MOTT MACDONALD

Water Framework Directive Assessment (RAPID Gate Two)

South Lincolnshire Reservoir

November 2022

Confidential

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Executive summary

This Water Framework Directive (WFD) assessment supports the Environmental Assessment Report (EAR) that accompanies the gate two submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the South Lincolnshire Reservoir (SLR) Strategic Resource Option (SRO). This report presents the findings of the WFD assessment for all the scheme elements including: abstraction, conveyance 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 24 waterbodies which could potentially be affected by the scheme. Following the Level 1 assessment, seven of these waterbodies were identified as requiring further assessment, due to the potential effects on the WFD waterbodies.

The findings from the Level 2 assessment are:

- A potential major adverse risk (risk of deterioration) to the Swaton Drains (ID: GB105030056515) has been identified. Within the reservoir footprint over 2.5km of open channel would be lost, along with 28% of the catchment. The loss of open channel would impact on habitat, flow and hydromorphology in this waterbody.
- A potential minor localised risk (no risk of deterioration) to the South Beck (ID: GB105030056520) has been identified from the loss of open watercourse and loss of up to 4% of open watercourse within the catchment due to the presence of the reservoir. This loss of catchment and watercourses would impact on habitat, flow and hydromorphology in this waterbody.
- A potential major adverse risk (risk of deterioration) to the Trent from Soar to Beck (ID: GB104028053110) was identified as a result of the new surface water abstraction. Abstraction rates are expected to be <10% of the total volume of the Trent catchment and the change in flow and velocity has the potential to impact biological elements. Further investigation is required to determine the full extent of the impacts. A potential adverse risk was also identified due to potential for changes in water quality due to the surface water abstraction.
- A potential major adverse risk (risk of deterioration) to the Witham – conf Cringle Bk to conf Brant (ID: GB105030056780) has been identified as a result of the discharge from the Trent from Soar to Beck. A high-level water quality assessment of the proposed transfer was conducted, it concludes there is an expected 69% increase in ammonia. • A potential major adverse risk (risk of deterioration) to the Witham – conf Brant to conf Catchwater Drain (ID: GB105030062370) and the Witham - conf Catchwater Drain to conf Bain (ID: GB205030062425) have been identified as a result of the discharge into the Witham – conf Cringle Bk to conf Brant (ID: GB105030056780). A high-level water quality assessment concludes there is an expected 46% increase in phosphate by the time it reaches both catchments.
- A potential major adverse risk (risk of deterioration) to the Lower Witham conf Bain to Grand Sluice (ID: GB205030062426) has been identified as a result of the discharge from the Witham – conf Cringle Bk to conf Brant (ID: GB105030056780). A high- level water quality assessment, concludes there is an expected 46% increase in phosphate by the time it reaches the catchment. A potential adverse effect (risk of deterioration) was also identified for biological status elements due to the transfer of water from upstream and subsequent abstraction at this waterbody leading to changes in water velocity and level, which could impact on biological status elements.

Further WFD assessment will be required during the next stages of project development (i.e. for gate three and beyond) to improve the levels of certainty for the WFD related risks outlined in this assessment, and to identify mitigation where required.

1 Introduction

1.1 Overview

This report supports the Environmental Appraisal for the scheme as part of the South Lincolnshire Reservoir (SLR) Strategic Resource Option (SRO) gate two submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID). It presents the findings of the Water Framework Directive (WFD) assessment of the scheme.

1.2 South Lincolnshire Reservoir

A new strategic reservoir in Lincolnshire, referred to as the South Lincolnshire Reservoir (SLR), 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 being is promoted by Anglian Water and is being progressed through the fast-tracked delivery framework overseen by the Regulatory Alliance for Progressing Infrastructure Development (RAPID).

The SLR has previously progressed through gate one in 2021, the first opportunity to check progress on investigations and development of solutions in the gated 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 including: abstraction, conveyance including pumps, storage, treatment and distribution into supply and the reservoir.

1.3 Scheme overview

The proposed reservoir site is located in the South Lincolnshire area. It is located approximately 7km southeast of the town of Sleaford, between the settlements of Swaton, Scredington and Helpringham in the North Kesteven District Council area. At its greatest dimensions the reservoir is approximately 2.6km wide and 3.2km 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 will be abstracted from the River Witham, from a location assumed to be between Chapel Hill and Langrick Bridge. It is proposed that flow in the River Witham will be supported via a transfer from the River Trent. The intake is currently assumed to be near Newark-on-Trent and transferred to River Witham near Claypole.

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

1.4 Methodology

1.4.1 Approach to WFD assessment for SROs

The Water Framework Directive (WFD) is transposed into law for England and Wales through *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 All Company Working Group (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 WFD approach, 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.

This report includes the WFD assessment of the reservoir footprint, abstractions, discharges, and transfers associated with the potential reservoir.

1.4.2 Level 1 – basic screening

Level 1 assessment follows these steps:

- Identify affected waterbodies
- Review SRO option 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 (no risk of deterioration) 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 outlined in Table 1.1. The scores assumes 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 5.1 and Appendix A. Where waterbodies and option impacts were ‘screened in’, they have been taken forward to the Level 2 assessment.

[2] All Company Working Group (Nov 2020). Water Framework Directive: Consistent framework for undertaking no deterioration assessments

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.

1.4.3 Level 2 – detailed impact assessment

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

- Waterbody scale detailed assessment of impacts to each WFD quality element (biological quality elements, hydromorphological supporting elements, physio-chemical quality elements, priority hazardous substances, priority substances and specific pollutants) of the footprint of the proposed site[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 about the option at the time of assessment. Requirements for further investigations, data and/or design information required in order to raise the level of confidence for future gates is listed in the WFD assessment (Level 2 summary).
- Identification of further mitigation needs.
- Assessment of impacts after mitigation (scoring on a 6-point scale).
- Identification of activities to improve the certainty of assessment outcomes.

The outcomes of the Level 2 assessments are summarised in Section 5.2 and Appendix B.

1.4.4 WFD for gate three and beyond

Where waterbodies and option 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 development of the scheme and

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

for subsequent gateways if the option is progressed. Both the Level 1 and 2 WFD assessment will be updated at gate three 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 updates to the WFD assessments.

1.5 Assumptions and limitations

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

- The ACWG approach uses WFD 2015 data, as it is the current officially reported baseline in the Anglian region RBMP Cycle 2 (2015-2021)[4]. The RBMPs are anticipated to be updated in 2022, and 2019 WFD baseline data released in late 2020 would then become the new baseline. For consistency, the 2015 data has been used at Gate 1 and 2; but it is acknowledged that this will need to be updated to the 2019 status, once the RBMPs are published (proposed for gate three).
- Where there is no data available for the WFD element, this has not been assessed as part of the Level 2 WFD assessment.
- Decommissioning of the reservoir and transfers have not been assessed as part of the gate two assessment.
- It is assumed the Water Treatment Works (WTW) will only treat water from the reservoir and will not discharge to a local watercourse.
- It is assumed bund 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 EA. It is assumed the permit will cover water quality to ensure it is suitable to discharges into the watercourses.
- The geographical extent of the WFD assessment has been limited to waterbodies where construction activities are taking place.
- This assessment only takes into account the waterbody where the abstraction is located on the River Trent and River Witham. Consideration of the impacts on waterbodies downstream and the associated impacts of the abstraction will be included during the next stages of project development, following further investigation.
- This option includes a transfer of water between the River Trent and River Witham. Water is discharged into the River Witham, and then abstracted further downstream from the River Witham to supply the SLR. This assessment considers all the River Witham waterbodies between the abstraction and discharge locations.
- At the time of writing, the emergency draw down design has not been completed as multiple options are under consideration. The emergency draw down has therefore been

[4] Environment Agency (2016) Anglian RBMP. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718327/Anglian_RBD_Part_1_river_basin_management_plan.pdf

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.

2 Scheme Description

2.1 Scheme overview

The SLR 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 Witham and River Trent, raw water transfers, treatment works, and distribution into supply.

