Sandstone Formations are present. Further north, the geology comprises mainly Permian rocks, comprising the Kinnerton Sandstone Formation, but the Carboniferous Warwickshire Group is also represented, consisting of the Etruria Formation and made up of mudstone, sandstone and conglomerate. There are multiple faults crossing the Draft Order Limits in this area, with one main fault oriented east-west and several associated faults approximately perpendicular, oriented north-south. Further north along the Draft Order Limits, towards Thatto Heath and St Helens, the bedrock transitions to the Carboniferous Pennine Middle Coal Measures Formation comprising mudstone, siltstone and sandstone.
- 7.5.37 Superficial deposits are widespread within the North Corridor, consisting predominantly of Devensian Till Diamicton in the area south of the River Mersey crossing with areas of the alluvium, Shirdley Hill Sand Formation and river terrace deposits associated with the River Mersey. The Warrington Spur is parallel to the trend of the River Mersey and associated with similar superficial deposits. These areas may also include layers of peat. North of the River Mersey superficial deposits are predominantly Devensian Till Diamicton.

### *East Corridor*

- 7.5.38 The bedrock of the East Corridor, west of Broomedge, mainly comprises the Bollin Mudstone. The bedrock geology transitions to Tarporley Siltstone Formation and

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<sup>101</sup> BGS (2017) UKGEOs Cheshire Energy Research Field Site - Science infrastructure UK Geoenergy Observatories Programme Open Report OR/18/055

the Helsby Sandstone Formation along the line of north-west to south-east oriented faults that intersects the Draft Order Limits north-east of Broomedge. Bedrock geology further north-east consists of the Northwich Halite and Bollin Mudstone Members of the Mercia Mudstone Group, as well as the Tarporley Siltstone and the Helsby Sandstone and Wilmslow Sandstone Formations.

- 7.5.39 Superficial deposits overlying the East Corridor consist predominantly of Devensian Till Diamicton with alternating areas of Devensian glaciofluvial deposits of sand and gravel. To the north and west of Arley, superficial deposits of peat, glacial sand and gravel are occasionally present. North of Broomedge to Dunham Massey, the Shirdley Hill Sand Formation, Devensian glaciofluvial river terrace deposits, wind-blown sand and alluvium consisting of clay, silt, sand and gravel are present associated with the River Bollin. In the north-east corner of the Study Area around Partington the superficial geology is predominantly Devensian glaciofluvial river terrace deposits with an area of peat, as well as alluvium comprising clay, silt, sand and gravel associated with the River Mersey.

### *South Corridor*

- 7.5.40 The bedrock geology of the South Corridor comprises the Bollin Mudstone, Northwich Halite and Sidmouth Mudstone Members of the Mercia Mudstone Group. The Byley Mudstone Formation and Wych Mudstone Formation (undifferentiated) also belong to the Mercia Mudstone Group and underlie the south-western most part of the Study Area. The bedrock geology of the Winsford area consists of the Bollin Mudstone and Northwich Halite. The area around the Central Hub HAGI is intersected by a fault oriented north north-west – south south-east.
- 7.5.41 The superficial geology of the South Corridor is primarily Devensian Till Diamicton with areas of alluvium consisting of sand, silt and gravel associated with the River Dane and River Weaver. In the northern area of the South Corridor superficial deposits are absent at Partington and overlain by alluvium associated with the River Weaver. South-west of Cuddington, areas of sand and gravel are predominantly found. At Moulton in the south-east of the Study Area the Draft Order Limits are overlain by Devensian Till Diamicton, and an area of alluvium consisting of clay, silt, sand and gravel is associated with the River Weaver.

### *Soils and current land use*

- 7.5.42 The following sections summarise the soil types and their associated drainage qualities across the Study Area, this summary has been based on Landis Soils<sup>92</sup> mapping. A more in-depth analysis of the soils across the Study Area is provided in **Chapter 13: Agriculture and Soil Resources** using NATMAP soils data.
- 7.5.43 Landis Soils<sup>92</sup> mapping indicates a number of soil types within the Study Area. The predominant soil type is slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.
- 7.5.44 The urban areas within the Study Area are predominantly residential, but also contain areas of industrial development and urban green space. Rural areas in the Study Area are predominantly arable farming with limited areas of farm buildings,

small settlements and local roads along with minor wooded areas interspersed throughout.

### *West Corridor*

- 7.5.45 Soils mapping indicates a number of soil types within the West Corridor and Runcorn/Rocksavage Spur. Soils in the east of the West Corridor are a mixture of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage, loamy and clayey floodplain soils with naturally high groundwater associated with the River Weaver, and freely draining slightly acid sandy soils. Towards the coast to the west are areas of loamy and sandy soils with naturally high groundwater and a peaty surface.
- 7.5.46 Land in the West Corridor has a number of different uses. Arable farming makes up the vast majority of the land use outside of the urban areas. Interspersed between these there are limited areas of farm buildings and small settlements and local roads along with minor wooded areas. The urban areas along the West Corridor are Runcorn, Weston, Frodsham, Helsby and Elton. The West Corridor also crosses the M56, in addition to multiple dual carriageways and smaller A and B category roads. Multiple railway lines are also present.

### *North Corridor*

- 7.5.47 Soils mapping indicates a number of soil types within the North Corridor. Soils in the south of the North Corridor are slowly permeable, seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage. Areas of freely draining slightly acid sandy soils are also present around Daresbury. The area directly south of the River Mersey crossing, around the Manchester Ship Canal, has naturally wet very acid sandy and loamy soils with areas of loamy and clayey floodplain soils with naturally high groundwater and naturally wet drainage. Directly north of the River Mersey crossing the predominant soil type is slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage.
- 7.5.48 Land in the North Corridor has a number of different uses. Arable farming makes up the vast majority of the land use outside of the urban areas. Interspersed between these there are limited areas of farm buildings and small settlements and local roads along with minor wooded areas. The urban areas along the North Corridor are Daresbury, Walton, Warrington, Bold Heath, Sutton Manor and St Helens. The North Corridor also crosses both the M56 and M62, in addition to multiple dual carriageways and smaller A and B category roads. There is also an oil refinery directly adjacent to the Draft Order Limits at Cuerdley Cross and multiple industrial estates associated with both the Manchester Ship Canal and the urban centres along the North Corridor. Multiple railway lines are also present.

### *East Corridor*

- 7.5.49 Soils mapping indicates a number of soil types within the East Corridor. Soils in the Draft Order Limits south-west of Broomedge are predominantly slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage. Two areas of naturally wet fen peat soils are present to the north-east and north-west of Arley. Soils to the north-east of Broomedge are more

varied, comprising naturally wet very acid sandy and loamy soils, loamy and clayey floodplain soils with naturally high groundwater associated with the River Bollin and freely draining very acid sandy and loamy soils, with raised bog peat soils towards Partington.

- 7.5.50 Land in the East Corridor has a number of different uses. Arable farming makes up the vast majority of the land use outside of the urban areas. Interspersed between these there are limited areas of farm buildings and small settlements and local roads along with minor wooded areas. Partington is the only major urban area along the East Corridor. The East Corridor also crosses both the M56 and M6, in addition to multiple dual carriageways and smaller A and B category roads. Railway lines are also present.

### South Corridor

- 7.5.51 Soils mapping indicates a number of soil types within the South Corridor. The northern area of the South Corridor has both freely draining slightly acid sandy soils and loamy and clayey floodplain soils with naturally high groundwater associated with the River Weaver. To the south of Northwich, soils are a mixture of both slowly permeable, seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage and freely draining slightly acid sandy soils.
- 7.5.52 Land in the South Corridor has a number of different uses. Arable farming makes up the vast majority of the land use outside of the urban areas. Interspersed between these areas there are limited areas of farm buildings and small settlements and local roads along with minor wooded areas. The urban areas along the South Corridor comprise Weaverham, Northwich, Hartford and Moulton. The South Corridor has A and B category roads associated with major urban areas. Railway lines are also present.

### Aquifers

#### *Aquifer status*

- 7.5.53 The Defra MAGIC Aquifer Designation Map<sup>102</sup> was used to identify aquifer designations with the Study Area. Aquifer coverage is varied across the Study Area with much of the northern and western part of the Study Area bedrock designated as a Principal Aquifer<sup>103</sup> associated with the Permo-Triassic Sherwood Sandstone Group. To the east of Frodsham, the Study Area is predominantly Secondary B Aquifer<sup>104</sup> associated with the Mercia Mudstone Group. Where

<sup>102</sup> Defra (2024) MAGIC. (Online). Available at: <http://www.magic.gov.uk/MagicMap.aspx> (Accessed 22 August 2024).

<sup>103</sup> These are layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, Principal Aquifers are aquifers previously designated as major aquifer.

<sup>104</sup> These are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

superficial aquifers are present in the Study Area these are predominantly Secondary (undifferentiated)<sup>105</sup> Aquifers other than areas of Secondary A Aquifer<sup>106</sup> around Northwich, Partington, Warrington and St Helens.

- 7.5.54 Vulnerability<sup>107</sup> of the Principal Aquifer and other secondary aquifers to surface contamination in the Study Area is likely to be largely a function of the thickness and permeability of overlying superficial deposits or the absence thereof. A screen of Principal Aquifer and other secondary aquifers areas located below the Draft Order Limits in terms of vulnerability to the receptor due to possible pathways is given within **Appendix 7B - Table 7B.7**.

### *West Corridor*

- 7.5.55 The bedrock underlying the eastern section of the West Corridor is defined as comprising a Secondary B Aquifer designation associated with the Mercia Mudstone Group Bollin Mudstone Member and Tarporley Siltstone. Further west, the Principal Aquifer bedrock designation is associated with the Triassic Sherwood Sandstone Group.
- 7.5.56 The superficial aquifer designation is largely Secondary (undifferentiated) associated with areas of Devensian till and Tidal Flat Deposits. A Secondary A aquifer is associated with the alluvial deposits along the River Weaver.
- 7.5.57 Areas of high groundwater vulnerability around the Runcorn and Halton area are associated with areas lacking superficial deposits. Adjacent areas at Sutton Weaver and Aston also have areas where groundwater vulnerability is high.

### *North Corridor*

- 7.5.58 The Mercia Mudstone Group Bollin Mudstone and Tarporley Siltstone Members underlying the southern section of the North Corridor constitute a Secondary B Aquifer with medium to medium-low groundwater vulnerability. The area of the North Corridor north of Walton is identified as a Principal Aquifer up to 600m thick and yielding up to 125l/s associated with the Sherwood Sandstone Group.
- 7.5.59 Those superficial aquifers present south of the River Mersey are primarily Secondary (undifferentiated), with limited areas of Secondary A Aquifer. North of the River Mersey the superficial aquifer designation is Secondary (undifferentiated).
- 7.5.60 An area of high groundwater vulnerability around the River Mersey is associated with the superficial river terrace and sands and gravels, whilst areas of high

<sup>105</sup> These are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

<sup>106</sup> Secondary A aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

<sup>107</sup> The term vulnerability in this context means the overall likelihood of a pollutant reaching the groundwater. The Environment Agency vulnerability maps have five risk categories (High, Medium – High, Medium, Medium – Low, and Low) based on the type of aquifers present and the potential impact (i.e. on the aquifer designation).

vulnerability around the St Helens area are related to areas with no superficial geology.

### *East Corridor*

- 7.5.61 The bedrock geology underlying the area south-west of Broomedge is defined as a Secondary B Aquifer associated with the Mercia Mudstone Group Bollin Mudstone Member. There is a limited area within the Study Area north-east of Broomedge of unproductive bedrock strata associated with the Mercia Mudstone Group Northwich Halite Member. In the area around Partington the bedrock is classified as a Principal Aquifer associated with the Triassic Helsby and Wilmslow Sandstone Formations.
- 7.5.62 Areas designated as superficial aquifers (undifferentiated) are associated predominantly with areas of till, with areas identified as superficial Secondary A aquifers associated with river terrace and alluvial deposits.
- 7.5.63 Within the Draft Order Limits, in areas without superficial geology, at Frandley and High Legh, groundwater vulnerability is high. An area of medium vulnerability is also present around Partington.

### *South Corridor*

- 7.5.64 The bedrock underlying the South Corridor is defined as a Secondary B Aquifer, associated with the Mercia Mudstone Group Bollin Mudstone and Sidmouth Mudstone Members, and also the Byley and Wych Mudstone Formations. The Mercia Mudstone Group Northwich Halite Member is present north of Northwich, and at Moulton on the South Corridor, is considered unproductive.
- 7.5.65 Superficial aquifer designation in the South Corridor is a mixture of Secondary A and Secondary (undifferentiated). Secondary A aquifer areas are associated with areas of alluvium and river terrace deposits of sand and gravel. Secondary (undifferentiated) aquifer areas are associated with Devensian till.
- 7.5.66 Areas of high superficial groundwater vulnerability are present south of Hartford on the South Corridor, associated with Devensian till.

### *WFD groundwater bodies*

- 7.5.67 There are five WFD groundwater bodies that intersect the Study Area, namely the Wirral and West Cheshire Permo-Triassic Sandstone aquifer, the Weaver and Dane Quaternary Sand and Gravel aquifer, the Manchester and East Cheshire Permo-Triassic Sandstone Aquifer, the Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone aquifer and the Sankey and Glaze Carboniferous aquifer. **Appendix 7B - Table 7B.5** contains full details of the current (2022 Cycle 3) status of all the WFD groundwater bodies within the Study Area.

### *Groundwater recharge, levels and flows*

- 7.5.68 The main groundwater recharge area is the Mid-Cheshire Ridge, located south of Frodsham (West Corridor) and south and south-west of the Draft Order Limits (South Corridor) and free of drift cover. In the rest of the catchment, recharge has first to pass through drift, which is extensive in places, up to 60m thick, before it

can enter the Permo-Triassic Sherwood Sandstone Group. Where drift is absent aquifer recharge is estimated to be approximately 350mm/yr, but across till-covered areas recharge will be considerably less, approximately 52mm/yr<sup>108</sup>.

- 7.5.69 The Mercia Mudstone Group, which overlies and confines the Sherwood Sandstone Group over much of the Draft Order Limits area, particularly across the South and East Corridors, is an aquitard and so restricts recharge to the sandstone even further.
- 7.5.70 The 1:625,000 scale Hydrogeological map of England and Wales and the Hydrogeological map of Clwyd and the Cheshire Basin indicate that groundwater levels are high in areas of recharge, e.g. along the Mid-Cheshire Ridge and along the route of the River Weaver at levels reaching 100mAOD. Groundwater levels drop to the north and west indicating groundwater flow into the Rivers Mersey and Dee respectively, the principal groundwater discharge areas. The mapping shows groundwater levels as being typically around 0mAOD within the Permo-Triassic Sherwood Sandstone Principal Aquifer at Ellesmere Port and within the Warrington area.
- 7.5.71 The Environment Agency data provided indicate that the Study Area is covered by a groundwater monitoring network of sixteen boreholes, predominantly located in the north and west, corresponding to the location of the Permo-Triassic Sherwood Sandstone Principal Aquifer. Regional 2017 groundwater contours suggest the highest groundwater levels in this aquifer reach greater than 50mAOD at St Helens, 40mAOD at Frodsham and approximately 30mAOD to the south of the Mersey.
- 7.5.72 These groundwater levels are in line with those provided in data supplied by United Utilities<sup>109</sup>. Rest groundwater levels of 42, 22 and 29 metres below ground level (mbgl) (approximately 28, 58 and 3 mAOD) have been recorded at its boreholes at Daresbury (July 2018), Eccleston Hill (July 2020) and Walton Borehole 1 (July 2018) respectively. To the extreme west of the Study Area groundwater levels are close to the ground surface.
- 7.5.73 Where large displacements across faults have caused the juxtaposition of permeable and impermeable strata at depth, e.g. where Carboniferous strata are up-thrown against Permo-Triassic strata and inliers of Carboniferous reach outcrop, the hydraulic continuity across the faults can be broken or significantly reduced. These circumstances may influence the groundwater levels within the area of faulting<sup>110</sup>.
- 7.5.74 Groundwater levels in a number of areas, e.g. Ellesmere Port, have been lowered as a result of abstraction, notably by industry, exceeding recharge during the past

<sup>108</sup> BGS and Environment Agency - Baseline Report Series: 2. The Permo-Triassic Sandstones of West Cheshire and the Wirral Groundwater Systems and Water Quality Commissioned Report CR/02/109N.

<sup>109</sup> E-mail communication with Holly Grant (United Utilities) on the July 11, 2022.

<sup>110</sup> Allen, D J, Brewerton, L J, Coleby, L M, Gibbs, B R, Lewis, M A, MacDonald, A M, Wagstaff, S J, and Williams, A T. 1997. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8.

century. However, in more recent years a gradual recovery has been taking place because of reduced abstraction and improved aquifer management.

- 7.5.75 The online BGS GeoIndex Viewer describes the Mercia Mudstone Group (South Corridor) as being of low permeability and generally having no groundwater except at shallow depths. The predominantly thick clayey sequence with subordinate sandstones may only occasionally support domestic water supplies.
- 7.5.76 Groundwater levels within the area's superficial deposits are likely to be variable, but close to the ground surface at lower elevations and where close to surface water bodies.

### *Aquifer hydraulic properties*

- 7.5.77 **Table 7.10** provides an overview of the range of hydraulic properties for the Sherwood Sandstone Principal Aquifer underlying the Draft Order Limits, based on typical values obtained from standard literature<sup>111</sup>.
- 7.5.78 Natural controls on transmissivity within the Triassic Sandstone are many, including controls on the matrix hydraulic conductivity, such as variable lithology and layered heterogeneity, and often results in an anisotropy within the strata. Lateral facies changes can also cause deposits to change from being aquifers to aquitards. Fine-grained layers within the Permo-Triassic Sandstone have lower hydraulic conductivities and can act as confining layers.
- 7.5.79 Preferential flow paths exist within these strata between layers and predominantly through fracture hydraulic conductivity. Significant hydraulic conductivity increases can be attributed to fracture flow and hydraulic conductivity values obtained in fractured sections are generally much higher than in the unfractured sections. A zone of high hydraulic conductivity exists in the top part of the aquifer where fractures are common, whereas underlying this is a low hydraulic conductivity zone (generally less than 1m/d) where intergranular flow predominates and fractures are rare.

**Table 7.10 Aquifer hydraulic properties**

| Hydraulic properties                      | Sherwood Sandstone           | Helsby Sandstone             | Wilmslow Sandstone           | Chester Pebble Beds          | Collyhurst/Kinnerton Sandstone |
|-------------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------------------------|
| Core hydraulic conductivity (range) (m/d) | 3.7 x 10 <sup>-5</sup> to 15 | 3.1 x 10 <sup>-4</sup> to 15 | 2.6 x 10 <sup>-4</sup> to 13 | 2.5 x 10 <sup>-4</sup> to 15 | 3.7 x 10 <sup>-5</sup> to 10   |

<sup>111</sup> Table 7.5.3 from Allen, D J, Brewerton, L J, Coleby, L M, Gibbs, B R, Lewis, M A, MacDonald, A M, Wagstaff, S J, and Williams, A T. 1997. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8.

- 7.5.80 The hydraulic effects of faults in the Sherwood Sandstone vary widely, ranging from impermeable features which form barriers to groundwater flow to highly transmissive structures which may act as recharge boundaries<sup>112</sup>.
- 7.5.81 There is no observable cementation variation with depth within the top 200m of the Sherwood Sandstone. Core data for these depths show a scatter range of porosity of approximately 10-35%. Typical values of storage coefficient of the aquifer are  $10^{-5}$  to  $10^{-3}$ . Given the porosity of the sandstones, the unconfined values of storage coefficient for the Sherwood Sandstone are likely to be broadly in the range  $10^{-2}$  to  $10^{-1}$ .

### Groundwater quality

- 7.5.82 The water in the Permo-Triassic Sherwood Sandstone Group is generally of good quality and the aquifer has in consequence been extensively exploited for a wide range of uses. Groundwater chemistry varies both with depth and laterally, towards the feather edge of the aquifer or down dip beneath the confining Mercia Mudstone Group. The water in the unconfined sandstones is generally oxic and of a calcium bicarbonate type with subsidiary magnesium and sulphate ions and very minor sodium and chloride ion concentrations.
- 7.5.83 The age of groundwaters is generally less than one hundred years old, this being approximately the time taken from recharge to discharge at springs, rivers or by borehole abstraction. The potential for saline intrusion exists in the Liverpool area and along the tidal reaches of the River Mersey.
- 7.5.84 Aquifers within the Study Area are vulnerable to urban, agricultural and industrial pollution. Agricultural land use may give rise to diffuse and point source pollution by nitrate and pesticides. There is significant current and historical industrial land use in the area including oil refining, salt production, coal mining, manufacturing industry and chemical processing, mainly concentrated in the north of the area along the Mersey Estuary at Ellesmere Port, Stanlow, Helsby and Runcorn. To the east of the Study Area, around Northwich and Winsford, extensive salt production has taken place. These industrial areas pose a potential contamination threat to groundwater and surface water and there are a number of known areas of contamination. In addition, contamination can be associated with the major railways and roads that traverse the area, including the M56 and M6 motorways, as well as with the Manchester Ship Canal that runs adjacent to the Mersey Estuary in the north of the Study Area.
- 7.5.85 Specifically, the West Corridor (HPP HAGI to Rocksavage HAGI) is located through an area with historic and current industrial land uses. These include the former Weston Quarry landfills, the former Manchester Ship Canal dredging grounds and the Stanlow manufacturing complex. The North Corridor's (St. Helens Spur to Higher Walton HAGI including Warrington) industrial land uses include mining activities, glass manufacturing in the Warrington area and active and

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<sup>112</sup> Allen, D J, Brewerton, L J, Coleby, L M, Gibbs, B R, Lewis, M A, MacDonald, A M, Wagstaff, S J, and Williams, A T. 1997. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8.

former landfills such as the LeBlanc waste deposits. Along the East Corridor (Central Hub HAGI to Partington) within the ZoI of the pipeline is the former Partington Gas works and the Partington liquid natural gas terminal. The South Corridor (Central Hub HAGI to Hydrogen Storage Facility HAGI) contains historic chemical manufacturing industry and salt extraction.

- 7.5.86 Concentrations of some chemicals are elevated in groundwater above the natural baseline due to pollution in the Study Area<sup>113</sup>. For example, elevated nitrate, pesticides and chloride concentrations may indicate modification by agricultural and hydrocarbons and other chemicals due to industrial practices. The most obvious indicator of diffuse pollution is the presence of high nitrate, although nitrate concentrations are naturally generally low throughout much of the aquifer due to relatively reducing conditions, which are present in confined parts of the aquifer. Anthropogenic inputs of nitrate have been reduced by denitrification.
- 7.5.87 In some parts of the aquifer, arsenic, barium and uranium occur at concentrations which exceed drinking water standards. However, these concentrations are not considered to be the impact of pollution but result from water-rock interaction and reflect aquifer mineralogy.
- 7.5.88 Per- and poly-fluoroalkyl substances (PFAS) is an emerging contaminant of concern in the UK and to regulators. It has been linked to former landfills, paper manufacturing, chemical industry and chemicals manufacturing, military establishments, fire-fighting foams and fire suppression systems, among other sources. Work completed by the Forever Pollution Project (2023)<sup>114</sup> maps the extent of Europe's contamination of PFAS, noting the locations of known and presumptive contamination. Data points within the Study Area are shown within **Table 7.11**.

**Table 7.11 Potential PFAS contamination within the Study Area**

| PFAS contamination category | Name  | Sector                      | NGR            | Location compared to Draft Order Limits |
|-----------------------------|-------|-----------------------------|----------------|-----------------------------------------|
| Known contamination         | Koura | PFAS manufacturing facility | SJ 52212 79974 | Adjacent to west <sup>115</sup>         |

<sup>113</sup> BGS and Environment Agency - Baseline Report Series: 2. The Permo-Triassic Sandstones of west Cheshire and the Wirral Groundwater Systems and Water Quality Commissioned Report CR/02/109N.

