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Essex & Suffolk Water - Water Resources Management Plan 2024

Environmental Report - Appendix G

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1 Introduction

1.1 Overview

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. The plans must be prepared every five years and reviewed annually. Essex and Suffolk Water's WRMP 2024 (WRMP24) renews the previous WRMP first published in 2019[1]. In the development of a WRMP, water companies must follow the Environment Agency (EA) Water Resources Planning Guideline[2] and consider broader government policy objectives. WRMPs should ensure a secure and sustainable supply of water, focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

The Essex and Suffolk Water (ESW) supply area is situated within the Water Resources East (WRE) regional planning area. Therefore, some of the water resource options considered as part of the Essex and Suffolk Water's WRMP 2024 (WRMP24) will be sourced from the existing selected options for this regional plan. Therefore, efficiencies between the regional planning and WRMP process can be achieved. For the Essex and Suffolk Water WRMP24 the Water Framework Directive (WFD) assessments will focus on the local scale, drawing on the higher-level work previously completed for the regional plans where applicable.

As part of the environmental assessment process to support the development of the WRE Regional Plans and Essex and Suffolk Water's WRMP24, WFD Level 1 and where needed, Level 2 assessments have been completed. This appendix supports the Environment Assessment Report (EAR) that accompanies the Essex and Suffolk Water Resource Management Plan (WRMP) submission to regulators. The annex presents the findings of a Water Framework Directive (WFD) assessment applied to the Essex and Suffolk Water WRMP options.

1.2 Essex and Suffolk Water WRMP24 Options

The outputs of the initial options identified 37 options for additional water supplies in the E&SW region. These options are shown in Table 1.1.

Table 1.1: Essex and Suffolk Water WRMP24 Options

Option name	Description overview
ESW-DES-001	Canvey Island Desalination Terrestrial: Abstraction from the Thames Estuary with discharge to Hanningfield Service Reservoir. Transfer length between plant and reservoir approximately 20.7km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route passes under three railway lines, multiple major roads (A130, A13, A127, A129, A132), one minor road (B1464), eight river crossings (including the River Crouch) and five drainage channel crossings. First part of the route passes through Canvey Wick Nature Reserve however has been routed to avoid as much of this area as possible. An extension to the pipeline to Holton is under consideration (EFR-002B) but was not available at time of writing. This assessment will be updated in the final plan.

[1] Essex and Suffolk Water / Northumbrian Water Group (2019). Water Resources Management Plan 2019. Available at: Water Resources Management Plan (nwg.co.uk)
[2] Environment Agency, Natural Resources Wales, Office for Water Services (2022). Water resources planning guideline. Available at: Water resources planning guideline - GOV.UK (www.gov.uk)

Option name	Description overview
ESW-DES-002	Tilbury Brackish Desalination Terrestrial: Abstraction from the Thames Estuary, discharge to Herongate Service Reservoir. Transfer length between plant and reservoir approximately 19.0km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route crosses two railway lines, multiple major roads (A1013, A13, A128, A127), one unnamed river, and one drainage channel. There is also a crossing with a high-pressure gas main, however, this should not require trenchless techniques.
ESW-DES-006	Canvey Island Desalination - Barge Mounted Solution: Abstraction from the Thames Estuary, discharge to Hanningfield Service Reservoir. Transfer length between plant and reservoir approximately 20.7km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route passes under three railway lines, multiple major roads (A130, A13, A127, A129, A132), one minor road (B1464), eight river crossings (including the River Crouch) and five drainage channel crossings. First part of the route passes through Canvey Wick Nature Reserve however has been routed to avoid as much of this area as possible.
ESW-DES-007	Tilbury Brackish Desalination - Barge Mounted Solution: Abstraction from the Thames Estuary, discharge to Herongate Service Reservoir. Transfer route the same as for ESW-DES-002. Transfer length between plant and reservoir approximately 18.5km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route crosses two railway lines, multiple major roads (A1013, A13, A128, A127), one unnamed river and one drainage channel.
ESW-EFR-001	Southend-on-Sea Water Reuse: Intake from Southend-on-Sea WRC (Anglian Water owned asset), discharge to Hanningfield Service Reservoir. Two transfers required: Southend-on-Sea WRC to new effluent reuse plant (Transfer 1), new effluent reuse plant to Hanningfield reservoir (Transfer 2). Transfer 1: Transfer length approximately 991m. Route runs under an industrial estate road, no need for tunnelling. Pump station required at existing STW – located where the two existing outfalls meet. Transfer 2: Transfer length approximately 23.1km. Tunnelling (micro-tunnelling/horizontal directional drilling) required as route passes under one railway line, multiple major roads (A130, A132), two large river/estuary crossing (River Roach and River Crouch), three smaller river crossings, and one drainage channel crossing.
ESW-EFR-003	Colchester Water Reuse: Intake from Colchester WRC (Anglian owned asset), discharge to Abberton Reservoir. Two transfers required: Colchester WRC to new effluent reuse plant (Transfer 1), new effluent reuse plant to Abberton Reservoir (Transfer 2). Transfer 1: Transfer length approximately 200m (no more than 300m). Transfer 2: Transfer length approximately 5.4km. Tunnelling (micro-tunnelling/horizontal directional drilling) potentially required as route passes under one minor road (B1025), two rivers (River Colne, Roman River), and one drainage channel (Birch Brook).
ESW-TRA-003	New main from AW SPA main near Little Whelnetham to Eye Airfield: Transfer length approximately 31.3km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route crosses two railways, three major roads (A14 (dual carriageway and slip road), A1088, A140), one minor road (B1113), six drainage channels. Crossing towards end of route that appears to be of an industrial estate

Option name	Description overview
	road. There is also a crossing of a high-pressure gas main towards the end of the route, however, this does not require trenchless techniques.
ESW-TRA-004	Essex to Hartismere Transfer: Transfer length approximately 47.5km. Tunnelling (micro-tunnelling/horizontal directional drilling) required as route crosses one railways, five major roads (A1071, A1141, A14, A1120, A140), three minor roads (B1068, B1078, B1113), four rivers (including River Stour, River Brett, River Gipping), seven drainage channels. Major crossing near Badley consists of road crossing (B1113, B1117) followed by railway line followed by River Gipping – all in space of approximately 270m – assumed to be two separate crossings: road (trenched); river and railway (trenchless).
ESW-TRA-007	Anglian Water Treated Water Import (from east of Norwich area): Intake from east Norwich (convergence of multiple AWS desalination pipeline routes), discharge to Barsham WTW. Transfer length approximately 24.7km. Route realigned so that it takes off from an Anglian Water transfer outside of Norwich ring road (A47). This has reduced the length of the transfer and reduced the number of critical crossings. Tunnelling (micro-tunnelling/horizontal directional drilling) required as route crosses three major roads (A47, A146, A143), one minor road (B1062), and a large river crossing when just leaving Norwich (River Yare). The route crosses three other rivers (The Beck, River Chet, River Waveney (twice)) and one drainage channel.
ESW-TRA-008	Sizewell to Saxmundham: Transfer (8Ml/d) from AW Sizewell desalination plant to Saxmundham Water Tower.
ESW-ABS-002 ESW-ABS-002-B	Linford WTW: Borehole Abstraction 3.5Ml/d DO (7Ml/d DO for ESW-ABS-002-B). New conventional water treatment works built on Linford WTW's existing site. Intake from existing, decommissioned borehole, outfall to existing treated water network. ESW-ABS-002-B (7Ml/d DO option) has been assessed process and represents both options as it has been assumed option with higher DO will have largest impact on water environment and both options use the same footprint; this covers the worst case impact scenario for the option.
ESW-ASR-004	Abberton ASR with additional treatment capacity: ASR scheme located on neighbouring land to Layer de la Haye WTW. New borehole reaching Abberton chalk aquifer. New treatment works and borehole. Raw water transfer from Abberton Reservoir, via existing main to new ASR site and associated WTW. Raw water treated on site at new WTW. Potable water injected into borehole. Raw water abstracted from borehole. Raw borehole water treated on site at new WTW. Potable water transfer from new WTW to existing service reservoir at Layer de la Haye WTW.
ESW-DES-003	Sizewell Desalination using Beachwell: Seawater Desalination Plant. Abstraction from beach wells to desal plant then transfer to Saxmundham Tower.
ESW-DES-004	California (Caister) Desalination using Beachwell: Seawater Desalination Plant. Abstraction from beachwells to a desal plant. Transfer to discharge to Barsham WTW.

Option name	Description overview
ESW-DES-008	Corton Desalination using Beachwell : Seawater Desalination Plant. Abstraction from beachwells to a desal plant. Transfer to discharge to Barsham WTW.
ESW-EFR-002	Lowestoft Water Reuse to Lound Lakes: Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to Lound Lakes. Two transfers required: Lowestoft/Corton WRC to new effluent reuse plant (Transfer 1), new effluent reuse plant to Lound Lakes (Transfer 2). Transfer links plant with buffer tank.
ESW-EFR-002A	Lowestoft Water Reuse to Ellingham Mill: Effluent Reuse Plant (11.1Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill. Two transfers required: Lowestoft/Corton WRC to new effluent reuse plant (Transfer 1, length approximately 200m), new effluent reuse plant to Ellingham Mill on the River Waveney (Transfer 2, length approximately 26.3km).
ESW-EFR-002B	Lowestoft Water Reuse to Ellingham Mill 15Ml/d: Effluent Reuse Plant (15Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill. Three transfers required: Lowestoft/Corton WRC to new effluent reuse plant (Transfer 1, length approximately 200 m), new effluent reuse plant to Ellingham Mill on the River Waveney (Transfer 2, length approximately 26.3 km), and a transfer of treated water from Barsham to Holton (Transfer 3, length approximately 12.5 km).
ESW-EFR-004	Tilbury Water Reuse: Intake from Tilbury WRC (Anglian Water owned asset), discharge to Hanningfield Service Reservoir. Two transfers required: Tilbury WRC to new water reuse plant (Transfer 1, new water reuse plant to Hanningfield reservoir (Transfer 2).
ESW-EFR-010	Langford Recycling Plant: New balance tank to incorporate additional flows and maintain consistently high outputs at Langford Recycling Plant (LRP). Balance tank will take an existing intake from Chelmsford WRC and a new intake from Basildon WRC (both Anglian Water owned assets), existing discharge from LRP to River Chelmer. Two new transfers required: Basildon WRC to LRP inlet works (Transfer 1), LRP inlet works to new balance tank (Transfer 2). Transfer 1: Transfer length approximately 29km. Tunnelling (micro-tunnelling/horizontal directional drilling) required as route passes under two major roads (A127, A130), three rivers (River Crouch, Fenn Creek, River Chelmer) and a railway line. Transfer 2: Transfer length approximately 30m. No need for tunnelling.
ESW-NIT-001	Barsham Nitrate Treatment: Nitrate treatment extension on Barsham WTW's existing site.
ESW-NIT-002	Langford Nitrate Treatment: Nitrate treatment extension on Langford WTW's existing site.
ESW-NIT-003	Langham Nitrate Treatment: Nitrate treatment extension on Langham WTW's existing site.
ESW-RES-002	North Suffolk Winter Storage Reservoir: New winter storage reservoir to be built. Intake comes from the River Waveney/River Hundred when there's no spare capacity at Barsham WTW. When supplies are short at Barsham WTW, water is taken from the reservoir and transferred to the WTW.

