MOTT MACDONALD

Water Framework Directive Assessment (RAPID Gate Two)

Fens Reservoir

November 2022

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Issue and Revision Record

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Executive summary

This informal Water Framework Directive (WFD) assessment supports the Environmental Appraisal that accompanies the gate two submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Fens Reservoir (FR) Strategic Resource Option (SRO). This report presents the findings of the WFD assessment for all scheme elements including abstraction, transfers including pumps, storage, treatment and distribution into supply and the reservoir.

The two-stage WFD assessment follows the approach outlined in the All Company Working Group (ACWG) framework for undertaking WFD assessments for SROs (*ACWG, 2020*).

Level 1 assessment identified 13 waterbodies which could potentially be affected by the scheme. Following the Level 1 assessment, three of these waterbodies were identified as requiring further assessment, due to the potential effects on WFD waterbodies. Best available design information at the time of writing was used to undertake the assessment including preliminary abstraction, reservoir design and transfer alignments.

The findings from the Level 2 assessment include the following:

- Minor localised effects identified to the Middle Level from the loss of open watercourse and 1.1% of the catchment due to the presence of the reservoir. This loss of catchment and watercourses could impact on habitat, flow and hydromorphology within this waterbody.
- A potential amber adverse risk to biological quality elements within the River Great Ouse (Roxton to Earith) was identified as a result of the new surface water abstraction. Abstraction rates are expected to reduce the flow volume and velocity. This change could potentially impact on biological status elements. A minor localised risk on the hydrological regime and water quality are anticipated. Further investigation is required to determine the full extent of the impacts.
- A potential amber adverse risk to the Old Bedford River/River Delph (incl. the Hundred Foot Washes) was identified as a result of the new surface water abstraction. Abstraction rates are expected to reduce the water levels and flow velocity. This reduction in level could lead to a deterioration in hydrological regime from the current High status. Additionally, this change could impede fish migration and cause deterioration to the habitat. A minor localised risk on the hydrological regime and water quality are anticipated. Further investigation is required to determine the full extent of the impacts.

Further updates to this WFD assessment would be required as the Scheme is further developed (i.e. for gate three and beyond) to improve the levels of certainty for the WFD related risks outlined in this assessment. Further investigations are also recommended to improve the levels of certainty including: continued hydroecology studies to understand the impact of reduced flow on the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) catchments; and additional water quality monitoring (both continuous and spot) on the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) waterbodies. This data should then be used in further water quality analysis to determine the effects of the abstractions on river water quality and biological quality elements.

1 Introduction

1.1 Overview

This report supports the Environmental Appraisal for the FR SRO gate two submission to the RAPID. It presents the findings of the informal WFD assessment of the scheme, based on best available information and provides an update to previous assessments.

1.2 Fens Reservoir

A new strategic reservoir in Cambridgeshire, referred to as the FR, has been proposed for development as one of several nationally strategic water resource options required to address increasing deficits in public water supply. The scheme is promoted by Anglian Water and Cambridge Water and is being progressed through the fast-tracked delivery framework overseen by the RAPID.

The FR has previously progressed through gate one in 2021, the first opportunity to check progress on investigations and development of solutions in the gate process and is now at gate two. Gate two is intended to look at solutions in more detail, with focus on ensuring that funding for continued investigation and development of solutions is aligned to water resources planning.

This report presents a scheme wide WFD assessment of the scheme including abstraction, conveyance including pumps, storage, treatment and distribution into supply and the reservoir itself.

1.3 Scheme overview

The proposed reservoir site is located within the Fenland district of Cambridgeshire. The proposed site is between Chatteris and March, near to Doddington, Wimblington and Manea. The Forty Foot Drain, the Sixteen Foot Drain and the A141 surround the site on three sides. At its greatest dimensions the reservoir is approximately 2.6km wide and 2.4km long to the embankment toe. This is based on the initial concept design and is subject to further work at gate three.

It is proposed that water is abstracted from the River Great Ouse at an intake located south of Earith and transferred to the reservoir via a pipeline. An additional abstraction point is also proposed from the River Delph. The precise abstraction locations will be identified following further detailed work (including stakeholder engagement) for gate three.

Further details on the scheme are set out in Section 2.

1.4 Methodology

1.4.1 Approach to WFD assessment for SROs

The WFD is transposed into law for England and Wales and is set out in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and updated in 2017[1].

The WFD requires all waterbodies (both surface and groundwater) to achieve ‘good status or potential’. The Directive also requires that waterbodies experience no deterioration in status or

[1] https://www.legislation.gov.uk/uksi/2017/407/made

potential. Good status/potential is a function of good ecological status/potential (biological, physico-chemical and hydromorphological elements and specific pollutants) and good chemical status (Priority Substances and Priority Hazardous Substances).

The ACWG[2] has developed a consistent framework for undertaking WFD assessments for SROs to demonstrate that options will not cause deterioration in status/potential of any WFD waterbodies. The assessment considers mitigation that would need to be put in place to protect waterbody status/potential. The assessment also considers WFD future objectives to ensure the option would not preclude affected WFD waterbodies from reaching good status/potential.

Two stages of assessment are completed under the ACWG approach (2020), an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2. Further detail on the WFD classifications and approach adopted can be found in the ACWG approach (2020).

This package of works includes the WFD assessment of the reservoir footprint, abstractions, discharges and transfers associated with the proposed reservoir.

1.4.2 Level 1 - basic screening

The Level 1 assessment applied the following steps to screen waterbodies:

- Identify affected waterbodies
- Review SRO scheme design information
- Identify possible impacts
- Apply ‘embedded’ mitigation measures
- Calculate screening score (using a 6-point scale – see Table 1.1) to ‘screen out’ waterbodies and options with no or minor localised potential impacts from further assessment (score of 1 or less).

The process involves the identification of all activities involved in construction, operation and decommissioning for the SRO and identification of all WFD waterbodies which these activities may affect.

Following this, each activity is automatically assigned an impact score using the predetermined scores, as illustrated in

Table 1.1.

The scores assume some basic embedded mitigation is applied. If these mitigation measures do not apply or further measures are included in the design, then the impact score can be reassessed and the score manually updated. The mean and maximum impact score is then calculated for each waterbody. If the maximum impact is 1 or less, then the waterbody is not to be considered further and no further action is needed. If the maximum impact score is greater than 1 (i.e. there is the potential for deterioration at a waterbody scale) then the waterbody is taken forward into the level 2 assessment.

The outcomes of the Level 1 assessment are summarised in Section 4.1 and Appendix A. Where waterbodies and impacts were ‘screened in’, these have been taken forward to the Level 2 assessment.

[2] ACWG (2020). Water Framework Directive: Consistent framework for undertaking no deterioration assessments, November 2020.

Table 1.1: Impact scoring system used for WFD assessment

Impact	Score	Description
Very 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 waterbody.
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 waterbody or any quality elements.
No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Low	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.
Medium	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.
High	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.

The outcomes of the Level 1 assessment are summarised in Section 5.1 and Appendix A. Where waterbodies and impacts were 'screened in', these have been taken forward to the Level 2 assessment.

1.4.3 Level 2 - detailed impact assessment

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

- Waterbody scale detailed assessment of impacts to each WFD quality element (biological quality elements, hydromorphological supporting elements, physico-chemical quality elements, priority hazardous substances, priority substances and specific pollutants) of the footprint of the scheme[3].
- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on professional judgement of the quality and availability of both physical data and design information at the time of assessment.[4] Where the confidence levels are medium or low, the requirements for further data or design information in order to raise this confidence level at future RAPID gates will be listed in the WFD spreadsheet (Level 2 summary).
- Identification of further mitigation needs.
- Assessment of impacts after mitigation (scored using a 6-point scale).
- Identification of activities to improve the certainty of assessment outcomes.

The outcomes of the Level 2 assessment are summarised in Section 6 and Appendix B.

1.4.4 WFD assessment at gate three and beyond

Where waterbodies and Scheme impacts have been identified, recommendations have been made for mitigation and increasing the confidence in the assessment. This is expected to be through increasing the level of detail available during later stages of the scheme development

[3] Gate 1 assessed all activities associated with the SLR SRO, however a change in scope has resulted in the WFD only assessing the reservoir footprint only.

[4] It should be noted that confidence/ certainty is anticipated to be low/medium at Gate 2 and increase over time.

for subsequent gateways, should the SRO progress. Both the Level 1 and 2 WFD assessment will be updated at Gate 3 following updated design information.

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

1.5 Assumptions and limitations

Due to the level of design information available at this early stage, the WFD assessment has the following limitations and assumptions:

- Best available design information at the time of writing was used to undertake the assessment including indicative abstraction regime, reservoir design and transfer alignments.
- The ACWG approach uses WFD 2015 data, as it is the current officially reported baseline in the 2015-2021 Cycle 2 RBMP[5]. The RBMPs are anticipated to be updated in 2022, and 2019 WFD baseline data released in late 2020 would then become the new baseline. To make sure of consistency, the 2015 data has been used at gate one and two but acknowledge that this will need to be updated to the 2019 status as soon as the RBMPs are published (proposed for Gate three).
- Where there is no data available for the WFD element, this has not assessed as part of the Level 2 WFD assessment.
- Decommissioning of the reservoir and transfer have not been assessed as part of the Gate two assessment.
- It is assumed the Water Treatment Works (WTW) will treat water from the reservoir in line with regulatory standards before discharging to a local watercourse.
- It is assumed the reservoir embankments will contain a core of low permeability material, which will limit connection between the reservoir and local watercourses, excluding where formal discharges maybe present.
- If dewatering is required, a permit will need to be obtained from the Environment Agency. It is assumed the permit will cover water quality to ensure it is suitable to discharges into the watercourses.
- This assessment only considers the waterbodies where the abstractions are located (River Great Ouse and River Delph). Consideration of the impacts on waterbodies downstream, and the associated impacts of the abstraction, will be included at gate three following further investigation.
- At the time of writing, the emergency drawdown design had not been confirmed as multiple options were under consideration. Emergency drawdown has therefore been excluded from this WFD assessment. It is expected that this will be included within the WFD assessment at the gate three once the design has been finalised.

[5] River Basin Management Plans 2015. Available online at: https://www.gov.uk/government/collections/river-basin-management-plans-2015

2 Scheme Description

2.1 Scheme overview

The FR scheme includes the development of a new embanked raw water reservoir for water storage for public water supply. It also comprises abstractions from the River Great Ouse and River Delph, raw water transfers, treatment works, and distribution into supply.

Key scheme parameters include:

- River Great Ouse maximum abstraction and transfer flow to reservoir: 300Ml/d
- River Delph maximum abstraction and transfer flow to reservoir: 400Ml/d
- Reservoir total capacity: 55Mm^3
- Reservoir usable volume: 50Mm^3
- Treatment distribution flow[6]: 150Ml/d
  - Fens Reservoir to Anglian Water
  - Fens Reservoir to Cambridge Water (North)
  - Fens Reservoir to Cambridge Water (South)

2.1.1 Reservoir overview

The proposed reservoir site is shown in Figure 2.1, located within the Fenland district of Cambridgeshire. The proposed site is between Chatteris and March, near to Doddington, Wimblington and Manea. The Forty Foot Drain, the Sixteen Foot Drain and the A141 surround the site on three sides.

An indicative concept plan has been developed for the scheme. This indicative concept has been established to provide reference for cost and carbon estimation in gate two. The summary provisional details are provided below, but much work is still required to develop the scheme and the final details will develop accordingly.