Key scheme parameters include:

- River Trent maximum abstraction and transfer flow to River Witham: (Megalitres per day) 300Ml/d
- River Witham maximum abstraction and transfer flow to reservoir: 400Ml/d
- Reservoir total capacity: 55MCM
  Reservoir usable volume: 50MCM
- Treatment distribution flow[5]: 150Ml/d

2.1.1 Reservoir overview

The proposed reservoir site is shown in Figure 2.1, and is located approximately 7km southeast of the town of Sleaford, between the settlements of Swaton, Scredington and Helpringham in the North Kesteven District Council area. South Kesteven District Council's administrative boundary is approximately 100m south of the polygon, south of the A52 Holland Road. The Peterborough to Lincoln railway line runs along the north-eastern boundary with the North Beck watercourse situated just north of the site boundary.

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 as follows:

- At its greatest dimensions the reservoir is 2.6km wide and 3.2km long to the embankment toe.
- The embankment crest is estimated at 26m AOD making the embankment an average of 14m above the existing ground level at the toe, a maximum of 15.1m and a minimum of 3.7m above existing ground levels.

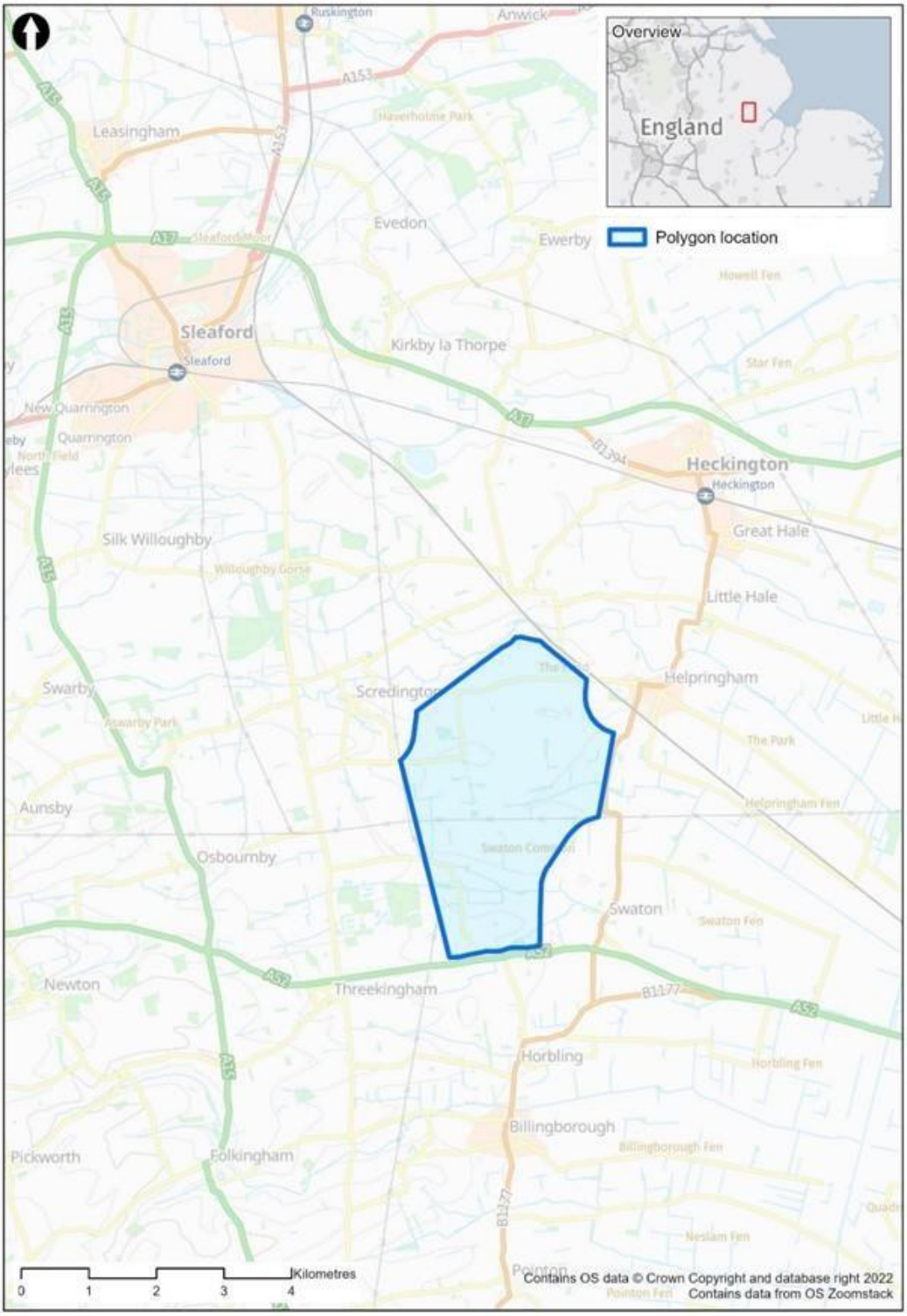
[5] The proposed capacity of the water treatment works and transfer pipelines has been updated since this assessment was completed. The figures quoted in the gate two report include a scheme deployable output of 166Ml/d and works capacity up to 180Ml/d. These changes are not anticipated to have any material impact on the completed assessments.

- The total perimeter length of the crest is approximately 8.5km and the estimated reservoir surface area is 4.8km^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 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 will be abstracted from the River Witham. The abstraction location has currently been assumed, for indicative purposes, to be at an intake between Chapel Hill and Langrick Bridge. The precise abstraction location will be identified following further detailed work

(including stakeholder engagement) for gate three. The current design includes the transfer of water into the reservoir by about 18km of 1600mm (millimetres) diameter steel pipeline.

However, the precise abstraction location will be identified following further detailed work (including stakeholder engagement) for gate three. The proposed abstraction rate from the River Witham is up to 400Ml/d when flows allow. This is subject to further assessment undertaken in collaboration with the Environment Agency (EA) to develop an abstraction rate which is licensable. The associated abstraction licence is expected to stipulate a minimum flow and minimum 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.

It is proposed that flows in the River Witham would be supported via a transfer from the River Trent. Up to 300Ml/d would be abstracted from the River Trent, with an intake currently assumed for indicative purposes to be located near Newark-on-Trent (although, as with the River Witham abstraction, the precise abstraction location will be identified following further detailed work for gate three) and transferred by about 10km of 1400mm diameter steel pipeline to the River Witham near Claypole. Without mitigation, there is a risk of INNS transferring between catchments (see EAR).

The current design includes the transfer of water into the reservoir by about 18km of 1600mm (millimetres) diameter steel pipeline. The potential for the raw water transfer to the reservoir from the River Witham into the South Forty Foot Drain (SFFD) and then into the reservoir, using open channel, to deliver additional benefits has been identified as an opportunity. This opportunity is being investigated further and will be confirmed during the next stage of project development.

Further work is planned for the next stage to confirm the locations of the abstraction points and routes for the transfers. This will involve 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. 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