<sup>114</sup> Dagorn, G., Aubert, R., Horel, S., Martinon, L., Steffen, T. (2023) 'Forever pollution': Explore the map of Europe's PFAS contamination. (Online). Available at: [https://www.lemonde.fr/en/les-decodeurs/article/2023/02/23/forever-pollution-explore-the-map-of-europe-s-pfas-contamination\\_6016905\\_8.html](https://www.lemonde.fr/en/les-decodeurs/article/2023/02/23/forever-pollution-explore-the-map-of-europe-s-pfas-contamination_6016905_8.html) (Accessed August 2024).

<sup>115</sup> The data from the Forever Pollution Project website shows the Koura site as occurring within the Draft Order Limits, but it is more likely within the Rocksavage site boundary to the west and adjacent to the Draft Order Limits.

| PFAS contamination category | Name                                           | Sector                     | NGR            | Location compared to Draft Order Limits         |
|-----------------------------|------------------------------------------------|----------------------------|----------------|-------------------------------------------------|
| Known PFAS user             | Byk                                            | Chemical manufacturer      | SJ 52545 87814 | 1,060m south                                    |
| Known PFAS user             | Whitfield                                      | Chemical manufacturer      | SJ 54962 83680 | 1,920m west                                     |
| Presumptive contamination   | National Grid Gas PLC, Partington LNG Facility | Historic gas works         | SJ 72699 91301 | 250m south-west                                 |
| Presumptive contamination   | Stanlow manufacturing complex                  | Oil refinery               | SJ 43999 75499 | 700m west                                       |
| Presumptive contamination   | Widnes Alumina Fibres                          | Material manufacturer      | SJ 52900 85400 | 1,810m west                                     |
| Presumptive contamination   | St Helens Electrical Recycling Facility        | Recycling facility         | SJ 53059 94626 | 1,750m east, downgradient of Draft Order Limits |
| Presumptive contamination   | Runcorn Energy From Waste Facility             | Energy from waste facility | SJ 49840 81619 | 1,240m north-west                               |
| Presumptive contamination   | Runcorn Halochemicals                          | Chemical manufacturer      | SJ 50600 79998 | 700m west                                       |
| Presumptive contamination   | Runcorn Halochemicals Manufacturing            | Chemical manufacturer      | SJ 53839 81201 | 1,810m east                                     |
| Presumptive contamination   | ReCarton UK                                    | Packaging manufacturer     | SJ 57558 83327 | 190m south, downgradient of Draft Order Limits  |
| Presumptive contamination   | SAICA Natur - Partington                       | Packaging manufacturer     | SJ 72363 92231 | 180m west                                       |
| Presumptive contamination   | SAICA Paper - Manchester                       | Packaging manufacturer     | SJ 72485 92214 | 90m west                                        |

| PFAS contamination category | Name                                                  | Sector                      | NGR            | Location compared to Draft Order Limits |
|-----------------------------|-------------------------------------------------------|-----------------------------|----------------|-----------------------------------------|
| Known contamination         | Crewe Sewage Treatment Works (STW) - river downstream | Waste water treatment works | SJ 66540 60080 | 8,090m south                            |
| Known contamination         | Crewe STW - river upstream                            | Waste water treatment works | SJ 66650 57000 | 11,250m south                           |
| Known contamination         | Northwich STW - river downstream                      | Waste water treatment works | SJ 60060 76070 | 100m south-east                         |
| Known contamination         | Altrincham STW - treatment effluent                   | Waste water treatment works | SJ 75040 90440 | 1,720m east                             |
| Known contamination         | Northwich STW - river upstream                        | Waste water treatment works | SJ 64190 74830 | 330m north-west                         |
| Known contamination         | Winsford STW - treatment effluent                     | Waste water treatment works | SJ 65440 67440 |                                         |
| Known contamination         | Crewe STW - treatment effluent                        | Waste water treatment works | SJ 66690 57370 | 10,950m south                           |
| Known contamination         | Altrincham STW - river downstream                     | Waste water treatment works | SJ 74840 90420 | 1,560m east                             |
| Known contamination         | Altrincham STW - river upstream                       | Waste water treatment works | SJ 75210 90280 | 1,950m east                             |
| Known contamination         | Northwich STW - treatment effluent                    | Waste water treatment works | SJ 63740 74160 | 740m south-west                         |
| Known contamination         | Northwich STW - river downstream                      | Waste water treatment works | SJ 64019 74773 | 420m west                               |

7.5.89 Although no specific PFAS areas within the pipeline corridors have been identified, there is the potential for PFAS or wider contaminants within groundwater specific to certain industrial processes to occur within the vicinity of the pipeline route and Draft Order Limits. Monitoring data for PFAS within rivers, lakes, groundwater, estuaries and coastal waters suggest they are likely widely present in surface waters and groundwater<sup>116</sup>.

### *Shallow groundwater*

7.5.90 The BGS depth-to-groundwater dataset<sup>117</sup> was used to identify the probable maximum depth to the water table and likely areas where the Project's pipeline subsurface infrastructure may interact with groundwater flow. In addition, groundwater flooding and superficial geology mapping were used to indicate where shallow groundwater flow paths may be dynamic within permeable strata such as sands and gravels and/or alluvial deposits. These are areas within which streams and rivers and water dependent habitats are likely to be receiving significant baseflow, and hence need to be protected, and are described in more detail below and with further details are given within **Appendix 7B - Table 7B.8**.

### *West Corridor*

- 7.5.91 Within the low-lying (less than 10mAOD) area around Frodsham are numerous straight manmade surface water drainage ditches and a shallow groundwater table, within 5m of surface, with a high potential for groundwater flooding. The Draft Order Limits crosses an area which is of predominantly tidal flat deposits clay, silts and sands, of variable thickness up to 60m deep, with occasional lenses of peat and blown sand. Groundwater exhibits upward vertical hydraulic gradients (as evidenced by some rising heads within drilled boreholes within GeoIndex borehole logs), i.e. higher piezometric levels within the deeper Permo-Triassic Sherwood Sandstone Group than in the shallower superficial deposits.
- 7.5.92 In this area the upper surface of the bedrock was deeply incised during the Quaternary, with thicker accumulations of alluvium deposits in filling a series of broadly north-trending buried channels. These follow the modern north-flowing tributaries of the River Mersey (i.e. the west and the Hornsmill/Peckmill Brook). These form more permeable deposits, such as glaciofluvial sands and gravels, which tend to be present in lenses of limited lateral extent and surrounded by lower-permeability deposits, which limit recharge or discharge.

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<sup>116</sup> Environment Agency (August 2021) Poly- and perfluoroalkyl substances (PFAS): sources, pathways and environmental data Chief Scientist's Group report. (Online) Available at:

<https://assets.publishing.service.gov.uk/media/611e31fbd3bf7f63b19cea2d/Poly-and-perfluoroalkyl-substances-sources-pathways-and-environmental-data-report.pdf> (Accessed July 2024).

<sup>117</sup> BGS, Depth to groundwater. (Online) Available at:

<https://www.bgs.ac.uk/datasets/depth-to-groundwater/> (Accessed August 2024)

### North Corridor

- 7.5.93 Shallow groundwater levels along the River Mersey, north of the Manchester Ship Canal and around Higher Walton, south-west of Warrington, are also associated with alluvium, river terrace deposits and wind blow sands. There are large lakes left after sand and gravel quarrying and the area is associated with minimal groundwater flooding potential.

### East Corridor

- 7.5.94 An area of shallow groundwater and potential groundwater flooding within shallow valleys and undulating ground is found to the south and east of Higher Whitley (NGR SJ 6187 8005). In this area, superficial sands and gravels predominantly make up the higher ground whilst till deposits form the valley bottoms, although sediments in the area are likely to be interbedded.
- 7.5.95 In addition, an extensive area of shallow groundwater and potential groundwater flooding exists on permeable superficial deposits along the East Corridor, north of the M56 up to Partington. These deposits are alluvium, river terrace deposits and wind blow sands associated with the River Bollin. An exception to this is where the river runs parallel to Caldwell Brook on wind-blown sands north of Dunham Woodhouses (NGR SJ 7297 8939). Shallow groundwater levels approximately less than 3m bgl are present but are not associated with groundwater flood risk.

### South Corridor

- 7.5.96 An area north of the River Weaver comprises sands and gravels and groundwater levels are shallow with an associated groundwater flood risk. Along a tributary south-east of the Sutton Weaver (NGR SJ 5506 7889), the pipeline runs perpendicular and up hydraulic gradient to the small stream running into woodland (Beckett's Wood).
- 7.5.97 West of Dutton Park Farm (3km to the south-east) (NGR SJ 5764 7760), the proposed pipeline crosses a railway and then runs parallel and up hydraulic gradient of a pond and stream that is a west to east flowing tributary to the River Weaver. This area is located on the Bollin Mudstone Member with no superficial deposits and is unlikely to be associated with groundwater bodies due to the low permeability nature of the strata. Further to the east of this location, the pipeline crosses a watercourse (Longacre Brook at NGR SJ 5831 7744) and lies within the floodplain of the River Weaver. The watercourses in this area are associated with alluvium, clay, silt, sand and gravel and groundwater levels are likely to be shallow and in connection with the surface water body.
- 7.5.98 Within an area of superficial sands and gravels, south of the River Weaver, north-east of Sandiway (NGR SJ 6139 7162), the pipeline route passes across the headwaters of the Handforth Brook tributary. This area comprises low-lying ground (less than 30 mAOD) and a shallow water table, likely around 3m bgl (from local geological borehole logs), is present. A large pond is located in a hollow to the west of the pipeline, in the vicinity of Littledale's Gorse.
- 7.5.99 South of the A556, where the ground first becomes higher with presumably thicker superficial sands and gravels, the pipeline then crosses a valley (NGR SJ 6202

7051) where a shallow water table exists to the north-east of Petty Pool Lake and Pettypool Wood (which is a GWDTE).

7.5.100 South of Moulton (NGR SJ 6542 6913) the area comprises interbedded superficial sands and gravels and till. The pipeline runs parallel to the Vale Royal Cut for approximately 2.5km after its crossing to the north-west. It then passes through areas of shallow groundwater and floodplain within lower lying valleys of tributaries of the River Dane in the vicinity of Bostock Green (NGR SJ 67056 69089) and east of Whatcroft (NGR SJ 68263 69930). These areas are associated with alluvial deposits as well as peat and sand and gravel superficial deposits.

## Abstractions

### Catchment management strategies

7.5.101 The Study Area covers three Catchment Abstraction Management Strategy (CAMS) areas, namely the Upper Mersey<sup>118</sup>, Lower Mersey<sup>119</sup> and Weaver and Dane<sup>120</sup>.

7.5.102 The Upper Mersey CAMS area covers a small part of the north-east of the Study Area between Broomedge and Partington and both surface and groundwater within the Study Area are classed as *Water Available* areas. A small area north of Broomedge is classified as *Restricted Water Available*.

7.5.103 The Lower Mersey CAMS area covers areas directly around the River Mersey and Manchester Ship Canal, and areas north of the Mersey, as well as parts of the West Corridor around Helsby. Areas classified as *No Water Available* are present around St Helens, Lymm and Runcorn. Areas classified as *Limited Water Available* are Warrington, Helsby and Daresbury. Where Groundwater Management Units are present, these are classified as *Restricted Water Available* within the Study Area.

7.5.104 The Weaver and Dane CAMS area covers the southern part of the Study Area. A limited area classified as *Water Unavailable* is present directly north-east of Northwich and areas of *Limited Water* available are also present to the south and west of Northwich. Where Groundwater Management Units (GMUs) are present, the area around Frodsham is classified as *Restricted Water Available*. The Abstraction Licensing Strategy (ALS) reports published in 2013<sup>118,119</sup> may no

<sup>118</sup> Environment Agency (2013). Upper Mersey Abstraction Licensing Strategy. (Online). Available at: <https://www.gov.uk/government/publications/upper-mersey-abstraction-licensing-strategy> (Accessed August 2024).

<sup>119</sup> Environment Agency (2013). Lower Mersey and Alt Abstraction Licensing Strategy. (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/300490/LIT\\_7881\\_35d3ed.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300490/LIT_7881_35d3ed.pdf) (Accessed August 2024).

<sup>120</sup> Environment Agency (2020). Weaver and Dane Abstraction Licensing Strategy. (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf) (Accessed August 2024).

longer be representative due to the effects of climate change and changing demand.

### *Licensed abstractions*

7.5.105 The Environment Agency was contacted to obtain details on licensed abstractions within the Study Area. **Appendix 7B - Table 7B.9, 7B.10 and 7B.11** provides details of the licensed abstractions (with licensed volumes and purpose of abstraction) that have been identified and screened as receptors based on their presence within the Zol (for surface water abstractions) and hydraulic pathways. This includes 100 groundwater abstractions, ten public water supply groundwater abstractions, and 49 surface water abstractions (**Figure 7.6**). The deregulation of small abstractions of less than 20 cubic m<sup>3</sup>/day meant the removal of these abstractions from water resource regulation as of 1 April 2005, with these abstractions no longer requiring an abstraction licence after this date<sup>121</sup>. Nine groundwater and no surface water abstractions are deregulated<sup>122</sup>.

7.5.106 Licensed groundwater abstractions are spread across the Study Area, with clusters around the Walton area of the Manchester Ship Canal on the Warrington Spur, Cuerdley on the North Corridor and Great Budworth south of the East Corridor.

7.5.107 The majority of surface water abstractions are located in the South Corridor of the Study Area around the wider Northwich area, with other clusters in the East Corridor, centred around Heatley, the North Corridor, centred around Warrington, and the West Corridor, centred around the Stanlow area of the Manchester Ship Canal.

7.5.108 LPAs were contacted for private water supply information, but all councils either did not hold the information, did not respond to the data request or the abstraction locations supplied were found to be outside of the Study Area.

### *SPZs*

7.5.109 The Study Area intersects multiple SPZs<sup>123</sup> which show the level of risk to the groundwater abstractions from contamination. The SPZs include a continuous area of Total Catchments (SPZ3s) across the northern part of the Study Area and

<sup>121</sup> <http://www.groundwateruk.org/Modernising-the-regulation-of-water-resources.aspx>

<sup>122</sup> Although no surface water abstractions were confirmed with the Environment Agency, this does not mean there are 'no' deregulated water abstractions within the area whereby abstractions from 2005 of less than 20m<sup>3</sup> per day, since these no longer required a licence from the Environment Agency and they would not hold a record of such abstractions in this instance.

<sup>123</sup> SPZ1 has a 50-day travel time from pollutant to source with a 50m default minimum radius. SPZ2 has a 400-day travel time of pollutant to source and has a 250m or 500m minimum radius around the source depending on the amount of water taken. SPZ3 is the area around a supply source within which all the groundwater ends up at the abstraction point. All groundwater abstractions intended for human consumption or food production assume a default SPZ1 with a minimum radius of 50m and in some cases a default SPZ2 (Groundwater Position Statement B3).

five Inner Protection Zones (SPZ1s) associated with the Triassic Sherwood Sandstone aquifer. No SPZ1s are intersected by the Draft Order Limits, with the nearest SPZ1s to the Draft Order Limits being located at Daresbury and Higher Walton (North Corridor), approximately 250m and 480m away respectively. An area of SPZ2c<sup>124</sup> is present around the Higher Walton SPZ1 approximately 20m from the Draft Order Limits and a limited area of SPZ2 is also present within the Draft Order Limits at the same locality.

### *Drinking Water Protected Areas*

7.5.110 Rivers, lakes and groundwater that currently (or will in the future) supply more than 10m<sup>3</sup> per day of water for human consumption, or serve more than 50 people, are identified as Drinking Water Protected Areas (DWPAs). The WFD requires that DWPAs are identified and that they are given the necessary protection with the aim of avoiding deterioration in their quality to reduce the level of purification treatment required in the production of drinking water. This includes public drinking water supplied by water companies to their customers and private water supplies for domestic dwellings or the food and drink industry. Meeting the requirements of the Water Supply (Water Quality) Regulations 2016 is regulated by the Drinking Water Inspectorate (DWI).

7.5.111 The objectives for Drinking Water Protected Areas are as follows:

- to ensure that, under the water treatment regime applied, the drinking water produced meets the requirements of the Water Supply (Water Quality) Regulations 2016;
- to ensure the necessary protection of the supply by avoiding deterioration in water quality to reduce the level of purification treatment required in producing drinking water; and
- for groundwater to meet good chemical status and reverse upward trends in pollution.

7.5.112 A DWPA is present to the south-east of Higher Walton at Appleton Reservoir (Water body ID: GB31232665). This DWPA is 0.4km east of the Draft Order Limits along the North Corridor although the topography in the area suggests drainage from the pipeline route is away from the reservoir.

### *Drinking Water Safeguard Zones*

7.5.113 Drinking Water Safeguard Zones (SgZs) have been established to reduce and prevent pollution of water abstracted for drinking water supplies. These safeguard zones are a non-statutory, joint initiative between the Environment Agency and water companies to define areas where actions and measures will be targeted to address water contamination and avoid or minimise extra treatment needed. SgZ

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<sup>124</sup> Zones 1c, 2c and 3c are extended zones beneath protected cover, where protective geology cover such as clay is present. Activities below the surface, such as deep drilling, could create pathways for pollutants to enter the groundwater.

Action Plans have been developed for both groundwater and surface water and aim to prevent and avoid water quality deterioration within SgZs<sup>125</sup>.

- 7.5.114 The geometry of groundwater SgZs are based on SPZs, typically around SPZ2s with additional assessment to identify areas which may or may not coincide with the SPZs. SgZs can be large or small depending on the pollution problem and may not cover the whole of a catchment or sub-catchment.
- 7.5.115 Two groundwater SgZs intersect the Study Area. One is centred on Five Crosses (GWSGZ0046), which is located near Frodsham and approximately 500m south-east of the Draft Order Limits boundary on higher ground. This zone is related to an SPZ of a groundwater abstraction borehole south of Frodsham and has nitrate associated pressure. The second SgZ is at Houghton Green, Winwick (GWSGZ0266), which is north of Warrington and 4.5km north of the Draft Order Limits and also associated with nitrate pressure. Both SgZs are outside of the Zol boundary.
- 7.5.116 There are no surface water SgZs within the Study Area.

### Discharges

- 7.5.117 The Environment Agency supplied data on all permitted discharges to both groundwater and surface water within the Study Area (468 in total). Only five of these discharges are located within the Draft Order Limits. The location of the discharges is shown on **Figure 7.6**.

### Conservation sites

- 7.5.118 **Appendix 7B** contains details of the water dependent nature conservation sites within the Zol<sup>126</sup>. Its **Table 2.6** includes all of the nature conservation sites with a hydrological or hydrogeological component to their designation within the Zol. In total, 137 conservation sites have been identified with a range of designations, including SSSIs, SPAs, Ramsar sites, LNRs and LWSs. No Special Areas of Conservation (SACs) or National Nature Reserves (NNRs) were identified within the Zol and no Local Geological Sites (LGSs) were screened in.

### GWDTEs

- 7.5.119 The WFD defines GWDTEs as wetlands that are dependent on groundwater bodies. They are sensitive to changes in the environment and are protected by the

<sup>125</sup> DEFRA (2022). Drinking Water Safeguard Zone (Groundwater). (Online). Available at <https://environment.data.gov.uk/dataset/6288b7b0-d465-11e4-b13c-f0def148f590> (accessed: 13 January 2023).

<sup>126</sup> It has been assumed the 500m upstream buffer of the Zol is likely to include any shallow groundwater feeds to conservation sites. Deeper groundwater feeds to conservation sites are unlikely given the hydrogeological setting or included within larger WFD water bodies.

WFD<sup>127</sup>. GWDTE data from the government website<sup>128</sup> indicates that there is only one GWDTE site within the ZOI. The site, Pettypool Brook Valley (SSSI), is located in the South Corridor at NGR SJ 620 700 to the north-west of Whitegate, approximately 230m from the Draft Order Limits at its closest point. The SSSI is composed of wetland communities and a diverse valley mire system at the head of Pettypool and downstream along the course of Pettypool Brook<sup>129</sup>. The fen vegetation throughout the valley is typified by the presence of greater tussock sedge *Carex paniculata* either in association with *Sphagnum* mosses, bottle sedge and marsh cinquefoil *Potentilla palustris*. The valley lies in an undulating landscape of sandy soils (sands and gravel superficial deposits). Where the flow of acidic water draining from these sands has been impeded accumulations of peat have formed locally along the valley floor.

### Potential land affected by contamination

7.5.120 The historical land use of the area within the Draft Order Limits and its immediate surrounding area has been established from a review of the historical mapping and historical land use data provided in the Groundsure EnviroGIS report<sup>130</sup>. Google Earth Pro has also been used to provide some historical and recent aerial photographic coverage of the area of interest. A detailed review of the historical mapping can be found in **Chapter 12: Ground Conditions**.

7.5.121 The available historical mapping reveals that much of the East Corridor, South Corridor and part of the West Corridor has remained agricultural throughout their recorded history. Elsewhere, however, extensive industrial development has taken place. The lists presented below identify selected former industrial land uses with the potential to give rise to soil and groundwater contamination. Note that not all the industrial land uses identified present the same risk of contamination. While the risk associated with large scale industrial activity such as refining, chemical works, iron and steel and major gas works may be higher, the risk associated with collieries, rail land, sewage works and small to medium sized fuel tanks is likely to be low to moderate.

### West Corridor:

- HPP HAGI and corridor section to Rocksavage HAGI: oil refinery located within the HAGI, brick fields, gasworks, gasometer, water works, electricity generating

<sup>127</sup> Methodology for characterisation and classification of non-SSSI groundwater dependent wetlands (2014). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/314653/Characterisation\\_and\\_classification\\_of\\_non-SSSI\\_groundwater\\_dependent\\_wetlands\\_-\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/314653/Characterisation_and_classification_of_non-SSSI_groundwater_dependent_wetlands_-_report.pdf) (last accessed January 2024).

<sup>128</sup> Ground Water Dependent Terrestrial Ecosystems (England Only) (2020). (Online) Available at:

<https://environment.data.gov.uk/portalstg/home/item.html?id=ad748712f42c45ea9dd3654424074f8d> (last accessed January 2024).

<sup>129</sup> <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1003452.pdf>

<sup>130</sup> GroundSure EnviroGIS Report references GSIP-2021-12402-9275, GSIP-2021-12402-9276, GSIP-2021-12402-9281 and GSIP-2021-12402-9282, all dated 02 April 2022

station, sewage works, telephone exchange, unspecified works, depots, glass manufacturing plant, reservoir, fire station, motorway services area, tanks, dredging disposal ground, railway infrastructure and roads.

- Rocksavage HAGI and Runcorn HAGI (and adjoining spur): various industrial works including bone and charcoal works, chemical works, a tube works, tanks and power stations, industrial estates, pumping stations, depots and unspecified works, gas pressure breakdown station, electricity substation, canal deposit tip and dredging disposal ground, lagoon and sludge lagoon, railway infrastructure and roads.
- Corridor section to Central Hub: rare clay pits, farms, smithies and roads scattered sparsely throughout the corridor.

### *North Corridor:*

- St Helens Spurs and Clock Face Spur: densely concentrated industrial works including glass and bottle works, pottery works, copper works, brick and tile works, lead works, boiler works, timber yards, foundries, sewage works, transport depots, landfills, collieries, clay pits, coal pits, coal shafts and smalt works, magazines, garages, tanks, unspecified works and factories, power station, waste recycling centre, canals, railway infrastructure, roads and isolated farms.
- Clock Face HAGI and corridor section to Higher Walton HAGI: predominantly agricultural with isolated residential development and sparse industrial use including a sewage farm, a septic tank, a tannery, canal turn bridge and ferry lock, hydraulic installation, sheep dip works, shipyard, unspecified works buildings, cannery, sandstone quarries and sand pits, canals, railway infrastructure, roads and isolated farms.
- Warrington Spurs: mixed residential and industrial uses, including unspecified works and depots, borate works, bitumen works, iron works, tube works, tanneries, industrial estates (Richmond Works, Palatine Works), tanks, canal deposit land, allotment gardens and roads.
- Higher Walton HAGI; mixed agricultural and industrial uses, including Runcorn and Latchford Canal, Manchester Shipping Canal, railway lines and sidings, sewage disposal works, saw mills, timber yards, dredging deposit ground (Arpley Landfill), iron foundry, warehouses, depots, tanks and roads.
- Corridor section to Central Hub: predominantly agricultural with isolated residential development and sparse industrial use including sewage works, farms and roads.