The provisional reservoir parameters are:

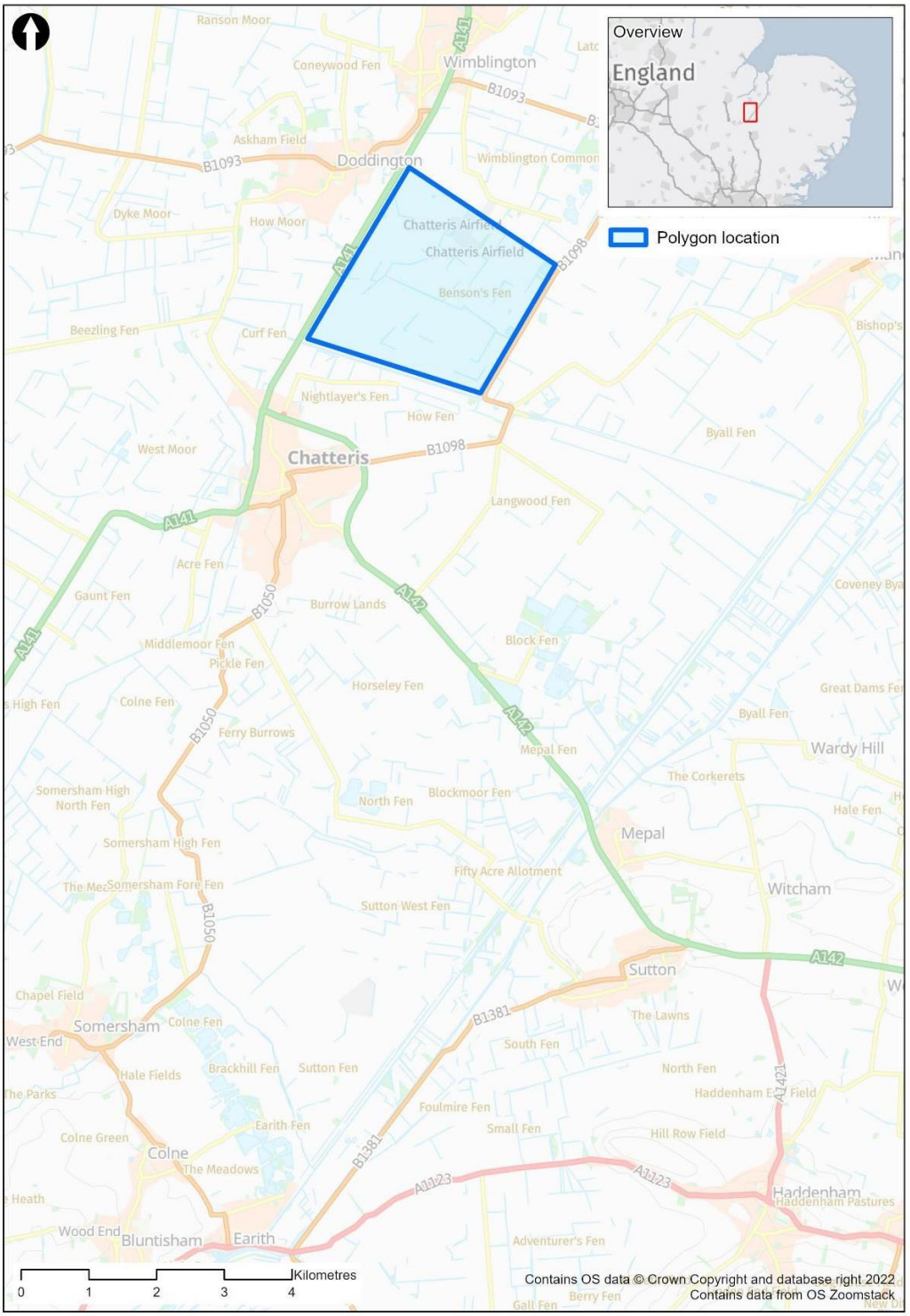
- At its greatest dimensions the reservoir is about 2.6km wide and 2.4km long to the embankment toe.
- The embankment crest is estimated at 12.5m AOD (above ordnance datum) making the embankment an average of 12m above the typical existing ground level at the toe. This is with approximate relative embankment elevations of maximum 15m and a minimum of 4m above existing ground levels.
- The total perimeter length of the crest is about 8.5km and the estimated reservoir surface area is about 4.4km^2.

The reservoir would include key infrastructure necessary for its safe operation, including intake and outtake structures; drawdown facilities; a spillway and water sampling facilities. The reservoir will also be expected to provide benefits beyond public water supply. Opportunities to incorporate facilities to enable recreation (such as a visitor centre and parking), infrastructure to improve health and wellbeing (such as multi-use footpaths, quiet areas and leisure opportunities) and careful design to enhance and encourage biodiversity are planned and will

[6] The proposed capacity of the water treatment works and transfer pipelines has been updated since this assessment was completed. The figures quoted in the gate two report include a scheme deployable output of 87Ml/d and works capacity up to 100Ml/d. These changes are not anticipated to have any material impact on the completed assessments.

be developed further, with the features that would deliver these wider benefits being subject to further assessment and consultation. Landscaping would be carefully designed surrounding the reservoir to minimise the visual impact of the reservoir whilst ensuring it sits within the existing landscape and delivers wider recreational and biodiversity benefits.

Figure 2.1: Site context map



2.1.2 Raw water abstraction and transfers

It is proposed that water is abstracted from the River Great Ouse at an intake located south of Earith and transferred to the reservoir via approximately 18km of 1500mm diameter steel pipeline. An additional abstraction point is also proposed from the River Delph, with water transferred to the reservoir by about 6km of 1600mm diameter steel pipeline. The precise abstraction location will be identified following further detailed work (including stakeholder engagement) for gate three.

The proposed abstraction rate from the River Great Ouse is up to 300Ml/d and from the River Delph up to 400Ml/d when flows allow. This is subject to further assessment to be undertaken in collaboration with the Environment Agency (EA) to develop an abstraction rate which is licensable. The associated abstraction licences are expected to stipulate a minimum flow and water level requirement at the point of abstraction below which it would not be possible to abstract. Abstraction to fill the reservoir would only be possible during high flow periods.

Further work is planned for the next stage to confirm locations for the abstraction points and routes for the transfers involving landowner engagement, environmental surveys, and preliminary ground investigations. The opportunity for the transfer conveyance to be open channel is still being investigated and will be confirmed during the next stage of project development. The information provided in this report and accompanying appendices are assumptions based on indicative locations only at this stage. The indicative transfer routes for are shown in Figure 2.2.

The abstraction facilities are expected to comprise an intake structure, a transfer pumping station (TPS) and pipeline.

2.1.3 Water treatment and potable transfers

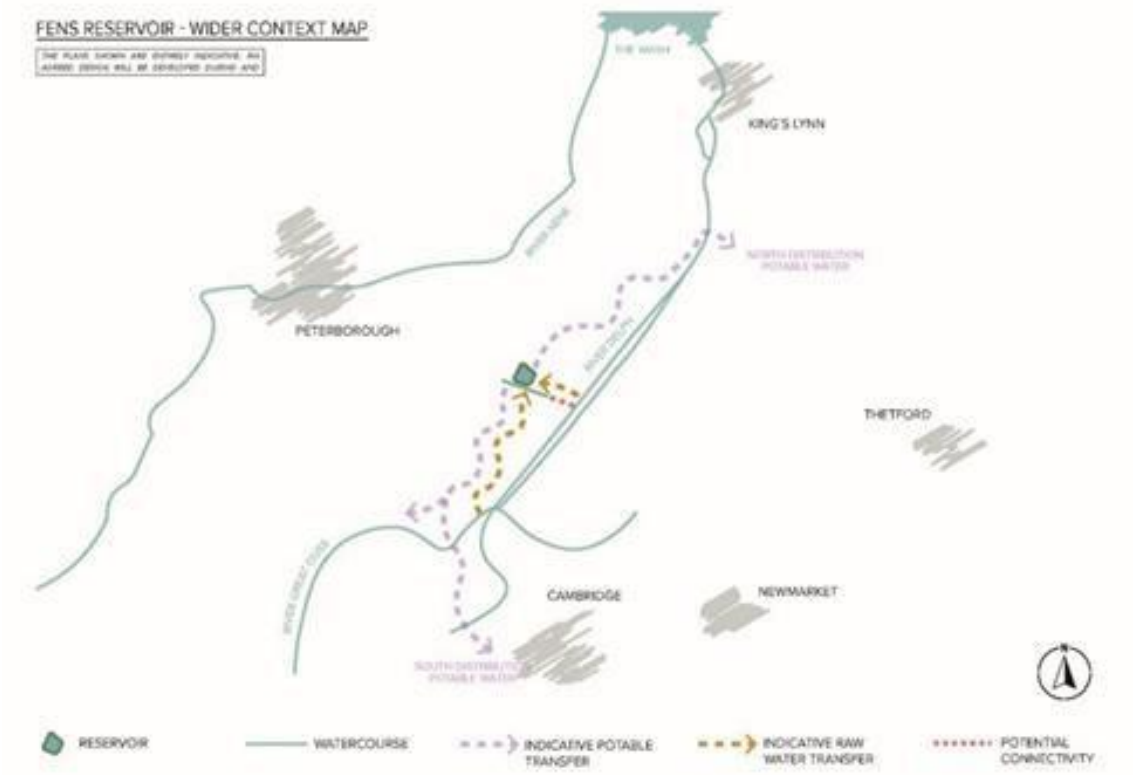
Stored water will subsequently be abstracted from the reservoir and treated to a potable quality. It is proposed that a WTW is located on land adjacent to the reservoir with a peak throughput capacity of 100Ml/d.

It is proposed that the treated water will be transferred by an approximate 32km 900mm diameter steel pipeline to an existing Anglian Water Service Reservoir (SR). The Cambridge Water connection will include about 12km 900mm steel pipeline to one take-off point, and approximately 22km 700mm steel pipeline spur to a second take-off point. The reservoir is to supply over 250,000 homes in Cambridgeshire.

Further work is planned for the next stage to confirm the routes for the transfers involving landowner engagement, environmental surveys, and preliminary ground investigations. The information provided in this report and accompanying appendices are assumptions based on indicative locations only at this stage.

See Figure 2.2 for an illustration of indicative proposed transfer corridor locations.

Figure 2.2: Proposed transfer corridors



2.1.4 Summary of operation and use

Development and operation of the reservoir will be subject to the Reservoirs Act 1975 (as amended by the Floods and Water Management Act 2010). The embankments and associated water retaining elements of the reservoir will need to be maintained and supervised in accordance with the Act to maintain public safety.

Provision of EDD must be designed in accordance with the Reservoirs Act. The proposed solution at this stage is to discharge to the Forty Foot Drain, but this is to be further modelled and confirmed as part of the next stage of development. Although the risk of needing to fully drawdown the reservoir is very low, there is a need for regular testing and maintenance to confirm functionality. This will involve the opening and testing of relevant valves and gates. Test flows are envisaged to be held in a pond to avoid disruption and to enable water to be returned back to the reservoir.

The operation and maintenance of the water treatment works and the distribution water supply system inclusive of distribution pump stations are expected to be in constant regular use according to water supply demand. The water supply components will need regular inspections and maintenance activities in accordance with the requirements of the respectively installed equipment.

2.1.5 Associated infrastructure and features

It is proposed that there will be a need for associated infrastructure and other features such as environmental mitigation to minimise the impacts of the reservoir, as well as enhancement opportunities. The location and design of the additional infrastructure has not been established and will therefore need to be confirmed at the next phase of scheme development.

3 Changes since Gate One

A site selection process has been undertaken to determine the location for the FR SRO option, which has been put forward to the RAPID gate two submission. This process has identified and assessed potential site locations against the following criteria: planning, community, environmental, economic and technical criteria (constraints and opportunities). The iterative approach was aligned with relevant legislation and national and local planning policy, including the draft National Policy Statement for Water Resources Infrastructure. Local planning authorities and statutory stakeholders have been consulted on the methodology, and local stakeholders have been engaged through the Fens Water Partnership.

Following completion of the gate one WFD assessment in 2021, the proposed reservoir location has been selected, and further design development work has continued. This has allowed the list of waterbodies requiring further WFD assessment to be refined for gate two.

This informal assessment is based on preliminary work to identify indicative transfer routes and abstraction locations. The waterbodies identified and associated with the different scheme elements are set out below.

Reservoir and transfers

- GB205033000050 – Middle Level

Transfers only

- GB530503300300 – River Great Ouse
- GB205033000010 - Counter Drain (Sutton and Mepal IDB inc. Cranbrook Drain)
- GB205033000020 – Counter Drain (Manea and Welney Internal Drainage Board (IDB))
- GB205033043375 – Old West River
- GB105033042770 – Swavesey Drain
- GB105033042680 – Bin Brook
- GB205033047665 – Relief Channel
- GB205033000030 – Counter Drain (Upwell and Outwell IDB)
- GB205033047665 – Relief Channel
- GB205033043375 – Old West River
- GB40501G400400 – North West Norfolk Sandringham Sands (Groundwater body)
- GB40501G445700 - Cam and Ely Ouse Woburn Sands (GW)

Abstractions and transfers

- GB105033047921 – River Great Ouse (Roxton to Earith)
- GB205033000060 – Old Bedford River / River Delph (incl. the Hundred Foot Washes).