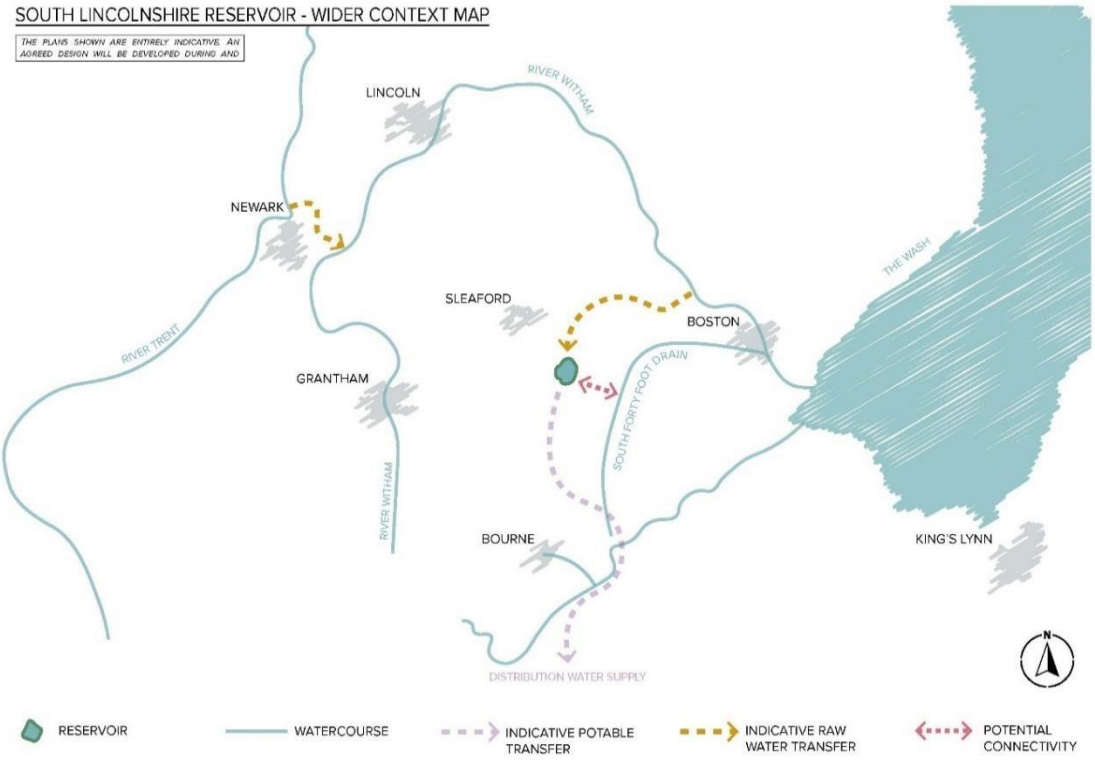
Stored water will subsequently be abstracted from the reservoir and treated to a potable quality. It is proposed that a WTW is located on land adjacent to the reservoir with a peak throughput capacity of 180Ml/d.

It is proposed that the treated water will be transferred by an approximate 37km 1100mm diameter steel pipeline into the potable supply network by an existing Anglian Water Service Reservoir. The reservoir is to supply over 500,000 homes in Lincolnshire and the south-west of the Anglian region.

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 emergency drawdown must be designed in accordance with the Reservoirs Act. The proposed solution at this stage is to discharge to the SFFD, 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 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 proposed site for the SLR 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 South Lincolnshire 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.

Reservoir and transfers

- South Beck GB105030056520
- Swaton Drains GB105030056515

Transfers only

- Brook Drain (including Marholm Brook) - GB105031050595
- The Fleet Upper Catchment (tributary of Trent) - GB104028053430
- Black Sluice IDB draining to the South Forty Foot Drain - GB205030051515
- Ousemere Lode - GB105030056490
- Slough Dyke Catchment (tributary of Trent) - GB104028053111
- Billingborough Lode - GB105030056480
- Pointon Lode - GB105030051555
- Old Beck - GB105030051540
- Glen - GB105031050720
- Vernatt's Drain - GB205031050705
- Welland confluence of Gwash to confluence of Greatford Cut - GB105031050600
- Welland confluence of Greatford Cut to tidal - GB205031050685
- Maxey Cut - GB205031050595
- Lower Trent Erewash (Secondary Combined) groundwater body - GB40402G990300
- Witham Lias groundwater body - GB40502G401400
- Cornbrash groundwater body - GB40502G445000

Abstraction only

- Trent from Soar to The Beck - GB104028053110

Discharge only

- Witham – conf Cringle Bk to conf Brant- GB105030056780

Abstraction and transfer of discharged water from the abstraction at the River Trent

- Lower Witham – conf Bain to Grand Sluice - GB205030062426

Transfer of discharged water from the abstraction at the River Trent

- Witham conf Brant to conf Catchwater Drain - GB105030062370
- Witham – conf Catchwater Drain to conf Bain - GB205030062425

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 proposed 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 SLR 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 location options to help identify the proposed site. These assessments considered only the reservoir footprints and were based on the preliminary design information available at the time. The assessment for the proposed site has been used as the basis for this latest proposed site assessment.

4.3 Level 1 WFD assessment for transfers

The transfers considered consists of:

- Construction of a pipeline, approximately 10km in length to transfer water from River Trent to River Witham
- Construction of a pipeline, approximately 18km in length, to transfer water from River Witham to South Lincolnshire reservoir
- Construction of a pipeline, approximately 37km in length to transfer water from South Lincolnshire reservoir to Water Treatment Works in Peterborough

The following assumptions were made in the assessment of this transfer route:

- 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 transfers, 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 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 transfer network. Therefore, none of the waterbody catchments required a Level 2 assessment, where the transfer is the sole design element (see Section 5.1).

4.4 Hydro-ecology

Mott MacDonald carried out an informal Stage 2 Habitat Regulations Assessment (HRA)[6] in June 2022 and concluded that no residual effects remain on designated sites for the construction phase of the scheme at The Wash SPA/Ramsar Site and The Wash and Norfolk Coast SAC, assuming that all proposed mitigation is implemented. However, adverse effects for the operational phase cannot be ruled out, as the potential adverse effects of increased sedimentation and changes in water levels and flows and are currently unknown.

In June 2022, Mott MacDonald carried out a Hydro-ecology study to consider implications on aquatic habitats and species. This study concluded the following:

- The abstractions would only result in significant flow reduction during high-discharge periods in winter. Summer flows during high-discharge periods would not be significantly affected. On the basis of current modelled scenarios, water transfer from the River Trent would result in dramatic flow increases in the River Trent, throughout the year, with proportionately greater impact in the summer. The increase would be most pronounced at the point of transfer into the River Witham, and the effect would be reduced with distance downstream.
- Changes in flow because of the scheme have the potential to impact water depths and velocities at barriers along the watercourse, ultimately rendering barriers less passable for all of the fish species identified in this study.
- For aquatic communities, the impacts are pronounced at Claypole and gradually reducing in magnitude with distance from the discharge point. There is potential for a reduced impact on fish species further downstream of the discharge point as the results from the hydrological analysis suggest the increase in flow will be significantly reduced in comparison to the baseline.

4.5 Water quality modelling

Mott MacDonald conducted Soil and Water Assessment Tool (SWAT) modelling of phosphorus. This study concluded that:

- Transferring water from the River Trent to the River Witham to support flow and abstraction in the River Witham results in higher orthophosphate concentrations at the River Trent (Langrick Bridge) abstraction point.
- Transferring water from the River Trent to the River Witham during the summer results in a greater increase in phosphorus load at River Trent (Langrick Bridge) than transferring at the same rate during autumn and winter. This is a result of reduced dilution of phosphorus, mostly from point sources during the summer when flows are lower in both the River Trent and River Witham.

[6] Mott MacDonald, 2022. SLR Reservoir Informal Habitats Regulations Assessment (HRA), June 2022.

5 WFD Assessment

5.1 Level 1 assessment

Table 5.1 provides the colour-coding matrix applied to identify if waterbodies are screened in or out of further assessment. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*[7].

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

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

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

Waterbody ID	Maximum impact score / screening outcome	Comment
GB105030056515 – Swaton Drains	3	Headwaters of the main watercourse is located within the reservoir footprint, leading to the loss of a significant percentage of the catchment and several open channels. A new transfer will be located within this catchment. A new WTW will be located within this catchment.
GB105030056520 – South Beck	3	Reservoir located in this waterbody, leading to the loss of catchment and several open channels. Main watercourse located downstream of the reservoir. A new transfer will be located within this catchment.
GB104028053110 – Trent from Soar to Beck	3	A new surface abstraction, intake structure and pipeline will be located within this catchment, leading to reductions in flow in this water course
GB105030056780 – Witham – conf Cringle Bk to conf Brant	3	A new discharge and transfer will be located within this catchment, leading to the potential for changes in flow and water quality.
GB104028053111 – Slough Dyke Catchment (trib of Trent)	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105030062370- Witham conf Brant to conf Catchwater Drain	2	Discharge in upstream catchment, leading to the potential for changes in flow and water quality.
GB205030062425 – Witham – conf Catchwater Drain to conf Bain	2	Discharge in upstream catchment, leading to the potential for changes in flow and water quality.
GB205030062426 – Lower Witham – conf Bain to Grand Sluice	3	Discharge in upstream catchment, leading to the potential for changes in flow and water quality. A new surface water abstraction will also be located within this catchment..
GB104028053430 – The Fleet Upper Catchment (trib of Trent)	1	A new transfer will be located within this catchment. No significant impacts anticipated.