### *South Corridor:*

- Corridor section from Central Hub to the Hartford BVI located to the north of the A556 (Chester Road): predominantly agricultural with isolated residential development and sparse industrial use, including a quay, refining works, creamery, gasometer, coal yard, sanatorium, caravan parks, nursery, sand / marl pits and unspecified pits, farms, railway infrastructure and roads.

- HSF HAGI and corridor section to the west: predominantly agricultural with isolated residential development and sparse industrial use, including brick field, pumping station and water tower, salt works, caravan site, telephone exchange, sand pits, farms, smithies, railway infrastructure and roads.

### *East Corridor:*

- Partington HAGI: densely concentrated industrial uses including gasworks, petrochemical works, associated tanks, gasholders, pipework, unspecified industrial works, paper manufacturing plant, warehouses, depots, tramways, railway infrastructure and roads.
- Corridor from Central Hub to the Sworton Heath BVI off the A50, west of High Legh: predominantly agricultural with isolated residential development and sparse industrial use including clay and gravel pits, farms and roads.
- Corridor section from eastern BVI to Warburton HAGI (and corridor to Partington HAGI): predominantly agricultural with isolated residential development and sparse industrial use including brick field, depot, gas valve compound, farms, smithies, clay and gravel pits, railway infrastructure and roads.

7.5.122 The Groundsure data includes Environment Agency pollution incident records. Pollution incidents are recorded within the Draft Order Limits with particularly elevated concentrations of pollution incidents recorded in the vicinity of the Clock Face HAGI, Higher Walton spurs area, Rocksavage HAGI and Partington HAGI (PH1)<sup>131</sup>. Given the nature of the incidents, the dates and locations, these are unlikely to have significantly influenced land quality in the vicinity of the Draft Order Limits and these sites are regulated under reporting requirements by the Environment Agency.

### *Flood risk*

7.5.123 This Section provides an overview of the baseline sources of flood risk within the Draft Order Limits. A FRA has been provided within **Appendix 7F** that considers each of these sources of flood risk in more detail.

### *Fluvial and tidal flood risk*

7.5.124 The Environment Agency Flood Map for Planning<sup>132</sup> provides an indication of the likelihood of flooding from fluvial and or tidal sources, with Flood Zones 1, 2, and 3 indicating a low, medium and high annual probability of flooding respectively. The Environment Agency Flood Map for Planning is shown in **Figure 7.7**.

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<sup>131</sup> HyNet North West Hydrogen Pipeline Project. **Appendix 12A: Phase 1 Geoenvironmental Desk Study**

<sup>132</sup> Environment Agency (2021). Flood Map for Planning. (online). Available at: <https://flood-map-for-planning.service.gov.uk/> (Accessed 22 July 2024).

### West Corridor

- 7.5.125 The West Corridor is within a number of Flood Zone 3 and Flood Zone 2 areas<sup>133</sup>. Flooding affects the eastern part of the West Corridor associated with fluvial flooding from the River Weaver. Closer to the coast, Flood Zone 2 and 3 areas are likely to be a mix of fluvial and tidal sources associated with the River Mersey and the Manchester Ship Canal.
- 7.5.126 Near Elton, areas of Flood Zone 2 and 3 are associated with the River Gowy and Thornton Brook. Flood defences are present in the form of embankments and engineered high ground. Between Frodsham and Elton, large parts of the Draft Order Limits located in Flood Zone 2 and 3 are shown as areas benefitting from flood defences.

### North Corridor

- 7.5.127 The North Corridor is within a number of Flood Zone 3 and Flood Zone 2 areas. The North Corridor (on the Mersey crossing) and the Warrington Spur intersect a large area of Flood Zone 3 and Flood Zone 2 associated with the River Mersey and its tributaries. The River Mersey is a tidal watercourse in this reach, and as such associated Flood Zones are likely to be associated with both tidal and fluvial flooding. Flood defences are present along sections of the Mersey and are a mixture of natural and engineered high ground, embankments and walls. Flood gates are also present in two locations at Warrington substation and one near Woolston Weir. Areas benefitting from flood defences are located primarily on both banks of the River Mersey. However, these defences could be overtopped or breached, which could cause extensive flooding of the land with significant flood depths and high velocities.
- 7.5.128 Further north on the North Corridor, the route avoids an area of Flood Zone 2 and 3 associated with Penketh Brook to the south-east of Bold Heath. Around Sutton Manor, the Draft Order Limits overlap only marginally with areas of Flood Zone 2 and 3 associated with Pendlebury Brook. Flood defences are present in the form of embankments, engineered high ground and natural high ground.

### East Corridor

- 7.5.129 The East Corridor is within a number of Flood Zone 3 and Flood Zone 2 areas. An area of Flood Zone 2 and 3 crosses the Draft Order Limits in the south-west of the East Corridor near Lower Whitley associated with Whitley Brook. Flood defences are present in the form of natural high ground<sup>134</sup>. However, these defences could

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<sup>133</sup> Flood Zone 3 is formally defined as land having a 1% Annual Exceedance Probability (AEP) or greater of fluvial flooding or a fluvial flooding, or a 0.5% AEP or greater of tidal flooding. Flood Zone 2 is defined as land having between a 0.1% and 1% AEP of fluvial flooding, or between a 0.1% and 0.5% AEP of tidal flooding.

<sup>134</sup> These features relate to reaches of river which have natural banks, but over which the Environment Agency exercise maintenance for flood defence reasons (such as dredging and bank clearance) to maintain conveyance. So, although these are shown as an Environment Agency flood defence they are probably not flood defences as such, more like maintained channels.

be overtopped or breached, which could cause extensive flooding of the land with significant flood depths and high velocities.

7.5.130 In the central area of the East Corridor, the Draft Order Limits cross areas of Flood Zone 2 and 3 associated with Gale Brook to west of Arley, and Crowley Brook to the north. Both watercourses have flood defences consisting of natural high ground.

7.5.131 In the north of the East Corridor, the Draft Order Limits cross areas of Flood Zone 2 and 3, associated with flooding from the River Bollin, Sinderland Brook and Caldwell Brook. Flood defences in the form of natural high ground are present along the left banks of the River Bollin and on both banks of the Sinderland Brook and the Caldwell Brook.

### *South Corridor*

7.5.132 The South Corridor is also associated with areas of Flood Zone 2 and Flood Zone 3. The River Weaver Navigation crosses the Draft Order Limits near Acton Bridge. Flood defences are present consisting of embankments and natural high ground. The Draft Order Limits cross areas of Flood Zone 2 and 3 associated with Grange Brook. No flood defences are present on the Grange Brook where it crosses the Draft Order Limits.

7.5.133 South of Northwich, the Draft Order Limits cross areas of Flood Zone 2 and 3 associated with the River Weaver and the River Dane and its tributary Puddinglake Brook (also known as Ship Brook). Flood defences consisting of natural high ground are present on all three rivers, and the River Weaver also has areas of embankments. Northwich has areas designated as benefitting from flood defences and these defences comprise a series of flood gates, demountable defences and flood walls according to the Environment Agency flood defence dataset.

### *Groundwater flood risk*

7.5.134 The BGS Areas Susceptibility to Groundwater Flooding (AStGWF) map indicates that the Draft Order Limits contain a number of areas where there is potential for groundwater flooding to occur as a result of extended periods of intense rainfall. Additionally, there are a number of other areas where there is a potential risk of groundwater flooding for below ground construction activities. These areas of potential groundwater emergence generally coincide with watercourse valley floors, productive superficial deposits and soils. The potential for groundwater flooding is shown on **Figure 7.9**.

### West Corridor

- 7.5.135 The CWCC PFRA<sup>135</sup> states that there are known locations with high groundwater levels within the CWCC area. However, there are no specific records or reported incidents of groundwater flooding within the areas of the Study Area in the CWCC area.
- 7.5.136 The bedrock geology of the West Corridor is largely classed as being a Principal Aquifer. This indicates it is highly transmissible and may carry a greater quantity of groundwater that may pose a risk of groundwater flooding, should the water table rise above ground level. However, local topography is a determining factor in groundwater flood risk and so the presence of a Principal Aquifer does not necessarily indicate a high risk, merely that it is capable of being an area at high risk where the water table intersects the ground surface.
- 7.5.137 The superficial deposits beneath much of the West Corridor are classed as being Secondary (undifferentiated) Aquifers, which indicates a very low risk of groundwater emergence.
- 7.5.138 The potential for groundwater flooding (**Figure 7.9**) varies along the West Corridor, with an extensive area of 'Potential for groundwater flooding to occur at the surface' between Helsby and Frodsham where the topography is low and the water table is close to the surface.

### North Corridor

- 7.5.139 The St Helens PFRA<sup>136</sup> reviewed the AStGWF data set and Environment Agency and St Helens Borough Council (SHBC) flooding records and concluded that there is no locally significant risk of groundwater flooding in the SHBC. It can therefore be concluded that there is no locally significant risk of groundwater within the areas of the Study Area situated within the SHBC area.
- 7.5.140 Much of the North Corridor including Warrington and the area surrounding and north of the River Mersey are classed as being above a bedrock Principal Aquifer. This indicates it is highly transmissible and may carry a greater quantity of groundwater that may pose a risk of groundwater flooding, should the water table rise above ground level. However, local topography is often a key determining factor in groundwater emergence so the presence of a Principal Aquifer does not necessarily mean that there is a high risk of groundwater emergence.

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<sup>135</sup> Cheshire West and Chester Council (2017). Preliminary Flood Risk Assessment. (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/698398/PFRA\\_Cheshire\\_West\\_and\\_Chester\\_Council\\_2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698398/PFRA_Cheshire_West_and_Chester_Council_2017.pdf) (Accessed August 2024).

<sup>136</sup> St Helens Council Preliminary Flood Risk Assessment 2017-23 version (PFRA 2017-23) (online). Available at: [https://www.sthelens.gov.uk/media/5267/Preliminary-Flood-Risk-Assessment-PFRA-2017-23/pdf/pfra\\_2017\\_version\\_1.pdf?m=1672240838257](https://www.sthelens.gov.uk/media/5267/Preliminary-Flood-Risk-Assessment-PFRA-2017-23/pdf/pfra_2017_version_1.pdf?m=1672240838257) (sthelens.gov.uk) (Accessed August 2024).

7.5.141 The superficial deposits beneath much of the North Corridor are classed as being Secondary (undifferentiated) Aquifers, which indicates a very low risk of groundwater emergence.

7.5.142 The potential for groundwater flooding (**Figure 7.9**) is mostly limited along the North Corridor.

### *East Corridor*

7.5.143 The CEC PFRA<sup>137</sup> reviewed the Environment Agency's AStGWF data set. No parts of the Study Area within the CEC area were deemed to be at risk of groundwater flooding. The CEC PFRA also showed that there are no records of groundwater flooding within the Study Area coincident with the CEC area.

7.5.144 The bedrock geology around Partington is designated as a Principal Aquifer and the superficial geology has areas of both Secondary A Aquifer and Secondary Unproductive Aquifer. However, local topography is a determining factor in groundwater flood risk so the presence of a Principal Aquifer does not necessarily indicate a high risk, merely that it is capable of being an area at high risk where the water table intersects the ground surface.

7.5.145 The potential for groundwater flooding (**Figure 7.9**) varies greatly along the East Corridor.

### *South Corridor*

7.5.146 The CWCC PFRA<sup>135</sup> states that there are known locations with high groundwater levels within the CWCC area. There are no specific records or reported incidents of groundwater flooding within the areas of the Study Area within the CWCC area. The bedrock geology of the South Corridor is predominantly Secondary B Aquifer, with some areas of Unproductive Aquifer around Moulton indicating that groundwater flooding is unlikely.

7.5.147 The superficial deposits beneath much of the South Corridor are classed as being Secondary (undifferentiated) Aquifers which indicates a very low risk of groundwater emergence.

7.5.148 The potential for groundwater flooding (**Figure 7.9**) varies greatly along the South Corridor.

### *Surface water flood risk*

7.5.149 The Environment Agency Risk of Flooding from Surface Water map<sup>138</sup> (**Figure 7.8**) shows that there are areas at risk of surface water flooding throughout the Study Area. These are particularly associated with low-lying areas around watercourse, urban areas, localised depressions and areas of managed drainage.

<sup>137</sup> Cheshire East Council (2017). Preliminary Flood Risk Assessment. (Online). Available at: [https://www.cheshireeast.gov.uk/planning/spatial-planning/research\\_and\\_evidence/preliminary\\_flood\\_risk.aspx](https://www.cheshireeast.gov.uk/planning/spatial-planning/research_and_evidence/preliminary_flood_risk.aspx) (Accessed August 2024).

<sup>138</sup> Environment Agency (2021). Long term flood risk service. (Online). Available at: <https://check-long-term-flood-risk.service.gov.uk/map> (Accessed August 2024).

### West Corridor

7.5.150 The West Corridor has major flow paths associated with the river corridors mentioned in the fluvial flood risk section and these are also areas of surface water flood risk, particularly the River Weaver and its tributaries north of Acton Bridge. Areas of surface water accumulation are present at Frodsham and Helsby and intersect the Draft Order Limits at multiple points but are minimal with limited, confined spatial extents.

7.5.151 The CWCC SFRA (2016)<sup>139</sup> states that based on the Risk of Flooding from Surface Water Map<sup>140</sup>, surface water flooding is prevalent across the CWCC area over the flat ground, where surface water is able to accumulate and the higher ground of the central area of the CWCC area is much less at risk.

### North Corridor

7.5.152 The North Corridor has significant areas of surface water accumulation, with the river corridors mentioned in the fluvial flood risk section also being areas of surface water flood risk due to their low-lying topography, particularly the River Mersey, Manchester Ship Canal and Penketh Brook. Major areas of surface water accumulation occur in localised depressions and existing water bodies. 'Contour-parallel' features such as the M62 and railway embankments are also areas of accumulation. Flow paths in urban areas are prevalent and associated with roads. Major flow paths are present on the Walton Hall, Warrington and Sherdley Park golf courses. The Draft Order Limits cross generally surface water flow paths using the shortest possible route, i.e. perpendicular to the flow direction and therefore minimise coinciding with areas at risk.

7.5.153 The SHBC SFRA<sup>141</sup> states that surface water flooding can occur anywhere in the SHBC area where ground levels and profiles cause surface water to flow and accumulate. However, SHBC is yet to produce a Surface Water Management Plan and is awaiting further information regarding the areas surface water risk. The SHBC PFRA<sup>136</sup> has identified that there have been no recorded historically significant harmful consequences from surface water flooding.

### East Corridor

7.5.154 The East Corridor has major flow paths associated with the river corridors mentioned in the fluvial flood risk section also being areas of surface water flood

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<sup>139</sup> Cheshire West and Chester Council (2016). Strategic Flood Risk Assessment. (Online). Available at: <https://www.cheshirewestandchester.gov.uk/documents/parking-roads-and-travel/highways/flood-risk-assessment-final-report.pdf> (Accessed August 2024).

<sup>140</sup> As part of the PFRA, CWaC considered locally agreed surface water information that best represents local conditions to be the Areas Susceptible to Surface Water Flooding map produced by the Environment Agency.

<sup>141</sup> JBA Consulting (2014). St Helens Council Strategic Flood Risk Assessment Final Report. (online) Available at: [https://www.sthelens.gov.uk/media/1998/FLO001-St-Helens-Council-Strategic-Flood-Risk-Assessment-2014/pdf/FLO001\\_St\\_Helens\\_Council\\_Strategic\\_Flood\\_Risk\\_Assessment\\_2014.pdf?m=1643799636450](https://www.sthelens.gov.uk/media/1998/FLO001-St-Helens-Council-Strategic-Flood-Risk-Assessment-2014/pdf/FLO001_St_Helens_Council_Strategic_Flood_Risk_Assessment_2014.pdf?m=1643799636450) (Accessed August 2024).

risk, particularly the River Bollin, Sinderland Brook, Gale Brook, Whitley Brook and Northwood Drain. Major accumulation areas are associated with topographic lows and a large area of surface water flood risk intersecting the Draft Order Limits is present to the north of Arley associated with the Northwood Drain watercourse and near Lower Whitley associated with the Whitley Brook corridor.

7.5.155 The CEC SFRA142 states there the overall risk of surface water flooding is moderate. This is due to the flat level of the topography and a number of culverted Ordinary Watercourses in urban areas.

### *South Corridor*

7.5.156 Major surface water flow paths on the South Corridor are associated with the river corridors mentioned in the fluvial flood risk section also being areas of surface water flood risk, particularly the River Dane, River Weaver, Grange Brook and its tributaries and also Peckmill Brook. Major areas of surface water flood risk intersect the Draft Order Limits near Acton Bridge, associated with the River Weaver corridor.

7.5.157 The CWCC SFRA (2016)<sup>143</sup> states that based on the Risk of Flooding from Surface Water map, surface water flooding is prevalent across the CWCC area over the flat ground where surface water is able to accumulate and the higher ground of the central area of the Borough is much less at risk.

### *Sewer flood risk*

7.5.158 The risk of flooding from sewers is likely to be limited to where the Draft Order Limits intersects urban areas (of which there are only limited extents with the Draft Order Limits). A review of the SFRAs for the Study Area indicates that there are no concentrated areas of high sewer flood risk within the Draft Order Limits. No further sewer flooding data were available at this time for further analysis.

7.5.159 The **Appendix 7F** FRA highlights that above-ground permanent infrastructure is predominantly proposed in rural (greenfield) or industrial (brownfield) areas. None of the permanent above-ground infrastructure locations coincide with known areas of sewer flooding and the Project would not require integration into any existing sewer networks.

### *Canal flood risk*

7.5.160 Five canals are present within the Study Area, namely the Bridgewater Canal, Manchester Ship Canal, Sankey Canal, Trent and Mersey Canal and Weaver Navigation (**Figure 7.12**). Whilst the impact of flooding from these structures may

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<sup>142</sup> JBA Consulting (2013). Cheshire East Council Strategic Flood Risk Assessment Final Report. (Online) Available at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/researchand-evidence/strategic-flood-assessment/cheshire-east-council-sfra-final-report-v4.0.pdf> (Accessed August 2024).

<sup>143</sup> Cheshire West and Chester Council (2016). Strategic Flood Risk Assessment. (Online). Available at: <https://consult.cheshirewestandchester.gov.uk/kse/event/28136> (Accessed August 2024).

be high, the risk associated with the structures is low as they are actively maintained structures and the volume of water associated with flooding from canals (with the exception of the Manchester Ship Canal) is limited. They nevertheless do pose a residual risk as a consequence of a breach if the canal is impounded and raised above ground. This has been assessed as part of the **Appendix 7F: Flood Risk Assessment**.

### *West Corridor*

- 7.5.161 The Trent and Mersey Canal intersects the Draft Order Limits on the West Corridor directly to the west of the Central Hub, where the canal is cut and is broadly 'contour-parallel'. Therefore, the downslope area of the Draft Order Limits to the south-west would be more at risk in the event of canal flooding.
- 7.5.162 The Weaver Navigation Canal also intersects the Draft Order Limits on the Runcorn/Rocksavage spur and on the West Corridor to the west of Sutton Weaver. The Weaver Navigation Canal is thought to be embanked in the sections of the canal within the Draft Order Limits, with higher elevations on the right bank meaning the downslope areas of the left bank would be at more at risk in the event of canal flooding.

### *North Corridor*

- 7.5.163 Three canals intersect the Draft Order Limits on the North Corridor either side of the River Mersey, namely the Bridgewater Canal, the Manchester Ship Canal and the Sankey Canal. All three canals are predominantly not embanked and are lower than their immediate surroundings at the locations (hereafter referred to as 'cut' canals) where they intersect the Draft Order Limits, which reduces the risk of a breach. For the Manchester Ship Canal, the extent of flooding can be seen from the Environment Agency Flood Map for Planning.

### *East Corridor*

- 7.5.164 The Bridgewater Canal intersects the Draft Order Limits north-east of Broomedge. Within the Draft Order Limits, the Bridgewater Canal is cut and is broadly 'contour-parallel'. Therefore, the downslope area to the north-east of the Draft Order Limits would be more at risk in the event of canal flooding.

### *South Corridor*

- 7.5.165 The Trent and Mersey Canal intersects the Draft Order Limits north of Acton Bridge. Two options about 200m apart are considered for the Draft Order Limits to cross the canal. The Trent and Mersey Canal also intersects the Draft Order Limits east of Bostock Green. At all intersections with the Draft Order Limits, the canal is cut and is broadly 'contour-parallel'. Therefore, the downslope area of the Draft Order Limits would be more at risk in the event of canal flooding. For Acton Bridge, that would be to the south west of the canal, and for Bostock Green it would be to the west.

### Reservoir failure flood risk

7.5.166 The Environment Agency's Reservoir Flood Maps (RFM) (**Figure 7.12**) detail where water may go in the unlikely event of a dam or reservoir failure. The Reservoir Flood Maps include two scenarios, namely a 'dry-day' and a 'wet-day'. The 'dry-day' scenario is defined as *"the flooding that would occur if the dam or reservoir failed when rivers are at normal levels"*. The 'wet day' scenario assesses *"how much worse the flooding might be if a river is already experiencing an extreme natural flood"*. In a 'dry' scenario, where river flows are typical at the time of reservoir failure the risk of flooding from reservoir extents are generally smaller than the fluvial Flood Zones. Only in a 'wet' scenario, where a river is in flood at the time of reservoir failure, does the risk of flooding from a reservoir in some places exceed that from the Flood Zones.

### West Corridor

7.5.167 The Environment Agency Reservoir Flood Extents layer in the RFM indicates that flooding affecting the West Corridor has flood extents conveyed primarily through the River Weaver corridor, crossing the Draft Order Limits at Frodsham and Elton.

### North Corridor

7.5.168 The Environment Agency Reservoir Flood Extents layer indicates that a large number of reservoirs located upstream of the Study Area have flood extents that confluence along the River Mersey and Manchester Ship Canal corridor. As such, the parts of the North Corridor to be affected in the event of reservoir failure are the parts of the Draft Order Limits that cross the River Mersey and the Manchester Ship Canal. The Warrington Spur is also affected. The northern part of the North Corridor around St Helens is also shown to be impacted by the failure of reservoirs located outside of the Study Area, with reservoir flooding crossing the Draft Order Limits near Sutton Manor.

### East Corridor

7.5.169 The Environment Agency Reservoir Flood Extents layer indicates that a large number of reservoirs located upstream of the Study Area have flood extents that confluence along the River Mersey and Manchester Ship Canal corridor, affecting Partington and Lymm in the eastern part of the Study Area. Multiple reservoir flood extents also confluence along the River Bollin and Sinderland Brook corridors, crossing the Draft Order Limits to the south of Dunham Massey and to the east of Partington respectively.

### South Corridor

7.5.170 The Environment Agency Reservoir Flood Extents layer indicates that a number of reservoirs located upstream of the Study Area have flood extents conveyed primarily through the River Dane and River Weaver corridors, crossing the Draft Order Limits to the east and west of Moulton, and further north near Acton Bridge.

## Future baseline

### Climate change

7.5.171 As a result of climate change, it is predicted that winters will become generally wetter and summers generally drier. It is also likely that peak rainfall intensities could increase and the magnitude of flood events could also increase as a consequence.

7.5.172 The Environment Agency provides guidance<sup>144</sup> on the potential future increases in river flood flows and extreme rainfall intensity to assist FRAs. The guidance states that for essential infrastructure the higher central climate change allowances should be used for both the design and when assessing safe access and egress. The Study Area covers three different management catchments and within each of these the peak river flows have varying amounts of potential change (**Table 7.12**).

