

# **A46 Newark Bypass**

**TR010065/APP/6.3**

## **6.3 Environmental Statement**

### **Appendix 13.1 Water Framework Directive Compliance Assessment**

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and  
Procedure) Regulations 2009

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Infrastructure Planning

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**The Infrastructure Planning  
(Applications: Prescribed Forms  
and Procedure) Regulations 2009**

A46 Newark Bypass

Development Consent Order 202[x]

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**ENVIRONMENTAL STATEMENT**

**APPENDIX 13.1 WATER FRAMEWORK DIRECTIVE COMPLIANCE  
ASSESSMENT**

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# 1 Overview

## 1.1 Purpose of this report

- 1.1.1 This report provides a Water Framework Directive (WFD) compliance assessment to support an application for a Development Consent Order (DCO) for the A46 Newark Bypass (the Scheme). Further details of the Scheme can be found in Chapter 2 (The Scheme) of this Environmental Statement (ES) [APP-046].
- 1.1.2 According to Planning Inspectorate guidance<sup>1</sup>, a compliance assessment is “*a detailed assessment of waterbodies and their quality elements that are considered likely to be affected by the Scheme, identification of any areas of noncompliance; consideration of mitigation measures, enhancements, and contributions to the River Basin Management Plan objectives*”. As such, this assessment presents the WFD baseline within the study area (defined in Section 3 of this report as 1 kilometre radius around the Order Limits) and assesses the potential risks from the Scheme to the receptors that are considered likely to be affected by the Scheme.
- 1.1.3 This report follows the Environment Agency’s WFD guidance and position paper<sup>2</sup>, guidance produced by the Planning Inspectorate in Advice Note 18<sup>3</sup> and the requirements of DMRB LA 113 – Road drainage and the water environment section 3.50 to 3.57<sup>4</sup>.

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<sup>1</sup> The Planning Inspectorate (2017) The Water Framework Directive. Advice note 18 [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/> (Last Accessed December 2023).

<sup>2</sup> Environment Agency (2016) Water Framework Directive risk assessment [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/522426/LIT\\_10445.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf) (Last accessed December 2023).

<sup>3</sup> National Infrastructure Planning (2017) Advice Note Eighteen: The Water Framework Directive [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/> (Last accessed December 2023).

<sup>4</sup> Standards for Highways (2020) LA 113 – Road drainage and the water environment [online] Available at: <https://standardsforhighways.co.uk/search/d6388f5f-2694-4986-ac46-b17b62c21727> (Last accessed December 2023).

## 2 Legislation and methodology

### 2.1 Legislative background

- 2.1.1 The WFD is Directive 2000/60/EC, which is European legislation that aims to protect and improve the water environment within river catchments. The WFD became effective in 2000, prior to Britain's exit from the European Union (EU), and its provisions are transposed into law in England and Wales by regulations that are now the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD Regulations). The Environment Agency is the statutory body responsible for implementing the WFD Regulations in England.
- 2.1.2 Under the WFD Regulations, 'waterbodies' are the basic management units, defined as all or part of a river system or aquifer. Waterbodies form part of a larger 'river basin district' (RBD), for which 'River Basin Management Plans' (RBMPs) are used to manage a river basin district by setting environmental objectives and identifying a programme of measures to achieve them. The Scheme should seek to contribute to the delivery of the Humber RBMP<sup>5</sup> by contributing to the achievement of objectives, as identified in the River Trent Catchment Flood Management Plan<sup>6</sup>, where possible. RBMPs set out how organisations, stakeholders and communities work together to improve the water environment.
- 2.1.3 The WFD Regulations require objectives to be identified and set in order to protect and improve the status of all waterbodies. Waterbodies include rivers, streams, lakes, reservoirs, estuaries, coastal waters, canals and groundwaters. The standard objective is to achieve 'good status' or 'good potential' (if the water body is artificial or is heavily modified). Further to this, the WFD Regulations require the prevention of deterioration in status for all waterbodies. The original target date was for all waterbodies to achieve good status by 2015; however, this has been extended to 2027. Good status or potential is designated based on the assessment of ecological and chemical components in surface waters. Ecological status consists of biological quality elements, physico-chemical supporting elements and hydromorphological supporting conditions. For groundwater, status consists of quantitative and qualitative elements.

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<sup>5</sup> Environment Agency (2015) Humber river basin district River basin management plan [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/718328/Humber\\_RB\\_D\\_Part\\_1\\_river\\_basin\\_management\\_plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RB_D_Part_1_river_basin_management_plan.pdf) (Last accessed December 2023).

<sup>6</sup> Environment Agency (2010) River Trent Catchment Flood Management Plan [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/289105/River\\_Trent\\_Catchment\\_Management\\_Plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/289105/River_Trent_Catchment_Management_Plan.pdf) (Last accessed December 2023).

- 2.1.4 The environmental objectives for surface water and groundwater waterbodies that are required to be considered in the preparation of RBMPs are set out in Table 2-1. In England, the WFD Regulations place a general duty on the Secretary of State and the Environment Agency to exercise their 'relevant functions' so as to secure compliance with the WFD Regulations (Regulation 3). Although functions under the Planning Act 2008 are not 'relevant functions' for this purpose, the Secretary of State, the Environment Agency and each public body have a specific duty to have regard to the relevant RBMP, and any supplementary plans made under it, in exercising their functions (Regulation 33). These functions include the determination of applications under the PA2008.
- 2.1.5 The overall aims and objectives of the WFD Regulations are to:
- Enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystems;
  - Ensure progressive reduction of groundwater pollution;
  - Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants (Annex II, Environmental Quality Standards (EQS) Directive (2008/105/EC) as amended);
  - Contribute to mitigating the effects of floods and droughts;
  - Achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (Article 4, WFD (2000/60/EC) (outlined in Table 2-1 below) (or good ecological potential in the case of artificial or heavily modified water bodies); and,
  - Promote sustainable water use.

**Table 2-1: Article 4, WFD (2000/60/EC) environmental objectives**

Article	Objective
4.1 (a) (i)	to implement the necessary measures to prevent deterioration of the status of all bodies of surface water.
4.1 (a) (ii)	to protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water by 2015.
4.1 (a) (iii)	to protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015.
4.1 (a) (iv)	to implement the necessary measures with the aim of progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.
4.1 (b) (i)	to implement the necessary measures to prevent deterioration of the status of all bodies of groundwater,

Article	Objective
4.1 (b) (ii)	to protect, enhance and restore all bodies of groundwater, ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater status by 2015.
4.1 (b) (iii)	to implement the measures necessary to reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order progressively to reduce pollution of groundwater.

Source: Water Framework Directive 2000/60/EC<sup>7</sup>

## 2.2 Methodology for WFD assessment

- 2.2.1 This WFD assessment has been undertaken to identify the potential impacts that could affect the ground and surface waterbodies within the study area. The assessment has been informed by a desk-based assessment using publicly available data.
- 2.2.2 The assessment methodology has applied the Environment Agency 'Water Framework Directive assessment: estuarine and coastal waters' guidance<sup>8</sup> and the Planning Inspectorate Advice Note 18: The Water Framework Directive<sup>9</sup>. The advice note recommends that WFD assessments are completed in a 3-stage approach, as outlined below. The overview matrices recommended in Advice Note 18 have been completed using the information identified within this report and are provided in Appendix A.

### Stage 1 (WFD screening)

- 2.2.3 Stage 1 is an initial assessment to determine if there are any activities associated with the Scheme which may impact waterbodies within the vicinity. The Scheme's 'zone of influence' (hereafter referred to as 'study area') is based on aspects of the Scheme that could affect the identified water bodies and is identified in Section 3. WFD waterbodies to which there is considered to be a credible pathway are identified and screened-in to Stage 2.

<sup>7</sup> Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2000) [online]. Available at: [https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF) (Last accessed December 2023).

<sup>8</sup> GOV.UK (2016) *Water Framework Directive assessment: estuarine and coastal waters* [online] Available at: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters> (Last accessed December 2023).

<sup>9</sup> Planning Inspectorate (2017) *Advice Note Eighteen: The Water Framework Directive* [online] Available at: [Advice Note Eighteen: The Water Framework Directive | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://www.planninginspectorate.gov.uk/advice-note-eighteen-the-water-framework-directive/) (Last accessed December 2023).

## **Stage 2 (WFD scoping)**

- 2.2.4 Stage 2 identifies current baseline status and objectives of the screened in waterbodies and identifies elements that may be at risk as a result of the Scheme.

## **Stage 3 (WFD impact assessment)**

- 2.2.5 Stage 3 is a detailed assessment of the identified waterbodies and activities carried forward from the screening and scoping stage.
- 2.2.6 This assessment is informed by publicly available information and the scale of impact is determined based on professional judgement. This stage assesses the scale of impact during construction and operation and the potential risk of these impacts to cause a deterioration in WFD status and/or prevent the target status of the WFD waterbody being achieved in the future.

## **2.3 Scope of this assessment**

- 2.3.1 This assessment is a full WFD assessment and covers all three stages. This assessment supports, and should be read in conjunction with, Chapter 13 (Road Drainage and the Water Environment) of the ES [APP-057].

## **2.4 Consultation**

- 2.4.1 Consultation with the Environment Agency was held on 13 March 2023. The methodology and outcomes of the WFD screening, scoping and detailed compliance assessment were discussed and no objections were raised by the Environment Agency. Following potential changes to the design, a meeting was held with the Environment Agency and Trent Valley Internal Drainage Board on 20th June 2023 to discuss the potential changes to the WFD assessment. These potential design changes were not carried forward and therefore no changes were made to the WFD assessment.



## 3 Stage 1 WFD screening assessment

### 3.1 Baseline information

#### Study area

- 3.1.1 The study area for the WFD assessment covers a 1 kilometre radius around the Order Limits as shown in Figures 13.1 to 13.4 the ES Figures [contained in Volume 6.2 of the ES] and relates to both surface water and groundwater. This study area has been determined based on professional judgement as pollutants are expected to disperse and have been diluted beyond a 1 kilometre radius.

#### Catchment context

- 3.1.2 The Scheme is located within the Trent and Lower Erewash catchment, within the Humber RBD. The River Trent is classified by the Environment Agency as a main river, with many tributaries flowing into the River Trent around the Newark-on-Trent area.
- 3.1.3 The Humber RBMP outlines mitigation measures for the Humber RBD<sup>10</sup> in order to maintain the current status of the surface water and groundwater waterbodies within the RBMP. The measures that are applicable to the Scheme are provided in Table 3-1 below.