4 Supporting Technical Assessment

This section summarises supporting technical assessments that have influenced the gate two assessment. Ongoing workstreams, baseline data collection and analysis during gate two include, but not limited to, selection of the best performing site (as stated in Section 3), and hydraulic and hydro-ecology survey, modelling and monitoring.

4.1 Gate one assessment

Mott MacDonald carried out a Level 1 and Level 2 WFD Assessment for gate one in 2021 which assessed the risk of deterioration or impeding achieving 'good status' to a WFD waterbody based on various reservoir location options that were outlined in the optioneering phase. The findings indicated that there were precautionary WFD compliance risks associated with the abstractions and intakes.

4.2 Preferred site selection

In June 2022, strategic assessments were carried out on the short list of four reservoir location options, to help identify the best performing site. These assessments considered only the reservoir footprints and were based on the preliminary design information available at the time. The assessment for the best performing site has been used as the basis for this latest WFD assessment.

4.3 Level 1 WFD assessment for transfers

A Level 1 WFD Assessment was undertaken on indicative transfer routes comprising the following:

- A raw water transfer, approximately 18km in length, from a potential intake on the River Great Ouse to the FR
- A raw water transfer, approximately 6km in length, from a potential intake on the River Delph to the FR
- A treated water transfer, approximately 32km in length, from the FR to Anglian Water distribution
- A treated water transfer, approximately 12km in length, from the FR to Cambridge Water distribution
- A treated water transfer, approximately 22km in length, from the FR to Cambridge Water distribution.

The following assumptions were made in the assessment of these transfer routes:

- Operation and maintenance of the transfers were omitted from this assessment as the design and operation of the transfers is yet to be determined. An assessment of which will be undertaken at a later design stage.
- Regarding the construction methods of the pipelines, trenchless construction methods will be employed when crossing main rivers, watercourses, and watercourse links. The remaining lengths will be installed using trenching and laying methods.
- If the watercourse needs to be temporarily diverted, appropriate measures will be in put in place to protect ecology and the watercourse will be returned to its natural state.
- It is assumed that appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column.

Based on these assumptions made, the transfers do not have the potential to cause deterioration to WFD status within waterbodies that interface with the pipeline network. Therefore, none of the waterbody catchments required a Level 2 assessment, where the transfer is the sole design element (see Section 5.2).

4.4 Hydro-ecology

In June 2022, Mott MacDonald undertook a Hydroecology study to consider implications of the scheme on aquatic habitats and species. This study concluded the following:

- Abstraction would only result in significant flow reduction during medium and high flow periods. Summer flows during high-discharge periods would not be significantly affected. The abstraction on the River Great Ouse (Roxton to Earith) will result in lower flows entering the River Delph (in the vicinity of the Ouse Washes). When combined with the second abstraction from the River Delph, this will drive lower water flows and levels across the designated site and flood storage area, which will primarily occur in winter when sufficient flows exist to allow abstraction.
- Potential impacts were identified on 18 protected species including six fish species, six aquatic invertebrate species and six macrophyte species. The fish species were assigned a Provisional Risk Rating of ‘high’ due to sensitivity to changes in flow. For the aquatic invertebrate and macrophyte species, all were assigned a Provisional Risk Rating of ‘low’.
- For aquatic communities the impacts are considered ‘limited’ on the macroinvertebrate community biological indices.

4.5 Water quality modelling

Catchment water quality modelling for FR is currently underway using the Soil and Water Assessment Tool (SWAT) and was not complete at the time of writing this report.

This modelling investigates the nutrient source water quality (focusing on phosphorus and nitrogen) in the River Great Ouse upstream of the proposed abstraction locations. The outcomes from this modelling investigation will be incorporated into the WFD assessment at gate three, should this SRO progress beyond gate two.

5 WFD Assessment

5.1 Level 1 Assessment

Table 5.1 provides a key to describe the screening classification adopted in the Level 1 assessment, to identify whether waterbodies were screened in or out of further assessment, as defined in the ACWG approach (2020).

Table 5.1: Level 1 WFD screening classification

Green – Passes Level 1 WFD, no further assessment (score 1 or less)
Amber – Level 1 WFD score greater than 1, screened in for Level 2

A Level 1 assessment has been undertaken of the scheme. Table 5.2 summarises this assessment for gate two and provides context relating to the waterbodies affected. For the WFD waterbodies that have been identified, full details are included in Appendix A.

Table 5.2: Level 1 WFD assessment summary (waterbody screening)

Waterbody ID	Maximum impact score/ Screening outcome	Comment
GB530503300300 River Great Ouse	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB205033000050 Middle Level	3	The reservoir will be located in this waterbody, leading to the loss of catchment and several open channels. A new transfer will be located within this catchment. A new WTW will be located within this catchment.
GB205033000010 Counter Drain (Sutton and Mepal IDB inc. Cranbrook Drain)	1	A new pipeline will be located within this catchment. No significant impacts anticipated.
GB105033047921 River Great Ouse (Roxton to Earith)	3	A new surface water abstraction, intake structure and pipeline will be located within this catchment, leading to reductions in flow in this water course.
GB205033000020 Counter Drain (Manea and Welney IDB)	1	A new pipeline will be located within this catchment. No significant impacts anticipated.
GB205033000060 Old Bedford / River Delph (incl. The Hundred Foot Washes)	3	A new surface water abstraction, intake structure and pipeline will be located within this catchment, leading to reductions in flow in this water course.
GB205033043375 Old West River	1	A new pipeline will be located within this catchment. No significant impacts anticipated.
GB105033042770 Swavesey Drain	1	A new pipeline will be located within this catchment. No significant impacts anticipated.
GB105033042680 Bin Brook	1	A new pipeline will be located within this catchment. No significant impacts anticipated.

Waterbody ID	Maximum impact score/ Screening outcome	Comment
GB205033047665 Relief Channel	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB205033000030 Counter Drain (Upwell and Outwell IDB)	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB40501G445700 Cam and Ely Ouse Woburn Sands (GW)	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB40501G400400 North West Norfolk Sandringham Sands (GW)	1	A new transfer will be located within this catchment. No significant impacts anticipated.

The Level 1 assessment identified 13 waterbodies which could potentially be affected by the scheme. Following the Level 1 assessment, three of these waterbodies were identified as requiring further assessment, due to the scale of potential impacts on WFD waterbodies.

The following WFD surface water bodies were taken forward for assessment at Level 2:

- GB205033000050 - Middle Level
- GB105033047921 – River Great Ouse (Roxton to Earith)
- GB205033000060 - Old Bedford / River Delph (incl. The Hundred Foot Washes)

5.2 Level 2 Assessment

5.2.1 Assessment methodology

The second stage of the WFD assessment has been completed for the scheme for waterbodies that were screened in at Level 1. Further information on the WFD classifications and approach adopted can be found in ACWG (2020). This assessment will be updated as design progresses and a full WFD assessment will be completed for consenting.

Table 5.3 provides a summary of WFD confidence levels used to inform the Level 2 assessment.

Table 5.3: Explanation of WFD confidence levels, based on ACWG methodology

Confidence Level	Description
Low	Gate 1 & 2 - Limited data and evidence available, based mainly or completely on expert judgement with many assumptions. Preliminary design information only, detailed information on location/routes, construction methods etc not yet available.
Medium	Gate 2 - Some data and evidence available, based partially on expert judgement with some assumptions. Design progressed but some assumptions made on construction methods etc.
High	Gate 3 & 4 - Lots of good data and evidence are available, minimal assumptions. Design advanced minimal assumptions needed.

Source: ACWG, 2020.

Table 5.4 describes the risk of deterioration between status classes, compromising waterbody objectives, and assisting attainment of waterbody objectives in the future. Each WFD supporting element has been assessed against the potential risk as a result of the activity occurring.

Table 5.4: Description of WFD risk levels/outcomes

Deterioration between status classes	Compromises waterbody objectives	Assists attainment of waterbody objectives
Yes = activities have a clear potential to cause deterioration of WFD status	**Yes** = activities clearly conflict with delivery of future improvements in WFD status	**No** = activities unlikely to contribute to achieving 'Good' status or potential
Possible = activities could cause deterioration of WFD status but unclear extent/level of effect	**Possible** = activities conflict with future improvements in WFD status but unclear extent/level of effect	**Possible** = activities could contribute to achieving 'Good' status or potential but unclear extent/level of effect
No = activities unlikely to pose any risk of deterioration in status	**No** = activities unlikely to pose any risk of deterioration in status	**Yes** = activities could directly contribute to achieving 'Good' status or potential
Uncertain = insufficient information or evidence to assess		

Source: ACWG, 2020.

5.2.2 Standard mitigation and good practice

It is anticipated that construction activities will be managed through the use of good practice measures outlined in a construction environmental management plan (CEMP) for the scheme.

The CEMP shall be developed in accordance with Construction Industry Research and Information Association (CIRIA) Guidelines. Guidance on good practice in relation to pollution prevention and water management is set out in CIRIA's 'Environmental good practice on site'[7] , CIRIA's 'Control of water pollution from linear construction projects; Technical Guidance'[8] and the withdrawn Environment Agency's 'Protect groundwater and prevent groundwater pollution'[9], Pollution Prevention Guidelines (PPG)5 'Works and maintenance in or near water', PPG6 'Working at Construction and Demolition Sites', PPG7 'The safe operation of refuelling facilities', and PPG13 'Vehicle washing and cleaning'[10]. Whilst the Environment Agency PPGs were formally withdrawn in 2015, the guidance still provides useful information on good practice.

5.2.3 Level 2 Summary

The following WFD surface water bodies were assessed at Level 2:

- GB205033000050 – Middle Level
- GB105033047921 – River Great Ouse (Roxton to Earith)
- GB205033000060 – Old Bedford River/River Delph (incl. the Hundred Foot Washes)

The Level 2 WFD assessment for the Middle Level, the waterbody in which the proposed reservoir will be located, identified possible deterioration risks to hydromorphological supporting elements in addition to geomorphological conditions. These are primarily due to potential risks associated with the loss of open watercourses, which could be mitigated by the realignment of some watercourses and/or alternative mitigation (e.g. in-channel improvements). However, further assessment would be required to confirm suitable WFD mitigation.

The assessment for the remaining two waterbodies identified possible deterioration risks to flow, water quality and biological status elements owing to the proposed abstractions. However,

[7] Audus, Charles and Evans (2010). Environmental Good Practice on Site (Third Edition) (C692).
[8] Murnane, Heap and Swain (2006). Control of water pollution from linear construction projects; Technical Guidance.
[9] Environment Agency (2017). Protect groundwater and prevent groundwater pollution. Available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution. [Accessed on 30/07/2022].
[10] The Environment Agency PPGs were formally withdrawn on 17 December 2015; however, they nonetheless provide clear and useful best practice advice. The archived PPGs are available at: https://webarchive.nationalarchives.gov.uk/20140328090931/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx.

further assessment would be required to confirm the impact and to identify appropriate WFD mitigation.

A summary of the Level 2 WFD assessment is included in this section with detailed outputs presented in Appendix B.

Impacts on downstream waterbodies, including the Wash and Humber estuaries have not been considered at this stage. These will be considered further at gate three.

5.2.3.1 Middle Level

The following scheme elements are located within this catchment:

- Construction and operation of a new reservoir
- Construction and operation of new pipelines (FR to distribution)
- Construction and operation of a new WTW, set back from the watercourse.

A potential minor localised risk to the Middle Level was identified from the loss of open watercourses (mostly maintained field drains), and loss of up to 1.1% of the catchment for this waterbody due to the presence of the reservoir. This loss of catchment and watercourses could impact on habitat, flow and hydromorphology within this waterbody catchment. Further investigation is required to determine the full extent of these impacts.

At this stage it is assumed the construction of the pipeline will not involve in-channel modifications to the watercourse. Construction methods are likely to involve trenchless activities and therefore the impact on the watercourse catchment as a result of the transfer is expected to be negligible. The new WTW is anticipated to be set back from the watercourse with a likelihood to result in negligible construction impacts.

5.2.3.2 River Great Ouse (Roxton to Earith)

The following scheme elements are located within this catchment:

- Construction and operation of a new surface water abstraction
- Construction and operation of a new river intake structure
- Construction and operation of new pipelines (River Great Ouse to FR and FR to distribution).