GB205030051515 – Black Sluice IDB draining to the South Forty Foot Drain	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105030056490 – Ousemere Lode	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105030056480 – Billingborough Lode	1	A new transfer will be located within this catchment. No significant impacts anticipated.

Waterbody ID	**Maximum impact score / screening outcome**	**Comment**
GB105030051555 – Pointon Lode	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105030051540 – Old Beck	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105031050720 - Glen	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB205031050705 – Vernatt's Drain	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB105031050600 – Welland – conf Greatford Cut	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB205031050595 – Maxey Cut	1	A new intake structure and transfer will be located within this catchment. No significant impacts anticipated.
GB105031050595 – Brook Drain (including Marholm Brook)	1	A new transfer and storage reservoir will be located within this catchment. No significant impacts anticipated.
GB205031050685 – Welland – conf Greatford Cut to tidal	1	A new transfer will be located within this catchment. No significant impacts anticipated.
GB40502G445000 – Cornbrash	1	A new transfer will be located within this groundwater body catchment. No significant impacts anticipated.

GB40402G990300 – Lower Trent Erewash – Secondary Combined	1	A new intake structure and transfer will be located within this groundwater body catchment. No significant impacts anticipated.
GB40502G401400 – Witham Lias	1	A new transfer will be located within this groundwater body catchment. No significant impacts anticipated.

Level 1 assessment identified 24 waterbodies which could potentially be affected by the scheme. Following the Level 1 assessment, seven of these waterbodies were identified as requiring further assessment, due to the potential effects on the WFD waterbodies.

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

- GB105030056515 – Swaton Drains
- GB105030056520 – South Beck
- GB104028053110 – Trent from Soar to Beck
- GB105030056780 – Witham – conf Cringle Bk to conf Brant
- GB105030062370 - Witham conf Brant to conf Catchwater Drain
- GB205030062425 – Witham – conf Catchwater Drain to conf Bain
- GB205030062426 – Lower Witham – conf Bain to Grand Sluice

5.2 Level 2 WFD Assessment

5.2.1 Assessment methodology

The second stage of the WFD assessment has been completed for the SLR scheme for waterbodies that were screened in at Level 1. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 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 one and two - 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 two - 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 three and four - Lots of good data and evidence are available, minimal assumptions. Design advanced minimal assumptions needed.

Table 5.4 provides a description of the risk of deterioration between status classes, compromising waterbody objectives, and assisting future attainment of waterbody objectives. 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
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

Construction activities will be managed by good practice construction measures to be included within an CEMP for the scheme 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'[8] , CIRIA's 'Control of water pollution from linear construction projects; Technical Guidance'[9] and the withdrawn EA's 'Protect groundwater and prevent groundwater pollution'[10], 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'[11]. Whilst the EA PPGs were formally withdrawn in 2015, the information still provides useful guidance. It is assumed the reservoir will include adequate drainage to accommodate potential changes in surface water run-off and water control.

5.2.3 Summary of results/outcomes

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

- GB105030056515 – Swaton Drains
- GB105030056520 – South Beck
- GB104028053110 – Trent from Soar to Beck
- GB105030056780 – Witham – conf Cringle Bk to conf Brant
- GB105030062370 - Witham conf Brant to conf Catchwater Drain
- GB205030062425 – Witham – conf Catchwater Drain to conf Bain
- GB205030062426 – Lower Witham – conf Bain to Grand Sluice

The Level 2 WFD assessment for the two waterbodies which the reservoir will be located in: Swaton Drains and South Beck, identified deterioration risks to hydromorphological supporting elements, in addition to geomorphological conditions (not as assessed as part of the WFD). These are primarily due to potential risks associated with the loss of open watercourses, which could potentially be mitigated by the realignment of some watercourses and/or alternative mitigation (e.g., in-channel improvements). However, further assessment and mitigation design would be required to confirm, and the assessment remains as at risk of deterioration until this work is complete.

The assessment for the remaining five waterbodies identified possible deterioration risks to flow, water quality and biological status elements due to the abstractions and discharges. However,

[8] Audus, Charles and Evans (2010) Environmental Good Practice on Site (Third Edition) (C692).
[9] Murnane, Heap and Swain (2006) Control of water pollution from linear construction projects; Technical Guidance. [10] Environment Agency (2017) Protect groundwater and precent groundwater pollution [online] available at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protectgroundwater-and-prevent-groundwater-pollution (Last accessed March 2022).
[11] The Environment Agency PPGs were formally withdrawn on 17 December 2015; however, they nonetheless provide clear and useful good practice advice. The archived PPGs are available at: https://webarchive.nationalarchives.gov.uk/20140328090931/http://www.environmentagency.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 Table 5.5. Detailed outputs are presented in Appendix B.

Impacts on downstream waterbodies, including the Wash and Humber estuaries have not been considered at this stage. They will be considered during the next stages of project development.

5.2.3.1 South Beck

The following elements are located within this catchment:

- Construction and operation of a new reservoir
- Construction and operation of new SLR treatment works to supply connection point flow conveyance

A potential minor localised risk (no risk of deterioration) to the South Beck was identified from the loss of open watercourse and loss of up to 4% of open watercourse within 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 catchment.

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

5.2.3.2 Swaton Drains

The following elements are located within this catchment:

- Construction and operation of a new reservoir
- Construction and operation of a new pipeline
- Construction and operation of a new Water Treatment Works (WTW), set back from the watercourse
- Construction and operation of a new small storage reservoir (set back from the watercourse)

A potential major adverse risk (risk of deterioration) to the Swaton Drains was identified, as a result of the reservoir footprint. This would result in loss of up to 2.5km of open channel, along with 28% of the catchment. The loss of catchment and open channel would lead to major adverse effects (risk of deterioration) on habitat, flow, hydromorphology and mitigation measures assessment in this waterbody. Mitigation could include realigning and diverting any substantial watercourses. Similarly, river restoration (in-channel and/or floodplain reconnection and riparian improvements/NFM) could also be considered to offset loss of habitat and impacts on hydromorphology. Consideration could be given to providing compensatory flows from the reservoir to Swaton Drains to support flows, though implications on water quality and INNS would need to be considered. However, until further assessment and design has included suitable mitigation a risk of deterioration remains.

At this stage it is assumed the construction of the pipeline will not involve in-channel modifications to a watercourse. Construction methods will 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 will be set back from the watercourse, therefore the construction impacts are expected to be negligible.

5.2.3.3 Trent from Soar to Beck

The following 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

An amber adverse risk (potential risk of deterioration) to the Trent from Soar to Beck was identified as a result of the new surface water abstraction. Abstraction rates are expected to be <10% of the total volume of the Trent catchment and the change in flow and velocity has the potential to impact biological elements. Further investigation is required to determine the full extent of the impacts. An amber adverse risk (potential risk of deterioration) was also identified due to potential for changes in water quality due to the surface water abstraction. The abstraction could result in a change in the physio-chemical conditions due to reduced dilution downstream.

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

5.2.3.4 Witham – conf Cringle Bk to conf Brant

The following elements are located within this catchment:

- Construction and operation of a new discharge and outfall structure
- Construction and operation of a new inter river flow conveyance, Trent to Witham transfer

A potential major adverse risk (risk of deterioration) to the Witham – conf Cringle Bk to conf Brant was identified as a result of the discharge from the Trent from Soar to Beck. A high-level water quality assessment of the indicative transfer was conducted, it concludes there is an expected 69% increase in ammonia concentrations. The RBMP Cycle 2 status of ammonia is currently ‘High’. The expected increase in ammonia concentration has the potential to lead to a major adverse risk (risk of deterioration) on the water quality. There is an expected increase 17% in phosphate concentrations, with a Cycle 2 classification of ‘High’ and ‘Moderate’. This is expected to have an amber adverse risk (potential risk of deterioration). It is recommended additional water quality modelling analysis should be undertaken to assist in determining the appropriate mitigation measures.