**Table 3-1: Scheme relevant RBMP measures**

Type of mechanism	Measure / Mechanism	Measure information
Regulatory	National Highways Strategic Road Investment Strategy	Measures to mitigate impacts from road run-off.
Regulatory	Water Industry Asset Management Plan Price Review 24	Habitat restoration or creation and species recovery
Non-regulatory	National Highways Invasive Non Native Species (INNS) control work	Various measures to control INNS by National Highways.

<sup>10</sup> Environment Agency (2021) *Measures data for Humber River Basin District* [online] Available at: <https://environment.data.gov.uk/catchment-planning/v/c3-plan/RiverBasinDistrict/4/measures> (Last accessed December 2023).

Type of mechanism	Measure / Mechanism	Measure information
Partnerships	Water Industry Green Recovery Programme	Various environmental improvement projects e.g. pollution control initiatives, abstraction management and habitat restoration.
Partnerships	Transforming the Trent Valley National Lottery Heritage funded	Measure improving river habitat, reducing flood risk through nature based solutions and improving water quality.
Guidance / Process	Drainage Waste Water Management Plans to inform measures identified by Water Industry in Price Review 24	Integrated drainage management – Measures to address pollution, flood risk and habitat function.

Source: Environment Agency's "Measures data for Humber River Basin District (Summary of the measured planned)"<sup>15</sup>

## Topography

- 3.1.4 Newark-on-Trent is located within a low-lying area. The Scheme has an elevation change of approximately seven metres between its highest and lowest points (approximately 14 metres above sea level at the Farndon roundabout, and 21 metres above sea level at the Winthorpe roundabout).

## Geology

- 3.1.5 The study area is entirely underlain by the Mercia Mudstone Group which dips to the east.
- 3.1.6 British Geological Survey (BGS) superficial deposits data<sup>11</sup> shows Alluvium present along much of the Scheme, interspersed with smaller areas of the Holme Pierrepont Sand and Gravel member. The Balderton Sand and Gravel Member is present to the north of the Scheme. These deposits comprise clay, silt, sand and gravel.

## 3.2 Scope of works that could affect the water environment

- 3.2.1 The Scheme includes two permanent bridges, and one temporary bridge across the River Trent. Whilst no in-channel works associated with the River Trent would be carried out as part of the Scheme, the construction of piers and scour protection adjacent to the riverbank as

<sup>11</sup> BGS (Accessed 2022). BGS Geology Viewer 0.0.48 (Beta) [online] Available at: [BGS Geology Viewer \(BETA\)](#) (Last accessed December 2023).

well as overshadowing have the potential to affect the water environment. The construction of the permanent structures (including the FCAs) will require piling, excavation and dewatering activities and has the potential to affect the groundwater environment.

- 3.2.2 Additionally, routine surface runoff or accidental spillages on the carriageway may enter the drainage system and have the potential to affect the water environment.
- 3.2.3 The permanent realignment of Slough Dyke (The Fleet) adjacent to Brownhills Junction involves the following construction works, and has the potential to affect the water environment:
- Installation of temporary piped culverts (6 meters in length) within the watercourse to provide access to the works area.
  - Installation of a temporary culvert under the proposed working platform.
  - Installation of a bung on the southern temporary culvert with an over pumping system installed to maintain the flow from the dyke into the new culvert.
  - Infilling the existing watercourse to allow for the working platform to be constructed. Once working platform is no longer needed, the channel will be excavated.
  - Excavation of the profile of the new dyke alignment and connection to the existing dyke.
  - Removal of temporary culvert and the temporary realigned section<sup>12</sup>.
- 3.2.4 The temporary works for the Slough Dyke (The Fleet) realignment may last between six to 18 months.
- 3.2.5 The permanent realignment of the Slough Dyke (The Fleet) would result in an increase in length and sinuosity of the watercourse. A permanent access road comprising of concrete would also be created adjacent to the watercourse which would not have a drainage system incorporated within the design, as such there is a potential for contaminated surface water run-off to enter the watercourse during rainfall events. This access road would be used for maintenance purposes approximately once a month on average.
- 3.2.6 Three floodplain compensation areas (Kelham and Averham floodplain compensation area (FCA), Farndon East FCA and Farndon West FCA) would be constructed as part of the Scheme to compensate for the loss of floodplain storage. Farndon East and Farndon West would also be used as borrow pits during construction. The construction works at Farndon East and Farndon West would involve excavation of material and therefore has the potential to alter surface water flow paths.

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<sup>12</sup> Temporary works required to facilitate the permanent realignment of the Slough Dyke under the A1 crossing.

- 3.2.7 Following construction works, Farndon East FCA would be a permanent lake with fish passages for connectivity. This lake is expected to be groundwater fed. The design of the lake is expected to include a stepped profile with grass embankments to encourage wetland habitat to develop. Farndon West FCA would comprise of residual ponds formed in post-borrow pit excavations with floodplain grazing marsh created in the northern extent of the site. Both sites would incorporate fish escape passages to mitigate the risk of fish entrapment as flood water recedes. The optioneering process and preferred option for the design of the fish escape passages are set out in the Fish Escape Passage Technical note, appended to the HRA [REP3-024]. During operation, the FCAs have the potential to alter receding floodwater flow paths during flooding events.
- 3.2.8 Appendix 13.5 (Drainage Strategy) of the ES Appendices [APP-179] sets out the principles, design requirements and constraints for all drainage systems and features related to parts of the Scheme. There are 18 outfalls proposed. These outfalls present potential impact pathways by which the water environment could be affected by the Scheme.

### 3.3 Waterbody identification

#### Surface waterbodies

- 3.3.1 The Scheme is located within the Humber RBMP and lies within the Trent Lower and Erewash management catchment. With regards to surface water, the Scheme lies within three operational catchment areas; Nottingham Urban, Nottingham South A, and Nottingham South B.
- 3.3.2 Eight WFD surface waterbodies / waterbody catchments have been identified within the study area, see Figure 13.2 (River Waterbody Catchments) of the ES Figures [AS-074]. Whilst these waterbodies / waterbody catchments fall within the study area, it is possible for waterbodies to not be considered to have a credible pathway with the Scheme. The identification of and justification for surface water waterbodies that have been screened in for further assessment are outlined in Table 3-2.

**Table 3-2: WFD surface water waterbody screening**

WFD surface water waterbody	Screened-in?	Justification
Trent from the Soar to the Beck (GB104028053110)	Yes	Construction works including the three river crossings over the Trent from the Soar to the Beck, and the Kelham and Averham FCA, Farndon West Borrow Pit and FCA and

WFD surface water waterbody	Screened-in?	Justification
		Farndon East Borrow Pit and FCA are present within this catchment.
Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)	Yes	The Kelham and Averham FCA is partially located within this WFD waterbody catchment. As such, the Scheme has the potential to impact this waterbody.
Slough Dyke Catchment (tributary of Trent) (GB104028053111) <sup>13</sup>	Yes	The Order Limits overlap with the waterbody and cross a tributary (where the A46 meets the A1). The watercourse will be realigned as part of the Scheme, as well as being temporarily culverted during construction. Therefore, the waterbody has the potential to be impacted.
Devon from Cotham to Trent (GB104028052632)	Yes	The Order Limits overlap with the waterbody, and so has the potential to be impacted.
Pingley/ Rundell Dyke Catchment Upper (tributary of Trent) (GB104028053420)	No	Whilst the catchment has been identified within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.
Greet Catchment (tributary of Trent) (GB104028053410)	No	Whilst the catchment has been identified within the study area, the Greet Catchment (tributary of Trent) joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.
Middle Beck Catchment (tributary of Devon) (GB104028052633)	No	Whilst the catchment has been identified within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.
The Fleet Upper Catchment (tributary of Trent) (GB104028053430)	No	Whilst the catchment lies within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the works.

<sup>13</sup> This watercourse is also referred to as Slough Dyke (The Fleet) on Ordnance Survey maps and within the Scheme proposals. For the purposes of this WFD Assessment the watercourse will hereafter be referred to by the WFD name ('Slough Dyke (tributary of Trent)').

## Ground waterbodies

- 3.3.3 The Scheme overlies one WFD groundwater waterbody which is the Lower Trent Erewash – Secondary Combined (GB40402G990300). This groundwater waterbody has been screened in for further assessment.

## 3.4 Protected areas

- 3.4.1 WFD Regulations define ‘protected areas’ as areas requiring special protection under other EC Directives and waters used for abstraction of drinking water. These include:
- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
  - Areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish);
  - Bodies of water designated as recreational waters, including areas designated as Bathing Waters;
  - Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones (NVZ) under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive;
  - Areas designated for the protection of habitats or species where maintenance or improvement of the status of water is an important factor in the protection of the habitats or species.
- 3.4.2 The following protected areas<sup>14</sup> have been identified within the study area and are included on the register of protected areas maintained by the Environment Agency for the Humber RBMP:
- All the surface water waterbodies and the groundwater waterbody within the study area are designated as Nitrate Vulnerable Zones (NVZ)<sup>15</sup>.
  - The Lower Trent Erewash – Secondary Combined groundwater waterbody is also within a Drinking Water Protected Area<sup>16</sup>, however this is designated as “probably not at risk”.
  - The Trent from Soar to Beck, Devon from Cotham to Trent and Trent Bifurcation Pingley Dyke to Winthorpe surface waterbodies are

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<sup>14</sup> Environment Agency. (2022, 12). River Basin Management Plan: maps. Available at: [Protected Areas | River Basin Management Plan: maps \(arcgis.com\)](#) (Last accessed December 2023).

<sup>15</sup> Department for Environment, Food and Rural Affairs (DEFRA) (2021) *Nitrate Vulnerable Zones* [online] Available at: <https://www.gov.uk/government/collections/nitrate-vulnerable-zones> (Last accessed December 2023).

<sup>16</sup> Environment Agency (2019) *Drinking Water Protected Areas Pressure* [online] Available at: [https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user\\_uploads/drinking-water-protected-areas-pressure-rbmp-2021.pdf](https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user_uploads/drinking-water-protected-areas-pressure-rbmp-2021.pdf) (Last accessed December 2023).

located within areas designated under the Urban Waste Water Treatment Directive<sup>17</sup>.

- Two Local Nature Reserves (LNRs) are situated within the study area. These are Farndon Ponds LNR, situated within Trent from Soar to the Beck surface waterbody and Devon Park Pastures LNR, located within Devon from Cotham to Trent surface waterbody catchment.
- Humber Estuary SAC is located approximately 53 kilometres north east from the Order Limits directly, and 75 kilometres downstream via the River Trent. Lamprey, a qualifying feature of this designated site issue the River Trent within the study area and thus the Scheme is hydrologically connected to the SAC.