**Table 7.12 Environment Agency peak river flow climate change allowances (% increase relative to 1981 to 2000 baseline)**

| Allowance category                                          | Potential change anticipated for the 2020s | Potential change anticipated for the 2050s | Potential change anticipated for the 2080s |
|-------------------------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
| <b>Peak river flows – Weaver Gowry Management Catchment</b> |                                            |                                            |                                            |
| Central                                                     | 19%                                        | 30%                                        | 52%                                        |
| Higher central                                              | 24%                                        | 40%                                        | 67%                                        |
| Upper                                                       | 36%                                        | 64%                                        | 106%                                       |
| <b>Peak river flows – Lower Mersey Management Catchment</b> |                                            |                                            |                                            |
| Central                                                     | 18%                                        | 27%                                        | 44%                                        |
| Higher central                                              | 22%                                        | 35%                                        | 57%                                        |
| Upper                                                       | 32%                                        | 55%                                        | 90%                                        |
| <b>Peak river flows – Upper Mersey Management Catchment</b> |                                            |                                            |                                            |
| Central                                                     | 13%                                        | 22%                                        | 41%                                        |
| Higher central                                              | 17%                                        | 31%                                        | 53%                                        |
| Upper                                                       | 27%                                        | 51%                                        | 85%                                        |

<sup>144</sup> Environment Agency (2022). Flood risk assessments: climate change allowances, (Online). Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (Accessed 05 August 2024).

7.5.173 The Environment Agency also provides guidance on the potential future increases in peak rainfall intensity in small catchment or urban drainage catchments, included in **Table 7.13**. These values are also provided at the management catchment scale and both the central and upper end allowances need to be taken account of in the design of sustainable drainage and flood risk from pluvial flooding.

**Table 7.13 Environment Agency peak rainfall intensity allowances (% increase relative to 1981 to 2000 baseline)**

| Allowance category                                                    | Total potential change anticipated for the '2050s' (to 2060) | Total potential change anticipated for the '2070s' (2061 to 2125) |
|-----------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Peak rainfall – Lower Mersey Management Catchment – 3.33% AEP*</b> |                                                              |                                                                   |
| Upper                                                                 | 35%                                                          | 40%                                                               |
| Central                                                               | 20%                                                          | 30%                                                               |
| <b>Peak rainfall – Lower Mersey Management Catchment – 1% AEP</b>     |                                                              |                                                                   |
| Upper                                                                 | 40%                                                          | 45%                                                               |
| Central                                                               | 25%                                                          | 30%                                                               |
| <b>Peak rainfall – Upper Mersey Management Catchment – 3.33% AEP</b>  |                                                              |                                                                   |
| Upper                                                                 | 35%                                                          | 40%                                                               |
| Central                                                               | 20%                                                          | 30%                                                               |
| <b>Peak rainfall – Upper Mersey Management Catchment – 1% AEP</b>     |                                                              |                                                                   |
| Upper                                                                 | 40%                                                          | 45%                                                               |
| Central                                                               | 25%                                                          | 30%                                                               |
| <b>Peak rainfall – Weaver Gowy Management Catchment – 3.3% AEP</b>    |                                                              |                                                                   |
| Upper                                                                 | 35%                                                          | 40%                                                               |
| Central                                                               | 20%                                                          | 25%                                                               |
| <b>Peak rainfall – Weaver Gowy Management Catchment – 1% AEP</b>      |                                                              |                                                                   |
| Upper                                                                 | 40%                                                          | 45%                                                               |
| Central                                                               | 25%                                                          | 30%                                                               |

\*AEP – Annual Exceedance Probability

7.5.174 The Environment Agency further provides guidance on climate change-induced future sea level rise<sup>143</sup>. This is illustrated in **Table 7.14**. As the whole of the Study

Area is within the North West River Basin District, only these predicted sea level rises have been included in **Table 7.14**. This future sea level rise will need to be accounted for in the design of the Project in low-lying areas adjacent to tidal water bodies as the design is refined and all specific elements are assessed. As the Project is a NSIP, the Environment Agency Guidance requires that the H++ credible maximum scenario<sup>145</sup> for sea level rise (1.9m for the total sea level rise to 2100) will also need to be assessed, along with sensitivity test allowances for offshore wind speed and extreme wave height and an additional 2mm for each year on top of sea level rise allowances from 2017 for storm surge.

**Table 7.14 Environment Agency sea level allowances for the North West river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline)**

| Allowance category | 2000 to 2035 (mm) | 2036 to 2065 (mm) | 2066 to 2095 (mm) | 2096 to 2125 (mm) | Cumulative rise 2000 to 2125 (m) |
|--------------------|-------------------|-------------------|-------------------|-------------------|----------------------------------|
| Higher central     | 4.5 (158)         | 7.3 (219)         | 10 (300)          | 11.2 (336)        | 1.01                             |
| Upper end          | 5.7 (200)         | 9.9 (297)         | 14.2 (426)        | 16.3 (489)        | 1.41                             |

Note: the total sea level rise for each epoch is in brackets

### Land use change

7.5.175 Land use change can affect the permeability of the ground, which in turn can affect surface water run-off. Given that much of the land within the Study Area is currently used for agriculture, it is unlikely that the future run-off regime will change significantly within the Study Area. However, there may be further urban expansion within some of these areas which would result in an increase in surface water runoff. However, all development will be required to utilise SuDS to manage the rates and volumes of runoff to no greater than pre-development levels, and as such land use change is not expected to pose a significant change in runoff within the Study Area.

### WFD change

7.5.176 Given the current status of all the WFD surface water bodies within the Study Area is 'Moderate' or 'Poor', and that all of the groundwater bodies are 'Poor', it is anticipated that in future, supported by upward trends, their status will improve ultimately to one of 'Good' status/potential, as required by the WFD.

7.5.177 It may be appropriate to assess construction-related effects against the existing baseline surface water environment, however potential operational effects should take account of a future baseline environment that assumes 'Good' status/potential will be attained during the lifetime of the Project. This is because

<sup>145</sup> The H++ sea level rise allowance is part of assessing credible maximum scenarios for NSIPs and uses 1.9m for the total sea level rise to 2100 to ensure that the development can be adapted to large scale climate change over its lifetime.

the WFD will still be in effect and requires progression towards 'Good' status/potential within that timeframe.

### Hydromorphology

7.5.178 Hydromorphological conditions will be significantly impacted by climate change. These impacts are summarised in **Table 7.15** below, which is adapted from the Climate Change Adaptation Manual (NE751)<sup>146</sup>.

**Table 7.15 Potential impacts of climate change on hydromorphology**

| Cause                                    | Consequence                                             | Potential Impacts                                                                                                                                                     |
|------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hotter summers and milder winters</b> | Increased vegetation growth                             | Disruption to natural processes such as reduced sediment transport and deposition.                                                                                    |
| <b>Drier summers</b>                     | Reduced water levels and stream power in watercourses   | Sediments and soils become more vulnerable to erosion.                                                                                                                |
|                                          | Vegetation loss                                         | Vegetation loss may increase vulnerability to soil erosion, lateral adjustment through bank erosion and in turn leading to greater sediment transport and deposition. |
|                                          | Drying out of peat deposits                             | Increased potential for lateral adjustment of watercourses through bank erosion due to a reduction of this binding vegetation.                                        |
|                                          | Increased risk of wildfires                             | Drying out of peat also increases its vulnerability to erosion.                                                                                                       |
|                                          |                                                         | Fires result in further vegetation loss and increase the vulnerability of soil erosion.                                                                               |
| <b>Wetter winters</b>                    | Increased water levels and stream power in watercourses | Flooding may alter the landscape by washing away soils, changing the position of river channels (both laterally and vertically) and                                   |
|                                          | Increased flow in streams and rivers                    |                                                                                                                                                                       |

<sup>146</sup> Natural England (2020) Climate Change Adaptation Manual (NE751). (Online). Available at: <https://publications.naturalengland.org.uk/publication/5679197848862720> (accessed August 2024)

| Cause                                        | Consequence                                                                                       | Potential Impacts                                                                                                                                                                                                                                                      |
|----------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              |                                                                                                   | <p>initiating the formation of new geomorphological features.</p> <p>Changes to flow regime and frequency may change in sediment transport regime, including the size of sediment transported and deposited.</p>                                                       |
| <b>Increased frequency of extreme events</b> | <p>Highly concentrated rainfall episodes</p> <p>Water logging of soils and sediments</p>          | <p>Erosion of exposed soils.</p> <p>Flooding may wash away soils and alter the landscape e.g. change the position of river channels both vertically and laterally.</p> <p>Increases in erosion may lead to changes to sediment transport and depositional regimes.</p> |
| <b>Human responses to climate change</b>     | <p>Hard engineering schemes, such as river bank defences, flood barriers and drainage schemes</p> | <p>Alteration to natural processes (e.g. disruption of sediment transport, disconnecting the channel from its floodplain) may increase the severity of climate relates problems in the future.</p>                                                                     |

## 7.6 Embedded Environmental Measures

- 7.6.1 As part of the Project design process, a number of embedded environmental measures are proposed to reduce the potential for effects on the water environment, as summarised in **Table 7.16**. These can be broken down into measures that are incorporated into the overall design of the Project and those that are to be implemented during its construction and operational phases. Most of the embedded measures presented in **Table 7.16** are for the construction phase, as this is where most potential significant effects on the water environment are expected to occur. No measures have been specifically identified for the decommissioning phase of the Project. However, it is anticipated that measures equivalent to those implemented during construction would also be effective in mitigating effects on the water environment during decommissioning.
- 7.6.2 The embedded environmental measures will continue to evolve as the EIA progresses and where appropriate in response to consultation. The embedded environmental measures will be fed iteratively into the assessment process. These measures include those that would be considered as standard good practice in

construction and include actions that would be undertaken to meet existing regulatory requirements.

**Table 7.16 Summary of embedded environmental measures**

| ID                    | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Compliance mechanism                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Overall design</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |
| <b>D-1</b>            | <b>Underground pipeline:</b> The pipeline will be completely buried underground (with the exception of HAGIs and BVIs) and the ground will be suitably reinstated, so there will be minimal surface water and flood risk impacts once built, i.e. the pipeline will have no effect on surface runoff pathways and flood conveyance and/or storage in flood zone areas.                                                                                                                                                                                                                                                                                                                                                                                                                        | Final DCO design                     |
| <b>D-2</b>            | <b>Optimisation of routing:</b> Any permanent above ground infrastructure will be located so as to avoid sensitive aquatic environments and flood risk areas, as far as possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Final DCO design                     |
| <b>D-3</b>            | <b>Development of flood protection and drainage measures:</b> Where necessary, flood protection requirements for HAGIs and BVIs will be defined in the FRA as part of the final design for the DCO application. An Outline Drainage Strategy has also been developed for all HAGIs and BVIs for the DCO application, and is included as an annex to <b>Appendix 7F: FRA</b> . The principles of flood protection and drainage design will meet the requirements of NPS-EN1 and NPPF, including taking into account climate change over the operational lifetime of the Project. HAGI and BVIs drainage systems will incorporate SuDS principles as far as possible. Detailed flood protection and drainage designs will be secured by DCO requirement and finalised post-granting of the DCO. | Final DCO design and DCO requirement |
| <b>D-4</b>            | <b>Temporary access tracks design:</b> Temporary access tracks will be optimised to minimise impacts on drainage/soil conditions and will be specified based on ground conditions along the route. In specific areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options for access tracks include stripping the topsoil to allow vehicles to run on the subsoil and use of bog mats or overlaying crushed stone on a geotextile membrane to reduce impact. Detailed construction design will form part of the Construction Environmental Management Plan (CEMP) (see measure <b>C-1</b> ), which will be secured via a DCO requirement.                                          | CEMP secured via DCO requirement     |

| ID                                              | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Compliance mechanism               |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| D-5                                             | <p><b>Management of subsurface flow pathways:</b> All subsurface infrastructure will be designed to minimise disruption to existing subsurface flow pathways so as to avoid any localised increases in groundwater flooding risk and changes to the availability of water resources. This could include the placing of water barriers/mitigation to prevent preferential flows in pipeline backfill where pipelines are aligned with subsurface flow directions and the provision of cross-drainage above the pipelines where they are aligned transverse to subsurface flow directions. On this latter point, in many cases this may simply require reinstatement of existing agricultural drainage following completion of construction (see measure <b>C-4</b> below). Detailed pipeline backfill design will be secured by DCO requirement and finalised post-granting of the DCO.</p> | Final DCO design, DCO requirement. |
| <b>Construction - general</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |
| C-1                                             | <p><b>CEMP:</b> A CEMP will detail measures to be implemented to minimise disturbance and/or pollution to the water environment and will provide details of measures to protect environmental receptors. All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015. In addition, work will be done in accordance with advice notes, guidance documents and Environment Agency PPGs. An outline CEMP is provided with this Draft ES. However, the final CEMP will be developed by the construction contractor post-granting of the DCO and prior to commencement of works and will be secured through a DCO requirement.</p>                                                                                                                                                                                                | DCO requirement                    |
| <b>Construction - water and silt management</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |
| C-2                                             | <p><b>Drainage and Water Management Plan (DWMP):</b> A DWMP will be developed for all construction activities to support the CEMP, incorporating the embedded mitigation given below. The DWMP will incorporate SuDS principles and specify appropriate treatment and attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. This will set out surface water drainage measures for the pipeline swathe and associated haul road networks, construction compounds, laydown areas and HAGI/BVI construction sites. The DWMP will also specify measures for the treatment and discharge of dewatered groundwater. It will be developed by the construction contractor post-granting</p>                                                                                                                                             | CEMP and DCO requirement           |

| ID  | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Compliance mechanism            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|     | of the DCO and prior to commencement of works and will be secured through a DCO requirement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |
| C-3 | <b>Timing of works:</b> Pipeline construction is generally focused on the spring and summer months (March to September), with the aim to reduce impacts on agricultural land. The works at crossings and on pipelines in the public highway may occur outside the typical pipelaying season and throughout the year.                                                                                                                                                                                                                                                                                                         | CEMP and DWMP (DCO requirement) |
| C-4 | <b>Diversion and reinstatement of existing drainage networks:</b> To minimise impacts on surrounding agricultural land particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Existing land drainage systems will be maintained and diverted as necessary during construction and reinstated on completion.                                                                                                                                                                                                                                          | CEMP and DWMP (DCO requirement) |
| C-5 | <b>Private water supply abstraction risk assessment and mitigation strategy:</b> A detailed survey of private water supply abstractions will be carried out prior to construction to avoid abstractions wherever possible. Through risk assessment, where temporary loss of supply cannot be ruled out, alternative provision will be made, followed by full reinstatement on completion of the works.                                                                                                                                                                                                                       | CEMP and DWMP (DCO requirement) |
| C-6 | <b>Temporary provision of surface water drainage for construction areas:</b> Surface water drainage will be provided for construction areas, including the pipeline swathe, haul roads, construction compounds, laydown areas and HAGI/BVI construction sites, in line with the requirements of the DWMP. Construction drainage could include interceptor drains to ensure clean runoff from upslope areas is diverted away from working areas. Interceptor drains will provide appropriate water treatment and infiltration to ground or attenuation to greenfield rates, prior to discharge for runoff from working areas. | CEMP and DWMP (DCO requirement) |
| C-7 | <b>Management of dewatering of excavations:</b> Dewatering of trench excavations will be carefully monitored and groundwater flow disruption and drawdown will be minimised as much as possible by keeping excavation depths and abstraction rates to an operational minimum. Temporary cut-off drains will be installed to minimise surface water and shallow groundwater ingress into the pipeline trench and other excavations, such as Horizontal Directional Drilling (HDD) drive and reception pits (should                                                                                                            | CEMP and DWMP (DCO requirement) |

| ID          | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Compliance mechanism            |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|             | HDD be used) and excavations at HAGI/BVI construction sites. Appropriate treatment for dewatered groundwater will be installed before discharge to surface or land (as detailed below in measure <b>C-18</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |
| <b>C-8</b>  | <b>Silt management measures:</b> Silt management measures will be used to minimise the concentration of fine sediment in runoff from working areas and dewatered groundwater from excavations. These measures could include retaining as much vegetation as possible, seeding or sheeting of soil stockpiles where these are present for extended periods, discharge for infiltration to vegetated areas and the incorporation of silt fences, straw bales, settlement ponds or siltbuster-type devices into drainage systems prior to discharge to watercourses.                                                                                                                                                                                                                                                                                                       | CEMP and DWMP (DCO requirement) |
| <b>C-9</b>  | <b>Stand-off distances from watercourses, flood defences and water supply and sewage infrastructure:</b> To minimise the potential for impacts to watercourses, a stand-off distance from all watercourses/water bodies will be established (with the exception of crossings and where existing field access roads already located adjacent to watercourses are to be utilised). It is proposed that this is 8m for non-tidal watercourses and 16m for tidal watercourses, in order to align with Environment Agency FRAP requirements for Main Rivers and LLFA Land Drainage Consents requirements. These stand-offs will also apply to flood defences. Appropriate stand-off distances should also be applied where there is interaction between Project construction activities and water supply and sewerage infrastructure (to be agreed on a case-by-case basis). | CEMP and DWMP (DCO requirement) |
| <b>C-10</b> | <b>Timely reinstatement following completion of works:</b> Working areas will be reinstated to their pre-construction condition as soon as possible following completion of construction. If the risk of sediment mobilisation remains, any necessary drainage and silt management measures will stay in place until vegetation becomes re-established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CEMP (DCO requirement)          |
| <b>C-11</b> | <b>Permitting of discharges:</b> Discharges from construction activities will be subject to obtaining relevant discharge permits from the Environment Agency. A Monitoring Plan will be developed to ensure that the discharged water meets permit conditions (see measure <b>C-19</b> below)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Environmental Permit            |

| ID                                         | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Compliance mechanism           |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>C-12</b>                                | <b>Discharge outfall design:</b> Temporary construction outfalls will be suitably designed to minimise impacts on scour and erosion in the receiving watercourse and will be subject to FRAP for Main Rivers and OWC for Ordinary Watercourses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FRAP/OWC (DCO requirement)     |
| <b>Construction - pollution prevention</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |
| <b>C-13</b>                                | <b>Pollution Prevention Plan (PPP):</b> A PPP will be developed to support the final CEMP, detailing how ground and surface waters will be protected during construction. This will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning. The PPP will include measures to protect from materials becoming mobilised through flood water from all sources. It will also include measures for the protection of licenced and private water supply abstractions and could include a monitoring regime associated with critical or very proximate receptors (see measure <b>C-19</b> ). The PPP will be developed by the construction contractor post-granting of the DCO and prior to commencement of works and will be secured through a DCO requirement. | CEMP and PPP (DCO requirement) |
| <b>C-14</b>                                | <b>Storage of hydrocarbons and other chemicals:</b> Fuel storage will be in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 and other Environment Agency PPGs. Areas at risk of spillage will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or local watercourses. All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding. Any tanks and associated pipe work containing oils, fuels and chemicals will be double-skinned. They will have a bunded capacity appropriate for hazardous fluids.                                                                                                                                                                        | CEMP and PPP (DCO requirement) |
| <b>C-15</b>                                | <b>Refuelling, inspection and maintenance:</b> Refuelling of machinery will be undertaken within a designated area where spillages can be easily contained and provided with hydrocarbon separator. Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling will be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. Plant and machinery used during the construction and operation phases will be maintained to minimise the risks of oils leaks or similar. Placing a drip tray beneath a plant and machinery during refuelling and the availability of spill kits will contain small spillages.                                                                                                            | CEMP and PPP (DCO requirement) |

| ID   | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Compliance mechanism                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| C-16 | <b>Handling and processing of concrete:</b> Measures will be in place to control, store (and treat) concrete wash water and waste arising from the process on site. Concrete wash out areas on site should be sited away from any watercourses or drainage channels to prevent accidental escapes of liquid or slurries to the water environment. Lining of these areas may also be undertaken.                                                                                                                                                                                                                       | CEMP and PPP (DCO requirement)                       |
| C-17 | <b>Materials Management Plan (MMP):</b> Measures to avoid pollution impacts related to the disturbance of contaminated land will be documented in a MMP. Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the MMP. | DCO requirement                                      |
| C-18 | <b>Treatment and discharge of contaminated groundwater:</b> If water being pumped from excavations is suspected to be contaminated appropriate storage, testing and disposal will be undertaken in accordance with Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment. Contaminated groundwater will only be discharged following appropriate treatment, subject to an Environmental Permit.                                                                                               | CEMP, PPP (DCO requirement) and Environmental Permit |
| C-19 | <b>Monitoring and inspection programme:</b> A monitoring and inspection programme will be developed to ensure that the requirements of the PPP and Environmental Permits for discharge are being met during construction.                                                                                                                                                                                                                                                                                                                                                                                             | CEMP, PPP (DCO requirement) and Environmental Permit |
| C-20 | <b>Foul drainage from temporary compounds:</b> Appropriate treatment and disposal of sewage will be provided where no foul sewer is available to ensure protection of the water environment. Should discharge of treated effluent to watercourses or to land be required, this will be subject to an Environmental Permit.                                                                                                                                                                                                                                                                                            | Environmental Permit, if required.                   |
| C-21 | <b>Pre-commissioning pipeline testing:</b> Pre-commissioning pipeline testing will be subject to granting of requisite abstraction licences and discharge permits, subject to quantity and quality limits agreed with the Environment                                                                                                                                                                                                                                                                                                                                                                                 | Abstraction Licence and Environmental Permit         |

| ID                                          | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Compliance mechanism            |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|                                             | Agency during the licence/permit application process. Sufficient storage and treatment will be provided to ensure licence permit conditions are met. Design and risk assessment will reduce any impacts on sensitive water receptors and any environmental incidents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |
| <b>Construction - flood risk</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |
| <b>C-22</b>                                 | <b>Preferential siting:</b> Preferential siting of construction infrastructure and activities to minimise flood risk and impacts on sensitive receptors will be undertaken as far as possible. Any works in areas of significant flood risk will only be undertaken in line with the NPPF exception and sequential tests and subject to full FRA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FRA and CEMP (DCO requirement)  |
| <b>C-23</b>                                 | <b>Flood Emergency Response Plan (FERP):</b> An FERP will be prepared for those construction activities which must take place in areas of higher flood risk. This will describe the flood hazard, assess the risk to infrastructure and personnel, specify roles and responsibilities, describe arrangements for receiving flood warnings and responses to them (including evacuation as required) and identify evacuation routes. In addition, the FERP will set out arrangements for cessation of excavation dewatering activities should a flood alert or flood warning be received to minimise any impacts on flood flow conveyance and to maintain access for watercourse maintenance. The FERP will be developed by the construction contractor post-granting of the DCO and prior to commencement of works and will be secured through a DCO requirement. | FERP and CEMP (DCO requirement) |
| <b>C-24</b>                                 | <b>Minimise raised structures in floodplains:</b> Where potential flood risk receptors could be impacted by a loss of floodplain storage and/or impacts on floodplain conveyance, soil stockpiles (associated with both the pipeline construction and the temporary haul road) will be located outside of the fluvial floodplain wherever possible. Soil stockpile impacts in the floodplain, where unavoidable, will be mitigated through appropriate alignment, leaving gaps and cross-drainage. Haul road levels will be kept as close to existing ground levels as possible. Where haul roads must be raised, cross-drainage will be provided as required.                                                                                                                                                                                                   | FRA and CEMP (DCO requirement)  |
| <b>Construction - watercourse crossings</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |

| ID   | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Compliance mechanism                         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| C-25 | <b>Watercourse Crossing Plan (WCP):</b> A WCP will be developed to support the CEMP, setting out detailed design proposals for all watercourse crossings (temporary access and permanent pipeline), construction methods, mitigation requirements for installation, operation and, if required, removal and permitting requirements. The WCP will be developed by the construction contractor post-granting of the DCO and prior to commencement of works and will be secured through a DCO requirement.                                                                                                                                                                                                                                                                                                                                                                                                                      | CEMP and WCP (DCO requirement)               |
| C-26 | <b>Trenchless pipeline crossings:</b> All pipeline crossings of major watercourses are to be trenchless, with no temporary construction access crossing (including where flood defences present). Drive and reception pits or shafts for HDD and other trenchless technologies will be micro-sited outside of the floodplain where possible. All permanent pipeline crossings will pass beneath the bed of watercourses. Sufficient depth between the bed of the watercourse and the top of the pipeline will be provided to ensure no potential for exposure of pipeline due to scour. Where the pipeline route crosses an Environment Agency flood defence, trenchless methodologies will be used. All necessary permits (FRAP or OWC) will be obtained prior to commencement. Sensitive aquifers, identified from desk study and ground investigation works, will be considered in the design of the trenchless crossings. | CEMP, WCP, FRAP (DCO requirement) and/or OWC |
| C-27 | <b>Trenched crossings of minor watercourses:</b> Mitigation measures will be implemented to minimise impacts on flows, morphology, water quality and aquatic habitat. Working areas will be isolated and flows maintained by fluming or over-pumping. At sensitive crossing locations the working width will be reduced as far as practicable. Works will be brief, typically being completed in the short term. Banks and bed will be fully reinstated prior to flows being restored in the channel. The timing of in-channel works will be programmed to avoid seasonal fish spawning/migration periods for watercourses where this is identified as an issue. The timing of in-channel works will be programmed to avoid the wettest time of year, adapted when a flood warning is predicted. All necessary permits (FRAP or OWC) will be obtained prior to commencement.                                                  | CEMP, WCP, FRAP (DCO requirement) and/or OWC |
| C-28 | <b>Temporary construction access watercourse crossings:</b> Minor watercourses (where open cut techniques are proposed for the permanent pipeline crossings) will also typically have temporary crossings for                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CEMP, WCP, FRAP (DCO requirement) and/or OWC |

| ID                       | Embedded measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance mechanism                                            |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
|                          | the haul road to provide vehicular access along the route. Clear span bridges will be provided for larger or more sensitive watercourses to avoid impacts on channel morphology and aquatic habitat. Any temporary crossings will be in place for the minimal time possible. The mitigation measures set out above under measure <b>C-27</b> will be employed during crossing installation and removal. All necessary permits (FRAP or OWC) will be obtained prior to commencement.                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>C-29</b>              | <b>Managing groundwater risk during HDD:</b> Mitigation will be applied to reduce the potential risk of drilling contamination from drilling fluid/bentonite breakout into aquifer receptors. This will be achieved by suitable predesign surveys undertaken and the design and planning will also take account the conceptual hydrogeological model for a complete understanding of specific areas. Installation methodology will be based on best practices and controls on drilling fluid containment applied. Drilling additives will be selected to reduce environmental impacts and under environmental permitting. Contingency planning and emergency response would be prepared as part of the detailed planning stage prior to any works being undertaken. | CEMP, PPP, DWMP, MMP (DCO requirement) and Environmental Permit |
| <b>Operational phase</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |
| <b>O-1</b>               | <b>Periodic inspection and maintenance of flood protection and drainage measures:</b> Periodic inspection will be undertaken at HAGIs and BVI areas to ensure that they continue to operate effectively over the operational lifetime of the Project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DCO requirement                                                 |

7.6.3 Additional mitigation associated with the water environment is presented within the **Chapter 5: Biodiversity: Section 5.6**, including: 10. Habitat reinstatement, 11. Sensitive access and enabling works, 12. Protection of watercourses and 16. Screening of pumps.