Option name	Description overview
ESW-TRA-001	Barsham WTW to Blyth Transfer Main: Transfer from Barsham WTW to Saxmundham Water Tower. Transfer consists of multiple sections: A. Barsham WTW to Shadingfield Tower – construction of new pipeline next to an existing main, length approximately 5.6km Micro-tunnelling required for one railway crossing. B. Shadingfield Tower to Holton WTW - length approximately 7.4km. Tunnelling not required. C. Holton WTW to Saxmundham Tower - length approximately 19.2km. Tunnelling (micro-tunnelling/horizontal directional drilling) likely to be required as route passes under one railway, three major roads (A144, A1120, A12), three minor roads (B1124, B1123, B1119), two river crossings (River Blyth, River Yox), and two drainage channels. The route also runs along roads (B1119) for the last section to reach Saxmundham Tower. D. Connection to Walpole WTW, taken off Transfer C - approximate length of 1.4km. This transfer joins Transfer C not long after the railway crossing. No tunnelling required.
ESW-TRA-010	Wherstead to Saxmundham using AW SPA transfer as water source: Transfer from Wherstead to new service reservoir near Saxmundham Water Tower. Transfer is approximately 46.1km long. Tunnelling/trenchless techniques likely to be required as the route crosses two railways, six major roads (A12, A1071, A14, A12 (twice), A1094), two minor roads (B1079, B1078), three rivers (River Gipping (twice in one crossing) River Deben (twice in one crossing), River Ore (thrice)).
ESW-TRA-011	Saxmundham to Eye Airfield (Blyth to Hartismere): Transfer from Saxmundham Water Tower to Eye Airfield. Transfer is approximately 30.2km long. Tunnelling/trenchless techniques likely to be required as the route crosses two major roads (A12, A1120), three minor roads (B1119, B1117, B1077), two rivers (The Gull, River Alde).
ESW-TRA-012	Eye Airfield to Saxmundham (Hartismere to Blyth): Transfer from Eye Airfield to Saxmundham WT. Transfer is approximately 30.2km long, alignment is the same as for ESW-TRA-011. Tunnelling/trenchless techniques likely to be required as the route crosses two major roads (A12, A1120), three minor roads (B1119, B1117, B1077), two rivers (The Gull, River Alde)
ESW-TRA-013	Saxmundham to Barsham (Blyth to Northern Central): Transfer from Saxmundham Water Tower to Barsham WTW. Transfer is approximately 28.3km long. Tunnelling/trenchless techniques potentially required as the route crosses two major roads (A12, A1120, A144), one river (River Blyth).
ESW-TRA-014	Eye Airfield to Barsham (Hartismere to Northern Central): Transfer from Eye Airfield to Barsham WTW. Transfer is approximately 33km long. Tunnelling/trenchless techniques likely to be required as the route crosses three major roads (A143 (twice), A144), two minor roads (B1077, B1118), four rivers (River Dove (twice in one crossing), River Waveney (twice), one unnamed river).
ESW-TRA-015	Barsham to Eye Airfield (Northern Central to Hartismere): Transfer from Barsham WTW to Eye Airfield. Transfer is approximately 33km long. Tunnelling/trenchless techniques likely to be required as the route crosses three major roads (A143 (twice), A144), two minor roads (B1077, B1118), four rivers (River Dove (twice in one crossing), River Waveney (twice), one

Option name	Description overview
	unnamed river). Route was developed using routes that have been assessed by WRE.
ESW-TRA-016	Norwich to Eye: Transfer from Norwich (west) to Eye Airfield. Transfer is approximately 49km long. Tunnelling/trenchless techniques likely to be required as the route crosses two railways, three major roads (A11, A143 (twice)), one minor road (B1118), three rivers (River Tas, River Waveney, River Dove (twice in one crossing)), one combined crossing of A143, an unnamed river and a local road.
ESW-TRA-017	Saxmundham to Coldfair Green / Sizewell: Transfer from Saxmundham Water Tower to AW Sizewell desalination plant. Transfer is approximately 10.1km long. Tunnelling/trenchless techniques likely to be required as the route crosses one railway, one major road (A12), two minor roads (B1121, B1119).
ESW-TRA-018	Transfer from Bungay Well to Broome WTW: Transfer is approximately 3.6km long. Route follows roads.
ESW-TRA-019	Transfer from Holton WTW to Eye Airfield: Transfer approximately 30.6km long. Transfer mainly follows roads. Critical crossings include a railway crossing in Halesworth (route follows road bridge therefore trenchless techniques not possible), and the River Dove.
03-0478	03-0478 Water Reuse Treatment at Caister EFR (AW) and transfer from Caister to Ormesby Raw Water Tank

1.3 Methodology

1.3.1 Approach to WFD assessment for WRMP24 Options

The WFD has been transposed into UK law (latest legislation covered in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017)[3] under which there is the obligation to meet targets for the ecological and chemical status of water bodies.

The WFD's key objectives are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. All objectives are integrated for each river basin, and the last three to specific bodies of water that are designated for drinking water abstraction, those supporting special wetlands, and bathing areas. Ecological protection should apply to all waters.

The environmental objectives of the WFD are the core of this UK legislation providing for long-term sustainable water management on the basis of a high level of protection of the aquatic environment. Within the directive Part 5 Regulation 13 sets out the "environmental objectives" for natural surface and groundwater bodies, artificial water bodies (AWB) and heavily modified water bodies (HMWBs). Natural surface water bodies must, by 2015, adhere to good ecological and chemical status and groundwater bodies to good quantitative and chemical status. AWB and HMWBs must achieve good ecological potential and good chemical status. Regulation 13 also sets out the principal of no deterioration, providing protection from the deterioration of water status/potential. In Regulation 15 the criteria for the designation of AWB or HMWBs are described.

[3] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. https://www.legislation.gov.uk/uksi/2017/407/contents/made

Exemptions are defined within Regulations 16 to 19, outlining the conditions under which the achievement of good status or potential may be phased or not be achieved, or under which deterioration may be allowed. Regulation 16 to 19 describe these distinct conditions. In summary:

- Regulation 16 allows an extension of the time limit so that good status or potential is, under certain conditions, achieved only after 2015;
- Regulation 17 allows the achievement of less stringent objectives under certain conditions;
- Regulation 18 allows the temporary deterioration of status in case of natural causes or "force majeure";
- Regulation 19 allows for deterioration of status or non-achievement of good status or potential under certain distinct conditions.

The All Company Working Group (ACWG) has developed a consistent framework for undertaking WFD assessments to demonstrate that options will not cause deterioration in status of any WFD water bodies. The assessment considers mitigation that would need to be put in place to protect water body status. The assessment also considers WFD future objectives. This framework was developed to ensure consistency in environmental assessment across water companies for SRO development across the UK. To ensure consistent comparison between WRMP options and SRO options, the same framework has been used for the assessment of all WRMP options.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact assessment. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment based for Level 2. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

1.3.2 Level 1 – basic screening

The first stage of WFD assessment was completed for all options. Level 1 assessment follows these steps:

- Identify affected water bodies.
- Breakdown option into activities involved in construction, operation and decommissioning phases.
- Assign each activity an impact score (based on a predefined list).
- Consider any embedded mitigation measures.
- Calculate a screening score (using a 6-point scale from -2 to 3) to ‘screen out’ water bodies and options with no or very minor potential impacts from further assessment. If the maximum impact score is greater than 1 (minor localised impact) then the water body will need to be taken forward into level 2 screening.

The scoring system used is set out in below.

Table 1.2: Impact scoring system used for WFD assessments

Impact	Score	Description
Major beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire water body.
Minor beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body or any quality elements.

Impact	Score	Description
Negligible	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Minor localised	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Amber adverse	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
Major adverse	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

Assumed embedded mitigation, such as the use of trenchless river crossings or construction of trenches such that they will not form a preferential pathway for flow of groundwater, are set out in the Level 1 assessment tables (See Appendix A).

The WFD Level 1 screening outcomes for the Essex and Suffolk Water WRMP24 options are summarised in Section 2 and Appendix A. Where water bodies and option impacts were 'screened in', they have been taken forward to Level 2 assessment.

1.3.3 Level 2 – detailed impact screening

The second stage of WFD assessment has been completed for options that were screened in at Level 1, following the steps:

- Waterbody scale detailed assessment of impacts to each WFD quality element for each activity proposed as part of an option.
- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on the quality and availability of both physical data and design information about the option at the time of assessment *(note, confidence/certainty expected to be low during this initial WRMP assessment and increase over time).* Where the confidence levels are medium or low, the requirements for further data or design information in order to raise this confidence level for future gates will be listed.
- Identification of further mitigation needs.
- Assessment of impacts after mitigation (scoring on a 6-point scale).
- Identification of activities to improve certainty of assessment outcomes.

The outcomes of the Level 2 assessments are summarised in Section 3 and Appendix B.

Where waterbodies and option impacts have been identified, recommendations have been made for increasing the confidence in the assessment. This is expected to be through increasing the level of detail available during later stages of option development if the relevant options are progressed. In combination assessments where different option delivery is interdependent would also be required. Recommendations are included in Section 3

1.3.4 Limitations and assumptions

As the options set out in the WRMP are still in the early stages of design development a precautionary approach has been exercised because of residual uncertainty. The WFD assessment has the following limitations and assumptions:

- The ACWG approach uses WFD 2015 data, as it is the current officially reported baseline in the 2015-2021 Cycle 2 RBMP. The RBMPs are anticipated to be updated at the end of 2022. The 2019 WFD baseline data was released in late 2020 but will not form the legal baseline until the RBMPs are released. To ensure consistency, the 2015 data has been used

in this assessment, but acknowledge that this will need to be updated to the 2019 status once the RBMPs are published.

- Assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any larger watercourses, roads or railways and by bypass and trenching under small roads and watercourses) and therefore will not cross watercourses above ground or cause direct impacts.
- This assessment has only considered the impacts associated directly with the options at this stage and does not include the impacts of other water company WRMP options.
- The geographical extent of the WFD assessment is generally limited to the water bodies where abstractions take place. There is potential for some effects continuing downstream of the abstraction point, although it is assumed these would become increasingly limited to 'negligible' with distance. High level review is carried out on a case-by-case basis to ensure impacts in downstream waterbodies are negligible. Where downstream impacts are possible, these waterbodies have been included in the relevant assessments. This assumption will need to be reviewed as additional hydrological studies are undertaken.

Option specific assumptions are set out in the Level 2 assessment summary tables (see Section 3.2)

2 Water Framework Directive findings (Level 1 WFD)

2.1 Transfers

2.1.1 New main from AW SPA main near Little Whelnetham to Eye Airfield (ESW-TRA-003)

The Level 1 WFD assessment covered nine waterbodies of the option. The outcome for seven waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.1: WFD Level 1 assessment outcomes for New main from AW SPA main near Little Whelnetham to Eye Airfield

New main from AW SPA main near Little Whelnetham to Eye Airfield	
Option ID	ESW-TRA-003
Option Description	Transfer from Little Whelnetham Service Reservoir to New Eye Airfield Service Reservoir.
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB105033042940: Lark (Hawstead to Abbey Gardens) GB105033043300: Pakenham Stream GB105033043280: Sapiston GB105033043340: Stowlangtoft Stream GB105034045660: Dove trib – Finningham GB105034045670: Dove trib - Eye GB105034045710: Dove
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB40501G400500: Cam and Ely Ouse Chalk (GW) GB40501G400300: Broadland Rivers Chalk and Crag (GW)

2.1.2 Essex to Hartismere Transfer (ESW-TRA-004)

The Level 1 WFD assessment covered 17 waterbodies of the option. The outcome for 14 waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for three waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.2: WFD Level 1 assessment outcomes for Essex to Hartismere Transfer

Essex to Hartismere Transfer	
Option ID	ESW-TRA-004

Essex to Hartismere Transfer	
Option Description	Transfer from Langham WTW to New Eye Airfield Service Reservoir.
Number of waterbodies passing WFD assessment	14
Waterbodies passing WFD assessment	GB105036041000: Stour (d/s R. Brett) GB105035040440: Belstead Brook GB105035040310: Somersham Watercourse GB105035040350: Wattisham Watercourse GB105035046170: Jordan (East Suffolk) GB105035046180: Gipping (u/s Stowmarket) GB105034045650: Mendlesham Stream GB105034045660: Dove trib – Finningham GB105034045710: Dove GB40503G000400: Essex Gravels (GW) GB40503G000401: North Essex Lower London Tertiaries (GW) GB40501G400700: North Essex Chalk (GW) GB40501G400600: Waveney and East Suffolk Chalk & Crag (GW) GB40501G400300: Broadland Rivers Chalk & Crag (GW)
Number of waterbodies requiring further WFD assessment	4
Waterbodies failing WFD assessment	GB105036040942: Stour (Lamarsh - R. Brett) GB105036040930: Brett GB105035046280: Gipping (d/s Stowmarket) GB105034045670: Dove trib - Eye

2.1.3 Anglian Water Treated Water Import (from east of Norwich area) (ESW-TRA-007)

The Level 1 WFD assessment covered five waterbodies of the option. The outcome for one waterbody indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for four waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.3: WFD Level 1 assessment outcomes for Anglian Water Treated Water Import (from east of Norwich area)

Anglian Water Treated Water Import (from east of Norwich area)	
Option ID	ESW-TRA-007
Option Description	Intake from east Norwich (convergence of multiple AWS desalination pipeline routes), discharge to Barsham WTW.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB105034051210: Hellington Beck
Number of waterbodies requiring further WFD assessment	4
Waterbodies failing WFD assessment	GB105034051370: Yare (Wensum to tidal) GB105034051190: Chet GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB40501G400300: Broadland Rivers Chalk and Crag (GW)

