

BT-NG-020621-545-0091

Bramford to Twinstead Reinforcement

Volume 6: Environmental Information

Document 6.3.9.1: ES Appendix 9.1 – Water Environment Baseline

Final Issue A
April 2023

Planning Inspectorate Reference: EN020002

Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009 Regulation 5(2)(a)



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1. Introduction

1.1 Overview

- 1.1.1 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The Bramford to Twinstead Reinforcement ('the project') would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km (18 miles), the majority of which would follow the general alignment of the existing overhead line network.
- 1.1.2 This water environment baseline appendix has been produced to support the application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008. This appendix supports ES Chapter 9: Water Environment (**application document 6.2.9**) and sets out the water environment baseline relevant to the project.

1.2 Structure of this Report

- 1.2.1 The structure of this report is summarised in Table 1.1.

Table 1.1 – Structure of this Report

Chapter	Content
1: Introduction	Introduction to the project
2: Surface Water Discharges and Abstractions	This contains the data provided by the Environment Agency in August 2022, on existing consented surface water discharges and existing surface water licensed abstractions.
3: Water Quality Data	This contains Environment Agency water quality records, including a summary of the location of the monitoring stations and data for the four main rivers within the study area; the Belstead Brook, the River Brett, the River Box and the River Stour. The data presented is the most recent published data available.

2. Surface Water Discharges and Abstractions

- 2.1.1 Existing consented discharges to surface water and licensed abstractions from surface water sources have been provided by the Environment Agency (received August 2022). The information received is presented in Table 2.1 and Table 2.2.
- 2.1.2 The locations are shown in ES Figure 9.1: Water Environment Features (**application document 6.4**).

Table 2.1 – Existing Consented Surface Water Discharges

Consent No.	Discharge Type	Receiving Watercourse	Volume (m ³)
PR2NF71	Domestic property (single)	River Brett tributary	5
ASENF1090	Wastewater treatment works (WwTW)/ sewage treatment works (STW) (water company)	River Brett	1700
AW2NFE07884	WwTW/STW (water company)	River Brett	Unspecified
PR2NFE03671	Undefined or other	River Brett tributary	Unspecified
PR2NF428	Domestic property (single)	River Box tributary	5
PRENF16868	WwTW (not water company)	Belstead Brook tributary	1
PR4LF175	Domestic property (single)	Belstead Brook tributary	1
PRENF16891	WwTW (not water company)	River Stour tributary	1
PR2NFE04160	Domestic property (multiple)	River Stour tributary	10
AW4NF515	WwTW/STW (water company)	Belstead Brook tributary	136
EPREb3197VL	Domestic property (single)	Belstead Brook tributary	0.75
PRENF20833	WwTW (not water company)	Belstead Brook tributary	1.6
EPRTB3092AT	Domestic property (single)	Belstead Brook tributary	0.75
PR4NF1462	Domestic property (single)	Belstead Brook tributary	1
PRENF11638	WwTW (not water company)	River Box tributary	4
AW2NFE01363	Pumping station on sewerage network (water company)	River Brett	Unspecified
PR2NF315	Domestic property (single)	River Brett	4.5
PRENF20462	WwTW (not water company)	River Brett	1.6
PR2NFE0783A	WwTW (not water company)	River Stour tributary	1

Consent No.	Discharge Type	Receiving Watercourse	Volume (m³)
EPRBB3097WQ	Domestic property (single)	River Stour tributary	1
AW2NFE08084	Pumping station on sewerage network (water company)	River Box tributary	Unspecified
PR2NFE03655	WwTW (not water company)	River Stour tributary	30
PRENF19402	Making of beverages/breweries	River Box tributary	350
EPRBP3927GJ	Domestic property (single)	River Stour tributary	0.81
EPRKB3395RU	Domestic property (single)	River Stour tributary	1.2
EPRDP3928XR	Domestic property (single)	River Stour tributary	0.81
PR2LF910	Domestic property (single)	River Stour tributary	4.5
AW2NF426	WwTW/STW (water company)	River Stour tributary	Unspecified
EPRNB3093AU	Domestic property (single)	River Stour tributary	1.5
PRENF08680	Domestic property (single)	River Stour tributary	2
EPRTB3495EL	Domestic property (single)	River Stour tributary	1
PR2NFE22066	Food and Beverage Services/Cafe/Restaurant/Pub	River Colne	Unspecified
ASENF2391	Pumping station on sewerage network (water company)	River Stour tributary	Unspecified
PRENF02169	Undefined or other	River Colne tributary	Unspecified
PR2AF613	Groundwater Remediation Sites/Civil Engineering	River Box tributary	Unspecified
EPRYB3394WJ	Domestic property (single)	River Stour tributary	Unspecified
EPRNB3798RJ	Domestic property (single)	River Colne tributary	Unspecified
EPRXB3699WZ	Domestic property (single)	River Colne tributary	Unspecified
EPRTB3598RP	Domestic property (single)	Belstead Brook tributary	Unspecified
EPRRB3434AZ	Domestic property (single)	River Colne tributary	Unspecified