7.6.4 The '10. Habitat reinstatement' embedded mitigation states that areas of temporary habitat loss would be reinstated back to its original habitat, wherever practicable, following the completion of construction in each area. It also mentions that any "Reinstatement works to watercourses may require measures to stabilise the banks and prevent erosion. Reinstatement measures will avoid hard structural elements, such as gabion baskets, sheet piling and concrete filled bags where possible. Geotextiles such as coir rolls, coir matting and GeoJute will be used in conjunction with seeding of an appropriate grass mix or planting, where

appropriate. Reinstatement of watercourse channel bed will use sediment of similar size to the natural bed, and of the same geology. Where possible, excavated material from the channel bed should be kept separate from other excavated material and used for reinstatement of the channel bed”.

- 7.6.5 The ‘11. Sensitive access and enabling works’ embedded mitigation states that “At sensitive crossing locations (e.g. rivers), existing access routes would be used as far as possible, and the width of any required working area reduced as far as practicable. If access upgrades are required on WFD watercourses, temporary bridges will be used in preference to culverts. Culverts may be used on smaller watercourses/ditches, but these will be sensitively designed to affect the minimum length possible, retaining the natural bed of the watercourse/ditch. Alternatively, they would be installed with the invert set below the natural bed level for a semi-natural bed to establish within the culvert. For watercourses (including minor rivers, streams and ditches) identified to support fish, culverts will be designed and constructed so that fish can pass where possible. Habitat would be re-instated to pre-works condition or better following the removal of temporary bridges and culverts”.
- 7.6.6 The ‘12. Protection of watercourses’ covers embedded mitigation to minimise impacts on watercourses, such as the establishment of stand-off distances similar to the embedded mitigation C9 above. It states that “A minimum stand-off from all other watercourses and water bodies would be adopted where possible on a location-specific basis. This would be in line with regional Environment Agency requirements, excluding required access crossing points”.
- 7.6.7 The ‘16. Screening of pumps’ embedded mitigation states that “Where pumping is required, intakes would be screened with a suitably sized pump guard screen to avoid the entrainment of fauna. A screen aperture size compliant with the Eel Regulations<sup>14</sup>, with a default size of 2mm, is proposed. A competent and appropriately qualified person, such as an ECoW, will be made responsible for monitoring upstream and downstream water levels and quality, as well as potential sediment and debris accumulation on pump guard screens. If impingement is observed, immediate efforts will be made to recover any affected fish (when safe to do so)”.

## 7.7 Scope of the Assessment

- 7.7.1 The scope of the assessment has been refined as the project design has evolved and is aligned to feedback received to date as set out in **Section 7.3** and **Appendix 7A**.

### Spatial scope

- 7.7.2 The spatial scope in terms of the Study Area and ZoI are defined in **Section 7.4**.

### Temporal scope

- 7.7.3 The temporal scope of the assessment of effects on the water environment is consistent with the period over which the Project would be carried out and

therefore covers the construction, operation and maintenance and decommissioning phases as set out in **Chapter 2: The Project**. In summary:

- as set out in **Chapter 2: The Project**, construction of the Project is expected to commence in Q1 2027 and to be ready for commissioning in Q1 2030;
- the operational lifetime of the Project is expected to be 40 years but it is anticipated that the actual life of the pipeline could extend well over 40 years depending on ongoing monitoring of pipeline integrity and routine maintenance and upgrading where required; and
- the timing of the decommissioning itself is more uncertain but it is assumed that decommissioning works would take between 6 to 12 months.

7.7.4 Water environment effects arising from the Project are not expected to persist beyond the lifetime of the Project, following implementation of embedded environmental measures (as set out in **Table 7.16**).

### Potential receptors

7.7.5 The baseline characterisation (**Section 7.5** and **Appendix 7B: Detailed water environment baseline information**) identifies potential water environment receptors (**Figures 7.1 to 7.6**) within the following three broad receptor types:

- aquatic environment;
- water resources; and
- flood risk.

7.7.6 Each of these receptor types are discussed below.

### Aquatic environment receptors

7.7.7 Aquatic environment receptors are defined within this assessment as WFD surface water and groundwater bodies as identified in the Environment Agency's Cycle 3 RBMPs, Ordinary Watercourses, minor watercourses and ditches, water-dependent designated nature conservation sites and GWDTEs. Non-reportable WFD water bodies are also considered.

7.7.8 The WFD surface water bodies and Ordinary Watercourses, minor watercourses and ditches are those identified in the Study Area, all intersected by and/or downstream of the Draft Order Limits, whilst the WFD groundwater bodies are all intersected by the Draft Order Limits. The conservation sites and GWDTEs considered in the assessment are intersected by the Draft Order Limits and/or reside within the ZoI and have a hydrological or hydrogeological component to their designation. The rationale behind this conservation site screening is presented in **Chapter 5: Biodiversity** and **Table 2.6 of Appendix 7B**.

7.7.9 A standalone WFD compliance assessment is presented in **Appendix 7E** and considers impacts of the Project with respect to WFD compliance for both surface water and groundwater bodies, plus the water bodies overall status.

### Water resources receptors

- 7.1.1 Water resources receptors are defined as surface water and groundwater abstractions whose associated catchment areas are intersected by the Draft Order Limits and/or within the ZOI and/or down hydraulic gradient respectively. Discharges to surface water within the Draft Order Limits are also considered.
- 7.1.2 It should be noted that the Principal Aquifer vulnerability is screened within **Appendix 7B – Table 7B.7** in terms of identifying potential pathways from surface works into areas of the subsurface within SPZs. The aquifers themselves are assessed under WFD groundwater bodies within the **Appendix 7D** assessment.

### Flood risk receptors

- 7.7.10 Flood risk receptors are defined as people, property and infrastructure that could be at risk of flooding. Further detail regarding the identification of flood risk receptors is set out in the FRA (**Appendix 7F**).
- 7.7.11 The water environment receptors that have been identified as being potentially subject to effects are summarised in Table 7.17.

**Table 7.17 Water environment receptors subject to potential effects**

| Receptor                                                                                  | Reason for consideration                                                                     |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Aquatic environment receptors</b>                                                      |                                                                                              |
| <b><i>WFD river water bodies</i></b>                                                      | WFD river water bodies which are intersected by and/or downstream of the Draft Order Limits. |
| Sinderland Brook (GB112069060980)                                                         |                                                                                              |
| Whittle Brook (Mersey Estuary) (GB112069060990)                                           |                                                                                              |
| Sutton Brook (GB112069061170)                                                             |                                                                                              |
| Weaver (Dane to Frodsham) (GB 112068060500)                                               |                                                                                              |
| Mersey/Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin)<br>(GB112069061011) |                                                                                              |
| River Weaver (Barnet to Valley Brook) (GB112068060461)                                    |                                                                                              |
| River Weaver (Valley Brook to Winsford Flashes)<br>(GB112068060462)                       |                                                                                              |
| River Weaver (Winsford Flashes to Dane) (GB112068060463)                                  |                                                                                              |
| Bollin (Ashley Mill to Manchester Ship Canal) (GB112069061382)                            |                                                                                              |
| Dane (Wheelock to Weaver) (GBGB112068060470)                                              |                                                                                              |
| Gale Brook (GB112068060430)                                                               |                                                                                              |

| Receptor                                                                              | Reason for consideration                                                                     |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Puddinglake Brook (GB112068060220)                                                    |                                                                                              |
| Bogart Brook (GB112068060540)                                                         |                                                                                              |
| Cuddington Brook (Source to Crowton Brook)<br>(GB112068060480)                        |                                                                                              |
| Wade Brook (GB112068060370)                                                           |                                                                                              |
| Peckmill Brook, Hoolpool Gutter at Ince Marshes<br>(GB112068060330)                   |                                                                                              |
| Arley Brook (Source to Gale Brook) (GB112068060420)                                   |                                                                                              |
| Keckwick Brook (GB112068060520)                                                       |                                                                                              |
| Cogshall Brook (GB112068060510)                                                       |                                                                                              |
| Mersey (Bollin confluence to Howley Weir) including Padgate Brook<br>(GB112069061012) |                                                                                              |
| Hardshaw (Windle) Brook (GB112069061210)                                              |                                                                                              |
| <b>WFD canal water bodies</b>                                                         | WFD canal water bodies which are intersected by and/or downstream of the Draft Order Limits. |
| Weaver Navigation (canal section Frodsham to Weston Point Docks)<br>(GB71210545)      |                                                                                              |
| Bridgewater Canal (GB71210001)                                                        |                                                                                              |

| Receptor                                                                                   | Reason for consideration                                                                                 |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Manchester Ship Canal (GB71210004)                                                         |                                                                                                          |
| Sankey Canal (GB71210055)                                                                  |                                                                                                          |
| Trent and Mersey Canal, summit to Preston Brook Tunnel (GB71210247)                        |                                                                                                          |
| <b>WFD transitional water body</b>                                                         | WFD transitional surface water body which is intersected by and/or downstream of the Draft Order Limits. |
| Mersey (GB531206908100)                                                                    |                                                                                                          |
| <b>Non-reportable WFD surface water bodies</b>                                             | Surface water bodies which are intersected by and/or downstream of the Draft Order Limits.               |
| <b>WFD groundwater bodies</b>                                                              | WFD groundwater bodies which are intersected by the Draft Order Limits.                                  |
| Wirral and West Cheshire Permo-Triassic Sandstone Aquifers (GB41101G202600)                |                                                                                                          |
| Weaver and Dane Quaternary Sand and Gravel Aquifers (GB41202G991700)                       |                                                                                                          |
| Manchester and East Cheshire Permo-Triassic Sandstone Aquifers (GB41201G101100)            |                                                                                                          |
| Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers (GB41201G101700) |                                                                                                          |
| Sankey and Glaze Carboniferous Aquifers (GB41202G100100)                                   |                                                                                                          |

| Receptor                                                            | Reason for consideration                                                                                                                          |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Ordinary Watercourses, minor watercourses and ditches</i></b> |                                                                                                                                                   |
| <b><i>Conservation sites</i></b>                                    | Designated conservation sites which are intersected by the Draft Order Limits and/or reside within the Zol and are identified as water dependent. |
| <b>C2</b> Woolston Eyes (SSSI)                                      |                                                                                                                                                   |
| <b>C3</b> Pettypool Brook Valley (SSSI)                             |                                                                                                                                                   |
| <b>C4</b> Mersey Estuary (SSSI, RAMSAR, SPA, LWS)                   |                                                                                                                                                   |
| <b>C7</b> Thatto Heath Meadows (LNR, LWS)                           |                                                                                                                                                   |
| <b>C10</b> Marshall's Arm, Hartford (LNR)                           |                                                                                                                                                   |
| <b>C14</b> Old Mineral Line Lea Green (LWS)                         |                                                                                                                                                   |
| <b>C15</b> Pendlebury Brook (SJ493920-SJ515914) (LWS)               |                                                                                                                                                   |
| <b>C16</b> Whittle Brook (SJ521902-SJ535896) (LWS)                  |                                                                                                                                                   |
| <b>C17</b> Ansdells Wood (LWS)                                      |                                                                                                                                                   |
| <b>C18</b> Ravenhead Ponds (LWS)                                    |                                                                                                                                                   |
| <b>C23</b> Sutton Manor (LWS)                                       |                                                                                                                                                   |
| <b>C24</b> Sinderland Green Wood (LWS)                              |                                                                                                                                                   |
| <b>C25</b> Partington Nature Reserve                                |                                                                                                                                                   |
| <b>C28</b> Moore Nature Reserve (LWS)                               |                                                                                                                                                   |
| <b>C29</b> Upper Moss Side Farm (LWS)                               |                                                                                                                                                   |
| <b>C30</b> Norton Marsh and Upper Moss Side Fields (LWS)            |                                                                                                                                                   |

| Receptor                                                       | Reason for consideration |
|----------------------------------------------------------------|--------------------------|
| <b>C31</b> Gatewarth (LWS)                                     |                          |
| <b>C33</b> Rows Wood (LWS)                                     |                          |
| <b>C34</b> St Helens Canal Disused A (LWS)                     |                          |
| <b>C36</b> Pitts Heath Wood (LWS)                              |                          |
| <b>C37</b> Clifton Lagoon (LWS)                                |                          |
| <b>C38</b> Mort's Wood (LWS)                                   |                          |
| <b>C44</b> Disused Railway Line South of Warrington Road (LWS) |                          |
| <b>C52</b> Weston Marsh Lagoon (LWS)                           |                          |
| <b>C57</b> Clifton Cloughs_B (LWS)                             |                          |
| <b>C58</b> Clifton Cloughs_A (LWS)                             |                          |
| <b>C59</b> Walton Locks (LWS)                                  |                          |
| <b>C63</b> Woolstencroft Farm Meadow (LWS)                     |                          |
| <b>C64</b> Fields Behind Ye Olde No. 3_B (LWS)                 |                          |
| <b>C66</b> Frodsham Field Studies Centre (LWS)                 |                          |
| <b>C67</b> Sutton Bridge Unused Lagoon (LWS)                   |                          |
| <b>C68</b> Lowes Wood (LWS)                                    |                          |
| <b>C69</b> Lower Weaver Valley Woods (LWS)                     |                          |
| <b>C75</b> East Clifton Tip (LWS)                              |                          |

| Receptor                                            | Reason for consideration |
|-----------------------------------------------------|--------------------------|
| <b>C79</b> Birds Wood (LWS)                         |                          |
| <b>C80</b> Rye Grass Pipes (LWS)                    |                          |
| <b>C81</b> Quick Woods (LWS)                        |                          |
| <b>C83</b> Park Brow Pool (LWS)                     |                          |
| <b>C85</b> Lodge Wood (LWS)                         |                          |
| <b>C86</b> Garden Wood (LWS)                        |                          |
| <b>C87</b> Dutton Dean (LWS)                        |                          |
| <b>C88</b> New Pool and Wood (LWS)                  |                          |
| <b>C91</b> Weaver Valley/Newbridge Pool (LWS)       |                          |
| <b>C94</b> Heys Wood and the Riddings (LWS)         |                          |
| <b>C102</b> Dutton Dingles (LWS)                    |                          |
| <b>C103</b> Acton Bridge Meadows (LWS)              |                          |
| <b>C110</b> Helsby Hill (LWS)                       |                          |
| <b>C112</b> Sandiway Golf Course (LWS)              |                          |
| <b>C113</b> Frodsham, Helsby and Ince Marshes (LWS) |                          |
| <b>C115</b> Puddinglake Brook Wood (LWS)            |                          |
| <b>C117</b> Trent and Mersey Canal, Whatcroft (LWS) |                          |
| <b>C118</b> Whatcroft Lane Wetlands (LWS)           |                          |

| Receptor                                                                                                                                                                                                                                                                                                                                                                   | Reason for consideration                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>C119</b> Littledales Gorse (LWS)<br><b>C120</b> Meadow by Earls Wood and River Dane (LWS)<br><b>C121</b> Park Moss Wood (LWS)<br><b>C123</b> Merryfall Wood (LWS)<br><b>C124</b> Cuddington Brook (North) (LWS)<br><b>C127</b> River Dane, Bostock (LWS)<br><b>C130</b> Sutton Mill Dam (LWS)<br><b>C136</b> Sinderland Green Wood (LWS)<br><b>C137</b> Red Brook (LWS) |                                                                                                                                                                                                                  |
| <b>Water resources receptors</b>                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                  |
| <b><i>Licensed non-public groundwater abstractions</i></b>                                                                                                                                                                                                                                                                                                                 | Licensed non-public groundwater abstractions whose associated catchment areas (assumed groundwater catchment radius limit of 1.5km) are intersected by and/or down hydraulic gradient of the Draft Order Limits. |
| <b>A1</b> 2569017028, borehole at Peterhouse Farm, Gorsey Lane, Warburton                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |
| <b>A2, A3</b> 2569017026, borehole at Broad Oak Farm, Warburton, Lymm                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                  |
| <b>A4 – A7</b> 2569024013, boreholes at Warrington and Penketh Cheshire - Well 12                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                  |
| <b>A8</b> NW/069/0024/005, AO Plant Wells                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                  |

| Receptor                                                                             | Reason for consideration |
|--------------------------------------------------------------------------------------|--------------------------|
| <b>A9 – A13</b> 2569024013, boreholes at Warrington and Penketh Cheshire- Well 11    |                          |
| <b>A24</b> 2568004025, borehole at Blackstone Farm, Lower Whitley, Daresbury         |                          |
| <b>A25 – A28</b> 2569024013, boreholes at Warrington and Penketh Cheshire - Well 2   |                          |
| <b>A29 – A31</b> 2569024013, boreholes at Warrington and Penketh Cheshire - Well 1   |                          |
| <b>A32, A33</b> 2569024013, boreholes at Warrington and Penketh Cheshire - Well 5    |                          |
| <b>A34 – A43</b> 2569024024, 5 boreholes at Fiddlers Ferry Power Station, Widnes     |                          |
| <b>A44</b> 2569024027, borehole at Gatewarth Ind. Estate, Sankey Bridges, Warrington |                          |
| <b>A45</b> 2569027004, borehole near LH's premises at Moorfield Road, Widnes         |                          |
| <b>A48</b> 2568003039, well at Aston Grange, Preston Brook                           |                          |
| <b>A49</b> 2568003088, borehole at premises at Rocksavage Works, Runcorn             |                          |

| Receptor                                                                                | Reason for consideration                                                                                                                               |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| A51 – A56 2569024013, boreholes at Warrington and Penketh Cheshire - Well 6             |                                                                                                                                                        |
| A57 – A62 NW/068/0006/012, borehole No 7 at Thornton-Le-Moors & Stanlow, Ellesmere Port |                                                                                                                                                        |
| A65 2568003052, well at Dairy Farm, High Legh, Knutsford                                |                                                                                                                                                        |
| A84 2568005002, borehole at Mersey Bank Farm, Hapsford, Helsby                          |                                                                                                                                                        |
| <b><i>Licensed public groundwater abstractions</i></b>                                  | Licensed public groundwater abstractions whose associated catchment areas are intersected by and/or down hydraulic gradient of the Draft Order Limits. |
| A107 2568004008, Boreholes (2) at Hough Lane, Higher Walton, Warrington                 |                                                                                                                                                        |
| A109 2568004016, Borehole at Daresbury, near Warrington                                 |                                                                                                                                                        |
| A112 2569025037, Borehole (1) & Wells (2), Eccleston Hill, St.Helens                    |                                                                                                                                                        |
| A113 Bold Heath Borehole - non-operational borehole                                     |                                                                                                                                                        |
| A114 Broomedge Borehole - non-operational borehole                                      |                                                                                                                                                        |
| <b><i>Licensed non-public surface water abstractions</i></b>                            | Surface water abstractions whose associated catchment areas are intersected by and/or reside within the Zol.                                           |
| A116 2569020060, Bridgewater Canal at Agden, Lymm                                       |                                                                                                                                                        |
| A117 2569020063, River Bollin at Agden, Lymm, Cheshire                                  |                                                                                                                                                        |

| Receptor                                                                             | Reason for consideration |
|--------------------------------------------------------------------------------------|--------------------------|
| A118 2569020041, River Bollin at Heatley, Altrincham, Cheshire                       |                          |
| A120 2569017033, Caldwell Brook at Sinderland Green, Dunham Massey, Altrincham       |                          |
| A121 2569017030, Sinderland Brook at Warburton, Lymm, and Dunham Massey, Altrincham  |                          |
| A122 2569017031, Sinderland Brook at Sinderland Green Dunham Massey, Altrincham      |                          |
| A123 2569020067, Bridgewater Canal at Agden                                          |                          |
| A125 2568001028, Rookery Pool at Vale Royal Abbey, Whitegate                         |                          |
| A126 2568001206, Pettypool Brook at Whitegate, Winsford, Cheshire                    |                          |
| A127 2568001173, River Weaver at LH's Premises, Winsford, Cheshire                   |                          |
| A128 2569020059, River Bollin at Warburton, Lymm                                     |                          |
| A129 2569020010, River Bollin at Warburton, Lymm, Cheshire                           |                          |
| A130 2568001018, Petty Pool, Sandiway fed by unnamed tributaries of the River Weaver |                          |