3.4.3 The waterbodies these protected areas relate to are shown in Figure 13.2(River Waterbody Catchments) [AS-074] and Figure 13.3 [AS-075] of this ES. All the protected areas identified above have been screened-in and are considered at Stage 2.

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<sup>17</sup> European Commission (2014) *Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment* [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271> (Last accessed December 2023).



## 4 Stage 2 WFD scoping assessment

- 4.1.1 This section identifies the waterbodies which have been screened-in and the baseline conditions of those waterbodies. Once the baseline conditions of the waterbodies has been established, the WFD elements and screened-in protected areas are assessed to understand whether there are potential impact pathways between the Scheme and the receptors.

### 4.2 Screened in waterbodies

- 4.2.1 Four WFD surface waterbodies and one groundwater body have been identified as having the potential to be affected by the Scheme. These are as follows:
- Trent from the Soar to the Beck (GB104028053110)
  - Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)
  - Slough Dyke Catchment (tributary of Trent) (GB104028053111)
  - Devon from Cotham to Trent (GB104028052632)
  - Lower Trent Erewash – Secondary Combined (GB40402G990300)

### 4.3 WFD baseline for screened in waterbodies

- 4.3.1 The overall waterbody status for each of the screened in surface waterbodies and the groundwater waterbody is provided in Table 4-1. The table has been populated based on the WFD Classification Status Cycle 3<sup>18</sup> and, where relevant, outlines the reasons for not achieving good status (RNAG).

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<sup>18</sup> Environment Agency (2021) WFD Classification Status Cycle 3 [online] Available at: <https://www.data.gov.uk/dataset/41cb73a1-91b7-4a36-80f4-b4c6e102651a/wfd-classification-status-cycle-2> (Last accessed December 2023).



**Table 4-1 Waterbody status for screened in waterbodies**

Waterbody name (ID)	Waterbody Type	WFD quality element status (2019)	Reasons for Not Achieving Good Status (RNAG)	Heavily Modified Water Body (HMWB)
Trent from the Soar to the Beck (GB104028053110)	River	<p><b>Overall waterbody status = Moderate</b></p> <ul style="list-style-type: none"> <li>Ecological: <i>Moderate</i> <ul style="list-style-type: none"> <li>Biological quality elements: <i>Moderate</i> (Invertebrates: <i>Moderate</i>; Macrophytes and Phytobenthos Combined: <i>Moderate</i>; Macrophytes Sub Element: <i>Moderate</i>; Phytobenthos Sub Element: <i>Moderate</i>)</li> <li>Physico-chemical quality elements: <i>Moderate</i> (Acid Neutralising Capacity: <i>High</i>; Ammonia: <i>High</i>; Dissolved Oxygen: <i>High</i>; Phosphate: <i>Poor</i>; pH: <i>High</i>)</li> <li>Hydromorphological supporting elements: <i>Supports Good</i></li> <li>Specific pollutants: <i>High</i> (Arsenic, Chlorothalonil, Chromium, Copper, Diazinon, Dimethoate, Iron, Manganese, Mecoprop, Pendimethalin, Phenol, Toluene and Zinc all recorded as <i>High</i>)</li> </ul> </li> <li>Chemical: <i>Fail</i> <ul style="list-style-type: none"> <li>Priority hazardous substances: <i>Fail</i> (Mercury and its Compounds: <i>Fail</i>; Perfluorooctane sulphonate (PFOS): <i>Fail</i>; Polybrominated diphenyl ethers (PBDE): <i>Fail</i>)</li> <li>Priority substances: <i>Good</i></li> <li>Other pollutants: <i>Good</i></li> </ul> </li> </ul>	<p>Physical modification from navigation, urban transport and local central government purposes.</p> <p>Point source pollution associated with continuous sewage discharge from the water industry and diffuse soil pollution associated with transport drainage and from the urban and transport sector.</p>	Yes
Trent Bifurcation Pingley Dyke to	River	<p><b>Overall waterbody status = Moderate</b></p> <ul style="list-style-type: none"> <li>Ecological: <i>Moderate</i> <ul style="list-style-type: none"> <li>Biological quality elements: <i>Moderate</i></li> </ul> </li> </ul>	Diffuse source pollution associated with	No

Waterbody name (ID)	Waterbody Type	WFD quality element status (2019)	Reasons for Not Achieving Good Status (RNAG)	Heavily Modified Water Body (HMWB)
Winthorpe (GB104028053390)		<p>(Invertebrates: <i>Moderate</i>; Macrophytes and Phytobenthos Combined: <i>Moderate</i>; Macrophytes Sub Element: <i>Moderate</i>; Phytobenthos Sub Element: <i>Moderate</i>)</p> <ul style="list-style-type: none"> <li>– Physico-chemical quality elements: <i>Moderate</i> (Ammonia: <i>High</i>; Dissolved Oxygen: <i>High</i>; Phosphate: <i>Poor</i>; pH: <i>High</i>)</li> <li>– Hydromorphological supporting elements: <i>Supports Good</i></li> <li>• Chemical: <i>Fail</i> <ul style="list-style-type: none"> <li>– Priority hazardous substances: <i>Fail</i> (Mercury and its Compounds: <i>Fail</i>; Perfluorooctane sulphonate (PFOS): <i>Fail</i>; Polybrominated diphenyl ethers (PBDE): <i>Fail</i>)</li> <li>– Priority substances: <i>Good</i></li> <li>– Other pollutants: <i>Does not require assessment</i></li> </ul> </li> </ul>	transport drainage and from the urban and transport sectors.	
Slough Dyke Catchment (tributary of Trent) (GB104028053111)	River	<p><b>Overall waterbody status = Moderate</b></p> <ul style="list-style-type: none"> <li>• Ecological: <i>Moderate</i> <ul style="list-style-type: none"> <li>– Biological quality elements: <i>Bad</i> (Invertebrates: <i>Bad</i>; Macrophytes Sub Element: <i>High</i>)</li> <li>– Physico-chemical quality elements: <i>Moderate</i> (Ammonia: <i>Poor</i>; Dissolved Oxygen: <i>Bad</i>; Phosphate: <i>Poor</i>; Temperature: <i>High</i>; pH: <i>High</i>)</li> <li>– Hydromorphological supporting elements: <i>Supports Good</i></li> <li>– Supporting elements (Surface Water): <i>Moderate</i> (Mitigation measures assessment: <i>Moderate or less</i>)</li> <li>– Specific pollutants: <i>High</i></li> </ul> </li> </ul>	<p>Diffuse source pollution associated with transport drainage from the urban and transport sector.</p> <p>Point source pollution associated with industry (manufacturing) discharge.</p>	Yes

Waterbody name (ID)	Waterbody Type	WFD quality element status (2019)	Reasons for Not Achieving Good Status (RNAG)	Heavily Modified Water Body (HMWB)
		<p>(Copper and Zinc recorded as <i>high</i>)</p> <ul style="list-style-type: none"> <li>Chemical: <i>Fail</i> <ul style="list-style-type: none"> <li>Priority hazardous substances: <i>Fail</i> (Mercury and its Compounds: <i>Fail</i>; Polybrominated diphenyl ethers (PBDE): <i>Fail</i>)</li> <li>Priority substances: <i>Good</i></li> <li>Other pollutants: <i>Does not require assessment</i></li> </ul> </li> </ul>		
Devon from Cotham to Trent (GB104028052632)	River	<p><b>Overall waterbody status = Poor</b></p> <ul style="list-style-type: none"> <li>Ecological: <i>Poor</i> <ul style="list-style-type: none"> <li>Biological quality elements: <i>Poor</i> (Invertebrates: <i>Moderate</i>; Macrophytes and Phytobenthos Combined: <i>Poor</i>; Macrophytes Sub Element: <i>Poor</i>)</li> <li>Physico-chemical quality elements: <i>Moderate</i> (Acid Neutralising Capacity: <i>High</i>; Ammonia: <i>Moderate</i>; Dissolved Oxygen: <i>Poor</i>; Phosphate: <i>Bad</i>; pH: <i>High</i>)</li> <li>Hydromorphological supporting elements: <i>Supports Good</i></li> <li>Specific pollutants: <i>High</i> (Copper and Triclosan recorded as <i>High</i>)</li> </ul> </li> <li>Chemical: <i>Fail</i> <ul style="list-style-type: none"> <li>Priority hazardous substances: <i>Fail</i> (Polybrominated diphenyl ethers (PBDE): <i>Fail</i>)</li> <li>Priority substances: <i>Good</i></li> </ul> </li> </ul> <p>Other pollutants: <i>Does not require assessment</i></p>	Point source pollution associated with continuous and intermittent sewage discharge from the water industry.	No

Waterbody name (ID)	Waterbody Type	WFD quality element status (2019)	Reasons for Not Achieving Good Status (RNAG)	Heavily Modified Water Body (HMWB)
Lower Trent Erewash – Secondary Combined (GB40402G990300)	Groundwater	<p><b>Overall waterbody status = Good</b></p> <ul style="list-style-type: none"> <li>Quantitative Status Element: <i>Good</i> <ul style="list-style-type: none"> <li>Dependent Surface Water Body Status: <i>Good</i></li> <li>Groundwater Dependent Terrestrial Ecosystems (GWDTEs) test: <i>Good</i></li> <li>Saline Intrusion: <i>Good</i></li> <li>Water Balance: <i>Good</i></li> </ul> </li> <li>Chemical Status Element: <i>Good</i> <ul style="list-style-type: none"> <li>Dependent Surface Water Body Status: <i>Good</i></li> <li>Drinking Water Protected Area: <i>Good</i></li> <li>Groundwater Dependent Terrestrial Ecosystems (GWDTEs) test: <i>Good</i></li> <li>Saline Intrusion: <i>Good</i></li> <li>General Chemical Test: <i>Good</i></li> <li>Supporting elements (Groundwater) <ul style="list-style-type: none"> <li>Prevent and Limit Objective: <i>Active</i></li> </ul> </li> </ul> </li> </ul> <p>Trent Assessment: <i>No trend</i></p>	Point source pollution associated with an abandoned mine.	Not applicable to groundwater.