Table 2.2 – Existing Licensed Surface Water Abstractions

Licence No.	Purpose/Use	Source	Licensed Quantity (Mega Litres - MI)
8/36/15/*S/0128	Agriculture/Spray irrigation	Tributary of River Stour	40.9
8/36/15/*S/0156	Agriculture/Spray irrigation	Tributary of River Stour	54.6
8/36/16/*S/0039	Agriculture/Spray irrigation	Tributary of River Box	22.7
8/36/15/*S/0117	Agriculture/Spray irrigation	Tributary of River Box	146
8/36/17/*S/0110	Industrial	Tributary of River Brett	455
AN/036/0017/001/R01	Public Service/Top up water	Tributary of River Box	3.5
7/35/09/*S/0027	Agriculture/Spray irrigation	Tributary of Belstead Brook	18.1
8/36/15/*S/0131	Agriculture/Spray irrigation	Tributary of River Stour	32.0
8/37/23/*S/0094	Agriculture/Spray irrigation	Tributary of River Colne	9.1

3. Water Quality Data

3.1.1 The water quality of the main rivers within the study area are monitored by the Environment Agency. Data has been collected from the Environment Agency Water Quality Archive (Environment Agency, 2022) and is summarised in Table 3.1 to Table 3.5. The monitoring locations are shown in ES Figure 9.1: Water Environment Features (application document 6.4).

Table 3.1 – Monitoring Station Details

Station ID	Station Name	Location in relation to the Order Limits	Most Recent Data Available
AN-BEL020	Belstead Brook at The Grange	950m downstream of the Order Limits.	March 2018 – March 2019
AN-BT0112	River Brett at Layham Mill	680m downstream of the Order Limits.	January 2016 – January 2017
AN-BX0126	River Box at Wash Lane Boxford	1.4km upstream of the Order Limits.	March 2019 – March 2020
AN-ST0604	River Stour at Pitmere Railway Bridge	500m upstream of the point the Stour crosses the Order Limits.	March 2019 – March 2020

Note: data for the River Brett is less recent than at other stations and it is acknowledged that this data may be less representative of present-day conditions, but still has some value in characterising the rivers water quality. This is also the case for some determinands as noted in subsequent tables.

Table 3.2 – Water Quality Data Summary – Belstead Brook AN-BEL020

Determinand	Mean Value ^a	Published Quality Standard
pH	8.03	Typical range 6–9
Conductivity	884µs/cm	Typical range for freshwater 100–1,500µs/cm
Biological Oxygen Demand	1.3mg/l ^c	Water Framework Directive (WFD) high status ^b – 4mg/l
Nitrate	7.65mg/l	50mg/l for drinking water
Nitrite	0.04mg/l	1mg/l for drinking water
Ammoniacal nitrogen	0.05mg/l	WFD high status – 0.3mg/l
Orthophosphate	0.26mg/l	WFD high status – 0.05mg/l
Dissolved oxygen	81%	WFD high status – 70%

a – from the most recent 12 samples

b – applicable to rivers at an altitude of less than 80m and having an alkalinity (CaCO₃) of > 200mg/l

c – most recent available data is from 2007

3.1.2 The data in Table 3.2 shows that the majority of the determinands fall within the typical range for freshwaters and are recorded at concentrations that meet with published quality standards linked to WFD high status for the applicable river typology. Orthophosphate exceeds the concentration set for high status. The mean value for this determinand

slightly exceeds the concentration for moderate status (0.25mg/l). This is reflected in the WFD status of the waterbody, with reasons for not achieving high/good cited as including diffuse pollution from poor livestock management. Further details are provided in the WFD Assessment (**application document 5.6**).