An amber adverse effect (potential risk of deterioration) was also identified for biological status elements due to change in flow velocity and volume. The discharge into this waterbody will lead to changes in water velocity and levels, which could impact on biological status elements. It is recommended hydroecology analysis is carried out to better understand the impact of the discharge on flow velocity and levels, and therefore on biological status elements.

The transfer via the River Witham will only be operated during wetter periods and no impact is anticipated on dry/drought conditions within the river. At this stage it is assumed the construction of the pipeline will not involve in-channel modifications to the watercourse.

Construction methods will involve trenchless activities and therefore the impact on the watercourse catchment as a result of the transfer is expected to be negligible.

The INNS treatment planned on the abstraction from the River Trent will ensure there is no risk for transfer of INNS into the River Witham from the River Trent.

5.2.3.5 Witham - conf Brant to conf Catchwater Drain The

following elements are located within this catchment:

- Transfer of discharged water from the River Trent abstraction

A potential major adverse risk (risk of deterioration) to the Witham – conf Brant to conf Catchwater Drain was identified as a result of changes in water quality due to the discharge from the River Trent into the upstream River Witham waterbody (Witham – conf Cringle Bk to conf Brant). A high- level water quality assessment, concludes there is the potential for a 46% increase in phosphate in the Witham - conf Brant to conf Catchwater Drain catchment, due to the upstream discharge from the River Trent. On a precautionary basis this is assessed as a major adverse effect (risk of deterioration). Similarly, the following other potential changes in water quality have been assessed:

- Potential increase in ammonia concentration (7%) which is assessed as an amber adverse effect (potential risk of deterioration)
- Potential 4% increase in pH, assessed as an amber adverse effect (potential risk of deterioration)
- Potential 1% increase in temperature, assessed as a negligible effect
- Potential decrease of 2% in Dissolved Oxygen assessed as a negligible effect

Further investigation is required to determine the actually likely changes in water quality and the potential impact of these changes on biological status elements.

Finally, an amber adverse effect (potential risk of deterioration) was also identified for biological status elements due to change in flow velocity and volume. The discharge into this waterbody will lead to changes in water velocity and levels, which could impact on biological status elements. It is recommended hydroecological analysis is carried out to better understand the impact of the discharge on flow velocity and levels, and therefore on biological status elements. The transfer via the River Witham will only be operated during wetter periods and no impact is anticipated on dry/drought conditions within the river.

5.2.3.6 Witham - conf Catchwater Drain to conf Bain The

following elements are located within this catchment:

- Transfer of discharged water down River Witham from the River Trent abstraction

A potential major adverse risk (risk of deterioration) to the Witham - conf Catchwater Drain to conf Bain was identified as a result of changes in water quality due to the discharge from the River Trent into the upstream River Witham waterbody (Witham – conf Cringle Bk to conf Brant). A high- level water quality assessment, concludes there is the potential for a 46% increase in phosphate in the Witham - conf Catchwater Drain to conf Bain catchment, due to the upstream discharge from the River Trent. On a precautionary basis this is assessed as a major adverse effect (risk of deterioration). Similarly, the following other potential changes in water quality have been assessed:

- Potential increase in ammonia concentration (7%) which is assessed as an amber adverse effect (potential risk of deterioration)
- Potential 4% increase in pH, assessed as an amber adverse effect (potential risk of deterioration)
- Potential 1% increase in temperature, assessed as a negligible effect
- Potential decrease of 2% in Dissolved Oxygen assessed as a negligible effect

Further investigation is required to determine the actually likely changes in water quality and the potential impact of these changes on biological status elements.

Finally, an amber adverse effect (potential risk of deterioration) was also identified for biological status elements due to change in flow velocity and volume. The discharge into this waterbody will lead to changes in water velocity and levels, which could impact on biological status elements. It is recommended hydroecological analysis is carried out to better understand the impact of the discharge on flow velocity and levels, and therefore on biological status elements. The transfer via the River Witham will only be operated during wetter periods and no impact is anticipated on dry/drought conditions within the river.

5.2.3.7 Lower Witham - conf Bain to Grand Sluice

The following elements are located within this catchment:

- Transfer of discharged water down River Witham from the River Trent abstraction
- Construction and operation of a new surface water abstraction on the River Witham
- Construction and operation of a new river intake structure
- Construction and operation of a new River Witham to SLR flow conveyance pipeline

A potential major adverse risk (risk of deterioration) to the Lower Witham - conf Bain to Grand Sluice was identified as a result of changes in water quality due to the discharge from the River Trent into the upstream River Witham waterbody (Witham – conf Cringle Bk to conf Brant). A high- level water quality assessment, concludes there is the potential for a 46% increase in phosphate in the Lower Witham - conf Bain to Grand Sluice catchment, due to the upstream discharge from the River Trent. On a precautionary basis this is assessed as a major adverse effect (risk of deterioration). Similarly, the following other potential changes in water quality have been assessed:

- Potential increase in ammonia concentration (7%) which is assessed as an amber adverse effect (potential risk of deterioration)
- Potential 4% increase in pH, assessed as an amber adverse effect (potential risk of deterioration)
- Potential 1% increase in temperature, assessed as a negligible effect
- Potential decrease of 2% in dissolved oxygen assessed as a negligible effect

Further investigation is required to determine the actually likely changes in water quality and the potential impact of these changes on biological status elements.

An amber adverse effect (potential risk of deterioration) was also identified for biological status elements due to change in flow velocity and volume. The discharge and subsequent abstraction at this waterbody will lead to changes in water velocity and level, which could impact on biological status elements. It is recommended hydroecological analysis is carried out to better understand the impact of the discharge and abstraction on flow velocity and levels, and therefore on biological status elements.

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

5.2.4 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 water body objectives
GB105030056515 – Swaton Drains	3	3	Yes	Yes	Yes	No
GB105030056520 – South Beck	3	1	No	No	No	No
GB104028053110 – Trent from Soar to Beck	3	2	No	No	No	No
GB105030056780 – Witham – conf Cringle Bk to conf Brant	3	3	Yes	Yes	Yes	No
GB105030062370 - Witham conf Brant to conf Catchwater Drain	3	3	Yes	Yes	Yes	No
GB205030062425 – Witham – conf Catchwater Drain to conf Bain	3	3	Yes	Yes	Yes	No
GB205030062426 – Lower Witham – conf Bain to Grand Sluice	3	3	Yes	Yes	Yes	No
GB104028053111 - Slough Dyke Catchment (trib of Trent)	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB104028053430 - The Fleet Upper Catchment (trib of Trent)	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205030051515 - Black Sluice IDB draining to the South Forty Foot Drain	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105030056490 - Ousemere Lode	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A

GB105030056480-Billingborough Lode	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105030051555 - Pointon Lode	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A

GB105030051540 -Old BeckGB105030051540 - -Old Beck	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105031050720 - Glen	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205031050705 - Vernatt's Drain	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105031050600 - Welland - conf Gwash to conf Greatford Cut	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205031050595 - Maxey Cut	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB105031050595 - Brook Drain (including Marholm Brook)	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB205031050685 - Welland - conf Greatford Cut to tidal	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB40502G445000 - Cornbrash	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A
GB40402G990300 - Lower Trent Erewash - Secondary Combined	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A

GB40502G401400 - Witham Lias	**1**	Level 2 assessment not required	N/A	N/A	N/A	N/A

5.3 Risk of deterioration

A major adverse risk (risk of deterioration) to the Swaton Drains (ID: GB105030056515) has been identified. Within the reservoir footprint over 2.5km of open channel would be lost, along with 28% of the catchment. The loss of open channel would impact on habitat, flow and hydromorphology in this waterbody. Mitigation would include provision of new open water channels and providing compensatory flows from the reservoir to Swaton Drains. However, implications on water quality and INNS would to be considered. Similarly, river restoration (inchannel and/or floodplain reconnection and riparian improvements/NFM) could also be considered to offset loss of habitat and impacts on hydromorphology.