Source: Environment Agency Catchment Data Explorer<sup>19</sup>

<sup>19</sup> Environment Agency Catchment Data Explorer [online] Available at: <https://environment.data.gov.uk/catchment-planning/> (Last Accessed February 2023)

## 4.4 Identifying potential impact pathways

- 4.4.1 Three WFD elements are to be considered for surface waterbody receptors, and two WFD elements are to be considered for groundwater bodies. The Scheme activities (both construction and operation) will be assessed against these elements in Stage 3 (where scoped in). An assessment will determine whether the WFD elements would be impacted such that they would cause a deterioration in the baseline conditions identified above.
- 4.4.2 The WFD elements for surface waterbodies include:
- 'Hydromorphological supporting conditions': This element covers hydrological regime, quantity and dynamics of flow, connection to groundwater, morphological conditions, width/depth variation, and cross-section variation.
  - 'Physio-chemical': This element covers impacts on the chemical condition of the surface waterbody, including: ammonia, dissolved oxygen, pH, temperature and phosphate.
  - 'Biological quality element': This element covers impacts on aquatic species, including invertebrates, macroalgae, and fish.
- 4.4.3 The WFD elements for groundwater waterbodies include:
- 'Quantitative Status': This element covers the impacts on saline intrusion, water balance, GWDTEs, and dependent surface water body status.
  - 'Chemical Status': This element covers the impacts on drinking water protected areas, general chemical tests, and saline intrusions.
- 4.4.4 Potential risks to receptors (WFD waterbodies and protected areas) from the Scheme, which are identified through potential impact pathways, are assessed in Table 4-2 and Table 4-3.

**Table 4-2: Potential risks to WFD elements and impact pathways**

WFD element	Potential impact pathway	Significance of risk to receptor – Further assessment required?
Hydromorphology supporting conditions (applicable only to surface waterbodies)	<p><b>Trent from the Soar to the Beck (GB104028053110)</b></p> <p>The Scheme comprises of three watercourse crossings (two permanent, and one temporary) over the Trent from the Soar to the Beck waterbody. Construction activities associated with these works have the potential to alter the riverbank morphology. There are two proposed culvert extensions and a minor realignment on the Old Trent Dyke. This watercourse is not a WFD waterbody, however it is located within the Trent from the Soar to the Beck catchment.</p> <p>During operation, the presence of Farndon East FCA and Farndon West FCA has the potential to alter the flow paths of surface water within the catchment during flood events.</p> <p><b>Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)</b></p> <p>Construction activities would not directly impact the hydromorphology of this watercourse.</p> <p>During operation, the presence of Kelham and Averham FCA has the potential to alter the flow paths of surface water to the watercourse during flooding events.</p> <p><b>Slough Dyke Catchment (tributary of Trent) (GB104028053111)</b></p> <p>The realignment of the Slough Dyke (tributary of Trent) WFD waterbody has the potential to directly impact the hydromorphology of this waterbody during both construction and operation.</p>	Yes – the Scheme has the potential to change the hydromorphology within three waterbody catchments (Trent from the Soar to the Beck, Slough Dyke (tributary of Trent) and Trent Bifurcation Pingley Dyke to Winthorpe) within the study area. Therefore, further assessment on the hydromorphology elements is required for these three waterbodies only.

WFD element	Potential impact pathway	Significance of risk to receptor – Further assessment required?
	<p><b>Devon from Cotham to Trent (GB104028052632)</b></p> <p>The Scheme would not directly impact the hydromorphology of this watercourse either during construction or operation. Therefore, no hydromorphological impacts are anticipated.</p>	
Physio-chemical conditions (applicable only to surface waterbodies)	<p><b>All identified surface waterbodies</b></p> <p>Water quality within the identified waterbodies (including watercourses within their catchments) could be subject to change as a result of mobilised contaminants during construction, as well as from routine runoff from maintenance activities or spillage events during operation.</p> <p><b>Trent from the Soar to the Beck (GB104028053110)</b></p> <p>The extended culvert along the Old Trent Dyke has the potential to increase shading along the watercourse which has the potential to alter the temperature of the watercourse.</p> <p>Similarly, the new bridges at Windmill Viaduct and Nether Lock Viaduct have the potential to increase shading along the watercourse.</p> <p><b>Slough Dyke Catchment (tributary of Trent) (GB104028053111)</b></p> <p>During construction, the temporary culverting of the watercourse will result in overshading during construction.</p> <p>The presence of the new bridge over the watercourse has the potential to increase shading along the watercourse. During operation there is a potential for contaminated surface water runoff from maintenance vehicles on the</p>	<p>Yes - the Scheme has the potential to cause contaminants to enter the waterbodies and affect the physico-chemical status. The Scheme has the potential to change the temperature of the Trent from Soar to the Beck (GB10402853110) and Slough Dyke Catchment (tributary of Trent) (GB104028053111) through increased shading. Therefore, further assessment is required for all identified waterbodies.</p>

WFD element	Potential impact pathway	Significance of risk to receptor – Further assessment required?
	access road to alter the water quality of the watercourse and impact conditions for aquatic species.	
Biological quality element (applicable only to surface waterbodies)	<p><b>All identified surface waterbodies</b></p> <p>Construction activities could result in contaminated surface water runoff which has the potential to alter the water quality of the watercourse and impact the conditions for aquatic species.</p> <p><b>Trent from the Soar to the Beck (GB104028053110)</b></p> <p>The construction activities associated with the bridges and works adjacent to the watercourses have the potential to disturb aquatic species through noise and vibration, and result in the loss of riparian vegetation.</p> <p>During operation, there is a potential for contaminated surface water runoff from vehicles to alter the water quality of the watercourse and impact conditions for aquatic species.</p> <p><b>Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)</b></p> <p>No operational impacts on biological elements are anticipated due to the distance of the watercourse from the Scheme.</p> <p><b>Slough Dyke Catchment (tributary of Trent) (GB104028053111)</b></p> <p>The construction works associated with the realignment of the Slough Dyke (tributary of the Trent) would involve temporary restrictions to the watercourse as a result of over-pumping and bunting the downstream section of the</p>	Yes – the Scheme has the potential to disturb aquatic species. Therefore, further assessment for all identified waterbodies is required.



WFD element	Potential impact pathway	Significance of risk to receptor – Further assessment required?
	<p>watercourse. These activities (and in-channel working) have the potential to disturb aquatic species.</p> <p>During operation, there is a potential for contaminated surface water runoff from vehicles to alter the water quality of the watercourse and impact conditions for aquatic species. In addition, there will be an increase in shading of the watercourse due to the presence of the bridge.</p> <p><b>Devon from Cotham to Trent (GB104028052632)</b></p> <p>During operation, there is a potential for contaminated surface water runoff from vehicles to alter the water quality of the watercourse and affect aquatic species.</p>	
Quantitative Status elements (applicable only to groundwater bodies)	<p><b>Lower Trent Erewash – Secondary Combined (GB40402G990300)</b></p> <p>Construction activities associated with the bridges and FCAs, including dewatering and excavating materials and the presence of new subsurface structures, have the potential to alter the flow and volume of groundwater.</p> <p>During operation, the permanent lake at Farndon East FCA will be groundwater fed.</p>	Yes – the Scheme has the potential to alter the flow and volume of groundwater. Therefore, further assessment is required.
Chemical Status elements (applicable only to groundwater bodies)	<p><b>Lower Trent Erewash – Secondary Combined (GB40402G990300)</b></p> <p>Construction activities associated with the bridges and FCAs, including piling and excavation have the potential to create pathways for mobilised contaminants.</p>	Yes – the Scheme has the potential for contaminants to enter the groundwater and affect the status. Therefore, further assessment is required.

**Table 4-3: Potential risks to designated sites and impact pathways**

Receptor	Potential impact pathway	Significance of risk to receptor – Further assessment required?
Nitrate Vulnerable Zones	Surface water runoff and construction activities adjacent to the waterbodies have the potential to result in contaminants entering the watercourse, if unmitigated. However, given the nature of the Scheme, these contaminants will not contribute nitrates and, therefore, it is not considered possible for there to be a credible pathway which would affect the NVZ designation.	No – no credible pathway identified for nitrate pollution. Therefore, no further assessment is required.
Lower Trent Erewash – Secondary Combined (GB40402G990300 Drinking Water Protected Area	This protected area is designated as “probably not at risk”. Piling and excavation activities have the potential to create pathways for contaminants to this receptor.	No - whilst the Scheme will involve piling activities and below-ground permanent structures, given the size of the protected area as a whole it is not considered that the Scheme would have an impact on the protected area. Therefore, no further assessment is required.
Urban Waste Water Treatment Directive	Surface water runoff and construction activities adjacent to the waterbodies have the potential to result in contaminants entering the watercourse, if unmitigated. However, given the nature of the Scheme, these contaminants will not relate to sewage treatment wastewater. Therefore, it is not considered for there to be a credible pathway which would affect the Urban Waste Water Treatment designation.	No – no credible pathway identified to affect the Urban Waste Water Treatment designation. Therefore, no further assessment is required.
Farndon Ponds LNR	This designated site is located upstream of the Scheme. Therefore, it is not considered for there to be a credible pathway between the Scheme and this receptor.	No - there is no credible pathway, therefore no further assessment is required.
Devon Park Pastures LNR	This designated site is located downstream of the Scheme on the River Trent, however it is upstream of the confluence of River Devon and River Trent. Therefore, it is	No - there is no credible pathway, therefore no further assessment is required.

Receptor	Potential impact pathway	Significance of risk to receptor – Further assessment required?
	not considered for there to be a credible pathway between the Scheme and this receptor.	
Humber Estuary SAC	<p>This designated site is located approximately 75 kilometres downstream of the Scheme (via the River Trent) with the qualifying features being the presence of lamprey.</p> <p>This designated site is outside the study area and is considered to be a sufficient distance from the Scheme that any potential pollutants would be diluted as to not impact the water quality or fish species of this designation.</p>	No - there is no credible pathway, therefore no further assessment is required.

## 5 Stage 3 WFD detailed compliance assessment

- 5.1.1 The following tables assess potential Scheme impacts against the WFD waterbodies screened in for further assessment. The structure of this section is sub-divided by waterbody. If impacts are anticipated, mitigation measures are proposed to ensure WFD compliance. Mitigation measures of relevance during construction are included within the First Iteration Environmental Management Plan (EMP) [REP6-012]. Details on the First and Second Iteration EMPs, including how mitigation is secured within the DCO, are provided within Section 4.4 of Chapter 4 (Environmental Assessment Methodology) of the ES [APP-048].
- 5.1.2 The scale and magnitude of impact has been determined by professional judgement based on information provided in Stage 1 and Stage 2 of the WFD compliance assessment.
- 5.1.3 The following waterbodies have been identified as requiring further assessment against the proposed works, as identified within Section 3.3:
- Trent from the Soar to the Beck (GB104028053110)
  - Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)
  - Slough Dyke Catchment (tributary of Trent) (GB104028053111)
  - Devon from Cotham to Trent (GB104028052632)
  - Lower Trent Erewash – Secondary Combined (GB40402G990300)
- 5.1.4 Following the detailed compliance assessment, conclusions on the risk of WFD status deterioration from the Scheme and the risk of the Scheme preventing WFD status objectives being achieved are set out in Sections 6.2 and 6.3 respectively.