2.1.4 Sizewell to Saxmundham (ESW-TRA-008)

The Level 1 WFD assessment covered four waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.4: Sizewell to Saxmundham

Sizewell to Saxmundham	
Option ID	ESW-TRA-008
Option Description	Transfer (8 Ml/d) from AW Sizewell desalination plant to Saxmundham WaterTower.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105035045980: Fromus GB105035046260: Hundred River GB105035046271: Leiston Beck
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40501G400600: Waveney and East Suffolk Chalk & Crag (GW)

2.1.5 Barsham to Blyth Transfer Main (ESW-TRA-001)

The Level 1 WFD assessment covered 10 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.5: Barsham to Blyth Transfer Main

Barsham to Blyth Transfer Main	
Option ID	ESW-TRA-001
Option Description	Transfer from Barsham WTW to Saxmundham Water Tower.
Number of waterbodies passing WFD assessment	10
Waterbodies passing WFD assessment	GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB105035046251: Lothingland Hundred GB105035046300: Wang GB105035046290: Blyth (d/s Halesworth) GB105035046030: Blyth (Hevingham Hall - d/s Halesworth) GB105035046010: Wenhaston Watercourse GB105035046270: Minsmere Old River GB105035045980: Fromus GB40501G400300: Broadland Rivers Chalk & Crag (GW) GB40501G400600: Waveney and East Suffolk Chalk and Crag (GW)

2.1.6 Wherstead to Saxmundham using AW SPA transfer as water source (ESW-TRA-010)

The Level 1 WFD assessment covered 13 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.6: Wherstead to Saxmundham using AW SPA transfer as water source

Wherstead to Saxmundham using AW SPA transfer as water source	
Option ID	ESW-TRA-010
Option Description	Transfer from Wherstead to new service reservoir near Saxmundham Water Tower
Number of waterbodies passing WFD assessment	13
Waterbodies passing WFD assessment	GB105035040440: Belstead Brook GB105035046280: Gipping (d/s Stowmarket) GB105035040330: Fynn GB105035040360: Lark GB105035040370: Potsford Brook GB105035040340: Byng Brook GB105035046310: Deben (Brandeston Bridge - Melton) GB105035045970: Ore GB105035046060: Alde GB105035045950: Alde - Ore (d/s confluence) GB105035045980: Fromus GB40501G400600: Waveney and Suffolk Easy Chalk and Crag (GW) GB40501G401800: Felixstowe Peninsula Crag and Chalk (GW)

2.1.7 Saxmundham to Eye Airfield (Blyth to Hartismere) (ESW-TRA-011)

The Level 1 WFD assessment covered eight waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.7: Saxmundham to Eye Airfield (Blyth to Hartismere)

Saxmundham to Eye Airfield (Blyth to Hartismere)	
Option ID	ESW-TRA-011
Option Description	Transfer from Saxmundham Water Tower to Eye Airfield.
Number of waterbodies passing WFD assessment	8
Waterbodies passing WFD assessment	GB105035045980: Fromus GB105035046060: Alde GB105034045690: Chickering Beck GB105034045710: Dove GB105034045670: Dove trib - Eye GB105034045780: Waveney (Frenze Beck to Dove) GB40501G400600: Waveney and Suffolk Easy Chalk and Crag (GW) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.8 Eye Airfield to Saxmundham (Hartismere to Blyth) (ESW-TRA-012)

The Level 1 WFD assessment covered eight waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.8: Eye Airfield to Saxmundham (Hartismere to Blyth)

Eye Airfield to Saxmundham (Hartismere to Blyth)	
Option ID	ESW-TRA-012
Option Description	Transfer from Eye Airfield to Saxmundham Water Tower.
Number of waterbodies passing WFD assessment	8
Waterbodies passing WFD assessment	GB105034045670: Dove trib - Eye GB105034045710: Dove GB105034045780: Waveney (Frenze Beck to Dove) GB105034045690: Chickering Beck; GB105035046060:Alde GB105035045980: Fromus GB40501G400300: Broadland Rivers Chalk & Crag (GW) GB40501G400600: Waveney and Suffolk Easy Chalk and Crag (GW)

2.1.9 Saxmundham to Barsham (Blyth to Northern Central) (ESW-TRA-013)

The Level 1 WFD assessment covered 11 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.9: Saxmundham to Barsham (Blyth to Northern Central)

Saxmundham to Barsham (Blyth to Northern Central)	
Option ID	ESW-TRA-013
Option Description	Transfer from Saxmundham Water tower to Barsham WTW.
Number of waterbodies passing WFD assessment	11
Waterbodies passing WFD assessment	GB105035045980: Fromus GB105035046270: Minsmere Old River GB105035046010: Wenhaston Watercourse GB105035046030: Blyth (Hevingham Hall - d/s Halesworth) GB105035046050: Chediston Watercourse GB105035046070: Blyth (u/s Halesworth) GB105035046300: Wang GB105035046251: Lothingland Hundred GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB40501G400600: Waveney and East Suffolk Chalk and Crag (GW) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.10 Eye Airfield to Barsham (Hartismere to Northern Central) (ESW-TRA-014)

The Level 1 WFD assessment covered 10 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the

types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.10: Eye Airfield to Barsham (Hartismere to Northern Central)

Eye Airfield to Barsham (Hartismere to Northern Central)	
Option ID	ESW-TRA-014
Option Description	Transfer from Eye Airfield to Barsham WTW.
Number of waterbodies passing WFD assessment	10
Waterbodies passing WFD assessment	GB105034045670: Dove trib - Eye GB105034045710: Dove GB105034045780: Waveney (Frenze Beck to Dove) GB105034045690: Chickering Beck GB105034045901: Waveney (R Dove - Starston Brook) GB105034045880: Starston Brook; GB105034045830:The Beck GB105034045902: Waveney (Starston Brook - Ellingham Mill) GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.11 Barsham to Eye Airfield (Northern Central to Hartismere) (ESW-TRA-015)

The Level 1 WFD assessment covered 10 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.11: Barsham to Eye Airfield (Northern Central to Hartismere)

Barsham to Eye Airfield (Northern Central to Hartismere)	
Option ID	ESW-TRA-015
Option Description	Transfer from Barsham WTW to Eye Airfield.
Number of waterbodies passing WFD assessment	10
Waterbodies passing WFD assessment	GB105034045670: Dove trib - Eye GB105034045710: Dove GB105034045780: Waveney (Frenze Beck to Dove) GB105034045690: Chickering Beck GB105034045901: Waveney (R Dove - Starston Brook); GB105034045880: Starston Brook GB105034045830: The Beck GB105034045902: Waveney (Starston Brook - Ellingham Mill); GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter); GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.12 Norwich to Eye (ESW-TRA-016)

The Level 1 WFD assessment covered 12 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.12: Norwich to Eye

Norwich to Eye	
Option ID	ESW-TRA-016
Option Description	Transfer from Norwich (west) to Eye Airfield.
Number of waterbodies passing WFD assessment	12
Waterbodies passing WFD assessment	GB105034051281: Yare (Tiffey to Wensum) GB105034051240: Intwood Stream GB105034051230: Tas (Tasburgh to R. Yare) GB105034045720: Hempnall Beck GB105034045902: Waveney (Starston Brook - Ellingham Mill) GB105034045880: Starston Brook GB105034045901: Waveney (R Dove - Starston Brook) GB105034045690: Chickering Beck; GB105034045710: Dove GB105034045780: Waveney (Frenze Beck to Dove) GB105034045670: Dove trib - Eye GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.13 Saxmundham to Coldfair Green /Sizewell (ESW-TRA-017)

The Level 1 WFD assessment covered four waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.13: Saxmundham to Coldfair Green /Sizewell

Saxmundham to Coldfair Green /Sizewell	
Option ID	ESW-TRA-017
Option Description	Transfer from Saxmundham Water Tower to AW Sizewell desalination plant.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105035045980: Fromus GB105035046260: Hundred River GB105035046271: Leiston Beck
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40501G400600: Waveney and East Suffolk Chalk & Crag (GW)

2.1.14 Transfer from Bungay Well to Broome WTW (ESW-TRA-018)

The Level 1 WFD assessment covered three waterbodies of the option. The outcome for one waterbody indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.14: Transfer from Bungay Well to Broome WTW

Transfer from Bungay Well to Broome WTW	
Option ID	ESW-TRA-018
Option Description	Transfer from Bungay Wells to Broome WTW.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105034045930: Broome Beck GB105034045902: Waveney (Starston Brook - Ellingham Mill)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.1.15 Transfer from Holton WTW to Eye Airfield (ESW-TRA-019)

The Level 1 WFD assessment covered 12 waterbodies of the option. The outcome for all waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.15: Transfer from Holton WTW to Eye Airfield

Transfer from Holton WTW to Eye Airfield	
Option ID	ESW-TRA-019
Option Description	Transfer from Holton WTW to Eye Airfield.
Number of waterbodies passing WFD assessment	12
Waterbodies passing WFD assessment	GB105035046290: Blyth (d/s Halesworth) GB105035046070: Blyth (u/s Halesworth) GB105035046040: Blyth (New Reach through Halesworth) GB105035046050: Chediston Watercourse GB105034045810: Metfield Stream GB105034045741: Tributary of Waveney GB105034045690: Chickering Beck GB105034045901: Waveney (R Dove - Starston Brook) GB105034045710: Dove; GB105034045670: Dove trib - Eye GB40501G400600: Waveney and East Suffolk Chalk and Crag (GW) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.2 Effluent reuse

2.2.1 Southend-on-Sea Water Reuse (ESW-EFR-001)

The Level 1 WFD assessment covered seven waterbodies of the option. The outcome for four waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for three waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.16: WFD Level 1 assessment outcomes for Southend-on-Sea Water Reuse

Southend-on-Sea Water Reuse	
Option ID	ESW-EFR-001
Option Description	Intake from Southend-on-Sea WRC (Anglian Water owned asset), discharge to Hanningfield Service Reservoir.
Number of waterbodies passing WFD assessment	4
Waterbodies passing WFD assessment	GB105037028630: Sandon Brook (West arm) GB30541427: Hanningfield Reservoir GB105037028730: Prittle Brook GB105037028560: Rettendon Brook
Number of waterbodies requiring further WFD assessment	3
Waterbodies failing WFD assessment	GB530603911401: Lower Thames GB520503704100: CROUCH GB40503G000400: Essex Gravels (GW)

2.2.2 Colchester Water Reuse (ESW-EFR-003)

The Level 1 WFD assessment covered five waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.17: WFD Level 1 assessment outcomes for Colchester Water Reuse

Colchester Water Reuse	
Option ID	ESW-EFR-003
Option Description	Intake from Colchester WRC (Anglian owned asset), discharge to Abberton Reservoir.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105037034150: Roman River GB105037034130: Layer Brook GB30540418: Abberton Reservoir
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB520503713800: COLNE GB40503G000400: Essex Gravels (GW)

2.2.3 Lowestoft Water Reuse to Ellingham Mill (ESW-EFR-002B)

The Level 1 WFD assessment covered three waterbodies of the option. The outcome for seven waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.18: WFD Level 1 assessment outcomes for Lowestoft Water Reuse to Ellingham Mill

Lowestoft Water Reuse to Ellingham Mill	
Option ID	ESW-EFR-002B
Option Description	Effluent Reuse Plant (15Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill. Three transfers required: Lowestoft/Corton WRC to new effluent reuse plant (Transfer 1, length approximately 200 m), new effluent reuse plant to Ellingham Mill on the River Waveney (Transfer 2, length approximately 26.3 km), and a transfer of treated water from Barsham to Holton (Transfer 3, length approximately 12.5 km).
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB510503410700:BURE & WAVENEY & YARE & LOTHING GB105034045903:Waveney (Ellingham Mill - Burgh St. Peter) GB105035046251:Lothingland Hundred GB105035046300:Wang GB105035046290:Blyth (d/s Halesworth) GB40501G400300:Broadland Rivers Chalk & Crag (GW) GB40501G400600:Waveney and East Suffolk Chalk and Crag (GW)

2.2.4 Lowestoft Water Reuse to Ellingham Mill – A (ESW-EFR-002A)

The Level 1 WFD assessment covered three waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.19: WFD Level 1 assessment outcomes for Lowestoft Water Reuse to Ellingham Mill - A

Lowestoft Water Reuse to Ellingham Mill	
Option ID	ESW-EFR-002A
Option Description	Effluent Reuse Plant (11.1Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB510503410700: BURE & WAVENEY & YARE & LOTHING GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.2.5 Lowestoft Water Reuse to Lound Lakes (ESW-EFR-002)