An amber adverse risk (potential risk of deterioration) to the Trent from Soar to Beck was identified as a result of the new surface water abstraction. Abstraction rates are expected to be <10% of the total volume of the Trent catchment and the change in flow and velocity has the potential to impact biological elements. Further investigation is required to determine the full extent of the impacts. An amber adverse risk (potential risk of deterioration) was also identified due to potential for changes in water quality due to the surface water abstraction. The abstraction could result in a change in the physico-chemical conditions due to reduced dilution downstream.

A major adverse risk (risk of deterioration) to the Witham – conf Cringle Bk to conf Brant (ID: GB105030056780) has been identified as a result of the discharge from the Trent from Soar to Beck. A high-level water quality assessment of the indicative transfer was conducted, it concludes there is an expected 69% increase in ammonia. As of the RBMP Cycle 2 the status of ammonia is ‘High’, this increase in ammonia has the potential to cause a significant effect on the water quality. In combination with an increase in the other physico-chemicals, this has the potential to decrease the chemical status from ‘Moderate’ to ‘Poor’. It is recommended additional water quality modelling analysis should be undertaken to assist in determining proportionate mitigation measures.

Major adverse risk (risk of deterioration) to the Witham – conf Brant to conf Catchwater Drain (ID: GB105030062370) and the Witham - conf Catchwater Drain to conf Bain (ID: GB205030062425) have been identified as a result of the discharge from the Witham – conf Cringle Bk to conf Brant (ID: GB105030056780). A high-level water quality assessment concludes an expected 46% increase in phosphate by the time it reaches both catchments. Within the catchments, phosphate levels are expected to be lower. However, further investigation is required to determine the predicted percentage change. It is recommended additional water quality modelling analysis should be undertaken to assist in determining the proportionate mitigation measures.

If this scheme is taken forward, 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 (WFD Regulations 2017) in respect of potential deterioration in status of one or more waterbodies. Further investigation is required to fully quantify the impacts and identify possible mitigation.

5.4 In-combination effects

An initial in-combination effects assessment has been undertaken as part of the gate two WFD report. The SLR SRO is being considered as a major supply-side option in the Water Resources East (WRE) Regional Plan and Anglian Water’s draft Water Resources Management Plan 2024 (dWRMP24). If the scheme is selected, it will be subject to further in-combination and incombination effects assessment with the other selected options, neighbouring water company plans and neighbouring regional plans. 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 impacts on The Wash as a result of the SLR and Fens reservoir schemes. Further work will be undertaken during the next stages of project development to determine the extent of potential in-combination effects on The Wash, following the outcome of the ongoing hydrological assessments. Similarly, there are potential incombination effects as a result of SLR and Minworth SRO on the River Trent. Further work will be undertaken at during the next stages of project development to identify the potential incombination effects, based on the ongoing hydrological assessments (assuming Minworth SRO is taken forward to gate three).

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 or allocations have been considered.

A search of the committed developments identified 24 within the search radius of 10km. The search concluded no committed developments would be impacted as a result of the SLR scheme, due to their locations not being hydrologically connected.

A search of major planning applications identified 17 within the search radius of relevance to WFD. The search concluded one major planning application had the potential of being impacted by the scheme. The development[8] is to facilitate the Viking Link electrical interconnecter with an approximate capacity of 1400 megawatts (MW) extending from Revising, Jutland (Denmark) to Bicker Fen, Lincolnshire (United Kingdom). Works include installations of up to six onshore high voltage cables, link pillars along the cable rout, drainage mitigation and fibre optic cable. In relation to the SLR scheme, the cables intersect the River Witham between the SLR abstraction and discharge locations. The cables also intersect the transfer route between the River Witham and the A17. The Environmental Impact Assessment for this project states the construction of the cables will involve trenchless activities (i.e. Horizontal Directional Drilling) of the watercourse crossings. The activities associated with this construction method could lead to an increase in turbid run-off and spillages/leaks of fuel, oil or other pollutants; with the potential to impact on the water quality in the receiving the watercourses. Additionally, there could be an increase in soil erosion, along the exposed cable trenches. This has the potential to turbid (sediment laden) runoff affecting the nearby watercourses. Mitigation for The Viking Link Project includes areas of risk of spillage to be bunded or otherwise isolated to minimise the risk of hazardous substances entering the local watercourses, any surface water flowing into the trenches, will be pumped via settling tanks to remove sediment and potential contaminants before being discharged back into the watercourse, as well Environment Agency (EA) standard good practice measures (such as PPGs). Use of this mitigation would lead to minor adverse effects that are not significant. It is anticipated with effective mitigation from both the SLR scheme and the development, this will have a minor localised risk (no risk of deterioration) on the affected watercourses.

In addition, 3 mineral allocations were identified within the same waterbodies as SLR (see Table 5.6). SLR involves the installation of new transfers, 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 three of these projects there is the potential for in-combination effects due to impacts on river flows, from reduced baseflow from groundwater. However, the scale of works associated with SLR is likely to be small and

[8] National Grid (2017) Viking Link. Available at: viewDocument (sholland.gov.uk)

temporary. Within suitable mitigation in place (such as the discharge of dewatering into local watercourses), is it anticipated that construction of SLR 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.

Table 5.6: Mineral allocation projects in same water bodies as SLR

Project name	Description	Waterbody impacted
Baston No.2 Quarry Phase 2, Langtoft	Hanson Aggregates Quarry with proposed 2025 extension of existing site for 37 additional hectares of sand and gravel extraction	GB205031050705: Vernatt's Drain
Land off Main Road, Maxey	Potential sand and gravel at site across 33 hectares of land in Maxey	GB205031050595: Maxey Cut
West Deeping Development Brief	36.1 hectare extension to existing King Street Quarry for 2027	GB105031050600: Welland – conf Gwash to conf Greatford Cut

Overall, it is assessed that there will be no in-combination effects due to the SLR project and other committed developments or major planning applications.

5.5 Requirements to improve confidence

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

- On-going 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 HWMB measures where relevant) from the EA to understand the impact of the scheme, and 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 South Beck and Swaton Drains waterbodies.
- A hydrology study is recommended to understand potential impacts of reduced flow in the Trent from Sour to The Beck catchment on the hydrological regime and water quality (including both continuous and spot sample water quality monitoring).
- It is recommended additional water quality monitoring (both continuous and spot monitoring) is carried out on the four Witham waterbodies. This data should then be used in further water quality analysis to determine the effects of the discharge from the River Trent on water quality and therefore biology.
- It is recommended hydraulic modelling analysis is undertaken to determine the effects of the increase in flow volume and velocity on the four Witham waterbodies as a result of the discharge.
- Development of WFD mitigation to offset impacts of the scheme.
- Completion of full WFD assessment for consenting stage.

5.6 Mitigation measures

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

Potential mitigation measures for the surface water bodies are set out below:

- 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.[9]
- Considerations to avoid deterioration to hydromorphological determinants including how the flow and quantity of water changes over time.
- Intake structures should be fitted with appropriate fish / eel screens.
- INNS treatment for the transfer from the River Trent to the River Witham.
- If required, consideration of potential water quality treatment of water from River Trent before discharge to River Witham, if additional investigation into nutrient loads indicates a risk of WFD deterioration in water quality.
- Potential low flow releases from the reservoir into local watercourses to help maintain flow (if further investigation suggest this is needed).
- Industry good practice measures including PPG's.[10]
- Ensure all works carried out in accordance with guidance provided by the regulator, the EA, for working on/or near water.[11]
- 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'.[12]

A geomorphological walkover should be undertaken at future project stages to understand the status of each watercourse and identify potential suitable mitigation.

This environmental appraisal has highlighted that some uncertainties and risks remain that will need resolving. For WFD, a detailed strategy to develop a robust evidence base to inform subsequent assessments, and potentially derogation tests, will need to be developed in consultation with the regulators.