**Table 5-1: WFD assessment for Scheme impacts on the ‘Trent from the Soar to the Beck (GB104028053110)’**

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<b>Hydromorphological supporting conditions</b>  Hydrological regime  Quantity and dynamics of flow  Connection to groundwater  Morphological conditions  Width/depth variation  Cross-section variation	<b>Construction</b>  Sheet piling and supporting riprap <sup>20</sup> on the riverbank will be extended to support the new structure for Windmill Viaduct and Nether Lock Viaduct, which could result in the disruption and movement of sediments and surface water runoff into the watercourse.  The bridges will require larger support structures on the embankments, which is expected to require riparian vegetation clearance. This may alter the cross section of the river by removing vegetation and topsoil, having the potential to reduce slope stability.  Given the small-scale nature of the above works and incorporation of appropriate mitigation, the impacts on the waterbody are not expected to cause deterioration to the hydromorphological WFD status.  Construction activities associated with Farndon East FCA or Farndon West FCA are not anticipated to result in a change in the hydromorphological conditions of the catchment.	<b>Construction</b>  Best practice measures including pollution prevention measures would be followed. These requirements are contained within the First Iteration EMP [REP6-012].  Reinstatement of natural bank and riparian vegetation along the Scheme, following construction (as far as practicable).	Yes - subject to the following of specified mitigation.
	<b>Operation</b>  The Old Trent Dyke culverts would be extended approximately 10 metres under the A46 to	<b>Operation</b>  As no impacts are anticipated, no mitigation is required.	

<sup>20</sup> Riprap is human-placed rocks or other material used to protect shoreline structures against scour and water.

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	<p>accommodate widening of the road. This may involve minor realignment of the ordinary watercourse; however, this will be designed to mimic existing geometry to reduce the amount of earthworks required. As such, this is considered unlikely to impact the WFD waterbody.</p> <p>The design includes the installation of riprap along the toe of the bridge piers for Windmill Viaduct and Nether Lock Viaduct. This may result in a change in the volume of surface water runoff to the waterbody, however this is likely to have minor impacts due to the small size of the piers in comparison to the large catchment area of the waterbody.</p> <p>Farndon East FCA and Farndon West FCA will be created to tie into the Old Trent Dyke watercourse. Therefore, in a flooding event, receding floodwater will flow into the Old Trent Dyke, rather than the Trent from the Soar to the Beck. However, as the Old Trent Dyke discharges into the Trent from the Soar to the Beck downstream, the alterations in elevation are not anticipated to reduce the overall water volume within the catchment as a whole.</p> <p>Therefore, the impacts on the waterbody are not expected to cause deterioration to the hydromorphological WFD status of the waterbody during operation.</p>		
<b>Physio-chemical</b>  Ammonia	<b>Construction</b>  The Scheme involves construction works within the floodplain of the Trent from the Soar to the Beck waterbody, which could increase the	<b>Construction</b>  Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
Dissolved oxygen pH Temperature Phosphate	<p>likelihood of contaminants such as fuel and hydrocarbons entering the watercourse from vehicles, industry or plant machinery. In addition, compound sites along the A46 will be required to house equipment, some of which would be within 10 metres of the watercourse. As a result, there is the potential for contaminants to enter the watercourse and affect water quality, if not mitigated.</p> <p>Providing mitigation measures are implemented, impacts on water quality are considered to be short-term and localised, and are not expected to cause deterioration to the physio-chemical status of the waterbody.</p>	be followed. These requirements are contained within the First Iteration EMP [REP6-012].	
	<p><b>Operation</b></p> <p>The length of the Old Trent Dyke culvert would be increased, with the covered section under the A46 increasing in length. The culvert extension will be designed to mimic existing geometry to minimise earthworks required This may cause an increase in shading of the ordinary watercourse. This is however expected to be highly localised and have minimal impact as the ordinary watercourse is already heavily culverted along its length.</p> <p>The operational phase of the new bridges may also see contaminated surface runoff from road drainage entering the watercourse, through general use and potential accidents.</p> <p>For the Windmill Viaduct and Nether Lock Viaduct, increased shading of the watercourse will occur. This will have minor physio-chemical impacts on a</p>	<p><b>Operation</b></p> <p>Due to the minimal impact caused, no mitigation is anticipated to be required due to shading from bridge structures and culverts.</p> <p>Upgrades to the existing drainage for the roadway (as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057]) would prevent contaminated runoff from entering the watercourse.</p>	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	localised scale but considering the overall size of the WFD catchment, this is not anticipated to change the overall waterbody status.		
<b>Biological quality elements</b>  Invertebrates  Macroalgae  Fish	<b>Construction</b>  Construction activities could increase the risk of a pollution incident, such as contaminated surface runoff or spills/leaks of oils and fuels. These contaminants may alter the conditions of the water environment and harm aquatic species as a result.  Construction works to install sheet piling and riprap adjacent to the river could cause the loss of riparian habitat, and short-term localised disturbance to aquatic species through noise and vibration.  Imported material for the pier and scour protection works has the potential to introduce INNS to the watercourse.  Given the small-scale nature of the above works, any impacts are considered to be short-term and localised, and are not expected to cause deterioration to the biological WFD status of the waterbody.	<b>Construction</b>  Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. Biosecurity measures would be followed, and an INNS management plan would be produced prior to construction.  These requirements are contained within the First Iteration EMP [REP6-012].	
	<b>Operation</b>  Contaminated surface runoff from vehicles may alter water quality of the watercourses and impact conditions for aquatic species.  Loss of existing gabion baskets along a short length of the north bank of the Windmill Viaduct due to installation of sheet piling would result in	<b>Operation</b>  Upgrades to the existing drainage for the roadway (as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057]) would prevent contaminated runoff from entering the watercourse.	



WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	<p>the permanent loss of potential fish shelter. This impact would be localised and unlikely to impact the overall biological WFD status of the watercourse.</p> <p>Given the small-scale nature of these operational impacts, changes to the biological status of the waterbody are not expected.</p>		

**Table 5-2: WFD assessment for Scheme impacts on the ‘Trent Bifurcation Pingley Dyke to Winthorpe (GB104028053390)’**

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<b>Hydromorphological supporting conditions</b>  Hydrological regime  Quantity and dynamics of flow  Connection to groundwater  Morphological conditions  Width/depth variation  Cross-section variation	<b>Construction</b>  The construction of the Kelham and Averham FCA is within this WFD waterbody catchment, however this is approximately 400m north of the waterbody. No construction activities will impact the hydromorphology of the waterbody.	<b>Construction</b>  As no impacts are anticipated, no mitigation has been identified.	Yes - subject to the following of specified mitigation.
	<b>Operation</b>  The Kelham and Averham FCA will change the natural flow of receding floodwater back into the watercourse during the operation phase. This may change the quantity and dynamics of flow during a flood event, however the receding flood water will subsequently discharge into this WFD waterbody further downstream. Therefore, it is not anticipated that the presence of this FCA would impact the quantity of water within the catchment as a whole, or to impact the hydromorphological conditions of the waterbody status.	<b>Operation</b>  As no impacts are anticipated, no mitigation has been identified.	
<b>Physio-chemical</b>  Ammonia  Dissolved oxygen  pH  Temperature	<b>Construction</b>  Construction works could result in contaminated surface water runoff from plant machinery or sediment if works take place in wet conditions. This may lead to the washing of sediment and contaminants into the river which may impact the water quality of the watercourse. However, these would be short-term and localised, therefore not	<b>Construction</b>  Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. These requirements are contained within the First Iteration EMP [REP6-012].	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
Phosphate	impacting the chemical WFD status of the waterbody.		
	<b>Operation</b> The waterbody is located on the northern branch of the River Trent and is not associated with the road aspects of the Scheme. The Kelham and Averham FCA is located north of the watercourse and is separated by the A417. Therefore, no operational effects are anticipated.	<b>Operation</b> As no impacts are anticipated, no mitigation is proposed.	
<b>Biological quality elements</b> Invertebrates Macroalgae Fish	<b>Construction</b> Construction works could result in contaminated surface water runoff, from plant machinery or sediment if works take place in wet conditions. This may lead to the washing of sediment and contaminants into the river which may impact the biological quality elements. These impacts are considered to be localised and unlikely to affect the biological status of the waterbody.	<b>Construction</b> Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. These requirements are contained within the First Iteration EMP [REP6-012].	
	<b>Operation</b> The waterbody is located on the northern branch of the Trent from the Soar to the Beck and is not considered to have a credible pathway to the Scheme. The Kelham and Averham FCA is located north of the watercourse and is separated by the A417, and is not considered to have a credible pathway to the watercourse. Therefore, no operational effects are anticipated.	<b>Operation</b> As no impacts are anticipated, no mitigation is proposed.	