A potential amber adverse risk to biological quality elements within the River Great Ouse (Roxton to Earith) was identified as a result of the new surface water abstraction. Abstraction rates are expected to reduce the flow volume and velocity which is likely to impede fish migration and cause deterioration to the aquatic habitat. A minor localised risk on the hydrological regime and to water quality is also anticipated due to the changes in flow (and therefore dilution of physico-chemicals downstream). Further investigation is required to determine the full extent of these impacts.

At this stage it is assumed the construction of the pipeline will not involve in-channel modifications to the watercourse. Construction methods are likely to involve trenchless activities and therefore the impact on the watercourse catchment as a result of the transfer is expected to be negligible.

5.2.3.3 Old Bedford River/River Delph (incl. the Hundred Foot Washes)

The following scheme elements are located within this catchment:

- Construction and operation of a new surface water abstraction
- Construction and operation of a new river intake structure
- Construction and operation of a new pipeline (River Delph to FR)

A potential amber adverse risk to the Old Bedford River/River Delph (including The Hundred Foot Washes) was identified as a result of the new surface water abstraction. The abstraction has been modelled using a level duration curve which indicates that levels will be reduced across the flow ranges, and particularly noticeable during low level periods (below Q90) where levels begin to drop off earlier than without the abstraction. The decrease in flow and velocity has the potential to increase sedimentation and decrease the levels of dissolved oxygen within the watercourse. Additionally, it could increase the concentration levels of specific pollutants already present in the waterbody, through reduced dilution. These impacts could lead to a deterioration in hydrological regime from the current High status. Preliminary hydro-ecological assessment suggests that this change is likely to impede fish migration and cause deterioration to existing habitat.

A minor localised risk on the hydrological regime and water quality are also anticipated, due to these changes in flow (and therefore dilution of physico-chemicals downstream). Further investigation is required to determine the full extent of the impacts.

At this stage it is assumed the construction of the pipeline will not involve in-channel modifications to a watercourse. Construction methods are likely to involve trenchless activities and therefore the impact on the watercourse catchment as a result of the transfer is expected to be negligible.

5.3 Summary

Table 5.5 provides a summary of all the WFD waterbodies screened in at Level 1 and 2 of the WFD Assessment.

Table 5.5: Summary of WFD waterbodies affected

Waterbody ID	Maximum Impact Score (Level 1)	Maximum Impact Score (Level 2)	Deterioration between status classes	Impediments to GES/GEP	Compromises waterbody objectives	Assists attainment of waterbody objectives
GB530503300300 – Great Ouse	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205033000050 – Middle Level	3	1	No	No	No	No
GB205033000010 – Counter Drain (Sutton and Mepal IDB inc. Cranbrook Drain)	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105033047921 – Ouse (Roxton to Earith)	3	2	Possible	Possible	Possible	No
GB205033000020 – Counter Drain (Manea and Welney IDB	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205033000060 – Old Bedford River/River Delph (incl. the Hundred Foot Washes)	3	2	Possible	Possible	Possible	No
GB205033043375 – Old West River	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105033042770 – Swavesey Drain	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105033042680 – Bin Brook	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205033047665 – Relief Channel	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205033000030 – Counter Drain (Upwell and Outwell IDB)	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB40501G400400 – North West Norfolk Sandringham Sands (Groundwater body)	1	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB40501G445700 – Cam and Ely Ouse Woburn Sands (Groundwater body)	1	Level 2 assessment not required	N/A	N/A	N/A	N/A

5.4 Risk of deterioration

A minor localised risk of deterioration to the Middle Level was identified from the loss of open watercourse and catchment due to the presence of the reservoir. This loss of catchment and watercourse could impact on habitat, flow and hydromorphology within this waterbody.

An amber adverse risk (potential risk of deterioration) to biological quality elements within the River Great Ouse (Roxton to Earith) was identified as a result of the new surface water abstraction. Abstraction rates are expected to reduce the flow volume and velocity. This change is likely to impede fish migration and cause deterioration to the habitat. A minor localised risk on the hydrological regime and water quality are also anticipated. Further investigation is required to determine the full extent of the impacts.

An amber adverse risk (potential risk of deterioration) to the Old Bedford River/River Delph (including The Hundred Foot Washes) was identified as a result of the new surface water abstraction. Abstraction rates are expected to reduce the water levels and flow velocity. This reduction in level could lead to a deterioration in hydrological regime from the current High status. Additionally, this change could impede fish migration and cause deterioration to the habitat. A minor localised risk on the hydrological regime and water quality are therefore anticipated. Further investigation is required to determine the full extent of the impacts.

At this stage of assessment, it is anticipated that suitable mitigation can be found for the risks identified above. However, it is possible that an exemption would need to be sought under Regulation 19 of the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017, as a result of the scheme. Further investigation will be undertaken to determine the need and requirements for any potential exemption.

5.5 In-combination effects

A preliminary in-combination effects assessment has been undertaken as part of the gate two WFD report. The scheme is being considered as a major supply-side option in the Water Resources East (WRE) draft Regional Water Resource Plan and draft Water Resource Management Plans 2024 (dWRMP24). If the scheme is selected as a feasible option, it will be subject to further in-combination effects assessment with the other selected options, neighbouring water company plans and neighbouring regional plans, as well as inform assessments that accompany any development consent applications. Until the WRE Best Value Regional Plan has been developed, it is not known when the scheme would be implemented, and therefore which other developments it could act in-combination with.

There is the potential for in-combination effects on The Wash as a result of the FR and South Lincolnshire Reservoir schemes. Further work will be undertaken at gate three to determine the extent of potential in-combination effects on the Wash, following the outcome of ongoing hydrological assessments.

For the purpose of this assessment, only Local Development Frameworks, Development Consent Orders (DCOs) for Nationally Significant Infrastructure Projects, Hybrid Bills, Relevant Transport and Works Act Orders and relevant planning applications have been considered.

A search of committed developments in the vicinity of the scheme identified 62 developments within the search radius of 10km. Those with potential hydrological connectivity with the scheme are outlined in this section.

The search found that the Block Fen/Langwood Fen Master Plan, which was adopted as part of the Cambridgeshire and Peterborough Minerals and Waste Local Plan[11] has the potential to be impacted by the scheme. The Minerals and Waste Plan ensures sustainable minerals development has provision for sand, gravel and clay extraction and subsequent restoration in the Earith/Mepal area. The vision of the Block Fen/ Langwood Fen Master Plan is to improve recycling of construction waste materials, as well as creating wet grassland habitats and increasing flood risk management measures (as part of the Environment Agency's Cranbrook/ Counter Drain Strategy) adjacent to the River Delph.

The scheme has the potential to cause minor localised risks to the River Delph, as the abstraction from the River Delph is likely to lead to minor changes in water quality due to changes in flow volume and velocity. The Block Fen/ Langwood Fen allocation area is adjacent to the WTW infrastructure for the scheme, located in the Middle Level catchment. However, there are potential opportunities for the scheme to contribute to the creation of wetland habitats proposed in the Master Plan. This will be subject to further investigation at gate 3.

One major planning application (Planning application Ref. 21/00033/FUM) was identified as has the potential of impacting the same waterbody as the scheme. The development[12] is to divert the existing IDB Main Drain to create a coherent, contiguous block of lowland wet grassland to add on to the existing Coveney Byall Fen under the Ouse Washes Habitat Creation Project. The development is located 2km south-east of the scheme. All existing field ditches within the development area (existing IDB) will be isolated from the new IDB by extensive clay dams. With the application of good practice construction methods from both the scheme and the development, it is anticipated that there would be a cumulative negligible risk to the affected watercourses. Rather, there may be a potential opportunity for the expansion or enhancement of the proposed wetland habitat. This will be subject to further investigation at gate 3.

Another major development was identified as having the potential to have cumulative effects on the River Great Ouse (Roxton to Earith) waterbody. The A428 Black Cat to Caxton Gibbet project is to upgrade the A428 between A1/A421 Black Cat Junction and A428/A1198 Caxton Gibbet Junction to high quality dual carriageway. Construction will include 19km of new Dual Carriageway, and Grade separated junctions. The construction of this project is expected to occur before the Fens reservoir scheme, and therefore no cumulative effects are anticipated.

Finally, six mineral allocation/waste projects have been identified in the same waterbodies as this scheme (see Table 5.6). The FR involves the installation of new pipelines, with associated below ground structures for crossings in these waterbodies. Each of the mineral extraction sites may require dewatering to allow extraction of sand and gravel. Therefore, for all six of these projects there is the potential for in-combination effects due to impacts on river flows and/or groundwater levels. However, the scale of works associated with the Fens reservoir scheme is likely to be small and temporary. Within suitable mitigation in place (such as the discharge of dewatering into local watercourses), is it anticipated that construction of the Fens reservoir scheme will not increase the risk of deterioration in the water bodies associated with these mineral allocation projects. Further information is required on each of the mineral allocation projects to confirm this.

[11] Cambridgeshire County Council and Peterborough City Council (2021). Cambridgeshire & Peterborough Minerals & Waste Plan. Available at: https://www.cambridgeshire.gov.uk/business/planning-and-development/planning-policy/adopted-minerals-and-waste-plan [Accessed 23/08/2022].

[12] East Cambridgeshire District Council, 2021. Planning application reference 21/00033/FUM. Available at: 21/00033/FUM | To Divert existing Internal Drainage Board Main drain to create a coherent contiguous block of lowland wet grassland to add on to the already created habitat at Coveney Byall Fen under the auspices of the Ouse Washes Habitat Creation Project | Land At Coveney Byall Fen Old Lynn Drove Coveney Cambridgeshire (eastcambs.gov.uk)

Table 5.6: Mineral and waste allocation projects in same water bodies as Fens scheme.

Project name	Description	Waterbody impacted
Bare Fen & West Fen, Willingham / Over	Potential sand and gravel extraction proposed at site across 240.5 hectares of land in the Bare and West fen area	GB105033042770 Swavesey Drain GB205033043375 Old West River
Chear Fen, Cottenham	Potential sand and gravel extraction proposed at site across 36 hectares of land in Chear Fen area.	GB205033043375 Old West River
Mitchell Hill Farm South, Cottenham	Potential sand and gravel at site across 114 hectares of land in Cottenham.	GB205033043375 Old West River
Land to the north of Stow Bardolph	Allocated as an Area of Search for silica sand extraction at two parcels of land covering approximately 31 and 30 hectares respectively.	GB205033047665 Relief Channel GB40501G400400: North West Norfolk Sandringham Sands
Land to the east of South Ructon	Allocated as an Area of Search for silica sand extraction across 47 hectares in South Ructon	GB40501G400400: North West Norfolk Sandringham Sands
Land to the north of Shouldham	Allocated area of search covers 815 hectares adjacent to areas of previous and current mineral workings and close to a sand and gravel allocation	GB40501G400400: North West Norfolk Sandringham Sands

5.6 Requirements to improve confidence level

The following requirements have been identified in the WFD assessment to improve confidence in the assessment of the surface water bodies:

- Ongoing refinement of the design in consultation with a WFD specialist.
- Land drainage and site drainage design to understand which watercourses will be diverted/realigned and which are lost.
- Request for further specific details of mitigation measures assessment and RBMP measures (including artificial/ heavily modified waterbody measures where relevant) from the Environment Agency to understand impact of the scheme and also to identify opportunities to improve the water body as part of the scheme.
- Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published.
- It is recommended that a hydrology study is undertaken to understand the potential reduction in catchment area, impacts on flow and therefore biological status elements for the Middle Level.
- Hydroecology studies are continued to understand potential impacts of reduced flow in the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) catchments on the hydrological regime and biological status elements.
- It is recommended that additional water quality monitoring (both continuous and spot) is carried out on the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) waterbodies. This data should then be used in further water quality analysis to determine the effects of the abstractions on river water quality and therefore biological quality elements.
- Development of WFD mitigation to offset impacts of the scheme.

5.7 Mitigation measures

Potential mitigation measures have been suggested for each individual waterbody and scheme activity based on the risk that it poses. Mitigation measures will be further considered as the design progresses.