The Level 1 WFD assessment covered three waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.20: WFD Level 1 assessment outcomes for Lowestoft Water Reuse to Lound Lakes

Lowestoft Water Reuse to Lound Lakes	
Option ID	ESW-EFR-002

Lowestoft Water Reuse to Lound Lakes	
Option Description	Effluent Reuse Plant (11.1Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to Lound Lakes
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB510503410700: BURE & WAVENEY & YARE & LOTHING GB30536980: Lound Mill Water GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.2.6 Tilbury Water Reuse (ESW-EFR-004)

The Level 1 WFD assessment covered 12 waterbodies of the option. The outcome for 12 waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.21: WFD Level 1 assessment outcomes for Tilbury Water Reuse

Tilbury Water Reuse	
Option ID	ESW-EFR-004
Option Description	Intake from Tilbury WRC (Anglian Water owned asset), discharge to Hanningfield Service Reservoir
Number of waterbodies passing WFD assessment	12
Waterbodies passing WFD assessment	GB530603911402: THAMES MIDDLE GB106037028200: Mardyke GB106037028070: Mardyke (East Tributary) GB105037028500: Crouch (Upper) - u/s A129 GB105037028540: Crouch (A129 - Wickford) GB105037028550: Crouch (d/s Wickford) GB105037028560: Rettendon Brook GB105037028630: Sandon Brook (West arm) GB30541427: Hanningfield Reservoir GB40601G401100: South Essex Thurrock Chalk (GW) GB40602G401000: South Essex London Tertiaries GB40503G000400: Essex Gravels (GW)

2.2.7 Langford Recycling Plant (ESW-EFR-010)

The Level 1 WFD assessment covered nine waterbodies of the option. The outcome for eight waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.22: WFD Level 1 assessment outcomes for Langford Recycling Plant

Langford Recycling Plant	
Option ID	ESW-EFR-010
Option Description	New balance tank to incorporate additional flows and maintain consistently high outputs at Langford Recycling Plant (LRP) Balance tank will take an existing intake from Chelmsford WRC and a

Langford Recycling Plant	
	new intake from Basildon WRC (both Anglian Water owned assets), existing discharge from LRP to River Chelmer.
Number of waterbodies passing WFD assessment	8
Waterbodies passing WFD assessment	GB105037028550: Crouch (d/s Wickford) GB105037028560: Rettendon Brook GB520503704100: CROUCH GB105037028640: Sandon Brook (East arm) GB520503714000: BLACKWATER GB105037033530: Chelmer (d/s confluence with Can) GB105037041160: Blackwater (Combined Essex) GB40503G000400: Essex Gravels (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB105037028540: Crouch (A129 - Wickford)

2.2.8 Caister Water Reuse and Ormesby Transfer (03-0478)

The Level 1 WFD assessment covered three waterbodies of the option. The outcome for two waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.23: WFD Level 1 assessment outcomes for Caister Water Reuse and Ormesby Transfer

Caister Water Reuse and Ormesby Transfer	
Option ID	03-0478
Option Description	03-0478 Water Reuse Treatment at Caister EFR (AW) and transfer from Caister to Ormesby Raw Water Tank
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105034050860: Muck Fleet GB40501G400300: Broadland Rivers Chalk & Crag (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB510503410700: Bure & Waveney & Yare & Lothing

2.3 Reservoirs

2.3.1 North Suffolk Winter Storage Reservoir (ESW-RES-002)

The Level 1 WFD assessment covered five waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.24: WFD Level 1 assessment outcomes for North Suffolk Winter Storage Reservoir

North Suffolk Winter Storage Reservoir	
Option ID	ESW-RES-002
Option Description	New winter storage reservoir to be built. Intake comes from the River Waveney/River Hundred when there's no spare capacity at Barsham WTW. When supplies are short at Barsham WTW, water is taken from the reservoir and transferred to the WTW.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105034045902: Waveney (Starston Brook - Ellingham Mill) GB40501G400300: Broadland Rivers Chalk & Crag (GW) GB40501G400600: Waveney and East Suffolk Chalk and Crag (GW)
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB105035046251: Lothingland Hundred

2.4 Borehole abstraction

2.4.1 Linford WTW (ESW-ABS-002)

The Level 1 WFD assessment covered two waterbodies of the option. The outcome for one waterbody indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.25: WFD Level 1 assessment outcomes for Linford WTW

Linford WTW	
Option ID	ESW-ABS-002
Option Description	Borehole Abstraction (7Ml/d DO). New conventional water treatment works built on Linford WTW's existing site. Intake from existing, decommissioned borehole, outfall to existing treated water network.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB530603911402: Thames Middle
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40503G000400: Essex Gravels (GW)

2.5 Nitrate treatment

2.5.1 Barsham Nitrate Treatment (ESW-NIT-001)

The Level 1 WFD assessment covered two waterbodies of the option. The outcome for two waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.26: WFD Level 1 assessment outcomes for Barsham Nitrate Treatment

Barsham Nitrate Treatment	
Option ID	ESW-NIT-001
Option Description	Nitrate treatment extension on Barsham WTW's existing site.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter) GB40501G400300: Broadland Rivers Chalk & Crag (GW)

2.5.2 Langford Nitrate Treatment (ESW-NIT-002)

The Level 1 WFD assessment covered two waterbodies of the option. The outcome for two waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.27: WFD Level 1 assessment outcomes for Langford Nitrate Treatment

Langford Nitrate Treatment	
Option ID	ESW-NIT-002
Option Description	Nitrate treatment extension on Langford WTW's existing site.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105037041160: Blackwater (Combined Essex) GB40503G000400: Essex Gravels (GW)

2.5.3 Langham Nitrate Treatment (ESW-NIT-003)

The Level 1 WFD assessment covered two waterbodies of the option. The outcome for two waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.28: WFD Level 1 assessment outcomes for Langham Nitrate Treatment

Langham Nitrate Treatment	
Option ID	ESW-NIT-003
Option Description	Nitrate treatment extension on Langham WTW's existing site.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105036040942: Stour (Lamarsh - R. Brett) GB40503G000400: Essex Gravels (GW)

2.6 Desalination

2.6.1 Canvey Island Desalination Terrestrial (ESW-DES-001)

The Level 1 WFD assessment covered seven waterbodies of the option. The outcome for six waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for one waterbody indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.29: WFD Level 1 assessment outcomes for Canvey Island Desalination Terrestrial

Canvey Island Desalination Terrestrial	
Option ID	ESW-DES-001
Option Description	Abstraction from the Thames Estuary, discharge to Hanningfield Service Reservoir.
Number of waterbodies passing WFD assessment	6
Waterbodies passing WFD assessment	GB105037028550: Crouch (d/s Wickford) GB105037028560: Rettendon Brook GB105037028630: Sandon Brook (West arm) GB520503704100: CROUCH GB30541427: Hanningfield Reservoir GB40503G000400: Essex Gravels (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB530603911401: THAMES LOWER

2.6.2 Tilbury Brackish Desalination Terrestrial (ESW-DES-002)

The Level 1 WFD assessment covered eight waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for five waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.30: WFD Level 1 assessment outcomes for Tilbury Brackish Desalination Terrestrial

Tilbury Brackish Desalination Terrestrial	
Option ID	ESW-DES-002
Option Description	Abstraction from the Thames Estuary, discharge to Herongate Service Reservoir.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB106037028200: Mardyke GB105037028500: Crouch (Upper) - u/s A129 GB105037028650: Haverings Grove Brook
Number of waterbodies requiring further WFD assessment	5

Tilbury Brackish Desalination Terrestrial	
Option ID	ESW-DES-002
Waterbodies failing WFD assessment	GB530603911402: THAMES MIDDLE GB106037028070: Mardyke (East Tributary) GB40601G401100: South Essex Thurrock Chalk (GW) GB40602G401000: South Essex Lower London Tertiaries (GW) GB40503G000400: Essex Gravels (GW)

2.6.3 Canvey Island Desalination - Barge Mounted Solution (ESW-DES-006)

The Level 1 WFD assessment covered seven waterbodies of the option. The outcome for five waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.31: WFD Level 1 assessment outcomes for Canvey Island Desalination - Barge Mounted Solution

Canvey Island Desalination - Barge Mounted Solution	
Option ID	ESW-DES-006
Option Description	Abstraction from the Thames Estuary, discharge to Hanningfield Service Reservoir.
Number of waterbodies passing WFD assessment	5
Waterbodies passing WFD assessment	GB105037028550: Crouch (d/s Wickford) GB105037028560: Rettendon Brook GB105037028630: Sandon Brook (West arm) GB30541427: Hanningfield Reservoir GB520503704100: CROUCH
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB530603911401: THAMES LOWER GB40503G000400: Essex Gravels (GW)

2.6.4 Tilbury Brackish Desalination - Barge Mounted Solution (ESW-DES-007)

The Level 1 WFD assessment covered eight waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for five waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.32: WFD Level 1 assessment outcomes for Tilbury Brackish Desalination - Barge Mounted Solution

Tilbury Brackish Desalination - Barge Mounted Solution	
Option ID	ESW-DES-007
Option Description	Abstraction from the Thames Estuary, discharge to Herongate Service Reservoir. Transfer route the same as for ESW-DES-002.

Tilbury Brackish Desalination - Barge Mounted Solution	
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB106037028200: Mardyke GB105037028500: Crouch (Upper) - u/s A129 GB105037028650: Haverings Grove Brook
Number of waterbodies requiring further WFD assessment	5
Waterbodies failing WFD assessment	GB530603911402: THAMES MIDDLE GB106037028070: Mardyke (East Tributary) GB40601G401100: South Essex Thurrock Chalk (GW) GB40602G401000: South Essex Lower London Tertiaries (GW) GB40503G000400: Essex Gravels (GW)

2.6.5 Sizewell Desalination using Beachwell (ESW-DES-003)

The Level 1 WFD assessment covered five waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for two waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.33: WFD Level 1 assessment outcomes for Sizewell Desalination using Beachwell

Sizewell Desalination using Beachwell	
Option ID	ESW-DES-003
Option Description	Seawater Desalination Plant. Abstraction from beachwells to a desal plant. Transfer to discharge to Barsham WTW.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105035046260: Hundred River GB105035046271: Leiston Beck GB105035045980: Fromus
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB650503520002: Suffolk GB40501G400600: Waveney and East Suffolk Chalk & Crag (GW)

2.6.6 California (Caister) Desalination using Beachwell (ESW-DES-004)

The Level 1 WFD assessment covered six waterbodies of the option. The outcome for three waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for three waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.34: WFD Level 1 assessment outcomes for California (Caister) Desalination using Beachwell

California (Caister) Desalination using Beachwell	
Option ID	ESW-DES-004

California (Caister) Desalination using Beachwell	
Option Description	Seawater Desalination Plant. Abstraction from beach wells to desal plant then transfer to Saxmundham Water Tower.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB105034050860: Muck Fleet GB105034051370: Yare (Wensum to tidal) GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter)
Number of waterbodies requiring further WFD assessment	3
Waterbodies failing WFD assessment	GB650503520003: Norfolk East GB510503410700: BURE & WAVENEY & YARE & LOTHING GB40501G400300: Waveney and East Suffolk Chalk & Crag (GW)

2.6.7 Corton Desalination using Beachwell (ESW-DES-008)

The Level 1 WFD assessment covered four waterbodies of the option. The outcome for one waterbody indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. The outcome for three waterbodies indicated further assessment would be necessary for the option, because the types of activities present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.35: WFD Level 1 assessment outcomes for Corton Desalination using Beachwell

Corton Desalination using Beachwell	
Option ID	ESW-DES-008
Option Description	Seawater Desalination Plant. Abstraction from beachwells to a desal plant. Transfer to discharge to Barsham WTW.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter)
Number of waterbodies requiring further WFD assessment	3
Waterbodies failing WFD assessment	GB650503520003: Norfolk East GB510503410700: BURE & WAVENEY & YARE & LOTHING GB40501G400300: Waveney and East Suffolk Chalk & Crag (GW)

2.7 Aquifer storage and recovery (ASR)

2.7.1 Abberton ASR with additional treatment capacity (ESW-ASR-004)

The Level 1 WFD assessment covered two waterbodies of the option. The outcome for both waterbodies indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any waterbodies. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Table 2.36: WFD Level 1 assessment outcomes for Abberton ASR with additional treatment capacity

Abberton ASR with additional treatment capacity	
Option ID	ESW-ASR-004
Option Description	ASR scheme located on neighbouring land to Layer de la Haye WTW. New borehole reaching Abberton chalk aquifer. New treatment works and borehole:
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB105037034150: Roman River GB40503G000400: Essex Gravels (GW)

3 Water Framework Directive findings (Level 2 WFD)

In 19 of the WRMP24 options the Level 1 screening has identified water bodies which require further WFD assessment to assess potential significant effects. Of these 19, six feature within either the Best Value Plan or Best Value Plan Alternative 1 and 2 plans. Further information on WFD classification and the approach adopted can be found in Section 1.3.