**Table 5-3: WFD assessment for Scheme impacts on the ‘Slough Dyke Catchment (tributary of Trent) (GB104028053111)’**

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<b>Hydromorphological supporting conditions</b>  Hydrological regime  Quantity and dynamics of flow  Connection to groundwater  Morphological conditions  Width/depth variation  Cross-section variation	<b>Construction</b>  The flow of the watercourse would be altered during construction works to allow for the temporary culvert and pipes to be installed. Over-pumping would be required from the blocked section of the watercourse to the temporary culvert to maintain the flow of the watercourse. These works have the potential to alter the quantity and dynamics of the flow within the watercourse, however this is anticipated to be localised and limited to the construction phase.  Works to extract material from the Brownhills borrow pit may destabilise portions of the area and change the pathway of receding floodwater back into the watercourse during the construction phase.  The impacts to the watercourse as a result of this are unlikely to cause deterioration to the waterbody’s hydromorphological status.	<b>Construction</b>  To reduce the impact of changes to quantity and flow dynamics over-pumping would be carried out at the same flow rate. Fish rescue would be undertaken where necessary and silt traps would be deployed.  An environmental permit would be required to carry out the temporary dewatering activities.	Yes - subject to the following of specified mitigation.
	<b>Operation</b>  The permanent realignment of the watercourse would result in a minor increase in length and sinuosity of the watercourse. This has the potential to be minor beneficial for the waterbody as currently it is a heavily modified waterbody.	<b>Operation</b>  Impacts on natural surface water flow paths and flow conditions has been considered within the design (maintaining the dimensions of the watercourse similar to the existing watercourse), avoiding potential destabilisation and potential	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	<p>The realigned section of the watercourse is anticipated to be of similar cross-sectional dimensions as the current watercourse with the addition of buried scour protection, it is not expected that this would alter the flow dynamics of the watercourse.</p> <p>After completion of the extraction of the material, the excavations at Brownhills borrow pit would be backfilled and re-soiled. Therefore, it is not anticipated for this borrow pit to result in a change in receding floodwater during operation of the Scheme. The impacts to the watercourse as a result of this are unlikely to cause deterioration to the waterbody's hydromorphological status.</p>	reduction in flow quantity as much as possible.	
<b>Physio-chemical</b> Ammonia Dissolved oxygen pH Temperature Phosphate	<b>Construction</b> <p>The Scheme involves in-channel works and so there is a risk of mobilisation of sediment and contaminants. Contaminants such as fuel and hydrocarbons from vehicles, industry and plant machinery have the potential to enter the watercourse during construction activities (works associated with the realignment, as well as from the working platform). However, implementation of appropriate construction management plans would reduce the risk of the mobilisation of contaminants and sediment.</p> <p>The temporary culverting of the watercourse would result in an increase in shading of the watercourse which could change the temperature. However, this is anticipated to be limited to the construction phase and localised in nature.</p>	<b>Construction</b> <p>Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. These requirements are contained within the First Iteration EMP [REP6-012].</p>	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	These impacts are considered to be small-scale and localised, therefore unlikely to affect the physio-chemical status of the waterbody.		
	<p><b>Operation</b></p> <p>Whilst operationally the realigned watercourse would be an open channel, the proposed bridge over the watercourse has the potential to increase the shading of the watercourse. This has a potential to change the temperature.</p> <p>The realigned watercourse would be approximately 10 metres closer to the A1, however it is not expected that this would result in an increase in risk of polluted surface-run off from entering this watercourse given the proposed drainage design.</p> <p>The operational phase of the new road may also see contaminated surface runoff from vehicles enter the drainage ditch, through general use and potential accidents. This impact is however considered to be localised and small-scale, therefore unlikely to impact the physio-chemical status of this waterbody.</p> <p>The access road adjacent to the Slough Dyke (tributary of the Trent) will be made of concrete and surface water run-off would directly enter the watercourse. However, as the road will be used for maintenance and traffic is expected to be infrequent (on average, once a month), it is not anticipated for this to result in a change in the physio-chemical status of this waterbody.</p>	<p><b>Operation</b></p> <p>Upgrades to the existing drainage for the roadway (as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057] .</p>	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<b>Biological quality elements</b>  Invertebrates  Macroalgae  Fish	<b>Construction</b>  The in-channel works associated with the realignment of the watercourse (in particular the over-pumping system) has the potential to injure or kill aquatic species.  Contaminants from the construction works such as vehicle fluids and dust may enter the watercourse. These fluids may alter the conditions of the water environment and harm biodiversity as a result. The impacts of this would be short-term and small-scale, therefore unlikely to impact that biological status of the waterbody.	<b>Construction</b>  Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. These requirements are contained within the First Iteration EMP [REP6-012].  A mesh screen would be installed on the pump to avoid injury to aquatic species, and fish rescue would be carried out when required.	
	<b>Operation</b>  The operational phase of the A46, elevated over the A1 and the waterbody, may see contaminated surface runoff from vehicles enter the drainage ditch, through general use and potential accidents. This could alter the habitat conditions for aquatic species, impacting on biodiversity. However, this is unlikely to alter the biological status of this waterbody.  The covered section of the drainage ditch will also increase in length as a result of the Scheme. This will cause an increase in shading of the ordinary watercourse, which may cause a change in temperature. This is however expected to be highly localised and have minimal impact as the ordinary watercourse is already heavily culverted along its length.	<b>Operation</b>  Upgrades to the existing drainage for the roadway as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057].	

**Table 5-4: WFD assessment for Scheme impacts on the ‘Devon from Cotham to Trent (GB104028052632)’**

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<b>Hydromorphological supporting conditions</b>  Hydrological regime  Quantity and dynamics of flow  Connection to groundwater  Morphological conditions  Width/depth variation  Cross-section variation	This element has been scoped out in Stage 2 for both construction and operation. No further assessment required.		Yes - subject to the following of mitigation as specified in the ‘mitigation and recommendations’ column.
<b>Physio-chemical</b>  Ammonia  Dissolved oxygen  pH  Temperature  Phosphate	<b>Construction</b>  Contaminants from the construction works such as vehicle fluids and dust may enter the river, impacting the chemical conditions of the Devon from Cotham to Trent. These alterations are however considered unlikely to impact the physio-chemical status of the waterbody.	<b>Construction</b>  Best practice pollution control measures, including a pollution prevention plan and emergency response procedures, would be followed. These requirements are contained within the First Iteration EMP [REP6-012].	
	<b>Operation</b>  The operational phase of the new roadway may also see contaminated surface runoff from vehicles enter the Devon from Cotham to Trent, through general use and potential accidents. Due to the small-scale nature of this	<b>Operation</b>  Upgrades to the existing drainage for the roadway as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057] .	



WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	impact, it is unlikely to impact the physio-chemical status of the waterbody.		
<b>Biological quality elements</b> Invertebrates Macroalgae Fish	<b>Construction</b> Whilst no works are planned to take place within the watercourse, contaminants from the construction works such as vehicle fluids and dust may enter the watercourse. These fluids may alter the conditions of the water environment and harm biodiversity as a result. Given the small-scale nature of the impact in comparison to the large area of the catchment, it is not considered that this impact would change the overall status of the waterbody.	<b>Construction</b> Best practice pollution control measures would prevent pollution of the watercourse, including a pollution prevention plan and emergency response procedures. These requirements are contained within the First Iteration EMP [REP6-012].	
	<b>Operation</b> There is potential for surface water runoff from the operation of the Scheme to enter this waterbody. This could alter the habitat conditions for local aquatic species, impacting on biodiversity. The results of this impact are however unlikely to alter the current biological status of this waterbody.	<b>Operation</b> Upgrades to the existing drainage for the roadway as outlined in Chapter 13 (Road Drainage and Water Environment) of the ES [APP-057].	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
<p><b>Quantitative status</b></p> <p>Quantitative saline intrusion</p> <p>Quantitative water balance</p> <p>Quantitative Ground Water Dependent Terrestrial Ecosystems (GWDTE) tests</p> <p>Quantitative Dependent Surface water body status</p>	<p><b>Construction</b></p> <p>Dewatering of excavations for ground and earthworks such as sheet piling during construction may cause temporary short-term changes in groundwater flows and levels which would be highly localised.</p>	<p><b>Construction</b></p> <p>Environmental permits would be sought from the Environment Agency before commencement of works.</p> <p>A "no derogation" agreement would be made with the owner/operator of any private groundwater supply.</p> <p>If sheet piling is to take place, best practice methods as laid out by the Environment Agency<sup>21</sup> would be adhered to.</p>	<p>Yes - subject to the following of specified mitigation.</p>
	<p><b>Operation</b></p> <p>Permanent below-ground infrastructure may cause a change in the groundwater flow regime. However, groundwater is expected to flow around the subsurface structures.</p> <p>Change in impermeable surfacing and drainage may reduce recharge to the underlying aquifer. However, the impact on recharge from increased impermeable surfacing is expected to be offset by soft engineered drainage systems.</p> <p>As no GWDTEs are present within the study area and there is no possibility of saline intrusion into the waterbody due to the inland location, the quantitative status of the</p>	<p><b>Operation</b></p> <p>None</p>	

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WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	ground waterbody is not anticipated to be impacted by the Scheme.		
<b>Chemical (GW)</b> Chemical drinking water protected area General chemical test Chemical saline intrusion	<b>Construction</b> Contamination of groundwater by mobilisation of contaminants through accidental spillages or direct contact with construction materials or piling operations. Impacts on the chemical status would be unlikely to result in deterioration at the water body scale. Excavation below ground will be required to lay the foundations of new supporting structures for the bridges, and potentially for piling works as well. This poses a potential risk for groundwater contamination due to mobilisation of sediment and/ or disturbance of potentially contaminated land creating new pathways, which could impact the chemical status of the groundwater. If unmitigated, there is a potential risk of groundwater contamination due to mobilisation of sediment and/or disturbance of contaminated land creating new pathways, potentially impacting chemical status elements.	<b>Construction</b> Standard construction best practice measures will be used to mitigate against sediment/contaminant mobilisation. Piling works required for the Scheme will be subject to appropriate piling risk assessment. Rigorous groundwater protection measures would be followed. These requirements are specified in the First Iteration EMP [REP6-012].	

WFD elements	Proposed works and potential impacts	Mitigation and recommendations	WFD compliance
	<p><b>Operation</b></p> <p>There are no Source Protection Zones located within the study area.</p> <p>No chemical drinking water protected areas are present within the study area.</p> <p>There is no possibility of saline intrusion into the waterbody due to the inland location.</p>	<p><b>Operation</b></p> <p>None</p>	

## Cumulative impacts

- 5.1.5 Chapter 15 (Combined and Cumulative Effects) of the ES [APP-059] presents the information to enable the identification and assessment of likely significant combined and cumulative environmental effects. Construction activities would be phased, as outlined in Chapter 2 (The Scheme) of the ES [APP-046], to minimise the in-combination effects on individual waterbodies. See Chapter 13 (Road Drainage and the Water Environment) of the ES [APP-057] for further information on potential impacts. Providing mitigation measures, as described in the First Iteration EMP [REP6-012], are implemented, any in-combination impacts would be localised and limited to the construction phase.
- 5.1.6 The assessment for cumulative effects involved the identification of incremental changes likely to be caused by other existing development and/or approved development together with the Scheme. Seven developments were identified which met the criteria for inclusion in this assessment. No cumulative effects on WFD waterbodies were identified. As a result, no cumulative impacts are expected.

## 6 Conclusions and Recommendations

### 6.1 Scheme Proposals

- 6.1.1 The majority of the Scheme would be unlikely to result in large-scale losses of aquatic and bankside habitat, although there are several interactions between the Scheme and waterbodies, specifically the works at the Slough Dyke (tributary of the Trent), Windmill Viaduct, Old Trent Dyke and the FCAs.
- 6.1.2 The minor realignment of the Slough Dyke (tributary of the Trent) has the potential to be beneficial for the watercourse due to the minor increase in length and sinuosity. Currently the watercourse is a heavily modified waterbody, and the realignment has the potential to return aspects of the watercourse to a more natural state.
- 6.1.3 The Humber RBMP classes all of the surface waterbodies as not achieving 'Good' overall status or potential (a 'Moderate' for Trent from the Soar to the Beck, Trent Bifurcation Pingley Dyke to Winthorpe and Slough Dyke Catchment, and a 'Poor' overall rating given to Devon from Cotham to Trent). Implementation of the mitigation mentioned in the detailed assessments is necessary to ensure the Scheme does not cause further deterioration.
- 6.1.4 The groundwater waterbody (Lower Trent Erewash – Secondary Combined) is currently at 'Good' overall status. Mitigation should be implemented to maintain this status and ensure that the status of the waterbody is not affected by the Scheme.