Potential indicative mitigation measures considered to minimise potential impacts on waterbodies, include the following:

- Watercourses should be realigned around the reservoir footprint, where reasonably practicable, to re-provide lost habitat and flow into the main rivers.
- Channel modifications should seek to offer the change to incorporate environmental gain by widening drains to allow fringe vegetation to be retained or berms to be constructed, subjection to financial burdens during construction, land take and maintenance.
- Banks besides rivers and ditches within the Fens can support a range of species-rich wet and dry grassland as well as stands of sedges, reed and willow scrub, ideal for supporting the local ecology. Due to the close proximity of the scheme to the riparian zone, biodiversity conservation measures should be put in place during construction to ensure that the area isn't detrimentally impacted.
- Pipeline crossings should be constructed using trenchless techniques under watercourses.
- Intake structures should be fitted with appropriate fish / eel screens.
- Measures to avoid deterioration to hydromorphological determinants including how the flow and quantity of water changes over time.
- Industry good practice measures including Environment Agency PPG's[13].
- Ensure all works carried out in accordance with guidance provided by the regulator, the Environment Agency, for working on/or near water[14].
- Consideration of mitigation options in line with guidance provided in 'A Guide to Management Strategies and Mitigation Measures for Achieving Good Ecological Potential in Fenland Waterbodies'[15].

[13] Although PPGs are considered to be outdated, they remain industry best practice and should be used as embedded mitigation where applicable.

[14] Environment Agency, Protecting and improving the water environment. Water Framework Directive compliance of physical works on or near rivers.

[15] Mayer, L, Moodie, I, Carson, C, Vines, K, Nunns, M, Hall, K, Redding, M, Sharman, P. & Bonney, S. (2017) Good Ecological Potential in Fenland Waterbodies: A Guide to Management Strategies and Mitigation Measures for achieving Good Ecological Potential in Fenland Waterbodies. Association of Drainage Authorities & Environment Agency.

6 Conclusions

6.1 Conclusion

For the assessment of the scheme, an informal WFD assessment has been developed to assess the potential for WFD risks as a result of the scheme, based on best available, but preliminary, scheme information at this early stage of design. The Level 1 assessment identified 13 WFD surface water and groundwater bodies, with three surface waterbodies requiring further assessment.

Level 2 WFD assessments were completed for the three surface waterbodies requiring further assessment. Precautionary WFD compliance risks were identified with all of the waterbodies assessed, as summarised in Table 6.1.

Table 6.1: Summary of Level 2 WFD assessment results

Waterbody name	Waterbody ID	Maximum impact score (Level 2)	Potential impact score post mitigation (Level 2)
Middle Level	GB205033000050	1 (minor localised)	1 (minor localised)
Great Ouse (Roxton to Earith)	GB105033047921	2 (amber adverse)	2 (amber adverse)
Old Bedford River/ River Delph (incl. the Hundred Foot Washes)	GB205033000060	2 (amber adverse)	2 (amber adverse)

The risks identified with the surface waterbodies are primarily due to the loss of open watercourses and reductions in flow and associated deterioration of biological status elements and water quality. Mitigation is likely to adequately manage these risks, such as realignment/ diversion of the watercourses around the reservoir. However further investigation is required into the need to seek possible exemptions under Regulation 19 of the WFD Regulations 2017, as the scheme progresses to the next milestone, gate three.

6.2 Recommendations

Potential areas for further focus include the following:

- Consultation with the Environment Agency to present and discuss key WFD risks and proposed approach to improving certainty of assessments.
- Update to the WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published.
- Land drainage and site drainage design to determine which watercourses will be diverted/realigned and which would be lost.
- A further review of hydrology to improve understanding of the potential impacts a reduction in catchment area will have on flow and biological status elements for the Middle Level.
- Hydroecology studies are continued to understand potential impacts of reduced flow in the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) catchments on the hydrological regime and biological status elements.
- Additional water quality monitoring (both continuous and spot) should be undertaken on the River Great Ouse (Roxton to Earith) and Old Bedford River/River Delph (incl. the Hundred Foot Washes) waterbodies. This data should then be used in further water quality analyses to determine the effects of the abstractions on river water quality and therefore biological quality elements.
- Development of WFD mitigation to offset impacts of the scheme.
- Outlining further work and modelling required to demonstrate compliance at the next gate/milestone, gate three.

Appendices

A. WFD Level 1 Assessment

Scoring Key

Level 1 assessment	Impact	Impact Score	Description
Waterbody passes Level 1 WFD assessment	Very 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 waterbody
	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 waterbody or any quality elements
	No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
	Low	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.
Waterbody requires level 2 WFD assessment	Medium	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.

Component	Activity	Construction, Operation or Decommissioning	Assumptions / Mitigations assumed to be in place	Comments	Score	GB530503300300	GB205033000050	GB205033000010	GB105033047921	GB205033000020	GB205033000060	GB205033043375	GB105033042770	GB105033042680	GB205033047665	GB205033000030	GB40501G400400	GB40501G445700
Below ground	Construction/repair of new tunnels and conduits	Construction	Tunnels and conduits will be constructed such that they will not form a preferential pathway for the flow of groundwater	The specific below ground activities should affect the groundwater only and not surface water CJN: depending on construction method, site runoff will impact surface waters	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	1	1	1	1
Below ground	Construction of below ground structures (shaft/retaining wall) with associated dewatering, with no sensitive groundwater feature within 500m	Construction	Risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. Dewatering discharge will be treated before discharge.	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Presence of new underground structure (tunnel/shaft/retaining wall), with no sensitive groundwater feature within 500m	Operation	Land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow.	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Construction of below ground structures (shaft/retaining wall) with associated dewatering, within 500m of a sensitive groundwater feature	Construction	Risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. If impact likely appropriate mitigation to be put in place Dewatering discharge will be treated before discharge.	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Presence of new underground structure (tunnel/shaft/retaining wall) within 500m of a sensitive groundwater feature	Operation	Land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow.	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Construction of new cutting with external dewatering with no sensitive groundwater feature within 500m	Construction	N/A	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Construction of new cutting with external dewatering within 500m of a sensitive groundwater feature	Construction	Risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. If impact likely appropriate mitigation to be put in place Dewatering discharge will be treated before	The specific below ground activities (pipeline) should affect the groundwater only and not surface wate	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Below ground	Construction of new culvert	Construction	Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, providing new culverts and or extending culverts, if required, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water: and PPG23 Maintenance of structures over water).	The specific below ground activities should affect the groundwater only and not surface water CJN: depending on construction method, site runoff will impact surface waters	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Knowledge exchange or education programme	Operation	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Changes to land management practices to reduce pesticides, nutrients, sediment or flooding relating to a groundwater source	Operation	The impact of the scheme will be felt in the long term. The scheme will be focused around the SPZ1 and 2 areas of the groundwater source of interest. These schemes are smaller scale than surface water.	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Changes to land management practices to reduce pesticides, nutrients, sediment or flooding relating to a surface water source	Operation	An immediate change may be seen in the water quality downstream of the changes to land management. It is assumed there is a high level of engagement from those relevant for reducing the parameter of interest.	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	River restoration - construction phase	Construction	There may be minor short term impacts during the construction phase	CJN: Trenchless construction methods used near rivers to protect habitat. Assume suitable exclusion zones around water bodies will be set mitigating risk to watercourses.	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	River restoration - alter construction	Operation	River restorations will be selected in line with WINEP criteria. The restorations are to improve hydrological flows in the local area	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Flow augmentation and licensing	Operation	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Terrestrial habitat creation/management - creation	Construction	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Terrestrial habitat creation/management - management	Operation	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Natural water retention measures (including NFM and wetland creation) - construction	Construction	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Natural water retention measures (including NFM and wetland creation)	Operation	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Fisheries management	Operation	Assumed to be in place due to WINEP driver or similar criteria to improve ecological status of the river.	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Sustainable Urban Drainage Systems (SUDS) - construction	Construction	N/A	A type of SUDS should be built to avoid flooding during construction phase . May also be required to attenuate and treat site runoff prior to	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Catchment management	Sustainable Urban Drainage Systems (SUDS) - alter construction	Operation	Assumed to presented as an option at local scale.	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	Integrated catchment management	Operation	This assumes a short term benefit to WFD as imposed usage reduction should allow for recovery in the river or aquifer which may improve WFD status from pre restriction status.	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Construction of new inverted siphon or drop inlet culvert	Construction	Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, providing new culverts and or extending culverts, if required, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water: and PPG23 Maintenance of structures over water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Presence of new culvert, in headwaters or on drainage ditches	Operation	Appropriate improvements to local habitat to offset the presence of the culvert	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Presence of new culvert mid or lower catchment	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Presence of new inverted siphon or drop inlet culvert	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Removal of significant in channel watercourse structure (such as impassable weir)	Decommissioning	No assumed mitigations	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Culvert	Removal of existing culverts or other in channel watercourse structure	Decommissioning	No assumed mitigations	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	High volume discharge of water with a quality element of higher WFD status than the receiving water body	Operation	No assumed mitigations	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	High volume discharge of water with a quality element of a lower WFD status than the receiving water body	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Low volume discharge of water with a quality element of the same or higher WFD status than the receiving water body	Operation	No assumed mitigations	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Low volume discharge of water with a quality element of a lower WFD status than the receiving water body	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Low volume discharge of water with a quality element of the same WFD status as the receiving water body	Operation	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Discharge	High volume discharge of water with a quality element of the same WFD status as the receiving water body	Operation	No assumed mitigations	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	New WTW discharge to watercourse	Operation	No assumed mitigations	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Transfer of water via a river, canal or aqueduct	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	New discharge of highly saline water to a coastal or transitional waterbody	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	New discharge of highly saline water to a surface waterbody or groundwater	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Construction of a new outfall structure to a watercourse, coastal waters, transitional waters or reservoir	Construction	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Cessation of existing discharge to a watercourse	Construction	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Discharge	Maintenance and use of river, coastal or transitional water outfall	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater	Construction of a new abstraction borehole headworks and associated infrastructure	Construction	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater	Refurbishment of existing boreholes	Construction	Work will be carried out under appropriate consent from the EA	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater	Drilling new abstraction boreholes	Construction	Work will be carried out under appropriate consent from the EA	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater	Maintenance and use of abstraction borehole infrastructure	Operation	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitat	Creation of significant areas of riparian habitats	Construction	Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitat	Minor habitat creation	Construction	Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitat	Daylighting of existing culverts	Construction	Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitat	Channel realignment with natural bed substrate and good riparian connections	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Habitat	Channel realignment with artificial banks/base	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intake	Construction or modification of a new pumping station and/or intake from raw water (river or coastal waters)	Construction	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). In the low-level structure will impact existing water body.	New inlet structure will impact existing water body.	1	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intake	Maintenance and use of river intakes	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	1	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intake	Maintenance and use of coastal intakes	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	Use of existing ground and surface water abstraction licences, within licence conditions and recent abstraction patterns	Operation	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	Use of existing surface water and groundwater abstraction licences, within existing licence conditions but outside of the recent actual rates	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	Emergency or drought use of existing surface water or groundwater abstraction outside of licence conditions	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	New or increased surface water abstraction	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	3	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	New or increased groundwater abstraction	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	New coastal or transitional waterbody abstraction licence	Operation	No assumed mitigations	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	Reduction of coastal or transitional waterbody abstraction licence	Operation	No assumed mitigations	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Licence	Increase of coastal or transitional waterbody abstraction licence	Operation	No assumed mitigations	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	Trenching and laying of pipe lines within the interfluves of a catchment (no watercourse crossings)	Construction	Assumed that bedding material for pipelines will be constructed such that they do not form preferential pathways for groundwater flow.	Presume trenching and laying will be used for most lengths of pipe.	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pipelines	Trenching and laying of pipe lines involving watercourse crossings	Construction	Assumed that bedding material for pipelines will be constructed such that they do not form preferential pathways for groundwater flow. Assumed that watercourse crossings will be carried out using directional drilling or if the watercourse needs to be temporarily diverted, appropriate measures will be in place to protect ecology and watercourse will be returned back to its natural state.	Only trenchless activities are designed when there is a water crossing	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	Trenching and laying of pipe lines involving large watercourse crossings with in channel modifications	Construction	Flood risk assessment will be carried out to ensure that new in channel features will not adversely impact on flood risk	Only trenchless activities are designed when there is a water crossing	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	Maintenance of pipelines	Operation	No assumed mitigations	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipelines	Draining of pipelines for maintenance	Operation	If water is drained to local watercourse, this will be short term and temporary impacts only	N/A	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pipelines	removal / decommissioning of existing pipeline (no watercourse crossings)	Decommissioning	No assumed mitigations	Surveys not yet completed, so have presumed construction work to remove existing infrastructure is possible. Included for worst-case scenario.	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	removal / decommissioning of existing pipeline (involving watercourse crossings)	Decommissioning	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	Surveys not yet completed, so have presumed construction work to remove existing infrastructure is possible. Included for worst-case scenario.	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	New above ground pipelines (crossing watercourse)	Construction	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	New above ground pipelines (not crossing watercourse)	Construction	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pipelines	Temporary pipelines to support network upgrades or changes	Operation	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Construction of reservoir (set back from watercourse)	Construction	No assumed mitigations	N/A	0	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Construction of new storage reservoir (in line/next to watercourse - within 500m)	Construction	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	3	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Modification of an existing storage reservoir	Construction	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Presence of new or modified existing storage reservoir	Operation	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	3	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Modification of an existing service reservoir adjacent in close proximity to watercourse	Construction	Appropriate precautions will be taken when working close to channels of watercourses, to appropriately manage flood risk and the potential for discharge of chlorinated water into the watercourse. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Presence of new reservoir or modified existing service reservoir in close proximity to watercourse	Operation	Appropriate precautions will be taken when working close to channels of watercourses, to appropriately manage flood risk and the potential for discharge of chlorinated water into the watercourse. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Modification of an existing service reservoir not in close proximity to watercourse	Construction	No assumed mitigations	N/A	0	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Presence of new reservoir or modified existing service reservoir not in close proximity to watercourse	Operation	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Floating or constructed shade for the reservoir to reduce evaporation	Operation	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reservoir	Floating or constructed shade for the reservoir to reduce evaporation	Construction	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Transfer agreement	New or continuation of contractual agreement between companies to continue providing transfer with no change to abstraction licence associated	Operation	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Transfer agreement	Contractual agreement between companies to continue providing transfer with decrease in abstraction licence associated	Operation	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Transfer agreement	Contractual agreement between companies to continue providing transfer with increase in abstraction licence associated	Operation	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Impose water usage restriction under emergency drought orders to business and/or household	Operation	This assumes a short term benefit to WFD as imposed usage reduction should allow for recovery in the river or aquifer which may improve WFD status from pre restriction status.	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Communication with business or households to reduce water use in times of drought	Operation	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Reduce transfer of water between water companies	Operation	For treated water transfer, there is likely to be no WFD impact. For raw water transfer this may have a short term impact changing local habitats at either end of the transfer should the raw water be transferred from river to river. Any changes to transfers are assumed to be in place in the short term.	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Abstraction management. This could include limiting abstractions of vulnerable sources in times of drought and using more resilient sources more frequently. This could include switching from GW to surface water or reservoir sources. This could include resting some sources to all for recovery of supply.	Operation	This assumes a single abstraction management event is a short term activity, with abstraction changes occurring regularly to allow for recovery.	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Tankering treated water between WRZ	Operation	This assumes water being tankered is treated and will be input into the network at either treatment works or into a main. This should not have any WFD impact.	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Usage changes and abstraction management	Tankering raw water or treated effluent	Operation	Assumes use of water would not be for drinking unless sent to WTW for full treatment.	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Modification of an existing WTW or pumping station relating to treated water	Construction	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Construction of a new WTW or pumping station relating to treated water	Construction	No assumed mitigations	N/A	0	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Construction of a new WTW or pumping station relating to raw water	Construction	No assumed mitigations	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Maintenance and use of pumping stations and WTW	Operation	No assumed mitigations	N/A	0	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