Section 3.1 provides an overview of the findings from these Level 2 WFD assessments while Section 3.3 provides summary tables for each Level 2 assessment.

3.1 Best Value Plan and Best Value Plan Alternative 1 and 2 Options – Level 2 findings

3.1.1 Transfers

3.1.1.1 Transfer from Bungay Well to Broome WTW (ESW-TRA-018)

The Level 1 assessment identified one water body as requiring further assessment: Broadland Rivers Chalk and Crag groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative dependent surface water due to the use of refurbished boreholes outside of current recent actual rates, although within existing licence quantities. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. No risk to achieving water body objectives was identified.

A summary of the Level 2 WFD assessment is included in Table 3.1 and detailed outputs are presented in Appendix B.

3.1.2 Effluent Reuse

3.1.2.1 Southend-on-Sea Water Reuse (ESW-EFR-001)

Three waterbodies were identified as requiring further assessment: Lower Thames and Crouch transitional waterbodies and Essex Gravels groundwater body.

The Level 2 WFD assessment for the Lower Thames identified possible deterioration risks to biological elements due to changes in water quality as a result of a cessation of an existing discharge (reducing the freshwater flow into this transitional water body). Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. Similarly, the decrease in freshwater flow from the cessation of discharge could impact on the ability to achieve water body objectives.

For the Essex gravels groundwater body potential deterioration risks were identified on quantitative GWDTE status element due to possible impacts of construction dewatering on the Crouch and Roach Estuaries SSSI GWDTE. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. No risk to achieving water body objectives was identified.

Only minor effects were identified on the Crouch transitional water body largely due to construction impacts on river flow and quality. For this water body no compliance risk or risks to achieving water body objectives was identified due to this option.

A summary of the Level 2 WFD assessment is included in Table 3.2 and detail outputs are presented in Appendix B.

3.1.2.2 Caister Water Reuse and Ormesby Transfer (03-0478)

One waterbody was identified at Level 1 as requiring further assessment: Bure & Waveney & Yare & Lothing transitional waterbody.

The Level 2 WFD assessment for the transitional water body identified possible deterioration risks to biological elements and hydrological regime, largely due to changes in flow velocity as a result of a cessation of an existing discharge. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. No risk to achieving water body objectives was identified.

A summary of the Level 2 WFD assessment is included in Table 3.3 and detail outputs are presented in Appendix B.

3.1.3 Reservoirs

3.1.3.1 North Suffolk Winter Storage Reservoir (ESW-RES-002)

Two waterbodies were identified as requiring further assessment: Waveney (Ellingham Mill – Burgh St. Peter) river waterbody and Lothingland Hundred river waterbody.

The Level 2 WFD assessment for the Waveney identified minor localised risks to biological elements and physico-chemical quality elements, due to changes in flow velocity, flow volume, and sedimentation as a result of an installation of a new river intake. For this water body no compliance risk or risks to achieving water body objectives were identified due to this option.

For the Lothingland Hundred water body a potential deterioration risk was identified to fish due to the new river intake. Assuming appropriate fish screens are in place, then this risk is reduced to a minor localised effect. Minor effects were also identified to biological elements, hydrological regime and physico-chemical elements due to the new intake and abstraction. Assuming appropriate mitigation is put in place no compliance risk or risks to achieving water body objectives were identified due to this option

A summary of the Level 2 WFD assessment is included in Table 3.4 and detail outputs are presented in Appendix B.

3.1.4 Borehole abstraction

3.1.4.1 Linford WTW (ESW-ABS-002)

One water body was identified as requiring further assessment: Essex Gravels groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative dependent surface water body status and chemical GWDTE and saline intrusion and general chemical test elements. These are largely due to the new abstraction from the existing boreholes on the WTW site, which have been out of use for some time. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. No risk to achieving water body objectives was identified.

A summary of the Level 2 WFD assessment is included in Table 3.5 and detail outputs are presented in Appendix B.

3.1.5 Desalination

3.1.5.1 Canvey Island Desalination Terrestrial (ESW-DES-001)

One water body was identified as requiring further assessment: Lower Thames transitional body.

The Level 2 WFD assessment identified potential major deterioration risks to biological status elements and physico chemical quality elements. These are largely due to the new abstraction and the highly saline discharge from the new desalination plant. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. Similarly, a risk to achieving good status was identified to dissolved inorganic nitrogen, due to the potential impact of the discharge, reducing the future improvements which could be made.

A summary of the Level 2 WFD assessment is included in Table 3.6 and detail outputs are presented in Appendix B.

3.2 Alternative options assessed

In 19 of the WRMP24 options the Level 1 screening has identified water bodies which require further WFD assessment to assess potential significant effects. Of these 19, six feature within either the Best Value Plan or Best Value Plan Alternative 1 and 2 plans. Two further assessments were carried out on options which are no longer in the BVPs. A summary of these options are presented below.

3.2.1 Transfers

3.2.1.1 Essex to Hartismere Transfer (ESW-TRA-004)

The Level 1 assessment identified four waterbodies which require further assessment: Stour (Lamarsh – R. Brett), Brett, Gipping (d/s Stowmarket) and Dove trib – Eye river water bodies.

The Level 2 WFD assessments for these four waterbodies identified possible deterioration risks to biological status elements, due to dewatering relating to construction of below ground elements. Assuming appropriate mitigation is put in place it is anticipated that there would be no compliance risk for this waterbody. No risk to achieving water body objectives were identified for any of these waterbodies.

A summary of the Level 2 WFD assessment is included in Table 3.7 and detail outputs are presented in Appendix B.

3.2.2 Desalination

3.2.2.1 California beach desalination (ESW-DES-004)

The Level 1 assessment identified three waterbodies which require further assessment: Norfolk East coastal water body, Bure & Waveney & Yare & Lothing transitional water body and Broadland Rivers Chalk & Crag groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to biological status elements and physico chemical quality elements. This is largely to do with the new discharge of desalination plant waste into this transitional water body. Therefore, this assessment concludes a precautionary compliance risk, pending further investigation. Similarly, the change in water quality could impact on the ability to achieve water body objectives.

For the groundwater body potential deterioration risks to quantitative dependent surface water body status due to the new abstraction from the beach wells were identified. Therefore, this

assessment concludes a precautionary compliance risk, pending further investigation. No risk to achieving water body objectives was identified.

The Level 2 assessment for the coastal water body identified only minor localised effects relating to short term variations to water quality due to construction of pipelines and beach wells. No compliance risk or risks to achieving water body objectives were identified due to this option

A summary of the Level 2 WFD assessment is included in Table 3.8 and detail outputs are presented in Appendix B.

3.3 Level 2 Summary Tables

A summary of the Level 2 WFD outcomes for the options taken forward for Level 2 are provided in the following tables below. Detailed outputs are presented in Appendix B.

Table 3.1: Transfer from Bungay Well to Broome WTW (ESW-TRA-018) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40501G400300: Broadland Rivers Chalk and Crag	**Low / Low**	**2**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on groundwater balance and flow of Twyford Tertiaries as a result of increased groundwater abstraction. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including details on abstraction conditions. ESW to review current usage of borehole(s), ensure that boreholes can operate sustainably within the new proposed licence conditions of this option.	Ensure River Waveney receives appropriate compensation flow if deemed necessary.	**Possible**	**No**	**No**	Explore river restoration measures to address potential flow concerns in stream and ensure health of River Waveney is maintained post anticipated reduced baseflow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.2: Southend-on-Sea Water Reuse (ESW-EFR-001) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB530603911401: Thames Lower	**Low / Low**	**2**	WQ modelling of impact of reduced freshwater inflow from ceased discharge on water quality and therefore biology. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed hydroecological assessment of the impacts of cessation of discharge on flow in the watercourses, and potential influence on SSSIs, with focus on impacts on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including current discharge volumes into the estuary.	N/A	**Possible**	**No**	**No**	None
GB520503704100: Crouch	**Low / Low**	**1**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary dewatering abstraction on flow in the watercourses, and potential influence on SSSIs, with focus on impacts on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option.	Any dewatering needed for the construction will be discharged to the river to help maintain flow. If shafts needed for river crossing these should be located outside of the SSSI/SAC Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	**No**	**No**	**No**	Assumed major river crossings will be carried out using HDD or pipejacking. Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater. Assumes dewatering discharge to groundwater or surface water to help maintain flows.
GB40503G000400: Essex Gravels	**Low / Low**	**2**	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme. Detailed hydrogeological and hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option.	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. Use of Clay Stanks in pipeline route where groundwater potentially encountered. If shafts needed for estuary crossings these should be located outside of the SSSI.	**Possible**	**No**	**No**	Assumed major river crossings will be carried out using HDD or pipejacking. Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater. Assumes dewatering discharge to groundwater or surface water to help maintain flows.

Table 3.3: Caister Water Reuse and Ormesby Transfer 03-0478 Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB510503410700: Bure and Waveney and Yare and Lothing	**Low / Low**	**2**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed hydroecology assessment of the impacts of discharge cessation on flow, hydromorphology, water quality. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including details on discharge conditions (HOF etc.).	If deemed necessary, appropriate compensation flow provided to Bure River to maintain flow volume and velocity in the watercourse.	**Possible**	**Possible**	**No**	None.

Table 3.4: North Suffolk Winter Storage Reservoir (ESW-RES-002) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB105034045903: Waveney (Ellingham – Burgh St. Peter)	**Low / Low**	**1**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed hydroecology assessment of the impacts of abstraction on flow, hydromorphology, water quality / concentration of key physicochemical parameters, especially TP / Phosphate and therefore on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including details on abstraction conditions (HOF etc.).	Although not assessed as a biology element in this waterbody, fish and eel screening should be in place as good practice. Abstraction conditions to be set during wet periods during initial fill of reservoir site so as to minimise impact to the watercourse. Potential impacts to rivers caused by below ground activities associated with crossings and reservoir construction should be considered, with appropriate compensation flow provided if applicable Appropriate compensation flow to maintain appropriate dilution of water quality parameters within the Waveney, if considered necessary after further assessment.	**Possible**	**Possible**	**No**	None.
GB105035046251: Lothingland Hundred	**Low / Low**	**2**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed hydroecology assessment of the impacts of abstraction on flow, hydromorphology, water quality / concentration of key physicochemical parameters, especially TP / Phosphate and therefore on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including details on abstraction conditions (HOF etc.).	Fish and eel screening should be in place at new intake as good practice. Abstraction conditions to be set during wet periods during initial fill of reservoir site so as to minimise impact to the watercourse. Appropriate compensation flow to maintain appropriate dilution of water quality parameters within the Hundred River, if considered necessary after further assessment.	**Possible**	**Possible**	**No**	None.

Table 3.5: Linford WTW (ESW-ABS-002) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40503G000400: Essex Gravels	**Low / Low**	**2**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on groundwater balance and flow of Essex Gravels as a result of increased groundwater abstraction. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Historical usage to be shared with E&SW and reviewed to confirm if boreholes can operate sustainably at proposed new licence conditions of this option. Further information about option, including details on abstraction conditions.	Ensure issues to the west of Linford are not significantly impacted by new activities impacting this waterbody and if a reliance on groundwater is discovered at any surface watercourse near option, ensure appropriate compensation flow is provided.	**Possible**	**No**	**No**	None.

3.6: Canvey Island Desalination Terrestrial (ESW-DES-001) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB530603911401: Thames Lower	**Low / Low**	**3**	Detailed hydrodynamic assessment of the impacts of abstraction and discharge on hydromorphology. Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of new abstraction and discharge on flow water quality and therefore biology. Numerical modelling of the dispersion of the saline discharge may be required. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option operation.	Abstraction conditions to be set to minimise changes to hydrological regime that could cause deterioration of biological WFD elements. Discharge to be designed to maximise dilution and dispersion and avoid sensitive areas.	**Possible**	**No**	**No**	Exact abstraction and discharge have not been provided; assumptions have been made based upon deployable output.