Table 3.3 – Water Quality Data Summary – River Brett AN-BT0112

Determinand	Mean Value^a	Published Quality Standard
pH	8.05	Typical range 6–9
Conductivity	814µs/cm	Typical range for freshwater 100–1,500µs/cm
Biological Oxygen Demand	1.17mg/l ^c	WFD high status ^b – 4mg/l
Nitrate	7.5mg/l	50mg/l for drinking water
Nitrite	0.03mg/l	1mg/l for drinking water
Ammoniacal nitrogen	0.05mg/l	WFD high status – 0.3mg/l
Orthophosphate	0.13mg/l	WFD high status – 0.05mg/l
Magnesium	6.4mg/l ^d	50mg/l
Calcium	124mg/l ^d	250mg/l
Iron dissolved	Not monitored	1mg/l
Dissolved oxygen	88%	WFD high status – 70%

a – from the most recent 12 samples

b – applicable to rivers at an altitude of less than 80m and having an alkalinity (CaCO₃) of > 200mg/l

c – most recent available data is from 2007

d – only two samples available and these are from 2012

3.1.3 The data in Table 3.3 shows that the majority of the determinands are recorded at concentrations that meet with published quality standards. Orthophosphates exceed the concentration set for high status. The mean value for this determinand very slightly exceeds the concentration for good status (0.12mg/l).

Table 3.4 – Water Quality Data Summary – River Box AN-BX0126

Determinand	Mean Value^a	Published Quality Standard
pH	7.96	Typical range 6–9
Conductivity	899µs/cm	Typical range for freshwater 100–1,500µs/cm
Biological Oxygen Demand	1.43mg/l	WFD high status ^b – 4mg/l
Nitrate	9.3mg/l	50mg/l for drinking water
Nitrite	0.03mg/l	1mg/l for drinking water
Ammoniacal nitrogen	0.07mg/l	WFD high status – 0.3mg/l
Orthophosphate	0.25mg/l	WFD high status – 0.05mg/l
Magnesium	7.85mg/l	50mg/l

Determinand	Mean Value ^a	Published Quality Standard
Calcium	139mg/l	250mg/l
Iron dissolved	0.06mg/l	1mg/l
Dissolved oxygen	84%	WFD high status – 70%

a – from the most recent 12 samples

b – applicable to rivers at an altitude of less than 80m and having an alkalinity (CaCO₃) of > 200mg/l

3.1.4 The data in Table 3.4 shows that the majority of the determinands are recorded at concentrations that meet with published quality standards. Orthophosphate concentrations exceed the concentration set for high status. The mean value for this determinand aligns with the concentration for moderate status (0.25mg/l). This is reflected in the WFD status of the waterbody, with reasons for not achieving good status cited as including diffuse pollution from poor livestock management and point source sewage discharges. Further details are provided in the WFD Assessment (**application document 5.6**).

Table 3.5 – Water Quality Data Summary – River Stour AN-ST0604

Determinand	Mean Value ^a	Published Quality Standard
pH	8.09	Typical range 6–9
Conductivity	905µs/cm	Typical range for freshwater 100–1,500µs/cm
Biological Oxygen Demand	1.48mg/l	WFD high status ^b – 4mg/l
Nitrate	7.9mg/l	50mg/l for drinking water
Nitrite	0.03mg/l	1mg/l for drinking water
Ammoniacal nitrogen	0.04mg/l	WFD high status – 0.3mg/l
Orthophosphate	0.18mg/l	WFD high status – 0.05mg/l
Magnesium	7.2mg/l	50mg/l
Calcium	128mg/l	250mg/l
Iron dissolved	0.03mg/l	1mg/l
Dissolved oxygen	93%	WFD high status – 70%

a – from the most recent 12 samples

b – applicable to rivers at an altitude of less than 80m and having an alkalinity (CaCO₃) of > 200mg/l

3.1.5 The data in Table 3.5 shows that the majority of the determinands are recorded at concentrations that meet with published quality standards. Orthophosphate concentrations exceed the concentration set for high status and good status (0.12mg/l). The mean value for this determinand is lower than the concentration for moderate status (0.25mg/l). This is reflected in the WFD status of the waterbody, with, reasons for not achieving good status cited as diffuse pollution from poor livestock management and point source sewage discharges. Further details are provided in the WFD Assessment (**application document 5.6**).

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