WTW	Removal of existing WTW and associated discharge	Decommissioning	Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Small desalination temporary unit	Operation	Assumes no construction is required below ground. Unit would be temporary with no impact on WFD	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Construction or modification of a desalination plant	Construction	No assumed mitigations	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTW	Maintenance and use of desalination plant	Operation	No assumed mitigations	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Impacted Waterbody ID	Impacted Waterbody Name	Waterbody type	Overall waterbody Classification	Overall waterbody Objective	Number of activities assessed	Count of activities scoring major benefit score (-2)	Count of activities scoring minor benefit score (-1)	Count of activities scoring minimal impact score (0)	Count of activities scoring minor local impact score (1)	Count of activities scoring medium impact score (2)	Count of activities scoring high impact score (3)	Level 1 max score	Level 1 mean score	Carry through to level 2 assessment?
GB530503300300	GREAT OUSE	TransitionalWater	Poor in 2015	Moderate by 2021	6	0	0	1	5	0	0	1	0.83	NO
GB205033000050	Middle Level	River	Moderate in 2015	Good by 2027	10	0	0	3	5	0	2	3	1.10	YES
GB205033000010	Counter Drain (Sutton and Mepal IDB incl. Cranbrook Drain)	River	Moderate in 2015	Good by 2027	8	0	0	3	5	0	0	1	0.63	NO
GB105033047921	Ouse (Roxton to Earith)	River	Moderate in 2015	Moderate by 2015	7	0	0	1	5	0	1	3	1.14	YES
GB205033000020	Counter Drain (Manea and Welney IDB)	River	Moderate in 2015	Good by 2027	3	0	0	1	2	0	0	1	0.67	NO
GB205033000060	Old Bedford River / River Delph (inc The Hundred Foot Washes)	River	Moderate in 2015	Good by 2027	6	0	0	1	4	0	1	3	1.17	YES
GB205033043375	Old West River	River	Moderate in 2015	Moderate by 2015	3	0	0	1	2	0	0	1	0.67	NO
GB105033042770	Swavesey Drain	River	Poor in 2015	Poor by 2015	3	0	0	1	2	0	0	1	0.67	NO
GB105033042680	Bin Brook	River	Moderate in 2015	Good by 2027	3	0	0	1	2	0	0	1	0.67	NO
GB205033047665	Relief Channel	River	Moderate in 2015	Moderate by 2015	4	0	0	1	3	0	0	1	0.75	NO
GB205033000030	Counter Drain (Upwell and Outwell IDB)	River	Moderate in 2015	Moderate by 2015	4	0	0	1	3	0	0	1	0.75	NO
GB40501G400400	North west Norfolk Sandringham Sands	GroundWaterBody	Good in 2015	Good by 2015	4	0	0	1	3	0	0	1	0.75	NO
GB40501G445700	Cam and Ely Ouse Woburn Sands	GroundWaterBody	Poor in 2015	Good by 2019	4	0	0	1	3	0	0	1	0.75	NO

B. WFD Level 2 Assessment

Waterbody ID	Level 2 sheet created?	Waterbody Name	Maximum Level 2 Impact score	Confidence in WFD data	Confidence in option design	Requirements to improve confidence - add text	Mitigation measures - add text	Post mitigation impact score	Deterioration between status classes	Impediments to Good Ecological Status (GES) or Good Ecological Potential (GEP)	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB205033000050	TRUE	Middle Level	1	Low	Low	1) On-going refinement of the design. 2) Land drainage and site drainage design to understand which watercourses will be diverted/realigned and which are lost. 3) Hydrology study to understand potential reduction in catchment area (and impacts on flow) 4) Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 5) Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published.	Any large watercourses should be realigned to re-provide lost habitat and flow into the main rivers. Further details on mitigation measures assessment from EA to understand impact of the scheme and also to identify opportunities to improve the water body as part of the scheme.	1	No	No	No	No	
GB105033047921	TRUE	Ouse (Roxton to Earith)	2	Low	Low	1) On-going refinement of the design. 2) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction 3) Water quality modelling and monitoring (both continuous and spot sampling) to understand the impact of changes in water quality and therefore biology due to the abstraction. 4) Hydraulic modelling is required to determine the impact of abstraction on downstream flow regime. 5) Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 6) Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published.	Implementation of best practice mitigation measures for the intake structure. Further water quality modelling (both continuous and spot sampling) is required to determine the extent of impacts within this catchment. This will help determine appropriate mitigation measures.	2	Possible	Possible	Possible	No	Assumes pipeline crossings are trenchless under large watercourses
GB205033000060	TRUE	Old Bedford River / River Delph (inc The Hundred Foot Washes)	2	Low	Low	1) On-going refinement of the design. 2) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction 3) Water quality modelling and monitoring (both continuous and spot sampling) to understand the impact of changes in water quality and therefore biology due to the abstraction. 4) Hydraulic modelling is required to determine the impact of abstraction on downstream flow regime. 5) Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 6) Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published.	Implementation of best practice mitigation measures for the intake structure. Further water quality modelling (both continuous and spot sampling) is required to determine the extent of impacts within this catchment. This will help determine appropriate mitigation measures.	2	Possible	Possible	Possible	No	Assumes pipeline crossings are trenchless under large watercourses

Strategic Resource Option surface water assessment for: Fens Reservoir - Preferred Option
Is a groundwater assessment required? Yes

Waterbody ID	Waterbody name	Waterbody type	Maximum Impact score level 1	Maximum Impact score level 2	Maximum post mitigation impact score level 2	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Assists attainment of water body objectives
GB530503300300	GREAT OUSE	TransitionalWater	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB205033000050	Middle Level	River	3	1	1	No	No	No	No
GB205033000010	Counter Drain (Sutton and Mepal IDB incl. Cranbrook Drain)	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB105033047921	Ouse (Roxton to Earith)	River	3	2	2	Possible	Possible	Possible	No
GB205033000020	Counter Drain (Manea and Welney IDB)	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB205033000060	Old Bedford River / River Delph (inc The Hundred Foot Washes)	River	3	2	2	Possible	Possible	Possible	No
GB205033043375	Old West River	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB105033042770	Swavesey Drain	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB105033042680	Bin Brook	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB205033047665	Relief Channel	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB205033000030	Counter Drain (Upwell and Outwell IDB)	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB40501G400400	North west Norfolk Sandringham Sands	GroundWaterBody	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB40501G445700	Cam and Ely Ouse Woburn Sands	GroundWaterBody	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required

Option	Fens Reservoir - Preferred Option	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB105033047921	
Waterbody name	Ouse (Roxton to Earith)	
Waterbody type	River	
Hydromorphological designation	Heavily Modified	Action: Obtain HMWB measures information from the Environment Agency to add to the RNAG/PoM table.
Overall status	Moderate	
Overall status objective	Moderate by 2015	

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post mitigation)			Mitigation applied	Post mitigation impact score
								Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives		
Biological quality elements	Fish		Good in 2015	Good by 2015	2	Low	Low	Possible	Possible	Possible	Fish / eel screens to be included on the intake. Further assessment is required to determine whether impact of abstraction is significant on biological status elements	2
	Invertebrates	Guidance document available	Good in 2015	Good by 2015	2	Low	Low	Possible	Possible	Possible		2
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015	1	Low	Low	No	No	No	Hydraulic modelling is required to determine the impact of abstraction on downstream flow regime.	1
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027	1	Low	Low	No	No	No	See summary tab	1
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	Good by 2015	1	Low	Low	No	No	No	See summary tab	1
	Biochemical oxygen demand	Numerical limits for classes	High in 2015	No data available	1	Low	Low	No	No	No	See summary tab	1
	Dissolved oxygen	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Low	No	No	No	See summary tab	1
	pH		High in 2015	Good by 2015	1	Low	Low	No	No	No	See summary tab	1
	Phosphate	Calculator available	Moderate in 2015	Moderate by 2015	1	Low	Low	No	No	No	See summary tab	1
	Temperature	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Low	No	No	No	See summary tab	1
Priority substances	Isoproturon	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	See summary tab	0
	Lead and Its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	See summary tab	0
	Trichloromethane	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	See summary tab	0
Specific pollutants	Copper		High in 2015	High	0	Low	Low	No	No	No	See summary tab	0
	Mecoprop		High in 2015	High	0	Low	Low	No	No	No	See summary tab	0