[9] https://www.wlma.org.uk/uploads/Guide_GEP_Fenland_Water_Bodies_web.pdf

[10] Although PPG's are considered to be out of date, they remain good practices for the industry and should be used as embedded mitigation when applicable.

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

[12] 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 SLR scheme, a WFD assessment has been developed to assess the potential for WFD risks as a result of the scheme. The Level 1 assessment indicated that 24 surface waterbodies, with seven of them requiring further assessment.

Level 2 WFD assessments were completed for seven waterbodies and the findings indicate that there are precautionary WFD compliance risks associated with all seven of these waterbodies are set out in Table 6.1 below.

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)
Swaton Drains	GB105030056515	3 (major adverse)	3 (major adverse)
South Beck	GB105030056520	2 (amber adverse)	2 (amber adverse)
Trent from Soar to Beck	GB104028053110	2 (amber adverse)	2 (amber adverse)
Witham – conf Cringle Bk to conf Brant	GB105030056780	3 (major adverse)	3 (major adverse)
Witham conf Brant to conf Catchwater Drain	GB105030062370	2 (amber adverse)	3 (major adverse)
Witham – conf Catchwater Drain to conf Bain	GB205030062425	2 (amber adverse)	3 (major adverse)
Lower Witham – conf Bain to Grand Sluice	GB205030062426	3 (major adverse)	3 (major adverse)

The risks identified with the surface water bodies are due to the loss of catchment area and open watercourses, particularly associated with larger channel and decrease in the water quality. Mitigation could include realignment/diversion of the watercourses around the reservoir, but further assessment and design is needed to finalise mitigation needs.

It is possible that an exemption would need to be sought under Regulation 19 of the Water Environment (WFD) (England & Wales) Regulations 2017 (WFD Regulations 2017) in respect of potential deterioration in status of one or more waterbodies. Further investigation will be required

to fully quantify the impact, identify possible mitigation and determine the need for any potential exemption.

6.2 Recommendations

Area for future focus include:

- Consultation with the EA to present and discuss key WFD risks and proposed approach to improving certainty of assessment.
- Collation and review of Heavily Modified Waterbody (HMWB) and mitigation measures information from the EA 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.
- Land drainage and site drainage design to understand which watercourses will be diverted/realigned and which are lost.
- A hydrology study to understand potential impacts of reduced flow in the Trent from Sour to The Beck catchment on the hydrological regime and water quality (including both continuous and spot sample water quality monitoring).
- Additional water quality monitoring (both continuous and spot monitoring) is carried out on the four Witham waterbodies. This data should then be used in further water quality analysis to determine the effects of the discharge from the River Trent on water quality and therefore biology.
- It is recommended additional water quality modelling analysis should be undertaken to assist in determining the appropriate mitigation measures.
- It is recommended hydraulic modelling analysis is undertaken to determine the effects of the increase in flow volume and velocity on the four Witham waterbodies as a result of the discharge.
- Development of WFD mitigation to offset impacts of the scheme.
- Identify further work or modelling required to demonstrate compliance into during the next stages of project development.
- Completion of full WFD assessment for consenting stage.

A. Level 1 WFD assessment

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	Count of activities scoring minor benefit score	Count of activities scoring minimal impact score	Count of activities scoring minor local impact score	Count of activities scoring medium impact score	Count of activities scoring high Level 1 max score impact score		Level 1 mean score	Carry through to level 2 assessment?
GB105030056520	South Beck	River	Poor in 2015	Moderate by 2027	13	0	0	2	8	1	2	3	1.23	
GB105030056515	Swaton Drains	River	Moderate in 2015	Good by 2027	12	0	0	2	7	1	2	3	1.25	
GB104028053110	Trent from Soar to The Beck	River	Moderate in 2015	Moderate by 2015	9	0	0	1	6	1	1	3	1.22	
GB105030056780	Witham - conf Cringle Bk to conf Brant	River	Moderate in 2015	Moderate by 2015	9	0	0	2	6	0	1	3	1.00	
GB104028053111	Slough Dyke Catchment (trib of Trent)	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB104028053430	The Fleet Upper Catchment (trib of Trent)	River	Bad in 2015	Poor by 2027	5	0	0	1	4	0	0	1	0.80	NO
GB205030051515	Black Sluice IDB draining to the South Forty Foot Drain	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB105030056490	Ousemere Lode	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB105030056480	Billingborough Lode	River	Moderate in 2015	Good by 2027	5	0	0	1	4	0	0	1	0.80	NO
GB105030051555	Pointon Lode	River	Moderate in 2015	Good by 2027	5	0	0	1	4	0	0	1	0.80	NO
GB105030051540	Old Beck	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB105031050720	Glen	River	Moderate in 2015	Good by 2027	5	0	0	1	4	0	0	1	0.80	NO
GB205031050705	Vernatt's Drain	River	Moderate in 2015	Good by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB105031050600	Welland - conf Gwash to conf Greatford Cut	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB205031050595	Maxey Cut	River	Moderate in 2015	Moderate by 2015	6	0	0	1	5	0	0	1	0.83	NO
GB105031050595	Brook Drain (including Marholm Brook)	River	Moderate in 2015	Moderate by 2015	6	0	0	2	4	0	0	1	0.67	NO
GB205031050685	Welland - conf Greatford Cut to tidal	River	Moderate in 2015	Moderate by 2015	5	0	0	1	4	0	0	1	0.80	NO
GB40502G445000	Cornbrash	GroundWaterB	Poor in 2015	Poor in 2015	2	0	0	0	2	0	0	1	1.00	NO
GB40402G990300	Lower Trent Erewash - Secondary Combined	GroundWaterB	Poor in 2015	Good by 2027	3	0	0	0	3	0	0	1	1.00	NO
GB40502G401400	Witham Lias U	GroundWaterB	Good by 2015	Good by 2027	3	0	0	0	3	0	0	1	1.00	NO
GB105030062370	Witham - conf Brant to conf Catchwater Drain	River	Moderate in 2015	Moderate by 2015	1	0	0	0	0	0	1	3	3.00	
GB205030062425	Witham - conf Catchwater Drain to conf Bain	River	Moderate in 2015	Moderate by 2015	1	0	0	0	0	0	1	3	3.00	
GB205030062426	Lower Witham – conf Bain to Grand Sluice	River	Moderate in 2015	Moderate by 2015	5	0	0	1	2	0	2	3	1.60	