| Receptor                                                                       | Reason for consideration |
|--------------------------------------------------------------------------------|--------------------------|
| A132 NW/068/0003/003, Cliff Brook at Acton Bridge, Northwich, Cheshire         |                          |
| A133 2568003120, Acton Brook at Weaverham, Northwich                           |                          |
| A134, A135 2568003082, River Weaver at premises, Winnington, Northwich         |                          |
| A136 NW/068/0003/014, River Weaver Navigation at Saltersford Lock              |                          |
| A137 NW/068/0003/009, Anderton Boat Lift                                       |                          |
| A139 2568003097, Whitley Brook at Heath Hall Farm, Little Leigh                |                          |
| A140 NW/068/0003/011, Hydropower Intake - Dutton Sluices                       |                          |
| A141 2568003097, Whitley Brook (tributary) at Heath Hall Farm, Little Leigh    |                          |
| A143, A144 2568004026, Unnamed Watercourse feeding a pond at Daresbury Farm,   |                          |
| A145, A146 2569024005, River Mersey at Bank Quay, Warrington                   |                          |
| A148 2568003109, Weston Canal (Weaver Navigation) at Pumping Station, Frodsham |                          |
| A149 2568003095, Weston Canal at Sutton, Runcorn, Sutton Causeway/West         |                          |

| Receptor                                                                        | Reason for consideration                                                                                                                                                         |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A150, A151 2568004997, Weston Canal at Weston Point Runcorn Cheshire            |                                                                                                                                                                                  |
| A152, A153 2568009008, Manchester Ship Canal at Weston Point, Runcorn           |                                                                                                                                                                                  |
| A154, A155 2569025077, St. Helens Canal at St. Helens, Merseyside               |                                                                                                                                                                                  |
| A156 2569017032, Red Brook at Warburton, Lymm, Cheshire                         |                                                                                                                                                                                  |
| A157, A161, A162 2568009001, Manchester Ship Canal at Ellesmere Port            |                                                                                                                                                                                  |
| A158, A159 2568009017, Manchester Ship Canal at Ellesmere Port                  |                                                                                                                                                                                  |
| A160 NW/068/0006/016, Inland Water - Thornton Brook at Stanlow Manufacturing    |                                                                                                                                                                                  |
| A163 NW/069/0007/002, Manchester Ship Canal, Partington, Carrington, Manchester |                                                                                                                                                                                  |
| <b><i>Deregulated abstractions</i></b>                                          |                                                                                                                                                                                  |
| <b>A165</b> 2568005002, borehole at Mersey Bank Farm, Hapsford, Helsby          | Abstractions whose associated catchment areas (assumed groundwater catchment radius limit of 1.5km) are intersected by and/or down hydraulic gradient of the Draft Order Limits. |

| Receptor                                                                                                                                                                                                                                                                                                            | Reason for consideration                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A170</b> 2569017028, borehole at Peterhouse Farm, Gorsey Lane, Warburton                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                         |
| <b>Consented discharges</b>                                                                                                                                                                                                                                                                                         | Discharges within the Draft Order Limits.                                                                                                                                                                                                               |
| D1 Porch House Farm, Runcorn Road, Higher Walton (EPRAP3424GU) at SJ 58813 84891                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                         |
| D2 East Clifton Marsh Northern Outfall, Frodsham, Cheshire (016890503) at SJ 52690 79040                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                         |
| D3/D4 Encirc, Ash Road, Elton, Cheshire (016892435) at SJ 46207 76302                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                         |
| D5 Weaver Sailing Club (016892391) at SJ 52840 78830                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                         |
| <b>Flood risk receptors</b>                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                         |
| Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.                                                                                                                                                                                                          | Property, infrastructure and people with a very high vulnerability to flooding as per Table 7.20, which is classified as “essential infrastructure” and “highly vulnerable” in the NPPF <sup>23</sup> Annex 3: Flood risk vulnerability classification. |
| Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for:                                                                                                                                                                                |                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>Electricity supply including generation, storage and distribution systems (including electricity generating power stations);</li> <li>Grid and primary substations storage; and</li> <li>Water treatment works that need to remain operational in times of flood.</li> </ul> |                                                                                                                                                                                                                                                         |

**Receptor****Reason for consideration**

- Wind turbines
- Solar farms
- Police and ambulance stations
- Fire stations and command centres
- Telecommunications installations required to be operational during flooding
- Emergency dispersal points
- Basement dwellings
- Caravans, mobile homes and park homes intended for permanent residential use
- Installations requiring hazardous substances consent

For the Project, this includes:

- Pipe laying
- Material storage locations
- Trenchless crossing compounds
- HAGI temporary compounds
- Temporary access routes
- Pipeline
- DNO connections

| Receptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reason for consideration                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>HAGIs</li> <li>Pigging areas</li> <li>BVIs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                     |
| <p>Hospitals</p> <p>Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels</p> <p>Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels</p> <p>Non-residential uses for health services, nurseries and educational establishments</p> <p>Landfill and sites used for waste management facilities for hazardous waste</p>                                                                                                                                                                                                                                                     | <p>Property, infrastructure and people with a high vulnerability to flooding as per Table 7.20, which is classified as "more vulnerable" to flooding in the NPPF<sup>23</sup> Annex 3: Flood risk vulnerability classification.</p> |
| <p>Police, ambulance and fire stations which are not required to be operational during flooding</p> <p>Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution</p> <p>Non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure</p> <p>Land and buildings used for agriculture and forestry</p> <p>Waste treatment (except landfill and hazardous waste facilities)</p> <p>Minerals working and processing (except for sand and gravel working)</p> <p>Water treatment works which do not need to remain operational during times of flood</p> | <p>Property, infrastructure and people with a moderate to low vulnerability to flooding as per Table 7.20, which is classified as "less vulnerable" in the NPPF<sup>23</sup> Annex 3: Flood risk vulnerability classification.</p>  |

| Receptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reason for consideration                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place</p> <p>Car parks</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                              |
| <p>Water transmission infrastructure and pumping stations</p> <p>Sewage transmission infrastructure and pumping stations.</p> <p>Sand and gravel working</p> <p>Docks, marinas and wharves</p> <p>Navigation facilities.</p> <p>Ministry of Defence installations</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.</p> <p>Water-based recreation (excluding sleeping accommodation).</p> <p>Lifeguard and coastguard stations</p> <p>Amenity open space, nature conservation and biodiversity, outdoor sports and recreation.</p> <p>For the Project, this includes pipeline watercourse crossings.</p> | <p>Property, infrastructure and people that are resilient to flooding as per Table 7.20, which is classified as water compatible development” in the NPPF<sup>23</sup> Annex 3: Flood risk vulnerability classification.</p> |

## Likely significant effects

- 7.7.12 The effects on water environment receptors that have the potential to be significant and have been taken forward for detailed assessment in **Section 7.9** and **Appendix 7D** are summarised in Table 7.18. Construction phase effects would be temporary in nature for the duration of the works. Operational phase effects would persist throughout this phase, until such time as permanent project infrastructure is decommissioned. Decommissioning phase effects are likely to be similar to those for the construction phase, again being temporary, but of a lesser magnitude and less widely spatially distributed, due to the fact that much of the subsurface infrastructure would be left in-situ at the end of its operational lifetime.

**Table 7.18 Water environment effects scoped in for further assessment**

| Receptor                                                 | Likely significant effects                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Construction phase</b>                                |                                                                                                                                                                                                                                                                                                                                                 |
| <b>Aquatic environment and water resources receptors</b> | Deterioration in the water quality of surface water bodies via generation of sediment laden run-off from working areas and discharge of dewatered groundwater from excavations.                                                                                                                                                                 |
|                                                          | Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants.                                                                                                              |
|                                                          | Impacts on groundwater levels and/or hydrogeological flow regimes from the dewatering of trenched or trenchless excavations for pipeline and/or the effects of underground infrastructure due to barriers to flow and/or the development of less permeable access track or temporary construction compound establishment reducing infiltration. |
|                                                          | Reduction of water availability, due to impacts on groundwater levels or water quality, to support existing groundwater or surface water designated sites, ecosystems and water dependent features.                                                                                                                                             |
|                                                          | Potential effects on hydromorphology and flow regime of surface water bodies as a result of increased runoff, dewatering of excavations and sediment inputs from working areas or direct watercourse disturbance (including from new watercourse crossings).                                                                                    |
|                                                          | Physical disruption to existing discharge infrastructure from trenching and temporary access track or temporary construction compound establishment.                                                                                                                                                                                            |

| Receptor                                                 | Likely significant effects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          | Reduction of water availability to support existing surface water abstractions or changes to groundwater levels and/ or flow regimes as a consequence of water quantity and/or quality effects arising from pre-commissioning pipeline testing.                                                                                                                                                                                                                                                                                            |
| <b>Flood risk receptors</b>                              | <p>Changes to fluvial or tidal flood risk associated with raised structures in the floodplain (loss of floodplain storage and continuity and/or change in floodplain flow conveyance).</p> <p>Increased flood risk arising from restricted flow conveyance at trenched pipeline crossings and temporary construction access crossings.</p> <p>Changes to surface water flood risk due to changes in runoff rates and flow pathways resulting from ground disturbance and creation of new impermeable surfaces.</p>                         |
| <b>Operational and maintenance phase</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Aquatic environment and water resources receptors</b> | <p>Changes in channel morphology and fluvial geomorphological processes should pipelines become exposed at watercourse crossings.</p> <p>Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure.</p>                                                                                                                                                                                                                                                                               |
| <b>Flood risk receptors</b>                              | <p>Changes to fluvial or tidal flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance, where permanent above ground infrastructure is located in tidal or fluvial flood zones.</p> <p>Changes to surface water flood risk due to changes in flow pathways and runoff rates resulting from changed ground levels and creation of new impermeable surfaces for permanent above ground infrastructure.</p> <p>Changes to groundwater flood risk due to presence of underground infrastructure.</p> |
| <b>Decommissioning phase</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>All receptors</b>                                     | Likely to be similar to those arising from construction, although of a lesser magnitude and less widely spatially distributed.                                                                                                                                                                                                                                                                                                                                                                                                             |

## Elements scoped out of further assessment

7.7.13 Theoretical receptors scoped out from the assessment include the following:

- Ponds upslope of the Draft Order Limits because they are not hydrologically connected and therefore would not be impacted. Furthermore, ponds identified within the Draft Order Limits are small ephemeral features that have very local land drainage use. They therefore have limited hydrological value and so have also been scoped out of the water assessment. However, the value of these ponds is in the habitat they provide, and any impacts associated with this attribute is assessed in **Chapter 5: Biodiversity**.
- WFD water bodies, such as lake surface water bodies, that are over 500m upstream of the Draft Order Limits since no hydrological connection is anticipated.
- Licensed and de-regulated groundwater abstractions over 1.5km from the Draft Order Limits since this is assumed to be beyond the full catchment zone of the abstraction and therefore no hydrological connection is anticipated.

7.7.14 The deterioration in water quality of surface water bodies due to permitted discharges from construction (e.g. treated sewage effluent from welfare facilities or pre-commissioning pipeline testing) have been scoped out since these activities would be undertaken under appropriate environmental permitting. It is therefore assumed that the Project would not introduce any new long-term sources of nutrients into the environment during construction, operation and/or decommissioning associated with foul water arisings from worker facilities and it is anticipated that these impacts would be fully mitigated through the implementation of standard construction good practice (see **Appendix 7F: Flood Risk Assessment – Annex 7F6: Outline Drainage Strategy**).

7.7.15 Although the baseline in **Section 7.5** considers aquifer vulnerability and barriers to flow in terms of aquifer type and status, the assessment has been undertaken with respect to the WFD groundwater bodies. Effects on Principal and Secondary aquifers are therefore assessed in terms of their associated WFD groundwaters.

7.7.16 In addition, the effects detailed in **Table 7.19** have been scoped out from the assessment because they are not considered likely to be significant.

**Table 7.19 Summary of effects scoped out of the water environment assessment**

| Receptors/potential effects                                                    | Justification                                                                                                                                                                                    |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational and maintenance phase water quality effects on aquatic environment | Once construction is completed, there would be no routine discharges from the Project to the water environment. Furthermore, operational and maintenance activities would not involve the use of |

| Receptors/potential effects                                                                               | Justification                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| and water resource receptors                                                                              | heavy plant or the storage or handling of hydrocarbons or other potentially polluting substances.                                                                                                                                                                                                                               |
| Operational and maintenance phase flow regime effects on aquatic environment and water resource receptors | All operational abstraction and discharge during the operational phase of the Project would be via newly installed pipeline and drainage outlets for the permanent drainage ( <b>Appendix 7F: Flood Risk Assessment – Annex 7F6: Outline Drainage Strategy</b> ) so there would be no effects on the water environment.         |
| Risk of sewer flooding to project infrastructure (all phases)                                             | The baseline risk posed by sewer flooding has been assessed to be generally very low, due in large part to the predominantly rural nature of the Draft Order Limits. In addition, mitigation for other sources of flood risk (notably surface water flooding) would be provided and would also be effective for sewer flooding. |

## 7.8 Assessment Methodology

### Introduction

7.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 3: Approach to preparing the Draft ES**, and specifically in **Section 3.10**. However, whilst this has informed the approach that has been used in the water environment assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of the water environment assessment.

### Assessment criteria

7.8.2 Assessment criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including WFD and the NPPF, all of which represent good practice for water environment assessments within EIAs for NSIPs. The WFD assessment has its own specific assessment methodology set out within **Appendix 7E**.

### Significance evaluation methodology

- 7.8.3 The significance level attributed to each effect is assessed based on the sensitivity (value) of the affected receptor and the magnitude of change resulting from the Project. The level of significance is then determined by the combination of receptor sensitivity and magnitude of change.
- 7.8.4 Receptor sensitivity is assessed on a scale of high, medium, low and very low, whilst magnitude of change is assessed on a scale of high, medium, low and negligible.

### *Sensitivity of receptor*

- 7.8.5 Definitions of receptor sensitivity used in the assessment are provided in Table 7.20 together with examples of receptors for each receptor type.

Table 7.20 Definitions of receptor sensitivity

| Sensitivity | Criteria                                                                                                                      | Examples                                                                                                                                                                                                                                                                                                                                     | Scoped in receptor list                                                                                                                                                                         |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High        | Aquatic environment feature with a high quality and rarity at an international scale, with little potential for substitution. | <p>WFD surface water bodies (rivers, canals and transitional) with overall 'Good' status/potential.</p> <p>WFD groundwater bodies with overall 'Good' status.</p> <p>Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar sites), where the designation is based specifically on aquatic features.</p> | <p>WFD surface water bodies:<br/><i>None</i></p> <p>WFD groundwater bodies:<br/><i>None</i></p> <p>Conservation sites:<br/><i>C4 Mersey Estuary</i></p>                                         |
|             | Water resources supporting human health and economic activity at a regional scale.                                            | <p>Regionally important licensed public surface water and groundwater supplies.</p> <p>Large-scale permitted discharges e.g. city-scale Wastewater Treatment Works (WWTW) treated effluent discharges.</p>                                                                                                                                   | <p>Public water supplies:<br/><i>Higher Walton</i><br/><i>Daresbury</i><br/><i>Eccleston Hill</i><br/><i>Bold Heath</i><br/><i>Broomedge</i></p> <p>Large-scale discharges:<br/><i>None</i></p> |
|             | Flood risk receptors - Property, infrastructure and people with a very                                                        | Land use classified in the NPPF <sup>23</sup> Annex 3: Flood risk vulnerability classification as 'Essential Infrastructure' and 'Highly Vulnerable'.                                                                                                                                                                                        | Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.                                                                                      |

| Sensitivity | Criteria                        | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|---------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | high vulnerability to flooding. |          | <p>Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for:</p> <p><i>Electricity supply including generation, storage and distribution systems (including electricity generating power stations); grid and primary substations storage; and water treatment works that need to remain operational in times of flood.</i></p> <p><i>Wind turbines</i></p> <p><i>Solar farms</i></p> <p><i>Police and ambulance stations</i></p> <p><i>Fire stations and command centres</i></p> <p><i>Telecommunications installations required to be operational during flooding</i></p> <p><i>Emergency dispersal points</i></p> <p><i>Basement dwellings</i></p> <p><i>Caravans, mobile homes and park homes intended for permanent residential use</i></p> <p><i>Installations requiring hazardous substances consent</i></p> <p>For the Project, this includes:</p> <ul style="list-style-type: none"> <li>- Pipe laying</li> <li>- Material storage locations</li> <li>- Trenchless crossing compounds</li> <li>- HAGI temporary compounds</li> </ul> |

| Sensitivity   | Criteria                                                                                                                                | Examples                                                                                                                                                                                                                                                                                                                                    | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>- Temporary access routes</li> <li>- Pipeline</li> <li>- DNO connections</li> <li>- HAGIs</li> <li>- Pigging Areas</li> <li>- BVIs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Medium</b> | Aquatic environment feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution. | <p>WFD surface water bodies (rivers, canals and transitional) with overall 'Moderate' or lower status/potential.</p> <p>WFD groundwater bodies with overall 'Poor' status.</p> <p>Conditions supporting sites with national conservation designations (e.g. SSSI, NNR) where the designation is based specifically on aquatic features.</p> | <p>WFD surface water bodies:</p> <p><i>Mersey</i></p> <p><i>Sinderland Brook</i></p> <p><i>Whittle Brook (Mersey Estuary)</i></p> <p><i>Sutton Brook</i></p> <p><i>Weaver (Dane to Frodsham)</i></p> <p><i>Mersey/Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin)</i></p> <p><i>River Weaver (Barnet to Valley Brook)</i></p> <p><i>River Weaver (Valley Brook to Winsford Flashes)</i></p> <p><i>River Weaver (Winsford Flashes to Dane)</i></p> <p><i>Bollin (Ashley Mill to Manchester Ship Canal)</i></p> <p><i>Dane (Wheelock to Weaver)</i></p> <p><i>Gale Brook</i></p> <p><i>Puddinglake Brook</i></p> <p><i>Bogart Brook</i></p> <p><i>Cuddington Brook (Source to Crowton Brook)</i></p> <p><i>Wade Brook</i></p> |

| Sensitivity | Criteria | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|----------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          |          | <p><i>Peckmill Brook, Hoolpool Gutter at Ince Marshes</i></p> <p><i>Arley Brook (Source to Gale Brook)</i></p> <p><i>Keckwick Brook</i></p> <p><i>Cogshall Brook</i></p> <p><i>Mersey (Bollin confluence to Howley Weir) including Padgate Brook</i></p> <p><i>Hardshaw (Windle) Brook</i></p> <p><i>Weaver Navigation (canal section Frodsham to Weston Point Docks)</i></p> <p><i>Bridgewater Canal</i></p> <p><i>Manchester Ship Canal</i></p> <p><i>Sankey Canal</i></p> <p><i>Trent and Mersey Canal, summit to Preston Brook Tunnel</i></p> <p>WFD groundwater bodies:</p> <p><i>Wirral and West Cheshire Permo-Triassic Sandstone Aquifers</i></p> <p><i>Weaver and Dane Quaternary Sand and Gravel Aquifers</i></p> <p><i>Manchester and East Cheshire Permo-Triassic Sandstone Aquifers</i></p> <p><i>Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers</i></p> <p><i>Sankey and Glaze Carboniferous Aquifers</i></p> <p>Conservation sites:</p> |

| Sensitivity | Criteria                                                                                          | Examples                                                                                                                                                                                                                                                                                                                                                                      | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                               | <p>C2 Woolston Eyes</p> <p>C3 Pettypool Brook Valley</p>                                                                                                                                                                                                                                                                                                                                  |
|             | Water resources supporting human health and economic activity at a local scale.                   | <p>Locally important public surface water and groundwater supplies.</p> <p>Licensed non-public surface water and groundwater supply abstractions which are large relative to available resource, or where raw water quality is a critical issue e.g. industrial process water.</p> <p>Medium-scale permitted discharges e.g. town-scale WWTW treated effluent discharges.</p> | <p>Abstractions:<br/><i>None</i></p> <p>Medium-scale discharges:<br/><i>None</i></p>                                                                                                                                                                                                                                                                                                      |
|             | Flood risk receptors - Property, infrastructure and people with a high vulnerability to flooding. | Land use classified in the NPPF PPG as 'More Vulnerable'.                                                                                                                                                                                                                                                                                                                     | <p><i>Hospitals</i></p> <p><i>Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels</i></p> <p><i>Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels</i></p> <p><i>Non-residential uses for health services, nurseries and educational establishments</i></p> |

| Sensitivity | Criteria                                                                                                                                                      | Examples                                                                                                                                                                                                                                                                                                                                                                                                 | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                          | <i>Landfill and sites used for waste management facilities for hazardous waste</i>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Low         | Aquatic environment feature with a moderate yield and/or quality at a regional scale, or good quality at a local scale, with some potential for substitution. | <p>Non-reportable WFD surface water or groundwater bodies or non-WFD water bodies.</p> <p>Sites with local conservation designations, e.g. LNRs, LWSs, County Wildlife Sites (CWSs) and Sites of Importance for Nature Conservation (SINCs), where the designation is based specifically on aquatic features.</p>                                                                                        | <p>WFD surface water bodies:<br/><i>Non-reportable WFD surface water bodies</i><br/><i>Ordinary Watercourses</i><br/><i>Minor watercourses and ditches</i></p> <p>WFD groundwater bodies:<br/><i>None</i></p> <p>Conservation sites:<br/><i>All other LNRs and LWSs</i></p>                                                                                                                                                                                                                                       |
|             | Water resources supporting human health and economic activity at household/individual business scale.                                                         | <p>Licensed non-public surface water and groundwater supply abstractions which are small relative to available resource, or where raw water quality is not important e.g., cooling water, spray irrigation.</p> <p>Unlicensed potable surface water and groundwater abstractions e.g. private domestic water supplies.</p> <p>Small-scale permitted discharges (e.g. village-scale WWTW discharges).</p> | <p>Licensed non-public surface water abstractions:<br/><i>A116 2569020060, Bridgewater Canal at Agden, Lymm</i><br/><i>A117 2569020063, River Bollin at Agden</i><br/><i>A118 2569020041, River Bollin at Heatley</i><br/><i>A120 2569017033, Caldwell Brook at Sinderland Green</i><br/><i>A121 2569017030, Sinderland Brook at Warburton, Lymm, and Dunham Massey</i><br/><i>A122 2569017031, Sinderland Brook at Sinderland Green Dunham Massey</i><br/><i>A123 2569020067, Bridgewater Canal at Agden</i></p> |

| Sensitivity | Criteria | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|----------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          |          | <p>A125 2568001028, Rookery Pool at Vale Royal Abbey</p> <p>A126 2568001206, Pettypool Brook at Whitegate</p> <p>A127 2568001173, River Weaver at LH's premises</p> <p>A128 2569020059, River Bollin at Warburton, Lymm</p> <p>A129 2569020010, River Bollin at Warburton, Lymm</p> <p>A130 2568001018, Petty Pool, Sandiway Fed by and O/F to unnamed Tributaries ff the River Weaver</p> <p>A132 NW/068/0003/003, Cliff Brook at Acton Bridge</p> <p>A133 2568003120, Acton Brook at Weaverham</p> <p>A134, A135 2568003082, River Weaver at Premises</p> <p>A136 NW/068/0003/014, River Weaver Navigation at Saltersford Lock</p> <p>A137 NW/068/0003/009, Anderton Boat Lift</p> <p>A139 2568003097, Whitley Brook at Heath Hall Farm</p> <p>A140 NW/068/0003/011, Hydropower Intake - Dutton Sluices</p> <p>A141 2568003097, Whitley Brook (tributary) at Heath Hall Farm</p> |

| Sensitivity | Criteria | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          |          | <p>A143, A144 2568004026, Unnamed Watercourse feeding a pond at Daresbury Farm,</p> <p>A145, A146 2569024005, River Mersey at Bank Quay</p> <p>A148 2568003109, Weston Canal (Weaver Navigation) at Pumping Station, Frodsham</p> <p>A149 2568003095, Weston Canal at Sutton, Runcorn [ICI]</p> <p>A150, A151 2568004997, Weston Canal at Weston Point Runcorn Cheshire</p> <p>A152, A153 2568009008, Manchester Ship Canal at Weston Point, Runcorn</p> <p>A154, A155 2569025077, St. Helens Canal at St. Helens, Merseyside</p> <p>A156 2569017032, Red Brook at Warburton, Lymm, Cheshire</p> <p>A157, A161, A162 2568009001, Manchester Ship Canal at Ellesmere Port</p> <p>A158, A159 2568009017, Manchester Ship Canal at Ellesmere Port</p> <p>A160 NW/068/0006/016, Inland Water - Thornton Brook at Stanlow</p> <p>A163 NW/069/0007/002, Manchester Ship Canal</p> <p>Licensed non-public groundwater abstractions:</p> |