Activity	New pipe lines involving watercourse crossings with no in channel modifications				Maintenance of pipe lines (including draining pipeline)				
Construction, Operation or Decommissioning activity	Construction and Operation				Operation				
Potential Impacts of asset (following consideration of embedded mitigation)	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Change in water quality due to new or changes to existing discharge of surface water into surface water body	Change in INNS present in surface water body
Biological Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✗	✗	✗	✗	✗	✗
Physicochemical Effects	✗	✗	✗	✗	✓	✓	✓	✓	✗
Chemical effects	✗	✗	✗	✗	✗	✗	✗	✓	✗
	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Change in INNS present in surface water body' on each element
Fish	No measurable effects anticipated as a result of changes in the hydromorphology on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless actitivies.	No changes in flow and velocity expected as crossing will be below the river base, using trenchless methods	No changes in sedimentation expected as crossing will be below the river base, using trenchless methods	Potential temporary disturbance during construction, though fish likely to move away from impact and invertebrates unlikely to be sensitive to impact	No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	Pipeline will be filled with water from this catchment so no pathway for transfer of INNS
Invertebrates									
Hydrological Regime	No measurable impact anticipated	No measurable impact anticipated	No measurable impact anticipated		No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	
Mitigation Measures Assessment									
Ammonia (total as N)					No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated	
Biochemical oxygen demand									
Dissolved oxygen									
pH									
Phosphate									
Temperature									
Isoproturon								No measurable effects anticipated	
Lead and Its Compounds									
Trichloromethane									
Copper									
Mecoprop									

Activity	New or increased surface water abstraction				
Construction, Operation or Decommissioning activity	Operation	Operation	Operation	Operation	Operation
Potential Impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Change in water quality due to new or changes to existing discharge of surface water into surface water body
Biological Effects	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✓
Physicochemical Effects	✓	✗	✓	✓	✓
Chemical effects	✗	✗	✗	✗	✓
	Comment of the impact of 'Changes to channel footprint' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element
Fish	New abstraction anticipated to have limited footprint, but could impact on fish due to fish entrainment	The fish in the River Ouse at Earith may be impacted by the changes in level and water quality due to the abstraction, particularly during the low level periods. The hydroecology report completed as part of this project (Hydroecology study for Strategic resource options - Fens Reservoir, Mott MacDonald June 2022), suggests that the abstraction could lead to a 'high' to 'medium' risk to fish species (including Barbel, Brook Lamprey, Brown Trout, Bullhead, European Eel and Spined Loach), although further assessment is required to determine whether this impact is significant. On a precautionary basis this is assessed as an adverse impact at waterbody scale.	Changes in flow volume and velocity could change sedimentation pattern downstream of the abstraction. This could affect biological quality elements, further investigation would be required	Changes in flow volume and velocity could change sedimentation pattern downstream of the abstraction. This could affect biological quality elements, further investigation would be required.	Changes in water quality as a result of the abstraction, has the potential for minor localised impacts on fish and invertebrates
Invertebrates	It anticipated there will be minimal effects on the hydrological regime.	The macroinvertebrates in the River Ouse at Earith could be impacted by the changes in level and water quality due to abstraction. The hydroecology report completed as part of this project (Hydroecology study for Strategic resource options - Fens Reservoir, Mott MacDonald June 2022), suggests that the abstraction could lead to a 'High' risk of impact on Lacewing and 'Low' risk to other invertebrate species. Further work is required to better understand the potential impact to invertebrates and on a precautionary basis this is assessed as an amber adverse impact at waterbody scale.			
Hydrological Regime	New structure footprint anticipated to have no effect on hydrological regime	A flow duration curve at the River Ouse (at Earith) has been created for the baseline (with no abstraction and with the abstraction in place - see below). The flow duration curve shows that flows will be reduced but the impacts are minor across the flow curve.	Potential increased sedimentation due to abstraction not expected to have significant effect on the hydrological regime	Potential increased sedimentation due to abstraction not expected to have significant effect on the hydrological regime	No measurable impact anticipated on the hydrological regime
Mitigation Measures Assessment	New structure would create additional localised modification to the river bank morphology but not be of concern at waterbody scale	Changes in flow and velocity unlikely to significantly affect physical modifications pressure	Potential increased sedimentation due to abstraction not expected to have significant effect on mitigation measures	Potential increased sedimentation due to abstraction not expected to have significant effect on mitigation measures	No measurable impact anticipated on the mitigation measures assessments
Ammonia (total as N)	No measurable impact anticipated		No measurable effects anticipated as a result of changes in the sedimentation deposition on the phyisco-chemicals	No measurable effects anticipated as a result of changes in the hydromorphology on the phyisco-chemicals	Minor effects anticipated as a result of abstraction on the phyisco-chemicals
Biochemical oxygen demand					
Dissolved oxygen					
pH					
Phosphate					
Temperature					
Isoproturon					No measurable effects anticipated as a result of abstraction on chemicals
Lead and Its Compounds					
Trichloromethane					
Copper					
Mecoprop					

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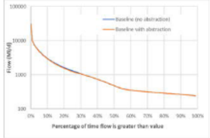
RNAG/PoM/HHWMM	**Id**	**Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)**	**Category (RNAG)/Lead organisation (PoM)**	**National Swmi Header (RNAG) / Title (PoM)**	Is this measure potential impacted by the scheme? (Yes/No)	**Impact score assessment**	**Data confidence**	**Design certainty**	**Does the component comply with WFD objectives**			**Mitigation applied**	**Post mitigation impact score (-2 to 3)**	**New or increased surface water abstraction**
									Assists attainment of water body objectives	**Impediment to GES/GEP**	**Compromises water body objectives**			
Reasons for Not Achieving Good (RNA	479142	Mitigation Measures Assessment	Recreation	Physical modifications	Yes		Low	Low	No	No	No		1	New intake structure will add another physical modification, however this will be minor and with mitigation is unlikely to have an impact other projects to improve this pressure
Reasons for Not Achieving Good (RNA	479143	Mitigation Measures Assessment	Local and Central Government	Physical modifications	Yes		Low	Low	No	No	No		1	
Reasons for Not Achieving Good (RNA	486697	Phosphate	Agriculture and rural land management	Pollution from rural areas	No									
Reasons for Not Achieving Good (RNA	486696	Phosphate	Water Industry	Pollution from waste water	No									
Reasons for Not Achieving Good (RNA	486698	Phosphate	Agriculture and rural land management	Pollution from rural areas	No									

Flow duration curves



Scoring Key

Level 1 assessment	**Impact**	**Impact Score**	**Description**
Waterbody passes Level 1 WFD assessment	Very 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 waterbody
	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 waterbody or any quality elements
	No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
	Low	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.
Waterbody requires level 2 WFD assessment	Medium	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.
	High	3	Impacts that, 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.

Option	Fens Reservoir - Preferred Option	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB105033000060	
Waterbody name	Old Bedford River / River Delph (inc The Hundred Foot Washes)	
Waterbody type	River	
Hydromorphological designation	Artificial	Action: Obtain HyMAR measures information from the Environment Agency to add to the RNAG/PoM Table.
Overall status	Moderate	
Overall status objective	Good by 2027	

Activity	New or increased surface water abstraction					New pipe lines involving watercourse crossings with no in channel modifications				Maintenance of pipe lines (including draining pipeline)				
Construction, Operation or Decommissioning activity	Operation	Operation	Operation	Operation	Operation	Construction and operation	Construction	Construction	Construction	Operation	Operation	Operation	Operation	Operation
Potential impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Change in water quality due to new or changes to existing discharge of surface water into surface water body	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Changes in water quality due to new or changes to existing discharge of surface water into surface water body	Change in WINS present in surface water body
Biological Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✗	✗
Physiochemical Effects	✓	✗	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓
Chemical effects	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective		Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post-mitigation): Overall assessment of water body objectives	Impact leads to QE/QSP	Component wise water body objectives	Mitigation applied	Post-mitigation impact score	Comment of the impact of 'Changes to channel footprint' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Construction and operation of pipelines and associated work, including temporary bridges and haul roads in the channel' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Changes in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Change in WINS present in surface water body' on each element
Biological quality elements	Fish		Moderate in 2015	Good by 2027		2	Low	Low	Possible	Possible	Possible	Fish / eel screens to be included on the intake. Further assessment is required to determine whether impact of abstraction is significant on fish species.	2	New abstraction anticipated to have limited footprint, but could impact on fish due to fish entrainment	The fish in the River Delph may be impacted by the changes in level and water quality due to the abstraction, particularly during the low level periods. The hydroecology report completed as part of this project (Hydroecology study for Strategic resource options - Fens Reservoir, Mott MacDonald June 2022), suggests that the abstraction could lead to a 'high' to 'medium' risk to fish species (including Barbel, Brook Lamprey, Brown Trout, Bullhead, European Eel and Spined Loach, although further assessment is required to determine whether this impact is significant. On a precautionary basis this is assessed as an adverse impact at waterbody scale.	Changes in flow volume and velocity could change sedimentation pattern downstream of the abstraction. This could affect biological quality elements, further investigation would be required.	Changes in flow volume and velocity could change sedimentation pattern downstream of the abstraction. This could affect biological quality elements, further investigation would be required.	Changes in water quality as a result of the abstraction, has the potential for minor localised impacts on fish and invertebrates.	No measurable effects anticipated as a result of changes in the hydromorphology on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless activities.	No changes in flow and velocity expected as crossing will be below the river base, using trenchless methods.	No changes in sedimentation expected as crossing will be below the river base, using trenchless methods.	Potential temporary disturbance during construction, though fish likely to move away from impact and invertebrates unlikely to be sensitive to impact	Temporary infrequent localised changes to flow velocity expected to have minimal effect on biological elements status	Temporary infrequent localised changes to flow velocity to affect sedimentation and expected to have minimal effect on biological elements status	Temporary infrequent localised noise unlikely to affect fish as they will move away from the source of the noise Temporary infrequent localised noise unlikely to affect invertebrates as they are likely to be insensitive to effects	Temporary infrequent localised changes to water quality unlikely to impact on biological elements status	Temporary infrequent discharges from pipeline maintenance could lead to introduction of INNS as pipeline would contain raw water from another waterbody. See INNS assessment for more details.
	Invertebrates	Guidance document available	Good in 2015	Good by 2015		2	Low	Low	Possible	Possible	Possible	Further assessment is required to determine whether impact of abstraction is significant on invertebrate species	2	It anticipated there will be minimal effects on the hydrological regime.	The macroinvertebrates in the River Delph could be impacted by the changes in level and water quality due to abstraction. The hydroecology report completed as part of this project (Hydroecology study for Strategic resource options - Fens Reservoir, Mott MacDonald June 2022), suggests that the abstraction could lead to a 'High' risk of impact on Lacewing and 'Low' risk to other macroinvertebrate species. Further work is required to better understand the potential impact to invertebrates and on a precautionary basis this is assessed as an adverse impact at waterbody scale.											
Hydromorphological Supporting Elements	Hydrological Regime		High in 2015	Supports Good by 2015		2	Low	Low	Possible	Possible	Possible	Hydraulic modelling is required to determine the impact of abstraction on downstream flow regime.	2	New structure footprint anticipated to have no effect on hydrological regime	The River Delph is level controlled and a level duration curve has been created for the baseline (with no abstraction and with the abstraction in place - see below). The abstraction has been modelled with a Hands-off Level in place (this is set at 1.05m). The Level duration curve shows that levels will be reduced particularly during low level periods (below 10%) where levels begin to drop off earlier than without the abstraction. This reduction in level could lead to a deterioration in hydrological regime from the current High status.	Potential increased sedimentation due to abstraction not expected to have significant effect on the hydrological regime	Potential increased sedimentation due to abstraction not expected to have significant effect on the hydrological regime	No measurable impact anticipated on the hydrological regime	No measurable impact anticipated	No measurable impact anticipated	No measurable impact anticipated		Temporary infrequent discharges are anticipated to have minimal effects on the hydrological regime.	Temporary infrequent discharges are anticipated to have minimal effects on the hydrological regime.			
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027		1	Low	Low	No	No	No		1	New structure would create additional localised modification to the river bank morphology but not be of concern at waterbody scale	Changes in flow and velocity unlikely to significantly affect physical modifications pressure	Potential increased sedimentation due to abstraction not expected to have significant effect on mitigation measures	Potential increased sedimentation due to abstraction not expected to have significant effect on mitigation measures	No measurable impact anticipated on the mitigation measures assessments							
Physico-chemical quality elements	Ammonia (total as N)		Good in 2015	Good by 2015		1	Low	Low	No	No	No		1	No measurable impact anticipated	Abstraction is likely to lead to minor changes in water quality due to changes in flow (and therefore dilution potential downstream). Further assessment is needed to understand this impact.	No measurable effects anticipated as a result of changes in the sedimentation deposition on the physico-chemicals	No measurable effects anticipated as a result of changes in the hydromorphology on the physico-chemicals	Minor effects anticipated as a result of abstraction on the physico-chemicals					No measurable effects anticipated as a result of changes in flow and velocity on the physico-chemicalelements	No measurable effects anticipated as a result of changes in sedimentation on the physico-chemical elements		No measurable effects anticipated as a result of changes in water quality on the physico-chemical elements	No measurable effects anticipated as a result of changes in INNS transfer on the physico-chemical elements
	Dissolved oxygen	Numerical limits for classes	Poor in 2015	Good by 2027		1	Low	Low	No	No	No		1													
	pH		High in 2015	Good by 2015		1	Low	Low	No	No	No		1													
	Phosphate	Calculator available	High in 2015	Good by 2015		1	Low	Low	No	No	No		1													
	Temperature	Numerical limits for classes	High in 2015	Good by 2015		1	Low	Low	No	No	No		1													
Specific pollutants	Diuron		High in 2015	High		0	Low	Low	No	No	No		0					No measurable effects anticipated as a result of abstraction on chemicals								