### 6.2 Risk of WFD status deterioration

- 6.2.1 The Scheme is not anticipated to cause deterioration of the current WFD status of the waterbodies within the study area. Instead, there is a potential minor benefit for the Slough Dyke (tributary of the Trent) as the increase sinuosity may reflect a more natural flow of the watercourse in comparison to the existing straightened, heavily modified morphology.
- 6.2.2 As the baseline conditions for the surface waterbodies within the study area are below that of the desired 'Good' status, proposed mitigation is recommended to be followed so as to not further risk WFD deterioration.

### 6.3 Risk of WFD status objectives

- 6.3.1 The Scheme is not anticipated to prevent any waterbodies within the study area from reaching their target 'Good' status in the future, as

potential impacts resulting from various elements of the Scheme are expected to have only small-scale localised impacts.

- 6.3.2 There is opportunity for the Scheme to contribute to improvements in the waterbody status of the Trent from Soar to Beck waterbody (GB104028053110). A permanent lake would be created in the Farndon East FCA with a maximum depth of 4 metres and grass planting around the edges where possible. During flooding events, the receding flood water would drain into the Old Trent Dyke. Farndon West FCA would be designed to comprise of residual ponds formed in post-borrow pit excavations with floodplain grazing marsh created in the northern extent of the site. During flooding events, the receding flood water would drain into the Old Trent Dyke. The FCAs would incorporate fish escape passages to mitigate the risk of fish entrapment as flood water recedes. The optioneering process and preferred option for the design of the fish escape passages are set out in the Fish Escape Passage Technical note, appended to the HRA [REP3-024]. Appendix 13.5 (Drainage Strategy Report) of the ES Appendices [APP-179] proposes that impermeable surface runoff from the highway will enter swales at the toe of the embankment, which will flow into attenuation basins and be discharged at a restricted rate into a receiving watercourse. These attenuation basins may also be planted as required to create wetland areas. These measures may help to reduce the levels of phosphate in the water, in turn aiding the improvement of the Trent from Soar to Beck WFD status.
- 6.3.3 The Scheme is also not expected to affect the status of WFD linked protected areas.

## 7 References

- <sup>1</sup> The Planning Inspectorate (2017) The Water Framework Directive. Advice note 18 [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/> (Last Accessed December 2023).
- <sup>2</sup> Environment Agency (2016) Water Framework Directive risk assessment [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/522426/LIT\\_10445.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/522426/LIT_10445.pdf) (Last accessed December 2023).
- <sup>3</sup> National Infrastructure Planning (2017) Advice Note Eighteen: The Water Framework Directive [online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18> (Last accessed December 2023).
- <sup>4</sup> Standards for Highways (2020) LA 113 – Road drainage and the water environment [online] Available at: <https://standardsforhighways.co.uk/search/d6388f5f-2694-4986-ac46-b17b62c21727> (Last accessed December 2023).
- <sup>5</sup> Environment Agency (2015) Humber river basin district River basin management plan [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/718328/Humber RBD Part 1 river basin management plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RBD_Part_1_river_basin_management_plan.pdf) (Last accessed December 2023).
- <sup>6</sup> Environment Agency (2010) River Trent Catchment Flood Management Plan [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/289105/River Trent Catchment Management Plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/289105/River_Trent_Catchment_Management_Plan.pdf) (Last accessed December 2023).
- <sup>7</sup> Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2000) [online]. Available at: [https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF) (Last accessed December 2023).
- <sup>8</sup> GOV.UK (2016) *Water Framework Directive assessment: estuarine and coastal waters* [online] Available at: <https://www.gov.uk/guidance/water->



[framework-directive-assessment-estuarine-and-coastal-waters](#) (Last accessed December 2023).

<sup>9</sup> Planning Inspectorate (2017) *Advice Note Eighteen: The Water Framework Directive* [online] Available at: [Advice Note Eighteen: The Water Framework Directive | National Infrastructure Planning \(planninginspectorate.gov.uk\)](#) (Last accessed December 2023).

<sup>10</sup> Environment Agency (2021) *Measures data for Humber River Basin District* [online] Available at: <https://environment.data.gov.uk/catchment-planning/v/c3-plan/RiverBasinDistrict/4/measures> (Last accessed December 2023).

<sup>11</sup> BGS (Accessed 2022). BGS Geology Viewer 0.0.48 (Beta) [online] Available at: [BGS Geology Viewer \(BETA\)](#) (Last accessed December 2023).

<sup>12</sup> [Clarification note].

<sup>13</sup> [Clarification note].

<sup>14</sup> Environment Agency. (2022, 12). River Basin Management Plan: maps. Available at: [Protected Areas | River Basin Management Plan: maps \(arcgis.com\)](#) (Last accessed December 2023).

<sup>15</sup> Department for Environment, Food and Rural Affairs (DEFRA) (2021) *Nitrate Vulnerable Zones* [online] Available at: <https://www.gov.uk/government/collections/nitrate-vulnerable-zones> (Last accessed December 2023).

<sup>16</sup> Environment Agency (2019) *Drinking Water Protected Areas Pressure* [online] Available at: [https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user\\_uploads/drinking-water-protected-areas-pressure-rbmp-2021.pdf](https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user_uploads/drinking-water-protected-areas-pressure-rbmp-2021.pdf) (Last accessed December 2023).

<sup>17</sup> European Commission (2014) *Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment* [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271> (Last accessed December 2023).

<sup>18</sup> Environment Agency (2021) WFD Classification Status Cycle 3 [online] Available at: <https://www.data.gov.uk/dataset/41cb73a1-91b7-4a36-80f4->

[b4c6e102651a/wfd-classification-status-cycle-2](#) (Last accessed December 2023).

<sup>19</sup> Environment Agency Catchment Data Explorer [online] Available at: <https://environment.data.gov.uk/catchment-planning/> (Last Accessed February 2023)

<sup>20</sup> [Clarification note].

<sup>21</sup> Environment Agency (2014) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention [online] Available at: <https://webarchive.nationalarchives.gov.uk/ukgwa/20140329082415/http://cdn.environment-agency.gov.uk/scho0501bitt-e-e.pdf> (Last accessed December 2023).

## Appendix A: WFD Overview Matrices (Appendix 1 of Advice Note Eighteen)

### A) WFD Screening Matrices

**Table A-1: Summary tale of WFD waterbodies considered at the WFD Screening Stage**

Waterbody ID	Name of waterbody	Stage of assessment reached (Screening/WFD Assessment)
<b><u>Humber River Basin Management Plan</u></b>		
GB104028053110	Trent from the Soar to the Beck	WFD Assessment
GB104028053390	Trent Bifurcation Pingley Dyke to Winthorpe	WFD Assessment
GB104028053111	Slough Dyke Catchment (tributary of Trent)	WFD Assessment
GB104028052632	Devon from Cotham to Trent	WFD Assessment
GB104028053420	Pingley/ Rundell Dyke Catchment Upper (tributary of Trent)	WFD Screening
GB104028053410	Greet Catchment (tributary of Trent)	WFD Screening
GB104028052633	Middle Beck Catchment (tributary of Devon)	WFD Screening
GB104028053430	The Fleet Upper Catchment (tributary of Trent)	WFD Screening
GB40402G990300	Lower Trent Erewash – Secondary Combined	WFD Assessment

**Table A-2: WFD Screening Summary Table**

Waterbody ID	Waterbody	Element	Screened in/out for WFD Assessment
GB104028053110	Trent from the Soar to the Beck	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>In - Construction works including the three river crossings over the Trent from the Soar to the Beck, and the Kelham and Averham FCA, Farndon West Borrow Pit and FCA and Farndon East Borrow Pit and FCA are present within this catchment.</i>
GB104028053390	Trent Bifurcation Pingley Dyke to Winthorpe	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>In - The Kelham and Averham FCA is partially located within this WFD waterbody catchment. As such, the Scheme has the potential to impact this waterbody.</i>
GB104028053111	Slough Dyke Catchment (tributary of Trent)	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>In - The Order Limits overlap with the waterbody and crosses a tributary (where the A46 meets the A1). The watercourse will be realigned as part of the Scheme, as well as being temporarily culverted during construction. Therefore, the waterbody has the potential to be impacted.</i>
GB104028052632	Devon from Cotham to Trent	<i>Physio-chemical &amp; biological quality</i>	<i>In - The Order Limits overlap with the waterbody, and so has the potential to be impacted.</i>
GB104028053420	Pingley/ Rundell Dyke Catchment Upper (tributary of Trent)	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>Out - Whilst the catchment has been identified within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.</i>
GB104028053410	Greet Catchment (tributary of Trent)	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>Out - Whilst the catchment has been identified within the study area, the Greet Catchment (tributary of Trent) joins the Trent from the Soar to the Beck</i>

Waterbody ID	Waterbody	Element	Screened in/out for WFD Assessment
			<i>upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.</i>
GB104028052633	Middle Beck Catchment (tributary of Devon)	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>Out - Whilst the catchment has been identified within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the Scheme.</i>
GB104028053430	The Fleet Upper Catchment (tributary of Trent)	<i>Hydromorphological, Physio-chemical &amp; Biological quality</i>	<i>Out - Whilst the catchment lies within the study area, the tributary joins the Trent from the Soar to the Beck upstream of the Scheme and so is not considered to be hydrologically linked to the works.</i>
GB40402G990300	Lower Trent Erewash – Secondary Combined	<i>Quantitative &amp; Qualitative</i>	<i>In – the Scheme overlies this groundwater waterbody.</i>

### Summary of WFD screening consultation

**Table A-3: Consultation summary – WFD Screening**

Consultee	Summary of discussion	Reference (to consultation evidence provided in ES / WFD Report / SoCG)
EA	No consultation was undertaken at WFD Screening stage as it was understood a WFD Detailed Compliance Assessment would be required due to the nature and location of the Scheme – multiple crossing points along a WFD waterbody.	N/A