Table 3.7: Essex to Hartismere Transfer (ESW-TRA-004) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB105036040942: Stour (Lamarsh - R. Brett)	**Low / Low**	**2**	Detailed review of all baseline ecological WFD data, including results of any surveys undertaken for this scheme. Further information about option, including construction methodology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	Minimise requirements for dewatering close to the watercourse. If dewatering is required discharge should be back to the watercourse or to groundwater in order to help maintain flow and minimise impact on biological status elements.	**No**	**No**	**No**	None.
GB105036040930: Brett	**Low / Low**	**2**	Detailed review of all baseline ecological WFD data, including results of any surveys undertaken for this scheme. Further information about option, including construction methodology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	Minimise requirements for dewatering close to the watercourse. If dewatering is required discharge should be back to the watercourse or to groundwater in order to help maintain flow and minimise impact on biological status elements.	**No**	**No**	**No**	None.
GB105035046280: Gipping (d/s Stowmarket)	**Low / Low**	**2**	Detailed review of all baseline ecological WFD data, including results of any surveys undertaken for this scheme. Further information about option, including construction methodology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	Minimise requirements for dewatering close to the watercourse. If dewatering is required discharge should be back to the watercourse or to groundwater in order to help maintain flow and minimise impact on biological status elements.	**No**	**No**	**No**	None.
GB105034045670: Dove trib - Eye	**Low / Low**	**2**	Detailed review of all baseline ecological WFD data, including results of any surveys undertaken for this scheme. Further information about option, including construction methodology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	Minimise requirements for dewatering close to the watercourse. If dewatering is required discharge should be back to the watercourse or to groundwater in order to help maintain flow and minimise impact on biological status elements.	**No**	**No**	**No**	None.

Table 3.8: California beach desalination (ESW-DES-004) Level 2 WFD summary

Water body ID and name	Confidence in WFD data / option design	Maximum impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB650503520003: Norfolk East	**Low / Low**	**1**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary dewatering abstraction on flow in the watercourses, and potential influence on Marine Protection Area, with focus on impacts on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option.	Potential treatment of dewatered water prior to discharge into the protected area.	**No**	**No**	**No**	None.
GB510503410700: BURE & WAVENEY & YARE & LOTHING	**Low / Low**	**2**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Review of WRC's capacity to dilute saline water prior to discharge. Detailed hydrodynamic assessment of the impacts new discharge on water quality, biology and concentration of key physicochemical parameters within the coastal environment. Detailed hydroecological assessment of the impacts of temporary dewatering abstraction on flow in the watercourses, with focus on impacts on biology. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option.	Ensure highly saline water is diluted to acceptable standard before eventual discharge into the River Bure.	**Possible**	**Possible**	**No**	None.
GB40501G400300: Broadland Rivers Chalk & Crag	**Low / Low**	**2**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on groundwater balance and flow of Broadland Rivers Chalk and Crag as a result of increased groundwater abstraction. This should include consideration of whether saline intrusion might be increased. Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions. Further information about option, including details on abstraction conditions.	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered. Any shafts to be sealed to ensure minimal groundwater egress after construction. Discharging of dewatering discharge to ground where feasible. Ensure where necessary River Yare / other surface water courses reliant on GW receive compensation flow.	**Possible**	**No**	**No**	None.

4 In combination and cumulative effects

4.1 Methodology

For WFD in combination and cumulative effects considers the additional impact on a waterbody caused by multiple options constructed and/or operating within it, along with the potential for cumulative impacts from other planning applications, allocations or major projects planned in the Essex and Suffolk area.

For the three preferred plans (Best Value Plan, Best Value Plan Alternative 1 and Best Value Plan Alternative 2) all of the waterbodies assessed have been compiled. The major planning applications, allocations and major projects have also been reviewed to identify whether any of these could occur in the same waterbodies as the options in each plan and therefore, lead to potential cumulative effects.

This assessment will show whether changes to overall risk of WFD deterioration will occur when considering the fully incapsulated impact of the Essex and Suffolk plans along with the planning projects on the water environment.

4.2 Best Value Plan

4.2.1 Options selected

In combination and cumulative effects have been assessed for options which fall under the Best Value Plan (BVP) laid out by Essex and Suffolk Water. The options selected as part of the Best Value Plan for the Essex and Suffolk Water WRMP24 are presented in Table 4.1.

Table 4.1: Essex and Suffolk Water WRMP24 Best Value Plan options

Option ID	Option title	Brief description
ESW-ABS-002	Linford WTW	Recommissioning existing borehole with new WTW
ESW-TRA-001	Barsham to Blyth Transfer Main	8 Ml/d transfer from Barsham WTW to Saxmundham Water Tower
ESW-TRA-019	Transfer from Holton WTW to Eye Airfield	8.5 Ml/d transfer from Holton WTW to Eye Airfield.
ESW-TRA-018	Transfer from Bungay Well to Broome WTW	Transfer from Bungay Wells to Broome WTW.
ESW-EFR-002B	Lowestoft Water Reuse	Effluent Reuse Plant (11.1 Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill.
03-0478[4]	Caister Water Reuse and Ormesby Transfer	Water reuse treatment within the existing site footprint at Caister EFR Plant sized for a maximum of 16.4 Ml/d. Transfer of water to Ormesby, approximately 7.2 km long.
ESW-RES-002	North Suffolk Winter Storage Reservoir	New winter storage reservoir to be built. Intake from the River Waveney/River Hundred.

In addition, the relevant planning applications, major projects or planning allocations which may have impacts on the same waterbodies have been identified within 500m of these options. These are set out in set out in Table 4.2.

[4] This is an Anglian Water option which has been taken forward in the Essex and Suffolk WRMP.

Table 4.2: Planning applications, allocations and major projects within 500m of the BVP options

Major project title	Waterbodies interacted with	BVP options in same waterbodies
Sizewell C	GB105035046270: Minsmere Old River GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-001 ESW-TRA-019
East Anglia TWO Offshore Windfarm	GB105035045980: Fromus GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-001 ESW-TRA-019

4.2.2 In combination and cumulative effects assessment

Table 4.3 below, identifies waterbodies which are impacted by more than one of the BVP options and/or planning projects, but where the in combination and cumulative effect assessment shows that there will not be change to the risk of WFD deterioration at the waterbody scale due to the multiple BVP options and planning projects.

Table 4.3: Waterbodies where in combination and cumulative effects are not anticipated to lead to a risk of WFD deterioration from BVP options.

Waterbody ID	Waterbody name	Options	Comments
GB105034045902	Waveney (Starston Brook - Ellingham Mill)	• ESW-RES-002 • ESW-TRA-018	ESW-RES-002 involves the construction of a new reservoir and pumping station / intake structure and a new WTW discharge to watercourse. ESW-TRA-018 involves the refurbishment of existing boreholes and the installation of new pipeline within this waterbody. All option activities have minor and localised risks associated with them and in-combination are assumed unlikely to be significant at a waterbody scale. Risk to waterbody **remains as minor localised effect**.
GB105035045980	Fromus	• ESW-TRA-001 • East Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline and upgrade to WTW in this waterbody. This waterbody was screened out of the East Anglian TWO offshore windfarm WFD assessment[5] as the only works in this water body are road improvement works. The in combination and cumulative effects are not expected to be significant at a waterbody scale and **impact remains minor localised**.
GB105034045903	Waveney (Ellingham Mill - Burgh St. Peter)	• ESW-TRA-001 • ESW-EFR-002B • ESW-RES-002	All three of these options feature pipelines through this waterbody. With Option ESW-EFR-002B also having a new discharge of treated effluent into this watercourse and ESW-RES-002 having a new abstraction and construction of new reservoir. If provided mitigation (as per ESW-RES-002 level 2 assessment) the combination of these options is unlikely to lead a cumulative effect at a waterbody scale and **impact remains minor localised**.
GB105035046290	Blyth (d/s Halesworth)	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines and the modification of existing WTW within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**

[5] Scottish Power Renewables. East Anglian TWO Offshore Windfarm. Environmental Statement, Volume 3. Appendix 20.4 Water Framework Directive Compliance Assessment. Available online at: EN010078-001516-6.3.20.4 EA2 ES Appendix 20.4 Water Framework Directive Compliance Assessment.pdf (planninginspectorate.gov.uk)

Waterbody ID	Waterbody name	Options	Comments
GB105035046300	Wang	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**
GB40501G400600	Waveney and East Suffolk Chalk and Crag (GW)	• ESW-EFR-002B • ESW-TRA-001 • ESW-TRA-019 • ESW-RES-002 • East Anglian TWO offshore Windfarm • Sizewell C	The two transfers, one effluent reuse and reservoir option will require the installation of shallow pipelines and below ground structures across this groundwater body. The groundwater body was scoped out of the WFD assessment for the East Anglian TWO offshore windfarm and for Sizewell C as construction will not impact on any of the WFD groundwater tests. In-combination and cumulative effects are unlikely to be significant at a waterbody scale so no change to impact score expected. Risk to waterbody **remains as minor localised effect**.
GB40503G000400	Essex Gravels	• ESW-ABS-002 • Sandon inert waste recycling and landfill	ESW-ABS-002 will involve refurbishment of existing boreholes with an associated increase in abstraction. Sandon inert waste recycling and landfill consists of road improvements and use of existing quarry as a waste recycling centre and landfill. While, the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-ABS-002 option,** pending further investigation.
GB40501G400300	Broadland Rivers Chalk & Crag (GW)	• ESW-TRA-001 • ESW-TRA-019 • ESW-TRA-018 • ESW-EFR-002B • 03-0478 • ESW-RES-002	ESW-TRA-018 involves abstraction for this waterbody potentially leading to changes in water balance and surface water tests and 03-0478 below ground structures. The remaining options include pipelines through this waterbody. While, the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-TRA-018 option,** pending further investigation.
GB510503410700	Bure & Waveney & Yare & Lothing transitional	• ESW-EFR-002B • 03-0478	A potential risk of WFD deterioration was highlighted for the Anglian 03-0478 option (due to a reduction in flow from the cessation of an existing discharge). ESW-EFR-002B involves a new WTW and pipeline in this waterbody. The combination of these options is not anticipated to lead cumulative effects but a **risk of deterioration remains as per option 03-0478**, pending further investigation.

Table 4.4 below, identifies waterbodies which have been assessed as having the potential for in combination effects from multiple BVP options and other major projects which could lead to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.4: Waterbodies where in combination and cumulative effects could lead to WFD deterioration risk from BVP options

Waterbody ID	Waterbody name	Options	Comments
GB105035046270	Minsmere Old River	• ESW-TRA-001 • Sizewell C • EA Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline in this waterbody. Part of this waterbody is also within the construction area for Sizewell C, and the Sizewell C WFD

Waterbody ID	Waterbody name	Options	Comments
			assessment[6] sets out potential impacts on water quality and therefore biology in the tidal sections of this waterbody. The impacts from the two projects do not overlap within the waterbody and the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.
GB105035046251	Lothingland Hundred	• ESW-TRA-001 • ESW-RES-002 • ESW-EFR-002B	All options involve the installation of pipelines with below ground structures associated with crossings. ESW-EFR-002B and ESW-TRA-001 utilise the same stretch of pipeline. ESW-RES-002 option also involves a new surface water abstraction within this waterbody used to support a new reservoir. If the provided mitigation (in the ESW-RES-002 Level 2 assessment) is followed, the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.

4.3 Best Value Plan Alternative 1

4.3.1 Options selected

In combination effects have been assessed for options which fall under the Best Value Plan Alternative 1 (BVPA1) laid out by Essex and Suffolk Water. The options selected as part of the BVPA1 for the Essex and Suffolk Water WRMP24 in Table 4.5.

Table 4.5: Essex and Suffolk Water WRMP24 BVPA1 options

Option ID	Option title	Brief description
ESW-ABS-002	Linford WTW	Recommissioning existing borehole with new WTW
ESW-TRA-001	Barsham WTW to Blyth Transfer Main	8 Ml/d transfer from Barsham WTW to Saxmundham Water Tower
ESW-TRA-019	Transfer from Holton WTW to Eye Airfield	8.5Ml/d transfer from Holton WTW to Eye Airfield.
ESW-TRA-018	Transfer from Bungay Well to Broome WTW	Transfer from Bungay Wells to Broome WTW.
ESW-EFR-001	Southend-on-Sea Water Reuse	Effluent re-use plant being fed from Anglian Water's WRC with a transfer to Hanningfield reservoir
ESW-EFR-002B	Lowestoft Water Reuse for Ellingham Mill	Effluent Reuse Plant (11.1 Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill.
03-0478[7]	Caister Water Reuse and Ormesby Transfer	Water reuse treatment within the existing site footprint at Caister EFR Plant sized for a maximum of 16.4 Ml/d. Transfer of water to Ormesby, approximately 7.2 km long.
ESW-RES-002	North Suffolk Winter Storage Reservoir	New winter storage reservoir to be built. Intake from the River Waveney/River Hundred.