| Sensitivity | Criteria | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          |          | <p>A1 2569017028, borehole at Peterhouse Farm</p> <p>A2, A3 2569017026, borehole at Broad Oak Farm</p> <p>A4 - A7 2569024013, boreholes at Warrington and Penketh</p> <p>A8 NW/069/0024/005, AO Plant Wells</p> <p>A9 – A13 2569024013, boreholes at Warrington and Penketh</p> <p>A24 2568004025, borehole at Blackstone Farm, Lower Whitley, Daresbury</p> <p>A25 – A28 2569024013, boreholes at Warrington and Penketh Cheshire - Well 2</p> <p>A29 – A31 2569024013, boreholes at Warrington and Penketh Cheshire - Well 1</p> <p>A32, A33 2569024013, boreholes at Warrington and Penketh Cheshire - Well 5</p> <p>A34 – A43 2569024024, 5 boreholes at Fiddlers Ferry Power Station</p> <p>A44 2569024027, borehole at Gatewarth Ind. Estate, Sankey Bridges, Warrington</p> <p>A45 2569027004, borehole near LH's premises at Moorfield Road, Widnes</p> <p>A48 2568003039, well at Aston Grange</p> <p>A49 2568003088, borehole at premises at Rocksavage Works</p> <p>A51 – A56 2569024013, boreholes at Warrington and Penketh Cheshire - Well 6</p> |

| Sensitivity | Criteria                                                                                                     | Examples                                                  | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                                                                                                              |                                                           | <p>A57 – A62 NW/068/0006/012, borehole No 7 at Thornton-Le-Moors &amp; Stanlow, Ellesmere Port</p> <p>A65 2568003052, Well at Dairy Farm, High Legh</p> <p>A84 2568005002, borehole at Mersey Bank Farm, Hapsford, Helsby</p> <p>Deregulated abstractions:</p> <p>A165 2568005002, borehole at Mersey Bank Farm, Hapsford, Helsby</p> <p>A170 2569017028, borehole at Peterhouse Farm, Gorsey Lane</p> <p>Small-scale discharges:</p> <p>D1 Porch House Farm</p> <p>D2 East Clifton Marsh Northern outfall</p> <p>D3, D4 Encirc, Ash Road</p> <p>D5 Weaver Sailing Club</p> |
|             | Flood risk receptors - Property, infrastructure and people with a moderate to low vulnerability to flooding. | Land use classified in the NPPF PPG as 'Less Vulnerable'. | <p>Police, ambulance and fire stations which are not required to be operational during flooding</p> <p>Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution</p>                                                                                                                                                                                                                                                                                             |

| Sensitivity     | Criteria                                                                           | Examples                                                                             | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                                                                                    |                                                                                      | <p><i>Non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure</i></p> <p><i>Land and buildings used for agriculture and forestry</i></p> <p><i>Waste treatment (except landfill and hazardous waste facilities)</i></p> <p><i>Minerals working and processing (except for sand and gravel working)</i></p> <p><i>Water treatment works which do not need to remain operational during times of flood</i></p> <p><i>Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place</i></p> <p><i>Car parks</i></p> |
| <b>Very Low</b> | Aquatic environment feature with a low yield and/or quality at a local scale, with | Conditions supporting an undesignated and low water-dependent site, including ponds. | Undesignated conservation sites:<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Sensitivity | Criteria                                                                                   | Examples                                                                                                                                                                                                                                                                                                                                              | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | good potential for substitution.                                                           |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|             | Water resources that do not support human health, and of only limited economic benefit.    | <p>Unlicensed non-potable surface water and groundwater abstractions e.g. livestock supplies.</p> <p>Unregistered, unlicensed wells on OS mapping.</p> <p>Small discharges exempt from permitting subject to adherence to general binding rules (e.g., package plants from small residential developments or commercial premises in rural areas).</p> | <p>Unlicensed non-potable abstractions:<br/><i>None</i></p> <p>Exempt discharges:<br/><i>None</i></p>                                                                                                                                                                                                                                                                                                                                                         |
|             | Flood risk receptors - Property, infrastructure and people that are resilient to flooding. | Land use classified in the NPPF PPG as 'Water Compatible', and undeveloped land.                                                                                                                                                                                                                                                                      | <p><i>Flood control infrastructure</i></p> <p><i>Water transmission infrastructure and pumping stations</i></p> <p><i>Sewage transmission infrastructure and pumping stations.</i></p> <p><i>Sand and gravel working</i></p> <p><i>Docks, marinas and wharves</i></p> <p><i>Navigation facilities.</i></p> <p><i>Ministry of Defence installations</i></p> <p><i>Ship building, repairing and dismantling, dockside fish processing and refrigeration</i></p> |

| Sensitivity | Criteria | Examples | Scoped in receptor list                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |          |          | <p><i>and compatible activities requiring a waterside location.</i></p> <p><i>Water-based recreation (excluding sleeping accommodation).</i></p> <p><i>Lifeguard and coastguard stations</i></p> <p><i>Amenity open space, nature conservation and biodiversity, outdoor sports and recreation.</i></p> <p>For the Project, this includes:</p> <ul style="list-style-type: none"><li>- Pipeline watercourse crossings.</li></ul> |

*Magnitude of change*

- 7.8.6 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. Table 7.21 provides examples of how various magnitudes of change are determined with respect to water environment features.
- 7.8.7 Magnitude of change may be either positive or negative. The criteria and examples in Table 7.21 focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required. Any positive changes are highlighted within the assessment where appropriate.

**Table 7.21 Definitions of magnitude of change**

| Magnitude     | Criteria                                                                                                  | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>High</b>   | Results in complete loss or major change to feature, of sufficient magnitude to affect its use/integrity. | <p>Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant designated site conservation objectives (COs<sup>147</sup>) or non-temporary downgrading (deterioration) of WFD surface water body status (including downgrading of individual WFD elements), or resulting in the inability of the surface water body to attain 'Good' ecological potential as well as 'Good' ecological status by the relevant deadline in line with the measures identified in the RBMP.</p> <p>Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of WFD groundwater body status, or the inability of the groundwater body to attain "Good" status in line with the measures identified in the RBMP.</p> <p>Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.</p> <p>Change in flood risk resulting in potential loss of life or major damage to property or infrastructure.</p> |
| <b>Medium</b> | Results in partial loss or noticeable change to                                                           | Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of surface water body status (including                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

<sup>147</sup> Natural England (2015) Conservation objectives for land-based protected sites in England: how to use the site advice. (Online). Available at: <https://www.gov.uk/guidance/conservation-objectives-for-land-based-protected-sites-in-england-how-to-use-the-site-advice> (accessed August 2024)

| Magnitude  | Criteria                                                                                                           | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | feature, of sufficient magnitude to affect its use/integrity in some circumstances.                                | <p>potential temporary downgrading of individual WFD elements), although not affecting the ability of the surface water body to achieve future WFD objectives.</p> <p>Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of WFD groundwater body status, although not affecting the ability of the groundwater body to achieve future WFD objectives.</p> <p>Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.</p> <p>Change in flood risk resulting in potential for moderate damage to property or infrastructure.</p> |
| Low        | Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances. | <p>Measurable effect on river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to WFD surface water body status (of overall status or element status).</p> <p>Measurable effect on groundwater levels, flows or water quality, but with no short-term or permanent downgrading of WFD groundwater body status.</p> <p>Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.</p> <p>Change in flood risk resulting in potential for minor damage to property or infrastructure.</p>                                                                                                                                              |
| Negligible | Results in little or no change to feature, with insufficient magnitude to affect its use/integrity                 | <p>No measurable effect on river flow regime, morphology or water quality, and no consequences in terms of COs or surface water body status.</p> <p>No measurable effect on groundwater levels, flows or water quality, and no consequences in terms of WFD groundwater body status.</p> <p>No measurable change in water availability or quality and no change in ability of the water user to exercise licensed rights.</p> <p>Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.</p>                                                                                                                                                                                                                       |

## Significance

- 7.8.8 During the assessment of effects for each identified receptor, the sensitivity value in Table 7.20 is combined with the magnitude of change from Table 7.21 to produce an overall significance rating based on the evaluation matrix shown in Table 7.22. A 'significant' effect is assessed as a Major rating whereas a Moderate rating is 'potentially significant' at this stage of the EIA process. Any effects found to be 'potentially significant' at Draft ES stage will be subject to further investigation as part of the Final ES and following refinement of design/mitigation information, a final, definitive conclusion on significance will be provided. This approach is based on professional judgement and carried out on a precautionary basis.

**Table 7.22 Significance evaluation matrix**

|             |          | Magnitude of change                   |                                       |                                       |                                 |
|-------------|----------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------|
|             |          | High                                  | Medium                                | Low                                   | Negligible                      |
| Sensitivity | High     | Major<br>(Significant)                | Major<br>(Significant)                | Moderate<br>(Potentially significant) | Minor<br>(Not significant)      |
|             | Medium   | Major<br>(Significant)                | Moderate<br>(Potentially significant) | Minor<br>(Not significant)            | Negligible<br>(Not significant) |
|             | Low      | Moderate<br>(Potentially Significant) | Moderate<br>(Potentially significant) | Negligible<br>(Not significant)       | Negligible<br>(Not significant) |
|             | Very Low | Moderate<br>(Potentially significant) | Negligible<br>(Not significant)       | Negligible<br>(Not significant)       | Negligible<br>(Not significant) |

## 7.9 Summary of Assessment of Water Environment Effects

- 7.9.1 **Appendix 7D** presents an assessment of water environmental (including flood risk) effects due to the construction, operational and decommissioning phases of the Project. The summary of this assessment of water environment effects is given within Table 7.23.
- 7.9.2 Decommissioning effects are likely similar to construction effects, but of a lesser magnitude and spatial extent, given that much of the subsurface infrastructure would be left in-situ.

- 7.9.3 The deterioration in the water quality of surface and groundwater bodies via discharges will be mitigated via the provision of appropriate sewage treatment with discharge subject to environment permit. In addition, licensed public groundwater supplies and other abstractions will be protected via specific risk assessments and mitigation strategy developed where appropriate, particularly where infrastructure is located within public water supply SPZs and secured post DCO submission. Flood risk receptors will be protected by the implementation of a FERP if required, in addition to other embedded mitigation measures.

Table 7.23 Summary of water environment significance of effects

| Receptor and summary of predicted effects                                                                                                                                                                                                                                                                                                      | Sensitivity/importance/value of receptor <sup>1</sup> | Magnitude of change <sup>2</sup> | Significance of effect <sup>3</sup>  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|--------------------------------------|
| Construction phase                                                                                                                                                                                                                                                                                                                             |                                                       |                                  |                                      |
| Aquatic Environment                                                                                                                                                                                                                                                                                                                            |                                                       |                                  |                                      |
| WFD Surface Water Bodies (Rivers, transitional and canals)                                                                                                                                                                                                                                                                                     |                                                       |                                  |                                      |
| Deterioration in the water quality of surface water bodies via generation of sediment laden run-off from working areas and discharge of dewatered groundwater from excavations                                                                                                                                                                 | Medium                                                | Negligible - Low                 | Negligible - Minor (Not Significant) |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Medium                                                | Negligible                       | Negligible (Not Significant)         |
| Potential effects on hydromorphology and flow regime of surface water bodies as a result of increased runoff, dewatering of excavations and sediment inputs from working areas or direct watercourse disturbance (including from new watercourse crossings)                                                                                    | Medium                                                | Negligible                       | Negligible (Not Significant)         |
| Reduction of water availability to support existing surface water and groundwater abstractions as a consequence of water quantity and/or quality effects arising from pre-commissioning pipeline testing                                                                                                                                       | Medium                                                | Negligible                       | Negligible (Not Significant)         |
| Surface Water Bodies (Non-reportable WFD and non-WFD surface water bodies, Ordinary Watercourses, minor watercourses and ditches)                                                                                                                                                                                                              |                                                       |                                  |                                      |
| Deterioration in the water quality of surface water bodies via generation of sediment laden run-off from working areas and discharge of dewatered groundwater from excavations                                                                                                                                                                 | Low                                                   | Low                              | Negligible (Not Significant)         |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Low                                                   | Negligible                       | Negligible (Not Significant)         |
| Potential effects on hydromorphology and flow regime of surface water bodies as a result of increased runoff, dewatering of excavations and sediment inputs from working areas or direct watercourse disturbance (including from new watercourse crossings)                                                                                    | Low                                                   | Negligible                       | Negligible (Not Significant)         |
| WFD Groundwater Bodies                                                                                                                                                                                                                                                                                                                         |                                                       |                                  |                                      |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Medium                                                | Negligible                       | Negligible (Not Significant)         |
| Impacts on groundwater levels and/or hydrogeological flow regimes from the dewatering of trenched or trenchless excavations for pipeline and/or the effects of underground infrastructure due to barriers to flow and/or the development of less permeable access track or temporary construction compound establishment reducing infiltration | Medium                                                | Negligible                       | Negligible (Not Significant)         |
| Conservation Sites                                                                                                                                                                                                                                                                                                                             |                                                       |                                  |                                      |
| Reduction of water availability to support existing groundwater or surface water designated or undesignated sites, ecosystems and features                                                                                                                                                                                                     | Low - High                                            | Negligible                       | Negligible - Minor (Not Significant) |

| Receptor and summary of predicted effects                                                                                                                                                                                                                                                                                                      | Sensitivity/importance/value of receptor <sup>1</sup> | Magnitude of change <sup>2</sup> | Significance of effect <sup>3</sup> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|-------------------------------------|
| <b>Water Resources</b>                                                                                                                                                                                                                                                                                                                         |                                                       |                                  |                                     |
| <b>Licensed Public Groundwater Supplies</b>                                                                                                                                                                                                                                                                                                    |                                                       |                                  |                                     |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | High                                                  | Negligible                       | Minor<br>(Not Significant)          |
| Impacts on groundwater levels and/or hydrogeological flow regimes from the dewatering of trenched or trenchless excavations for pipeline and/or the effects of underground infrastructure due to barriers to flow and/or the development of less permeable access track or temporary construction compound establishment reducing infiltration | High                                                  | Negligible                       | Minor<br>(Not Significant)          |
| <b>Licensed Non-Public Groundwater Abstractions</b>                                                                                                                                                                                                                                                                                            |                                                       |                                  |                                     |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| Impacts on groundwater levels and/or hydrogeological flow regimes from the dewatering of trenched or trenchless excavations for pipeline and/or the effects of underground infrastructure due to barriers to flow and/or the development of less permeable access track or temporary construction compound establishment reducing infiltration | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| <b>Licensed Non-Public Surface Water Abstractions</b>                                                                                                                                                                                                                                                                                          |                                                       |                                  |                                     |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| <b>Deregulated Abstractions</b>                                                                                                                                                                                                                                                                                                                |                                                       |                                  |                                     |
| Deterioration in the water quality of surface and groundwater bodies due to accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals/pollutants                                                                                                              | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| Impacts on groundwater levels and/or hydrogeological flow regimes from the dewatering of trenched or trenchless excavations for pipeline and/or the effects of underground infrastructure due to barriers to flow and/or the development of less permeable access track or temporary construction compound establishment reducing infiltration | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| <b>Consented Discharges</b>                                                                                                                                                                                                                                                                                                                    |                                                       |                                  |                                     |
| Physical disruption to existing discharge infrastructure from trenching and temporary access track or temporary construction compound establishment                                                                                                                                                                                            | Low                                                   | Negligible                       | Negligible<br>(Not Significant)     |
| <b>Flood Risk Receptors</b>                                                                                                                                                                                                                                                                                                                    |                                                       |                                  |                                     |

| Receptor and summary of predicted effects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sensitivity/importance/value of receptor <sup>1</sup> | Magnitude of change <sup>2</sup> | Significance of effect <sup>3</sup>                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|-----------------------------------------------------------|
| <p>Project receptor:</p> <p>All construction activities and elements (except pipeline watercourse crossings), namely pipe laying, material storage areas, trenchless crossing compounds, HAGI temporary compounds, temporary access routes.</p> <p>Flood risk is from existing sources and would be exacerbated through construction activities that lead to loss of channel conveyance, volumetric displacement of flood water in the floodplain through stock piling and raised infrastructure, or mobilisation of stored materials leading to impact or obstruction downstream.</p> | High                                                  | Negligible                       | Minor (Not Significant)                                   |
| <p>Non-project receptors:</p> <p>Flood risk is from existing sources and would be exacerbated through construction activities that lead to loss of channel conveyance, volumetric displacement of flood water in the floodplain through stock piling and raised infrastructure, mobilisation of stored materials leading to impact or obstruction downstream, changes to surface water flow routes through earthworks and changes to infiltration through introduction of temporary hard standing areas.</p>                                                                           | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant)   |
| <p>Project receptor:</p> <p>Material storage areas at Acton Bridge (South Corridor) and at Eastford Road (Warrington Spur).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | High                                                  | Medium                           | Major (Significant)                                       |
| <p>Non-project receptor:</p> <p>Third party receptors near material storage areas at Acton Bridge (South Corridor) and at Eastford Road (Warrington Spur).</p>                                                                                                                                                                                                                                                                                                                                                                                                                         | Low - High                                            | Medium                           | Moderate (Potentially Significant) to Major (Significant) |
| <p>Non-project receptor:</p> <p>Third party receptors near material storage area at Sutton Manor</p> <p>increased flood risk through mobilisation of stored materials in the flood zone and causing medium magnitude impact downstream, and increased flood risk through loss of floodplain storage through stored materials in the flood zone.</p>                                                                                                                                                                                                                                    | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant)   |
| <p>Non-project receptor:</p> <p>Third party receptors near temporary access road bridges</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Very Low - Medium                                     | Negligible                       | Negligible (Not Significant)                              |
| <p>Project receptor:</p> <p>Pipe laying at watercourse crossings</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Very Low                                              | Negligible                       | Negligible (Not Significant)                              |
| <p>Non-project receptor:</p> <p>Third party receptors near pipeline watercourse crossings</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant)   |
| Operational phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                       |                                  |                                                           |

| Receptor and summary of predicted effects                                                                                                | Sensitivity/importance/value of receptor <sup>1</sup> | Magnitude of change <sup>2</sup> | Significance of effect <sup>3</sup>   |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|---------------------------------------|
| <b>Aquatic Environment</b>                                                                                                               |                                                       |                                  |                                       |
| <b>WFD Surface Water Bodies (Rivers, transitional and canals)</b>                                                                        |                                                       |                                  |                                       |
| Changes in channel morphology and fluvial geomorphological processes should pipelines become exposed at watercourse crossings            | Medium                                                | Negligible                       | Negligible (Not Significant)          |
| <b>Surface Water Bodies (Non-reportable WFD and non-WFD surface water bodies, Ordinary Watercourses, minor watercourses and ditches)</b> |                                                       |                                  |                                       |
| Changes in channel morphology and fluvial geomorphological processes should pipelines become exposed at watercourse crossings            | Low                                                   | Negligible                       | Negligible (Not Significant)          |
| <b>WFD Groundwater Bodies</b>                                                                                                            |                                                       |                                  |                                       |
| Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure                           | Medium                                                | Negligible                       | Negligible (Not Significant)          |
| <b>Conservation Sites</b>                                                                                                                |                                                       |                                  |                                       |
| Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure                           | Low - High                                            | Negligible                       | Negligible - Minor (Not Significant)  |
| <b>Water Resources</b>                                                                                                                   |                                                       |                                  |                                       |
| <b>Licensed Public Groundwater Supplies</b>                                                                                              |                                                       |                                  |                                       |
| Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure                           | High                                                  | Negligible                       | Minor (Not Significant)               |
| <b>Licensed Non-Public Groundwater Abstractions</b>                                                                                      |                                                       |                                  |                                       |
| Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure                           | Low                                                   | Negligible                       | Negligible (Not Significant)          |
| <b>Deregulated Abstractions</b>                                                                                                          |                                                       |                                  |                                       |
| Changes in shallow groundwater flow and level regime due to presence of surface and underground infrastructure                           | Low                                                   | Negligible                       | Negligible (Not Significant)          |
| <b>Flood Risk</b>                                                                                                                        |                                                       |                                  |                                       |
| Project receptor:<br><br>Pipeline                                                                                                        | High                                                  | Negligible                       | Minor (Not Significant)               |
| Non-project receptors                                                                                                                    | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor |

| Receptor and summary of predicted effects                                                                                                                  | Sensitivity/importance/value of receptor <sup>1</sup> | Magnitude of change <sup>2</sup> | Significance of effect <sup>3</sup>                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------|---------------------------------------------------------|
| Increase of flood risk from buried pipeline disrupting shallow subsurface flows                                                                            |                                                       |                                  | (Not Significant)                                       |
| Non-project receptors                                                                                                                                      | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant) |
| Influence to groundwater flow and in turn changed flood patterns from pipeline disrupting buried channels in the Ince and Frodsham Marshes area.           |                                                       |                                  |                                                         |
| Project receptor:                                                                                                                                          | High                                                  | Negligible                       | Minor (Not Significant)                                 |
| HAGIs, Block Valves, DNO connections, pigging areas and maintenance staff                                                                                  |                                                       |                                  |                                                         |
| Non-project receptors                                                                                                                                      | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant) |
| Increase of fluvial/tidal flood risk through placement of HAGIs, Block Valves, DNO connections and pigging areas in areas at risk of flooding.             |                                                       |                                  |                                                         |
| Non-project receptors                                                                                                                                      | Low - High                                            | Negligible                       | Negligible (Not Significant) to Minor (Not Significant) |
| Increase of flood risk from surface water through landform changes and new impermeable surfaces at HAGIs, Block Valves, DNO connections and pigging areas. |                                                       |                                  |                                                         |

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 7.8** (Table 7.20) and is defined as very low, low, medium and high.
2. The magnitude of change on a receptor resulting from activities relating to the Project is defined using the criteria set out in **Section 7.8 (Table 7.21)** and is defined as negligible, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as Major (Significant), Moderate (Potentially Significant) or Minor/Negligible (Not Significant), subject to the evaluation methodology outlined in **Section 7.8 (Table 7.22)**.
4. Local Planning Authorities: Cheshire West and Chester Council (CWCC); Cheshire East Council (CEC); Halton Borough Council (HBC); Warrington Borough Council (WBC); St. Helens Borough Council (SHBC); Trafford Council (TC).

## 7.10 Assessment Of Cumulative (Inter-Project) Effects

- 7.10.1 A cumulative effects assessment (CEA) has been undertaken for the Project which considers the combined impacts with other developments on the same single receptor or resource (inter-project effects). The detailed method followed in identifying and assessing potential cumulative effects is set out in **Chapter 3: Approach to preparing the Draft ES**. The onshore screening approach follows the Planning Inspectorate's Advice (Planning Inspectorate, 2024) which is an accepted process for Nationally Significant Infrastructure Projects (NSIPs) and follows the four-stage approach set out in the guidance.
- 7.10.2 For water environment, a Zol<sup>148</sup> has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. The water environment Zol is shown in **Figure 3A.1 Cumulative Effects Shortlisted Projects**. A short list of 'other developments' that may interact with the Project Zols during their construction, operation and maintenance or decommissioning is presented in **Appendix 3A: Cumulative Effects Assessment: Long List and Short List** and has been collated up to the finalisation of the ES through desk study, consultation, and engagement. The cumulative Zol for the water environment is described in **Table 3.7** in **Chapter 3: Approach to preparing the Draft ES**.
- 7.10.3 Only those 'other developments' in the short list that fall within the water environment Zol have the potential to result in cumulative effects with the Project on water environment. All 'other developments' falling outside the water environment Zol are excluded from this assessment.
- 7.10.4 A tiered approach to the CEA has been set out in **Table 3.8** in **Chapter 3: Approach to preparing the Draft ES** and can be summarised as follows:
- Tier 1: developments under construction, permitted applications and submitted applications;
  - Tier 2: other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has been submitted; and
  - Tier 3: other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has not been submitted, or where developments are identified in Development Plans or other plans as appropriate.
- 7.10.5 On the basis of the above, a number of specific other developments contained within the short list in **Appendix 3A: Cumulative Effects Assessment: Long List and Short List** are considered in this CEA. Potential effects relating to the pipeline and HAGIs infrastructure during the construction, operation /maintenance and decommissioning phases could be relevant as a result of the activities which are

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<sup>148</sup> The maximum zone in which any direct effects of the Project on the water environment likely to occur, i.e. the cumulative effects Zol, extends further downstream (2.5km) than upstream (500m) as potential effects will be transferred downstream in the direction of flow more readily than upstream.

adjacent to and within the same surface water and groundwater catchments as the Tier 1 to 3 projects identified in **Table 7.24**. A simple qualitative assessment of the potential for any likely significant cumulative effects to arise is undertaken.