## B) WFD Assessment Matrices

**Table B-1: Summary table of WFD waterbodies considered at the WFD**

Waterbody ID	Name of waterbody	Deterioration concluded?
GB104028053110	Trent from the Soar to the Beck	No deterioration
GB104028053390	Trent Bifurcation Pingley Dyke to Winthorpe	No deterioration
GB104028053111	Slough Dyke Catchment (tributary of Trent)	No deterioration
GB104028052632	Devon from Cotham to Trent	No deterioration

**Table B-2: WFD Assessment Detailed Tables (*Trent from Soar to the Beck*)**

Waterbody name	Trent from the Soar to the Beck
Waterbody ID	GB104028053110
Location relative to Proposed Development	The Scheme crosses this watercourse three times, and construction compounds and works are adjacent to this watercourse.
Type	<i>Surface water</i>
Surface waterbody category	<i>River</i>

<b>Heavily Modified waterbody</b>	Yes
<b>Artificial waterbody</b>	No
<b>Element screened in to further assessment</b>	<b>Summary of conclusion and reference</b>
<i>Hydromorphology</i>	<i>No deterioration predicted – Table 5-1 in Section 5 of this report</i>
<i>Physio-chemical</i>	<i>No deterioration predicted – Table 5-1 in Section 5 of this report</i>
<i>Biological quality</i>	<i>No deterioration predicted – Table 5-1 in Section 5 of this report</i>
<b>Cumulative Impact Assessment</b>	
<i>No cumulative impacts anticipated during construction or operation – see Section 5.</i>	
<b>Measures Assessment</b>	
<p><i>During construction, best practice pollution control measures, including a pollution prevention plan and emergency response procedures would be followed. Biosecurity measures would be followed and an Invasive Non-Native Species (INNS) management plan would be produced prior to construction. These requirements are contained within the First Iteration EMP [REP6-012]</i></p> <p><i>During operation, upgrades to the existing drainage for the roadway (as outlined in Chapter 13 Road Drainage and Water Environment [APP-057]) would prevent contaminated runoff from entering the watercourse.</i></p>	
<b>Conclusion</b>	

*Providing the specified mitigation is implemented, the Scheme is not expected to result in a deterioration of WFD status of this watercourse, or prevent the watercourse reaching WFD objectives.*

**Article 4.7 derogation required?\***

*No*

\* In the event of degradation or impeding the ability to achieve 'good' status the derogation tests will need to be considered.

**Table B-3: WFD Assessment Detailed Tables (*Trent Bifurcation Pingley Dyke to Winthorpe*)**

<b>Waterbody name</b>	Trent Bifurcation Pingley Dyke to Winthorpe
<b>Waterbody ID</b>	GB104028053390
<b>Location relative to Proposed Development</b>	The Scheme (Kelham and Averham FCA) is partially located within this watercourse catchment.
<b>Type</b>	<i>Surface water</i>
<b>Surface waterbody category</b>	<i>River</i>
<b>Heavily Modified waterbody</b>	No
<b>Artificial waterbody</b>	No
<b>Element screened in to further assessment</b>	<b>Summary of conclusion and reference</b>



<i>Hydromorphology</i>	<i>No deterioration predicted – Table 5-2 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<i>Physio-chemical</i>	<i>No deterioration predicted – Table 5-2 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<i>Biological quality</i>	<i>No deterioration predicted – Table 5-2 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<b>Cumulative Impact Assessment</b>	
<i>No cumulative impacts anticipated during construction or operation – see Section 5.</i>	
<b>Measures Assessment</b>	
<p><i>During construction, best practice pollution control measures, including a pollution prevention plan and emergency response procedures would be followed. Biosecurity measures would be followed and an Invasive Non-Native Species (INNS) management plan would be produced prior to construction. These requirements are contained within the First Iteration EMP [REP6-012]</i></p> <p><i>During operation, upgrades to the existing drainage for the roadway (as outlined in Chapter 13 Road Drainage and Water Environment [APP-057][REP6-012] would prevent contaminated runoff from entering the watercourse.</i></p>	
<b>Conclusion</b>	
<i>Providing the specified mitigation is implemented, the Scheme is not expected to result in a deterioration of WFD status of this watercourse, or prevent the watercourse reaching WFD objectives.</i>	

<b>Article 4.7 derogation required?*</b>	<i>No</i>
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**Table B-4: WFD Assessment Detailed Tables (*Slough Dyke Catchment (tributary of Trent)*)**

<b>Waterbody name</b>	Slough Dyke Catchment (tributary of Trent)
<b>Waterbody ID</b>	GB104028053111
<b>Location relative to Proposed Development</b>	The Scheme crosses this watercourse. The watercourse will be realigned as part of the Scheme, as well as being temporarily culverted.
<b>Type</b>	<i>Surface water</i>
<b>Surface waterbody category</b>	<i>River</i>
<b>Heavily Modified waterbody</b>	Yes
<b>Artificial waterbody</b>	No
<b>Element screened in to further assessment</b>	<b>Summary of conclusion and reference</b>
<i>Hydromorphology</i>	<i>No deterioration predicted – Table 5-3 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>

<i>Physio-chemical</i>	<i>No deterioration predicted – Table 5-3 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<i>Biological quality</i>	<i>No deterioration predicted – Table 5-3 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<b>Cumulative Impact Assessment</b>	
<i>No cumulative impacts anticipated during construction or operation – see Section 5.</i>	
<b>Measures Assessment</b>	
<p><i>During construction, the following mitigation measures are to be implemented:</i></p> <ol style="list-style-type: none"> <li>1. Over-pumping should be carried out at a similar flow rate as currently experienced in the watercourse. Fish rescue would be required during over-pumping activities.</li> <li>2. An environmental permit would be required to carry out temporary dewatering works.</li> <li>3. Best practice pollution control measures, including a pollution prevention plan and emergency response procedures would be followed. Biosecurity measures would be followed and an Invasive Non-Native Species (INNS) management plan would be produced prior to construction. These requirements are contained within the First Iteration EMP [REP6-012]</li> </ol> <p><i>During operation, upgrades to the existing drainage for the roadway (as outlined in Chapter 13 Road Drainage and Water Environment [APP-057][REP6-012] would prevent contaminated runoff from entering the watercourse.</i></p>	
<b>Conclusion</b>	
<i>Providing the specified mitigation is implemented, the Scheme is not expected to result in a deterioration of WFD status of this watercourse or prevent the watercourse reaching WFD objectives. There is a potential for the minor realignment to result in an increase in length and sinuosity of the watercourse which may be beneficial to the watercourse.</i>	

<b>Article 4.7 derogation required?*</b>	<i>No</i>
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**Table B-5: WFD Assessment Detailed Tables (*Devon from Cotham to Trent*)**

<b>Waterbody name</b>	Devon from Cotham to Trent
<b>Waterbody ID</b>	GB104028052632
<b>Location relative to Proposed Development</b>	The watercourse is located within the Order Limits.
<b>Type</b>	<i>Surface water</i>
<b>Surface waterbody category</b>	<i>River</i>
<b>Heavily Modified waterbody</b>	Yes
<b>Artificial waterbody</b>	No
<b>Element screened in to further assessment</b>	<b>Summary of conclusion and reference</b>
<i>Physio-chemical</i>	<i>No deterioration predicted – Table 5-4 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>

<i>Biological quality</i>	<i>No deterioration predicted – Table 5-4 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<b>Cumulative Impact Assessment</b>	
<i>No cumulative impacts anticipated during construction or operation – see Section 5.</i>	
<b>Measures Assessment</b>	
<p><i>During construction, best practice pollution control measures, including a pollution prevention plan and emergency response procedures would be followed. Biosecurity measures would be followed and an Invasive Non-Native Species (INNS) management plan would be produced prior to construction. These requirements are contained within the First Iteration EMP [REP6-012]</i></p> <p><i>During operation, upgrades to the existing drainage for the roadway (as outlined in Chapter 13 Road Drainage and Water Environment [REP6-012][APP-057] would prevent contaminated runoff from entering the watercourse.</i></p>	
<b>Conclusion</b>	
<i>Providing the specified mitigation is implemented, the Scheme is not expected to result in a deterioration of WFD status of this watercourse or prevent the watercourse reaching WFD objectives.</i>	
<b>Article 4.7 derogation required?*</b>	<i>No</i>

**Table B-6: WFD Assessment Detailed Tables (*Lower Trent Erewash – Secondary Combined*)**

<b>Waterbody name</b>	<b>Lower Trent Erewash – Secondary Combined</b>
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<b>Waterbody ID</b>	<b>GB40402G990300</b>
<b>Location relative to Proposed Development</b>	The Scheme overlies this groundwater body
<b>Type</b>	<i>Groundwater</i>
<b>Surface waterbody category</b>	<i>N/A</i>
<b>Heavily Modified waterbody</b>	<i>N/A</i>
<b>Artificial waterbody</b>	<i>N/A</i>
<b>Element screened in to further assessment</b>	<b>Summary of conclusion and reference</b>
<i>Quantitative</i>	<i>No deterioration predicted – Table 5-5 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<i>Chemical</i>	<i>No deterioration predicted – Table 5-5 of the Environmental Statement: Volume 6.3 Technical Appendix 13.1 WFD Compliance Assessment</i>
<b>Cumulative Impact Assessment</b>	
<i>No cumulative impacts anticipated during construction or operation – see Section 5</i>	

<b>Measures Assessment</b>	
<p><i>During construction, environmental permits would be sought from the EA prior to works commencing, a “no derogation” agreement would be made with the landowner/operator of any private groundwater supply; and, best practice methods as outlined by the EA would be carried out for any sheet piling works. These requirements are contained within the First Iteration EMP [REP6-012]</i></p> <p><i>No mitigation measures have been identified for the Scheme during operation.</i></p>	
<b>Conclusion</b>	
<p><i>Providing the specified mitigation is implemented, the Scheme is not expected to result in a deterioration of WFD status of this watercourse or prevent the watercourse reaching WFD objectives.</i></p>	
<b>Article 4.7 derogation required?*</b>	<i>No</i>

## Summary of WFD assessment consultation

**Table B-7: Consultation summary – WFD Assessment**

<b>Consultee</b>	<b>Summary of discussion</b>	<b>Reference to status of agreement (to consultation evidence provided in ES / WFD Report / SoCG)</b>
EA	The methodology and outcomes of the WFD screening, scoping and detailed compliance assessment were discussed with the EA on the 13 <sup>th</sup> March 2023. Following minor design changes, the changes to the WFD assessment were presented to the EA on the 20 <sup>th</sup> June 2023. No objections to the methodology or the outcomes were raised during either of the meetings.	Consultation undertaken as part of the Scheme is outlined in Chapter 4 Environmental Assessment Methodology of the Environmental Statement [APP-048].