In addition, the relevant planning applications, major projects or planning allocations which may have impacts on the same waterbodies have been identified within 500m of these options. These are set out in set out in Table 4.6.

[6] EDF Energy and SZC. The Sizewell C Project: 8.14 Water Framework Direct Compliance Assessment Report Part 4 of 4 Available online at: SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4.pdf (sizewellcdco.co.uk)

[7] This is an Anglian Water option which has been taken forward in the Essex and Suffolk WRMP.

Table 4.6: Planning applications, allocations and major projects within 500m of the BVPA1 options

Major project title	Waterbodies interacted with	BVA1 options in same waterbodies
Sizewell C	GB105035046270: Minsmere Old River GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-019
East Anglia TWO Offshore Windfarm	GB105035045980: Fromus GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-019
Sandon inert waste recycling and landfill, Chelmsford	GB105037028630: Sandon brook (West Arm)	ESW-EFR-001

4.3.2 In combination and cumulative effects assessment

Table 4.7 below, identifies waterbodies which are impacted by more than one of the BVPA1 options and/or planning projects, but where the high level in combination effect and cumulative assessment has shown that it is unlikely that the multiple BVPA1 options and planning projects will lead to a risk of WFD deterioration at the waterbody scale.

Table 4.7: Waterbodies where in combination and cumulative effects are unlikely to a risk of WFD deterioration from BVPA1 options.

Waterbody ID	Waterbody name	Options	Comments
GB105034045902	Waveney (Starston Brook - Ellingham Mill)	• ESW-RES-002 • ESW-TRA-018	ESW-RES-002 involves the construction of a new reservoir and pumping station / intake structure and a new WTW discharge to watercourse. ESW-TRA-018 involves the refurbishment of existing boreholes and the installation of new pipeline within this waterbody. All option activities have minor and localised risks associated with them and in-combination are assumed unlikely to be significant at a waterbody scale. Risk to waterbody **remains as minor localised effect**.
GB105035045980	Fromus	• ESW-TRA-001 • East Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline and upgrade to WTW in this waterbody. This waterbody was screened out of the East Anglian TWO offshore windfarm WFD assessment[8] as the only works in this water body are road improvement works. The in combination and cumulative effects are not expected to be significant at a waterbody scale and **impact remains minor localised**.
GB105037028630	Sandon Brook (West arm)	• ESW-EFR-001 • Sandon inert waste recycling and landfill	ESW-EFR-001 consists of a pipeline passing through this waterbody. The Sandon inert waste recycling and landfill consists of road improvements and use of existing quarry as a waste recycling centre and landfill. This works is located over 5km from the ESW-EFR-001 option. The cumulative effects are not anticipated to be significant at a waterbody scale, so no change to impact score expected. **Remains at minor localised effect**.

[8] Scottish Power Renewables. East Anglian TWO Offshore Windfarm. Environmental Statement, Volume 3. Appendix 20.4 Water Framework Directive Compliance Assessment. Available online at: EN010078-001516-6.3.20.4 EA2 ES Appendix 20.4 Water Framework Directive Compliance Assessment.pdf (planninginspectorate.gov.uk)

Waterbody ID	Waterbody name	Options	Comments
GB40501G400600	Waveney and East Suffolk Chalk & Crag	• ESW-EFR-002B • ESW-TRA-001 • ESW-TRA-019 • ESW-RES-002 • East Anglian TWO offshore Windfarm • Sizewell C	The two transfers, one effluent reuse and reservoir option will require the installation of shallow pipelines and below ground structures across this groundwater body. The groundwater body was scoped out of the WFD assessment for the East Anglian TWO offshore windfarm and for Sizewell C as construction will not impact on any of the WFD groundwater tests. In-combination and cumulative effects are unlikely to be significant at a waterbody scale so no change to impact score expected. Risk to waterbody **remains as minor localised effect**.
GB105034045903	Waveney (Ellingham Mill - Burgh St. Peter)	• ESW-TRA-001 • ESW-EFR-002B • ESW-RES-002	All three of these options feature pipelines through this waterbody. With Option ESW-EFR-002B also having a new discharge of treated effluent into this watercourse and ESW-RES-002 having a new abstraction and construction of new reservoir. If provided mitigation (as per ESW-RES-002 level 2 assessment) the combination of these options is unlikely to lead a cumulative effect. At a waterbody scale and **impact remains minor localised**.
GB105035046290	Blyth (d/s Halesworth)	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines and the modification of existing WTW within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**
GB105035046300	Wang	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**
GB40501G400300	Broadland Rivers Chalk & Crag	• 03-0478 • ESW-EFR-002B • ESW-RES-002 • ESW-TRA-001 • ESW-TRA-018 • ESW-TRA-019	ESW-TRA-018 involves abstraction for this waterbody potentially leading to changes in water balance and surface water tests, and 03-0478 below ground structures. The remaining options include pipelines through this waterbody. While the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-TRA-018 option,** pending further investigation.
GB510503410700	Bure & Waveney & Yare & Lothing transitional	• ESW-EFR-002B • 03-0478	A potential risk of WFD deterioration was highlighted for the Anglian 03-0478 option (due to a reduction in flow from the cessation of an existing discharge). ESW-EFR-002B involves a new WTW and pipeline in this waterbody. The combination of these options is not anticipated to lead cumulative effects but a **risk of deterioration remains as per option 03-0478**, pending further investigation.
GB40503G000400	Essex Gravels	• ESW-ABS-002 • ESW-EFR-001	ESW-ABS-002 will involve refurbishment of existing boreholes with an associated increase in abstraction. ESW-EFR-001 will require construction dewatering beneath the

Waterbody ID	Waterbody name	Options	Comments
		• Sandon inert waste recycling and landfill	GWDTE: Crouch & Roach Estuaries (SSSI), along with pipelines from all three options. Sandon inert waste recycling and landfill consists of road improvements and use of existing quarry as a waste recycling centre and landfill. While, the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-ABS-002 option,** pending further investigation.

Table 4.8 below, identifies waterbodies which have been assessed as having the potential for in combination and cumulative effects from multiple BVPA1 options and other major projects leading to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.8: Waterbodies where in combination and cumulative effects could lead to WFD deterioration risk from BVPA1 options

Waterbody ID	Waterbody name	Options	Comments
GB105035046251	Lothingland Hundred	• ESW-TRA-001 • ESW-RES-002 • ESW-EFR-002B	All options involve the installation of pipelines with below ground structures associated with crossings. ESW-EFR-002B and ESW-TRA-001 utilise the same stretch of pipeline. ESW-RES-002 option also involves a new surface water abstraction within this waterbody used to support a new reservoir. If the provided mitigation (in the ESW-RES-002 Level 2 assessment) is followed, the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.
GB105035046270	Minsmere Old River	• ESW-TRA-001 • Sizewell C • EA Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline in this waterbody. Part of this waterbody is also within the construction area for Sizewell C, and the Sizewell C WFD assessment[9] sets out potential impacts on water quality and therefore biology in the tidal sections of this waterbody. The impacts from the two projects do not overlap within the waterbody and the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.

4.4 Best Value Plan Alternative 2

4.4.1 Options selected

In combination effects have been assessed for options which fall under the Best Value Plan Alternative 2 (BVPA2) plan laid out by Essex and Suffolk Water. The options selected as part of the BVPA2 for the Essex and Suffolk Water WRMP24 in Table 4.9.

Table 4.9: Essex and Suffolk Water WRMP24 BVPA2 options

Option ID	Option title	Brief description
ESW-ABS-002	Linford WTW	Recommissioning existing borehole with new WTW
ESW-TRA-001	Barsham WTW to Blyth Transfer Main	8 Ml/d transfer from Barsham WTW to Saxmundham Water Tower

[9] EDF Energy and SZC. The Sizewell C Project: 8.14 Water Framework Direct Compliance Assessment Report Part 4 of 4 Available online at: SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4.pdf (sizewellcdco.co.uk)

ESW-TRA-019	Transfer from Holton WTW to Eye Airfield	8.5 Ml/d transfer from Holton WTW to Eye Airfield.
ESW-TRA-018	Transfer from Bungay Well to Broome WTW	Transfer from Bungay Wells to Broome WTW.
ESW-DES-001	Canvey Island Desalination Terrestrial	Abstraction from the Thames Estuary with treatment via a new desalination plant before eventual discharge to Hanningfield Service Reservoir
ESW-EFR-002B	Lowestoft Water Reuse	Effluent Reuse Plant (11.1 Ml/d DO). Intake from Lowestoft/Corton WRC (Anglian Water owned asset), discharge to point near Ellingham Mill.
03-0478[10]	Caister Water Reuse and Ormesby Transfer	Water reuse treatment within the existing site footprint at Caister EFR Plant sized for a maximum of 16.4 Ml/d. Transfer of water to Ormesby, approximately 7.2 km long.
ESW-RES-002A	North Suffolk Winter Storage Reservoir	New winter storage reservoir to be built. Intake from the River Waveney/River Hundred.

In addition, the relevant planning applications, major projects or planning allocations which may have impacts on the same waterbodies have been identified within 500m of these options. These are set out in set out in Table 4.10.

Table 4.10: Planning applications, allocations and major projects within 500m of the BVA2 options

Major project title	Waterbodies interacted with	BVA2 options in same waterbodies
Sizewell C	GB105035046270: Minsmere Old River GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-019
East Anglia TWO Offshore Windfarm	GB105035045980: Fromus GB40501G400600: Waveney and East Suffolk Chalk & Crag	ESW-TRA-019 ESW-TRA-001
Sandon inert waste recycling and landfill, Chelmsford	GB105037028630: Sandon brook (West Arm)	ESW-EFR-001

4.4.2 In combination and cumulative effects assessment

Table 4.11 below, identifies waterbodies which are impacted by more than one of the BVPA2 options and/or planning projects, but where the high level in combination and cumulative effect assessment has shown that it is unlikely that the multiple BVPA2 options and planning projects will lead to a risk of WFD deterioration at the waterbody scale.

Table 4.11: Waterbodies where in combination and cumulative effects are unlikely to a risk of WFD deterioration from BVPA2 options.

Waterbody ID	Waterbody name	Options	Comments
GB105034045902	Waveney (Starston Brook - Ellingham Mill)	• ESW-RES-002 • ESW-TRA-018	ESW-RES-002 involves the construction of a new reservoir and pumping station / intake structure and a new WTW discharge to watercourse. ESW-TRA-018 involves the refurbishment of existing boreholes and the installation of new pipeline within this waterbody. All option activities have minor and localised risks associated with them and in-combination are assumed unlikely to be significant at a waterbody scale. Risk to waterbody **remains as minor localised effect**.
GB105035045980	Fromus	• ESW-TRA-001 • East Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline and upgrade to WTW in this waterbody. This waterbody was screened out of the East Anglian TWO offshore windfarm WFD

[10] This is an Anglian Water option which has been taken forward in the Essex and Suffolk WRMP.

Waterbody ID	Waterbody name	Options	Comments
			assessment[11] as the only works in this water body are road improvement works. The in combination and cumulative effects are not expected to be significant at a waterbody scale and **impact remains minor localised**.
GB105037028630	Sandon Brook (West arm)	• ESW-DES-001 • Sandon inert waste recycling and landfill	ESW-DES-001 consists of a pipeline passing through this waterbody. The Sandon inert waste recycling and landfill consists of road improvements and use of existing quarry as a waste recycling centre and landfill. The cumulative effects are unlikely to be significant at a waterbody scale, so no change to impact score expected. Risk to waterbody **remains as minor localised effect**.
GB105034045903	Waveney (Ellingham Mill - Burgh St. Peter)	• ESW-TRA-001 • ESW-EFR-002B • ESW-RES-002	All three of these options feature pipelines through this waterbody. With Option ESW-EFR-002B also having a new discharge of treated effluent into this watercourse and ESW-RES-002 having a new abstraction and construction of new reservoir. If provided mitigation (as per ESW-RES-002 level 2 assessment) the combination of these options is unlikely to lead a cumulative effect. At a waterbody scale and **impact remains minor localised**.
GB105035046290	Blyth (d/s Halesworth)	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines and the modification of existing WTW within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**
GB105035046300	Wang	• ESW-TRA-001 • ESW-EFR-002B	Both options involve the installation of new pipelines within this waterbody. ESW-EFR-002B utilises the same stretch of pipeline as ESW-TRA-001 so it is assumed that there is no in-combination effect. Therefore, risk to waterbody is not expected to increase and impact **remains as minor localised effect.**
GB40501G400600	Waveney and East Suffolk Chalk and Crag (GW)	• ESW-EFR-002B • ESW-TRA-001 • ESW-TRA-019 • ESW-RES-002 • East Anglian TWO offshore Windfarm • Sizewell C	The two transfers, one effluent reuse and reservoir option will require the installation of shallow pipelines and below ground structures across this groundwater body. The groundwater body was scoped out of the WFD assessment for the East Anglian TWO offshore windfarm and for Sizewell C as construction will not impact on any of the WFD groundwater tests. In-combination and cumulative effects are unlikely to be significant at a waterbody scale so no change to impact score expected. Risk to waterbody **remains as minor localised effect**.
GB40501G400300	Broadland Rivers Chalk & Crag (GW)	• ESW-TRA-001 • ESW-TRA-019 • ESW-TRA-018 • ESW-EFR-002B • 03-0478 • ESW-RES-002	ESW-TRA-018 involves abstraction for this waterbody potentially leading to changes in water balance and surface water tests, and 03-0478 below ground structures. The remaining options include pipelines through this waterbody. While, the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-TRA-018 option,** pending further investigation.