Table 7.24 Developments considered as part of the water environment CEA

| Application reference | Development type                                                                                                       | Development name/location | National Grid Reference | Status                                | Confidence in assessment | Tier | Distance to Draft Order Limits (m)          | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Likely significant cumulative effect? |
|-----------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------|---------------------------------------|--------------------------|------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 2019/36100            | Highways<br><br>WBC is proposing a new link road, connecting north and south Warrington to the west of the town centre | Warrington Western Link   | SJ 59136 87032          | Scoping Opinion issued:<br>09/01/2020 | Medium                   | 2    | The site lies within the Draft Order Limits | The overall site area is approximately 24ha, which in the context of the two non-reportable WFD catchments in which it is located (11,582.5ha combined area) is small. The Warrington Western Link is situated within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| 19/02452/MIN          | Industry (resource extraction)<br><br>Northern extension of the quarry and restoration scheme for nature conservation  | Forest Hill Quarry        | SJ 61122 71985          | Application approved:<br>21/01/2021   | High                     | 1    | The site lies within the Draft Order Limits | The overall site area is approximately 6.9ha, which in the context of the Cuddington Brook (Source to Crowton Brook) catchment (2,452ha) is small. The Forest Hill Quarry extension is situated within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no                                                                       | No                                    |

| Application reference                            | Development type                                           | Development name/location                                               | National Grid Reference | Status                           | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                                                                  | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Likely significant cumulative effect? |
|--------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------|----------------------------------|--------------------------|------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                                  |                                                            |                                                                         |                         |                                  |                          |      |                                                                                                                     | potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |
| <b>P/2020/0061/HY BR</b>                         | Industrial<br><br>A new warehouse with offices and parking | Land to the west of Omega South and south of the M62 Bold St Helens     | SJ 55167 90627          | Appeal approved: 18/12/2020      | High                     | 1    | The new warehouse is approximately 2.45km east of the Draft Order Limits                                            | The overall site area is approximately 75.3ha, which in the context of the Whittle Brook (Mersey Estuary) catchment (1,460ha) is small. The new warehouse is situated 2.45km east of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| <b>P/2018/0060/FUL</b><br><b>P/2021/0405/RES</b> | Mixed Use<br><br>294 dwellings with public open space      | Linkway Distribution Park and adjacent land, Elton Head Road, St Helens | SJ 50814 92985          | Application approved: 20/06/2018 | High                     | 1    | The mixed use development is adjacent to the Draft Order Limits associated with the temporary construction corridor | The overall site area is approximately 12.39ha, which in the context of the Hardshaw (Windle) Brook catchment (2,501ha) is small. The mixed use development is situated adjacent to the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are                                                                                                            | No                                    |

| Application reference                                               | Development type                                                            | Development name/location                | National Grid Reference | Status                                                                                                   | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                             | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Likely significant cumulative effect? |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------|--------------------------|------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                                                     |                                                                             |                                          |                         |                                                                                                          |                          |      |                                                                                | no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |
| <b>PINS Reference: EN070007 – Hynet Carbon Dioxide Pipeline DCO</b> | Renewable Energy<br><br>A new carbon dioxide pipeline                       | HyNet North West Carbon Dioxide Pipeline | SJ 25615 71058          | Application approved: 20/03/2024                                                                         | High                     | 1    | The Hynet North West Hydrogen Carbon Pipeline is within the Draft Order Limits | The overall site area is approximately 500ha and spans multiple catchments outside of the study area. The Hynet North West Carbon Dioxide pipeline is situated within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| <b>PINS Reference: EN030002 - Keuper Gas Storage Project DCO</b>    | Renewable Energy<br><br>Construction of an underground gas storage facility | Holford Brinefield                       | SJ 70813 69640          | Application approved: 15/03/2017. A non-material amendment to change to hydrogen storage refused in 2024 | High                     | 1    | The underground gas storage facility is within the Draft Order Limits          | The overall site area is approximately 145ha and is located across two catchments, which in the context of the combined catchment area (6620ha) is small. The underground gas storage facility is situated within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented                                                                                                                                                                    | No                                    |

| Application reference                                        | Development type                                                                    | Development name/location                                                                                                                                                                                             | National Grid Reference | Status                                     | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Likely significant cumulative effect? |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------------|--------------------------|------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                                              |                                                                                     |                                                                                                                                                                                                                       |                         |                                            |                          |      |                                                                   | on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                                          |                                       |
| <b>PINS Reference: EN010153 - Frodsham Solar Project DCO</b> | Energy generation (solar)<br><br>Solar voltaic panels and associated infrastructure | Frodsham Marshes                                                                                                                                                                                                      | SJ 51000 78500          | The solar farm is at pre application stage | High                     | 1    | The solar farm is within the Draft Order Limits                   | The overall site area is approximately 314ha, which in the context of the Weaver (Dane to Frodsham) catchment (6131ha) is small. The solar farm is situated within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| <b>P/2022/0212/HY BR</b>                                     | Mixed Use<br><br>Residential units, hotel and public open space                     | Land bound by Corporation Street to the north, St Helens Central and rail lines to the east, St Helens Canal to the south and the town centre. Broadly defined by Bickerstaffe Street and Market Street, to the west. | SJ 51225 95305          | Application approved: 31/03/2023           | High                     | 1    | The mixed use development is 500m north of the Draft Order Limits | The overall site area is approximately 9.87ha, which in the context of the Hardshaw (Windle) Brook catchment (2,510ha) is small. The mixed use development is 500m north of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are                                                                                                  | No                                    |

| Application reference | Development type                                                                         | Development name/location                                                | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                               | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Likely significant cumulative effect?                                                                     |
|-----------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                       |                                                                                          |                                                                          |                         |                                                    |                          |      |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | no significant effects. On this basis, there is no potential for significant cumulative effects to arise. |
| 100109/FUL/20         | Mixed Use<br><br>151 dwellings with landscaping, sub-station and other associated works. | Land off Hall Lane, Partington                                           | SJ 71595 91900          | Application approved with conditions: 24/03/2024   | High                     | 1    | The mixed use development is 640m west of the Draft Order Limits | The overall site area is approximately 4.4ha, which in the context of the Mersey/Manchester Ship Canal (Manchester Ship Canal/Irwell to Bollin) (1,541ha) is small. The mixed use development is 640m west of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                                                                                        |
| 113942/EIASCO/24      | Mixed Use<br><br>Extend residential and employment phases into the Safeguarded           | Land known as Carrington Village on land off Manchester Road, Carrington | SJ 73378 92880          | Application pending decision: submitted 03/07/2024 | High                     | 1    | The mixed use development is 350m west of the Draft Order Limits | The overall site area is approximately 48.4ha, which in the context of the Mersey/Manchester Ship Canal (Manchester Ship Canal/Irwell to Bollin) catchment (1,541ha) is small. The mixed use                                                                                                                                                                                                                                                                                                                                                       | No                                                                                                        |

| Application reference | Development type                                                                                                                                                                                          | Development name/location                 | National Grid Reference | Status                                           | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                  | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Likely significant cumulative effect? |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------|--------------------------------------------------|--------------------------|------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                       | Movement Corridor                                                                                                                                                                                         |                                           |                         |                                                  |                          |      |                                                                     | development is 350m east of the proposed DCO Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                                                                                                                                                                                              |                                       |
| 112794/FUL/24         | Industrial (employment)<br><br>Construction of new employment units within Class B8, with ancillary offices as well as car parking, service yards, landscaping, ancillary structures and associated works | Voltage Park, Manchester Road, Carrington | SJ 72932 91154          | Application pending decision: submitted 02/02/24 | High                     | 1    | The employment development is located within the Draft Order Limits | The overall site area is approximately 9.9ha, which in the context of the Mersey/Manchester Ship Canal (Manchester Ship Canal/Irwell to Bollin) catchment (1,541ha) is small. The employment development is located within the proposed Draft Order Limits in the area of the Partington HAGI. However, it is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |

| Application reference | Development type                                                                                     | Development name/location                                            | National Grid Reference | Status                                                 | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                             | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Likely significant cumulative effect? |
|-----------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------|--------------------------------------------------------|--------------------------|------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 113549/EIASCO/24      | Highway<br><br>New link road between A6144 Manchester Road and A6144 Carrington Lane/Carrington Spur | Carrington Relief Road Development Site, Isherwood Road, Carrington  | SJ 73769 92634          | Scoping Opinion pending decision: submitted 08/05/2024 | Medium                   | 2    | The new link road is located within the Draft Order Limits                     | The overall site area is approximately 101ha (and only partially within the Study Area), which in the context of the Mersey/Manchester Ship Canal (Manchester Ship Canal/Irwell to Bollin) catchment (1,541ha) is small. The new link road is located within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| 22/00569/OUT          | Mixed Use<br><br>545 residential units and employment development                                    | Heath Business and Technical Park and land north of Heath Road South | SJ 51230 81061          | Application pending decision: submitted 14/10/2022     | High                     | 1    | The mixed use development is located 820m north west of the Draft Order Limits | The overall site area is approximately 23.311ha, which in the context of the Weaver Lower catchment (7,422ha) is small. The mixed use development is located 820m north west to the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                              | No                                    |

| Application reference | Development type                                                                                                          | Development name/location                                                                           | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                            | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Likely significant cumulative effect? |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 23/03369/FUL          | Renewable Energy<br><br>Construction of a new underground natural gas pipeline with ancillary above-ground infrastructure | Land to the south-east of Stanlow Manufacturing Complex, Thornton-le-Moor, Ellesmere Port, Cheshire | SJ 45940 73774          | Application pending decision: submitted 24/10/2023 | High                     | 1    | The underground natural gas pipeline is located within the Draft Order Limits | The overall site area unknown but works at the surface are likely to be small in the context of the two catchments (the Peckmill Brook, Hoolpool Gutter at Ince Marshes catchment and the Gowy). in which the development is proposed (combined area 4,731 ha) is small. The underground hydrogen pipeline is located within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| 24/00261/FUL          | Renewable Energy<br><br>Construction and operation of a post-combustion carbon dioxide capture facility.                  | Land at Protos (Ince Resource Recovery Park), Grinsome Road and Marsh Lane, Ince                    | SJ 46789 76752          | Application pending decision: submitted 30/01/2024 | High                     | 1    | The carbon dioxide capture facility is located within the Draft Order Limits  | The overall site area is approximately 3.32ha, which in the context of the Peckmill Brook, Hoolpool Gutter at Ince Marshes catchment (2,643ha) is small. The carbon capture facility is located within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no                                                                                                                                                                              | No                                    |

| Application reference | Development type                                                                                                                                                                                                                                                       | Development name/location                                                | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                  | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Likely significant cumulative effect? |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                       |                                                                                                                                                                                                                                                                        |                                                                          |                         |                                                    |                          |      |                                                                     | potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |
| 22/03693/FUL          | Industrial<br><br>Erection of an automated warehouse (Use Class B2/B8), ancillary office space, an automated link between the automated warehouse and existing facility, a driver welfare building, HGV marshalling yard, security building and other associated works | Encirc Glass Ltd, Ash Road, Elton, Chester CH2 4LF                       | SJ 46227 75999          | Application pending decision: submitted 30/01/2024 | High                     | 1    | The industrial development is located within the Draft Order Limits | The overall site area is approximately 20.54ha, which in the context of the Peckmill Brook, Hoolpool Gutter at Ince Marshes catchment (2,643ha) is small. The industrial development is located within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| 21/04076/FUL          | Waste<br><br>Materials recycling facility, two plastics recycling facilities, a polymer laminate recycling facility and a hydrogen refuelling station                                                                                                                  | Plots 9b, 10a, 11 and 12, Protos, Grinsome Road, Ellesmere Port, CH2 4RB | SJ 46353 76394          | Application approved: 14/09/2022                   | High                     | 1    | The waste development is located within the Draft Order Limits      | The overall site area is approximately 10ha, which in the context of the Peckmill Brook, Hoolpool Gutter at Ince Marshes catchment (2,643ha) is small. The waste development is located within the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no                                                                | No                                    |

| Application reference | Development type                                                                                                                                                                                                                                                                          | Development name/location                                      | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                          | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Likely significant cumulative effect?                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
|                       |                                                                                                                                                                                                                                                                                           |                                                                |                         |                                                    |                          |      |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | potential for significant cumulative effects to arise. |
| 2023/00392/EA         | Industrial<br><br>Construction of units for general industrial (Use Class B2) and/or storage or distribution (Use Class B8) uses, together with ancillary offices (Use Class E(g)(i)) and associated service yards, parking, landscaping and infrastructure, with access from Widnes Road | Fiddlers Ferry Power Station, Widnes Road, Warrington, WA5 2UT | SJ 54015 86310          | Application pending decision: submitted 24/03/2024 | High                     | 1    | The industrial development is located 160m west of the Draft Order Limits   | The overall site area is approximately 45ha, which in the context of the Sankey catchment (4,149ha) is small. The waste development is located 160m west of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                                     |
| 20/00337/OUTEIA       | Mixed Use<br><br>Residential led mixed use development of the site, comprising of residential (Use Class C3), employment (Use Class B1) and                                                                                                                                               | Land at Daresbury Park, Warrington, WA4 4BB                    | SJ 56942 81921          | Application approved: 08/06/2021                   | High                     | 1    | The mixed use development is located 1.79km west of the Draft Order Limits. | The overall site area is approximately 26.4ha, which in the context of the Keckwick Brook catchment (2,464ha) is small. The mixed use development is located 1.79km west of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully                                                                                                                                                                                                            | No                                                     |

| Application reference                    | Development type                                                                                                                                                                                                                                                                  | Development name/location                                      | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                              | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Likely significant cumulative effect? |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                          | local centre uses (Use Class A1-A4/D1) and associated infrastructure, landscaping and land remodelling                                                                                                                                                                            |                                                                |                         |                                                    |                          |      |                                                                                 | implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                           |                                       |
| P/2023/0075/FUL                          | Mixed Use<br><br>Erection of 514 dwellings via a phased approach for the provision of associated access and infrastructure works, including roads, drainage infrastructure, car parking, public open space including play facilities, landscaping and the erection of substations | Land at Gartons Lane, St Helens                                | SJ 52120 91143          | Application pending decision: submitted 08/02/2023 | High                     | 1    | The mixed use development is located 670m to the east of the Draft Order Limits | The overall site area is approximately 20ha, which in the context of the Sankey catchment (1,460ha) is small. The mixed use development is located 670m east of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |
| 2023/00392/EA<br><br>Local Plan site MD3 | Mixed Use<br><br>Mixed-use development comprising approximately 101ha of employment land and a minimum of 860 new homes in the Plan period                                                                                                                                        | Fiddlers Ferry Power Station, Widnes Road, Warrington, WA5 2UT | SJ 54299 86058          | Application pending decision: submitted 24/03/2023 | High                     | 1    | The industrial development is located 160m west of the Draft Order Limits       | The overall site area is approximately 101ha, which in the context of the Sankey catchment (4,149ha) is small. The waste development is located 160m west of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA,                                                                                                                                         | No                                    |

| Application reference                                      | Development type                                                                                                                                                                                                       | Development name/location                                            | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                              | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Likely significant cumulative effect?                                                                                                |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                                            |                                                                                                                                                                                                                        |                                                                      |                         |                                                    |                          |      |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. |
| <b>P/2020/0061/HY BR</b><br><br><b>Local Plan site 1EA</b> | Strategic Employment Site, Industrial<br><br>A new warehouse with offices and parking                                                                                                                                  | Land to the west of Omega South and south of the M62 Bold, St Helens | SJ 55167 90627          | Appeal approved: 18/12/2020                        | High                     | 1    | The new warehouse is approximately 2.45km east of the Draft Order Limits        | The overall site area is approximately 75.3ha, which in the context of the Whittle Brook (Mersey Estuary) catchment (1,460ha) is small. The new warehouse is situated 2.45km east of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                                                                                                                   |
| <b>P/2023/0075/FU L</b><br><br><b>Local Plan site 5HA</b>  | Strategic Housing Site, Mixed Use<br><br>Erection of 514 dwellings via a phased approach for the provision of associated access and infrastructure works including roads, drainage infrastructure, car parking, public | Land at Gartons Lane, St Helens                                      | SJ 64701 86855          | Application pending decision: submitted 08/02/2023 | High                     | 1    | The mixed use development is located 670m to the east of the Draft Order Limits | The overall site area is approximately 20ha, which in the context of the Weaver Lower catchment (7422ha) is small. The mixed use development is located 670m east of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are                                                                                                                           | No                                                                                                                                   |

| Application reference                                       | Development type                                                                                                                                                                                                                              | Development name/location                                  | National Grid Reference | Status                                           | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                          | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Likely significant cumulative effect? |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------|--------------------------------------------------|--------------------------|------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                                             | open space including play facilities, landscaping and the erection of substations                                                                                                                                                             |                                                            |                         |                                                  |                          |      |                                                                             | no significant effects. On this basis, there is no potential for significant cumulative effects to arise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |
| <b>P/2020/0083/OU EIA</b><br><br><b>Local Plan site 6HA</b> | Strategic Housing Site, Mixed Use<br><br>1,100 dwellings and up to 3,925m <sup>2</sup> of mixed use floorspace providing for flexible use within Use Classes A1, A2, A3, A4, B1, C1, D1 and D2 with associated landscaping and infrastructure | Land at Cowley Hill, College Street, St Helens, Merseyside | SJ 51209 96957          | Application approved with conditions: 20/07/2021 | High                     | 1    | The mixed use development is located 1.66km north of the Draft Order Limits | The overall site area is approximately 42ha, which in the context of the Rainford Brook catchment (3,423ha) is small. The mixed use development is located 1.66km north of the proposed Draft Order Limits. It is in an urban area with no likely hydrological connection between the two developments. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |

| Application reference                     | Development type                                                                                                                                                                                                                                                                                                                                      | Development name/location      | National Grid Reference | Status                                             | Confidence in assessment | Tier | Distance to Draft Order Limits (m)                                        | Discussion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Likely significant cumulative effect? |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------|----------------------------------------------------|--------------------------|------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 2023/00392/EA<br><br>Local Plan site 10HA | Strategic Housing Site with an indicative capacity of 802 dwellings, Mixed Use<br><br>Erection of 514 dwellings via a phased approach for the provision of associated access and infrastructure works including roads, drainage infrastructure, car parking, public open space including play facilities, landscaping and the erection of substations | Land at Gartons Lane St Helens | SJ 53221 94184          | Application pending decision: submitted 24/03/2023 | High                     | 1    | The industrial development is located 160m west of the Draft Order Limits | The overall site area is approximately 101ha, which in the context of the Sankey catchment (1,880ha) is small. The development is located 160m west of the proposed Draft Order Limits. It is assumed that good industry practice measures would be successfully implemented on this site, such as CIRIA's Environmental Good Practice on Site (CIRIA, 2010), to ensure there are no significant effects. On this basis, there is no potential for significant cumulative effects to arise. | No                                    |

## 7.11 Additional Measures

- 7.11.1 The assessment set out above has concluded that it would be necessary to implement additional measures. These have been identified and would be in addition to those embedded measures outlined and assessed in **Section 7.6**. **Table 7.25** outlines how these additional measures will influence the water environment assessment.

Table 7.25 Summary of the additional environmental measures

| Receptor                                                                                                                                         | Potential changes and effects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Additional measures                                                                                                                                                                                                                                                                    | Compliance mechanism                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Construction                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                        |                                                           |
| <b>Project receptor:</b><br><br><b>Material storage areas at Acton Bridge and at Eastford Road (Novelis Spur)</b>                                | <p>Approximately half of the material storage area of High Sensitivity at Acton Bridge coincides with Flood Zone 2 associated with the River Weaver and is in an area where flooding has been recorded in the past. The High Sensitivity material storage area at Eastford Road, associated with the Novelis Spur, is entirely in Flood Zone 3 adjacent to the River Mersey.</p> <p>In the event of a flood, these material storage areas could become inundated. Stored materials, changes in ground level and erection of impermeable fencing may obstruct flow paths and displace floodplain storage, leading to increased flood risk at the site.</p> <p>Stored materials, vehicles and machinery may become mobilised and pose a hazard to site staff and construction equipment.</p> <p>This could lead to Major (Significant) effects on Project receptors.</p>                                                                               | <p>Any displacement of floodplain storage would need to be compensated for on a level by level basis, in line with Environment Agency guidance and is being considered.</p> <p>Materials, including loose aggregates and excavates, would need to be stored to avoid mobilisation.</p> | Under consideration and will be provided in the Final ES. |
| <b>Non-Project receptor:</b><br><br><b>Third party receptors near material storage areas at Acton Bridge and at Eastford Road (Novelis Spur)</b> | <p>Approximately half of the material storage area of High Sensitivity at Acton Bridge coincides with Flood Zone 2 associated with the River Weaver and is in an area where flooding has been recorded in the past. The High Sensitivity material storage area at Eastford Road, associated with the Novelis Spur, is entirely in Flood Zone 3 adjacent to the River Mersey.</p> <p>In the event of a flood, these material storage areas could become inundated. Stored materials, changes in ground level and erection of impermeable fencing may obstruct flow paths and displace floodplain storage, leading to increased flood risk away from the site.</p> <p>Stored materials, vehicles and machinery may become mobilised and pose a hazard to people and property off site and obstruct flow paths elsewhere, leading to increased flood risk off site.</p> <p>This could lead to Major (Significant) effects on non-project receptors.</p> | <p>Any displacement of floodplain storage would need to be compensated for on a level by level basis, in line with Environment Agency guidance and is being considered.</p> <p>Materials, including loose aggregates and excavates, would need to be stored to avoid mobilisation.</p> | Under consideration and will be provided in the Final ES. |

## 7.12 Residual Effects Assessment

- 7.12.1 With reference to **Sections 7.8** and **7.11** effects have been identified for Project receptors at and third party receptors near two of the 14 material storage areas. Approximately half of the High Sensitivity material storage area at Acton Bridge coincides with Flood Zone 2 associated with the River Weaver and is in an area where flooding has been recorded in the past. The High Sensitivity material storage area at Eastford Road, associated with the Warrington Spur, is entirely in Flood Zone 3 adjacent to the River Mersey.
- 7.12.2 In the event of a flood, these material storage areas could become inundated. Stored materials, changes in ground level and erection of impermeable fencing may obstruct flow paths and displace floodplain storage, leading to increased flood risk at the site and away from the site. Stored materials, vehicles and machinery may become mobilised and pose a hazard to staff and construction equipment on site, as well as to receptors away from the site. This could lead to Major (Significant) effects on Project and non-Project receptors.
- 7.12.3 Any displacement of floodplain storage would need to be compensated for on a level by level basis, in line with Environment Agency guidance. Materials, including loose aggregates and excavates, would need to be stored to avoid mobilisation.
- 7.12.4 The Applicant intends to implement measures that would reduce the significance of the effect of Not Significant. However, a conclusive position as regards the significance of this effect will be included in the Final ES.

# HyNet North West Hydrogen Pipeline

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