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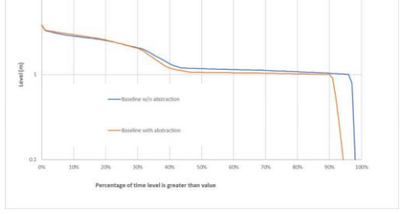
RNAG/PoM/HMWMId	Id	Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Semi Header (RNAG) / Title (PoM)	Is this measure potentially impacted by the scheme? (Yes/No)	Impact score assessed	Data confidence	Design certainty	Does the component comply with WFD objectives: Assess allotment of water body objectives	Impediment to QE/QSP	Component wise water body objectives	Mitigation applied	Post mitigation impact score (2 to 1)	New or increased surface water abstraction
Reasons for Not Achieving Good (RNA	519381	Dissolved oxygen	Sector under investigation		No									
Reasons for Not Achieving Good (RNA	519431	Fish	Local and Central Government	Physical modifications	No	1	Low	Low	No	No	No		1	New intake structure will add another physical modification, however this will be minor and with mitigation is unlikely to have an impact other projects to improve this pressure
Reasons for Not Achieving Good (RNA	519435	Fish	Local and Central Government	Physical modifications	Yes	1	Low	Low	No	No	No		1	
Reasons for Not Achieving Good (RNA	519491	Fish	No sector responsible		No									
Reasons for Not Achieving Good (RNA	519492	Fish	No sector responsible		No									

Level duration curve



Scoring Key

Impact	Impact Score	Description
Very Beneficial	+2	Impacts that, based on their own, have the potential to lead to the improvement to the ecological status or potential of a WFD quality element / or the entire waterbody
Beneficial	+1	Impacts that, across Europe on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the ecological WFD status of the waterbody or any quality elements
Neutral	0	No measurable change to the quality of the water environment or the ability for target WFD objective to to be achieved.
Low	-1	Impacts that, when taken on their own, has a 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
Medium	-2	Impacts that, when taken on their own, has a the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reductions in WFD status. Impacts have the potential to prevent target WFD objective
High	-3	Impacts when taken on their own have a the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for High impact on pre-existing target WFD objective as it not being achieved

option	Use 'Additional' / 'Alternative' option	Action (delete/copy paste as appropriate)
Waterbody ID	GB30503030000S0	
Waterbody name	Middle Level	
Waterbody type	River	
Hydromorphological designation	Artificial	Action: Obtain HMWB measure information from the Environment Agency to add to the WMU/Trail matrix.
Overall status	Moderate	
Overall status objective	Good by 2027	

Activity	New WTW (set back from a watercourse)		New pipe lines involving watercourse crossings with no in channel modifications		New impounding reservoir (in line/net to watercourse, or large compared to watercourse) - excluding diversions/discharge				Maintenance of pipe lines (including draining pipeline)						New ground structures (draft/retaining wall) with insulated dewatering
Construction, Operation or Decommissioning activity	Construction		Construction and operation		Construction and operation				Operation						Construction
Potential impacts of asset (following consideration of embedded mitigation)	Noise and vibration	Change in water quality due to new or changes to existing discharge of surface water into surface water body	Changes in sedimentation deposition	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes to channel footprint	Noise and vibration	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes in flow velocity and volume (increase or decrease)	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Change in water quality due to new or changes to existing discharge of surface water into surface water body	Change to WFD element in surface water body	Change to WFD element in surface water body	Change in water quality due to discharge of groundwater to surface water body
Biological effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
Physicochemical effects	✗	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓
Chemical effects	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Does the component comply with WFD objectives [post-mitigation]	Impact size	Extent	Duration	Reversible on short term	Hypothesis vs. GOS/GEP	Cumulative with other activities	Mitigation applied	Post mitigation impact score	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes in water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element	Comment of the impact of 'Changes to channel footprint' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Change in WFD element in surface water body' on each element	Comment of the impact of 'Change in WFD element in surface water body' on each element	Comment of the impact of 'Change in water quality due to discharge of groundwater to a surface water body' on each element
Biological quality elements	Invertebrates	Guidance document available	High in 2001	Good by 2015		1	Low	Low	No	No	No		1	Localised minor effects anticipated to biological quality elements as a result of noise and vibration during construction of the new WTW. Invertebrates and macrophytes and phytobenthos likely to be localised to the drainage	No measurable effects anticipated to biological quality elements as a result of construction of the new WTW.	No measurable effects anticipated as a result of changes in sedimentation deposition on the biological quality elements. At this stage it is assumed construction will involve trenchless solutions.	No measurable effects anticipated as a result of changes in hydromorphology on the biological quality elements. At this stage it is assumed construction will involve trenchless solutions.	The loss of the reservoir footprint will result in loss of numerous small field drainage ditches. This loss of open channel is assessed to potentially lead to minor localised effects on biological status elements.	Minor noise vibration may impact the biological quality elements within this watebody as a result of the construction of the reservoir. Potential temporary disturbance during construction, though unlikely to move away from impact and invertebrates unlikely to be sensitive to impact.	The size of the reservoir footprint will result in loss of some small field drainage ditches, which could lead to a slight reduction in the flow and velocity into the Sutton East Drain and the Forty Foot or Haugden Drain into which these channels drain. The scale of this reduction in flow is likely to be minor compared to the catchment size for these waterbodies. This is assessed to potentially lead to minor localised effects on biology.	The size of the reservoir footprint will result in loss of some small field drainage ditches and pipes/culverts. This will lead to a slight reduction in the flow and velocity into the Sutton East Drain and the Forty Foot or Haugden Drain into which these channels drain. The scale of this reduction in flow is likely to be minor compared to the catchment size for these waterbodies. However, this could be of minor localised effects on the hydrological regime in the area	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated				
	Macrophytes and Phytobenthos Combined	Calculator available	Moderate in 2015	Good by 2027		1	Low	Low	No	No	No		1									no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated	All pathways already wide but potential to introduce additional INNS sources or pathways from upstream areas of transfer.		
																										All pathways already wide but potential to introduce additional INNS sources or pathways from upstream areas of transfer.		
Hydromorphological Supporting Elements	Hydrological Regime		Does Not Support Good in 2016	Does Not Support Good by 2045		0	Low	Low	No	No	No	Hydrology study to understand potential reduction in catchment area (and impact on flow/levels).	0		No measurable effects anticipated	No measurable effects anticipated	No measurable effects anticipated			The size of the reservoir footprint will result in loss of some small field drainage ditches and pipes/culverts. This will lead to a slight reduction in the flow and velocity into the Sutton East Drain and the Forty Foot or Haugden Drain into which these channels drain. The scale of this reduction in flow is likely to be minor compared to the catchment size for these waterbodies. However, this could be of minor localised effects on the hydrological regime in the area	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated	no measurable effects anticipated				no measurable effects anticipated
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027		1	Low	Low	No	No	No		0			No measurable effects anticipated	No measurable effects anticipated	Reservoir will be constructed over the footprint of numerous small field drainage ditches, ditch systems and some small streams/ ditches. The assessment is, height of loss channel is estimated to be 1km. This would lead to minor localised loss of open channel, which could impact on the mitigation measures assessment.											
Physico-chemical quality elements	Dissolved oxygen (DO)	Guidance document available	Good in 2015	Good by 2027		1	Low	Low	No	No	No		1																Maximising good construction practice any discharge of groundwater to surface water during construction will be of similar quality to that already contained in the watercourse. Increased anticipated on biological activities levels
	Mathematical - Oxygen Saturation	Guidance document available	Good in 2015	Good by 2027		1	Low	Low	No	No	No		1																
	Mathematical - Temperature	Guidance document available	High in 2015	Good by 2027		1	Low	Low	No	No	No		1																
	pH	Calculator available	High in 2015	Good by 2027		1	Low	Low	No	No	No		1																
	Temperature	Calculator available	High in 2015	Good by 2027		1	Low	Low	No	No	No		1																
	Total Ammonia as Nitrogen	Guidance document available	High in 2015	Good by 2027		1	Low	Low	No	No	No		1		Minor impacts on physico-chemicals as a result of changes in water quality.													
Priority hazardous substances	1,2-dichloroethane	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Anthracene and its compounds	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Benzo (a) pyrene and its compounds	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Benzo (ghi) perylene and indeno (1,2,3-cd) pyrene	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Benzyl butyl phthalate	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	bis(2-ethylhexyl)phthalate	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
Priority substances	Mercury and its compounds	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Cypermethrin	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Dicofol	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Diuron and its compounds	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Lead and its compounds	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Nickel and its compounds	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Pentachlorobenzene	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Octabromodiphenyl ether	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Octylphenol	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Tributyltin compounds	AQs detected	Good in 2015	Good		0	Low	Low	No	No	No		0																
Specific pollutants	Copper		High in 2015	High		0	Low	Low	No	No	No		0																
	Iron		High in 2015	High		0	Low	Low	No	No	No		0																
	Manganese		High in 2015	High		0	Low	Low	No	No	No		0																
	Zinc		High in 2015	High		0	Low	Low	No	No	No		0																
Other chemicals	Dissolved organic carbon	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Electrical conductivity, chloride, tds, sodium	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Hydrocarbons	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																
	Hydrocarbons/phenol	Risk Unknown	Good in 2015	Good		0	Low	Low	No	No	No		0																

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WAIA(Tab)/Unmitigated	Id	Relevant WFD Quality Element [WAIA] / Measure category 1 [HAR]	Category [WAIA]/Lead organisation [HAR]	National Sand Master [WAIA] / Title [HAR]	Is this a measure potential impacted by the scheme? (Yes/No)	Does the component comply with WFD objectives [post-mitigation]	Impact size	Extent	Duration	Reversible on short term	Hypothesis vs. GOS/GEP	Cumulative with other activities	Mitigation applied	Post mitigation impact score	How impounding reservoir (in line/net to watercourse, or large compared to watercourse) - excluding diversions/discharge
Reasons for Not Achieving Good (WAIA)	12106	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Physical modifications	No		1	Low	Low	No	No	No		1	New reservoir will remove a number of small drainage ditches, reversing the flow in the larger receiving watercourses. The reservoir does not impact on the main watercourses in the catchment and is considered unlikely to significantly reduce the improvements that can be made.
Reasons for Not Achieving Good (WAIA)	12402	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Pollution from rural areas	No										
Reasons for Not Achieving Good (WAIA)	12106	Hydrological Regime	No sector responsible	No further action (Flow is below the Q5 but not causing an ecological failure)	No		1	Low	Low	No	No	No		1	New reservoir will remove a number of small drainage ditches, slightly decreasing flow in the larger receiving watercourses. Given the scale of the change this is not likely to significant in leading to a reduction in the improvements that can be made

Scoring Key

What it demonstrates	Impact	Impact Score	Criteria/Notes
Waterbody passes Level 1 WFD assessment	Very beneficial	-3	Impacts that, taken on their own, have the potential to lead to the improvement in the biological status or potential of a WFD quality element for the water waterbody
	Beneficial	-2	Impacts that, taken 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 waterbody or any quality elements
	Rathational	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Waterbody requires level 2 WFD assessment	Low	1	Impacts that, taken taken on their own, have the potential to lead to a minor localised or temporary 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.
	Medium	2	Impacts that, taken 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 decrease in WFD status. Impacts. Does the potential to prevent target WFD objectives from being achieved.
	High	3	Impacts that, 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.