[11] Scottish Power Renewables. East Anglian TWO Offshore Windfarm. Environmental Statement, Volume 3. Appendix 20.4 Water Framework Directive Compliance Assessment. Available online at: EN010078-001516-6.3.20.4 EA2 ES Appendix 20.4 Water Framework Directive Compliance Assessment.pdf (planninginspectorate.gov.uk)

Waterbody ID	Waterbody name	Options	Comments
GB510503410700	Bure & Waveney & Yare & Lothing transitional	• ESW-EFR-002B • 03-0478	A potential risk of WFD deterioration was highlighted for the Anglian 03-0478 option (due to a reduction in flow from the cessation of an existing discharge). ESW-EFR-002B involves a new WTW and pipeline in this waterbody. The combination of these options is not anticipated to lead cumulative effects but a **risk of deterioration remains as per option 03-0478**, pending further investigation.
GB40503G000400	Essex Gravels	• ESW-DES-001 • ESW-ABS-002 • Sandon inert waste recycling and landfill	ESW-ABS-002 will involve refurbishment of existing boreholes with an associated increase in abstraction. ESW-DES-001 will involve the installation of new pipelines and below ground structures. Sandon inert waste recycling and landfill consists of road improvements and use of existing quarry as a waste recycling centre and landfill. While the combination of these options is not anticipated to lead a cumulative effect **a risk of deterioration on this waterbody remains as per the ESW-ABS-002 option,** pending further investigation.

Table 4.12 below, identifies waterbodies which have been assessed as having the potential for in combination cumulative effects from multiple BVPA2 options and other major projects leading to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.12: Waterbodies where in combination and cumulative effects could lead to WFD deterioration risk from BVPA2 options.

Waterbody ID	Waterbody name	Options	Comments
GB105035046251	Lothingland Hundred	• ESW-TRA-001 • ESW-RES-002	Both options involve the installation of pipelines with below ground structures associated with crossings. ESW-RES-002 option also involves a new surface water abstraction within this waterbody used to support a new reservoir. If the provided mitigation (in the ESW-RES-002 Level 2 assessment) is followed, the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.
GB105035046270	Minsmere Old River	• ESW-TRA-001 • Sizewell C • EA Anglian TWO offshore Windfarm	The option ESW-TRA-001 involves construction of a pipeline in this waterbody. Part of this waterbody is also within the construction area for Sizewell C, and the Sizewell C WFD assessment[12] sets out potential impacts on water quality and therefore biology in the tidal sections of this waterbody. The impacts from the two projects do not overlap within the waterbody and the combination of these options is unlikely to lead a cumulative effect, however, further assessment is needed to confirm this.

[12] EDF Energy and SZC. The Sizewell C Project: 8.14 Water Framework Direct Compliance Assessment Report Part 4 of 4 Available online at: SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4.pdf (sizewellcdco.co.uk)

5 Conclusions

5.1 Level 1 Summary

For the Essex and Suffolk Water WRMP, 37 options have been subject to a WFD assessment. The Level 1 WFD assessments indicated that 17 options are anticipated to have very low risks of being non-compliant with WFD objectives, and do not require further assessment:

- Abberton ASR with additional treatment (ESW-ASR-004)
- Lowestoft Water Reuse (ESW-EFR-002B)
- Lowestoft Water Reuse to Lound Lakes (ESW-EFR-002)
- Tilbury Water Reuse (ESW-EFR-004)
- Barsham Nitrate Treatment Extension (ESW-NIT-001)
- Langford Nitrate Treatment Extension (ESW-NIT-002)
- Langham Nitrate Treatment (ESW-NIT-003)
- Barsham to Blyth Transfer Main (ESW-TRA-001)
- Wherstead to Saxmundham (ESW-TRA-010)
- Saxmundham to Eye Airfield (Blyth to Hartismere) (ESW-TRA-011)
- Eye Airfield to Saxmundham water tower (ESW-TRA-012)
- Saxmundham to Barsham Transfer (ESW-TRA-013)
- Eye Airfield to Barsham (Hartismere to Northern Central) (ESW-TRA-014)
- Barsham to Eye Airfield (Northern Central to Hartismere) (ESW-TRA-015)
- Norwich to Eye (ESW-TRA-016)
- Transfer from Holton WTW to Eye Airfield (ESW-TRA-019)

5.2 Level 2 Summary

Level 2 assessments for six options within the preferred plans (Best Value Plan, Best Value Plan Alternative 1 and Best Value Plan Alternative 2) and two additional options no longer in the plans. These options are:

- Transfer from Bungay Well to Broome WTW (ESW-TRA-018);
- Southend-on-Sea Water Reuse (ESW-EFR-001);
- Caister Water Reuse and Ormesby Transfer (03-0478);
- North Suffolk Winter Storage Reservoir (ESW-RES-002);
- Linford WTW (ESW-ABS-002);
- Essex to Hartimere transfer (ESW-TRA-004);
- Canvey Island Desalination Terrestrial (ESW-DES-001);
- Essex to Hartismere Transfer (ESW-TRA-004); and
- California beach desalination (ESW-DES-004).

The majority of the options assessed as part of the three plans have only been subject to high level design and if they are taken forward would require additional design and assessment as they progress to next stage of optioneering. Due to this, the confidence in the option design has been rated as low throughout all of the Level 2 assessments undertaken.

The findings indicate that there are precautionary WFD compliance risks for surface water bodies were associated primarily with the operation of additional/new abstractions and new or

ceased discharges (see summaries provided in Section 3). The potential hydrological effects of these activities, among several other varying impacts, could conflict with achieving WFD status objectives. This is particularly the case where hydrology/river flow is an existing limiting factor, recorded in WFD baseline data as a 'reason for not achieving good'. The potential biological effects, particularly on fish, and physio-chemical changes (for example, reduced dilution as a result of a new or increased abstraction) would require further assessment to improve certainty of the scale of effects.

Deterioration risks on coastal or transitional waterbodies were generally attributed to the intake and discharge of water for desalination projects, leading to changes in biological status elements, morphology and water quality.

For groundwater bodies deterioration risks were primarily associated with either changes to quantitative and chemical saline intrusion and chemical drinking water protected area status, as a result of new groundwater abstractions, or construction of below ground structures close to GWDTE.

For new or modified intakes, it is recognised that appropriate fish and eel screening would be required to prevent entrainment. At this stage, this has been considered as likely mitigation. The same approach has been taken with other likely mitigation such as using trenchless methods to cross larger watercourses where feasible or discharging construction dewatering into a watercourse to maintain flow.

5.3 Further investigations and assessments

Subject to their progression through the approvals process, of the BVP options which have been assessed at Level 2, further WFD mitigation and assessment would be required for the options set out in Table 5.1. At this stage the Level 2 assessments have assessed a potential risk of deterioration to some water bodies due to these options. Additional investigations and information are required to improve the certainty of WFD risk, and these are set out in detail in Section 3.

Table 5.1: ESW WRMP24 BVP, BVPA1 and BVPA2 Level 2 assessed options which require further investigation

Plan	Option ID	Option title	Water bodies currently at risk of deterioration
BVP, BVPA1, BVPA2	ESW-TRA-018	Transfer from Bungay Well to Broome WTW	GB40501G400300: Broadland Rivers Chalk and Crag
BVP, BVPA1, BVPA2	03-0478	Caister Water Reuse and Ormesby Transfer	GB510503410700: Bure and Waveney and Yare and Lothing
BVP, BVPA1, BVPA2	ESW-ABS-002	Linford WTW	GB40503G000400: Essex Gravels
BVPA1	ESW-EFR-001	Southend-on-Sea Water Reuse	GB530603911401: Thames Lower GB40503G000400: Essex Gravels
BVPA2	ESW-DES-001	Canvey Island Desalination Terrestrial	GB530603911401: Thames Lower

5.4 In combination and cumulative effects

In combination and cumulative effects have been assessed for each of the three preferred plans. These assessments include all options within these plans along with other major projects planned to operate within the same waterbodies. These assessments are based upon the WFD Level 1 assessments.

5.4.1 Best Value Plan

The Best value plan identifies seven WRMP options to meet the demand deficit. A review of planning information identified three projects which are planned in some of the same waterbodies. The in combination and cumulative effects assessment highlighted that in nine of the waterbodies where more than 1 option is planned, there is no change to the risk of deterioration for the combination of options. These are:

- GB105034045902: Waveney (Starston Brook - Ellingham Mill);
- GB105035045980: Fromus;
- GB40501G400600: Waveney and East Suffolk Chalk and Crag (GW);
- GB40501G400300: Broadland Rivers Chalk & Crag (GW);
- GB510503410700; Bure & Waveney & Yare & Lothing transitional;
- GB40503G000400: Essex Gravels;
- GB105034045903: Waveney (Ellingham Mill - Burgh St. Peter)
- GB105035046290: Blyth (d/s Halesworth)
- GB105035046300: Wang

However, two waterbodies were identified where there is a possible for an increased risk of WFD deterioration from the combination of different BVP options. These are:

- GB105035046270: Minsmere Old River
- GB105035046251: Lothingland Hundred

Further investigations and assessment are required to confirm the risk of deterioration in these waterbodies.

5.4.2 Best Value Plan Alternative 1 and 2

The Best value Plan Alternative 1 and 2 each identify eight WRMP options to meet the demand deficit. A review of planning information identified three projects which are planned in some of the same waterbodies. The in-combination and cumulative effects assessment highlighted that in ten of the waterbodies where more than 1 option is planned, there is no increased risk of deterioration for the combination of options. However, two waterbodies were identified where there is an increased risk of WFD deterioration from the combination of options. These are:

- GB105035046270: Minsmere Old River
- GB105035046251: Lothingland Hundred

Further investigations and assessment are required to confirm the risk of deterioration in these waterbodies.

5.5 Next steps

Areas for future focus for any options carried forward include:

- Consultation with the Environment Agency to present and discuss key WFD risks and proposed approach to improving certainty of assessments;
- Collation and review of HMWB measures, programme of measures and mitigation measures assessments information from the Environment Agency for inclusion into the assessment of potential impediment to obtaining Good Ecological Potential (GEP);
- Collation and review of detailed baseline data concerning WFD biological, physicochemical and hydromorphological elements identified as being at yellow, amber, or red risk in the Level 2 assessments. This may include existing Environment Agency and Essex and Suffolk

Water long term WFD and water quality monitoring data within the relevant water bodies, and targeted baseline surveys being undertaken specifically for the option assessments;

- Further development of conceptual models linking together how potential hydrological changes (from abstractions or discharges) could influence water quality and the sensitivity of aquatic communities to those changes. This will include a diagrammatic/visual presentation of linkages between abstraction impacts and the direct and indirect effects on physico-chemical and biological WFD status elements, indicating thresholds of WFD classes or tolerance to change. This step would aid consultation and discussion with stakeholders and the requirement for/scoping of any detailed modelling;
- Further information on the design and operation of the options;
- Update to Level 2 WFD assessments to incorporate additional information; and
- For the ASR option, a hydrogeological assessment of deep confined aquifer is required to prove no connection to the upper aquifer.

It is noted that the Cycle 3 River Basin Management Plans (RBMPs) are also due to be published in late 2022, which may bring about changes in the baseline status and objectives for water bodies. Where necessary, changes will need to be accounted for in updates to the WFD assessments at the next stage.

A. WFD Level 1 output tables

The Essex and Suffolk Water outputs can be provided upon request.

B. Further assessment Level 2 output tables

The Essex and Suffolk outputs can be provided upon request.

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