Component	Activity	Construction, Operation or Decommissioning	Assumptions / Mitigations assumed to be in place	Comments	Score	South Beck	Swaton Drains	Trent from Soar to The Beck	Witham - conf Cringle Bk to conf Brant	Slough Dyke Catchment (trib of Trent)	The Fleet Upper Catchment (trib of Trent)	Black Sluice IDB draining to the South Forty Foot Drain	Ousemere Lode	Billingborough Lode	Pointon Lode	Old Beck	Glen	Vernatt's Drain	Welland - conf Gwash to conf Greatford Cut	Maxey Cut	Brook Drain (including Marholm Brook)	Welland - conf Greatford Cut to tidal	Cornbrash	Lower Trent Erewash Secondary Combined	Witham Lias	Witham - conf Brant to conf Catchwater Drain	Witham 1st and 3rd IDBs draining to the River Witham	Lower Witham
						GB105030056520	GB105030056515	GB104028053110	GB105030056780	GB104028053111	GB104028053430	GB205030051515	GB105030056490	GB105030056480	GB105030051555	GB105030051540	GB105031050720	GB205031050705	GB105031050600	GB205031050595	GB105031050595	GB205031050685	GB40502G445000	GB40402G990300	GB40502G401400	GB105030062370	GB205030062425	GB205030062426
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 Depending on construction method, site runoff will impact surface waters	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	N/A	N/A	N/A
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 should affect the groundwater only and not surface water	1	1	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	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 should affect the groundwater only and not surface water	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	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 should affect the groundwater only and not surface water	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	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 should affect the groundwater only and not surface water	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	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 should affect the groundwater only and not surface water	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	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/below ground excavation 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 discharge.	The specific below ground activities should affect the groundwater only and not surface water	2	2	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	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	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	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		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	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			There may be minor short term impacts during the																									
Catchment management	River restoration - construction phase	Construction	construction phase	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Catchment management	River restoration - after 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	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		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	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	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		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	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	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		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	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		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	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	SuDS should be employed to manage flooding during construction phase. SuDS may also be required to control and treat surface water runoff during constrution	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	N/A	N/A	N/A
	Sustainable Urban Drainage Systems (SUDS) - after construction																											
Catchment management		Operation	Assumed to presented as an option at local scale.	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	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	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	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			presence of the culvert																									
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	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	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		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	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		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	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		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	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	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	N/A	N/A	N/A	3	3	3
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		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	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	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	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	Discharges from the abstraction and discharge catchments are at Moderate chemical status	1	1	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	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	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	The discharged water will be transfer through 3 catchments before being abstracted	2	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	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	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	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	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).	Outfall structures will be constructed for the discharges	1	1	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	N/A	N/A	1	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	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).	Assumes there will be maintanence needed	0	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Work will be carried out under appropriate consent from																									
Groundwater	Refurbishment of existing boreholes	Construction	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	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	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	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	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	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	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	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	1	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	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).	New inlet structure will impact existing water body.	1	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	1	N/A	N/A	N/A	1	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).	Maintenance of new inlet structures	1	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	N/A	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	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Emergency or drought use of existing surface water or groundwater abstraction																												
Licence	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	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	New abstraction within these catchments	3	N/A	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	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3
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	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		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	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	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. Sites should look to capture runoff from silles and treat before discharge.	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	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.	Trenchless activities used in locations for rivers, watercourses and watercourse links. Smaller land drains crossed using trenching and laying.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	1
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	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 pipe lines	Operation	No assumed mitigations	N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	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	1	1	1	1	1	N/A	N/A	N/A	N/A	N/A	N/A	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 exisitng 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	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 exisitng 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	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	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	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	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	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	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).	Construction of new reservoir within the catchment	3	3	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	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	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	3	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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 occuring 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	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	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		Operation	Assumes use of water would not be for drinking unless	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
abstraction management	Tankering raw water or treated effluent		sent to WTW for full treatment.																									
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	N/A	N/A	0	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	Construction of a new WTW set back from the	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				watercourse																								
WTW	Construction of a new WTW or pumping station relating to raw water	Construction	No assumed mitigations	It is assumed maintenance will be required for the new WTW	1	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	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	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	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	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	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Each activity has been predefined an impact score.

The maximum impact score for each waterbody determines if the waterbody requires further assessment or not.

Any waterbodies containing activities that score a 2 or 3 will require a level 2 assessment where mitigation must be demonstrated and PoM, RNAGs and the data will be considered.

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.

Level 1 assessment	Impact	Impact Score	Description
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 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.

B. Level 2 WFD assessments

Strategic Resource Option WFD assessment for: SLR 41

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
GB105030056520	South Beck	River	3	1	1	No	No	No	No
GB105030056515	Swaton Drains	River	3	3	3	Yes	Yes	Yes	No
GB104028053110	Trent from Soar to The Beck	River	3	2	2	No	No	No	no
GB104028053111	Slough Dyke Catchment (trib of Trent)	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
GB104028053430	The Fleet Upper Catchment (trib of Trent)	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
GB205030051515	Black Sluice IDB draining to the South Forty Foot	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
GB105030056490	Ousemere Lode	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
GB105030056480	Billingborough Lode	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
GB105030051555	Pointon Lode	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
GB105030051540	Old Beck	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
GB105031050720	Glen	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
GB205031050705	Vernatt's 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
GB105031050600	Welland - conf Gwash to conf Greatford Cut	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
GB205031050595	Maxey Cut	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
GB105031050595	Brook Drain (including Marholm 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
GB205031050685	Welland - conf Greatford Cut to tidal	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

GB40502G445000	Cornbrash	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

GB40402G990300	Lower Trent Erewash - Secondary Combined	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
GB40502G401400	Witham Lias U	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
GB105030056780	Witham - conf Cringle Bk to conf Brant	River	3	3	3	Yes	Yes	Yes	No
GB105030062370	Witham - conf Brant to conf Catchwater Drain	River	3	3	3	Yes	Yes	Yes	No
GB205030062425	Witham - conf Catchwater Drain to conf Bain	River	3	3	3	Yes	Yes	Yes	No
GB205030062426	Lower Witham - conf Bain to Grand Sluice	River	3	3	3	Yes	Yes	Yes	No

Workbook name SLR 41 - Level 2 WFD assessment Combined.xlsm

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	Mitigation measures	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 objectives	Further comments body
GB105030056520	TRUE	South Beck	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 habitat and flow into the main rivers 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 statusin line with Cycle 3 2021-2027 RBMPs once published.	Any large watercourses should be realigned to provide lost opportunities to improve the water body as part of the scheme Further details on mitigation measures assessment from EA to understand impact of the scheme and also to identify	1	No	No	No	No	
GB105030056515	TRUE	Swaton Drains	3	Low	Low	1) On-going refinement of the design. 2) Land drainage and site drainage design tocatchment and understand which watercourses will be diverted/realigned and which are lost. length 3) Hydrology study to understand potential reduction in catchment area (and impacts on flow) considered to 4) Request for further specific details of mitigationwater quality. measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA understand impact of the scheme and also to identify 5) update to WFD baseline data to include 2019 statusopportunities to improve the water body as part of the scheme in line with Cycle 3 2021-2027 RBMPs once published.	The reservoir will lead to the loss of approximately 28% of the therefore a reduction in flows in both channels. Need to offset loss of in-channel habitat and/or watercourse Flow support release of water from the reservoir could be support flows, but would need consideration of Further details on mitigation measures assessment from EA to	3	Yes	Yes	Yes	No	
GB104028053110	TRUE	Trent from Soar to The Beck	2	Low	Low	1) On-going refinement of the design. 2) Hydrology study to understand potential impact of reduced flow in the catchment on hydrological water quality (including both continuous and spot sample water quality monitoring) request for further specific details of mitigation assessment and RBMP measures (including elements. where relevant) from EA measures. 4) 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 regime and intake structure. Further water quality modelling and monitoring (both continuous and spot sampling) is required to 3) determine the extent of impacts on the biological quality measures This will help determine appropriate mitigation A/HWMB measures	2	No	No	No	no	
GB105030056780	TRUE	Witham - conf Cringle Bk to conf Brant	3	Low	Low	1) On-going refinement of the design. 2) Hydrology study to understand the impact ofincreased flow in the catchment on hydrological regime and biological status elements, 3) Water quality modelling and monitoring (bothcontinuous and spot sampling) to understand the impact of changes in water quality and therefore biology due to the discharge, 4) request for further specific details of mitigationmeasures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 5) update to WFD baseline data to include 2019 statusin line with Cycle 3 2021-2027 RBMPs once published. 6) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham 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.	3	Yes	Yes	Yes	No	
GB105030062370	TRUE	Witham - conf Brant to conf Catchwater Drain	3	Low	Low	1) On-going refinement of the design. 2) Hydrology study to understand the impact ofincreased flow in the catchment on hydrological regime and biological status elements, 3) Water quality modelling and monitoring (bothcontinuous and spot sampling) to understand the impact of changes in water quality and therefore biology due to the discharge, 4) request for further specific details of mitigationmeasures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 5) update to WFD baseline data to include 2019 statusin line with Cycle 3 2021-2027 RBMPs once published. 6) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham 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.	3	Yes	Yes	Yes	No	
GB205030062425	TRUE	Witham - conf Catchwater Drain to conf Bain	3	Low	Low	1) On-going refinement of the design. 2) Hydrology study to understand the impact ofincreased flow in the catchment on hydrological regime and biological status elements, 3) Water quality modelling and monitoring (bothcontinuous and spot sampling) to understand the impact of changes in water quality and therefore biology due to the discharge, 4) request for further specific details of mitigationmeasures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 5) update to WFD baseline data to include 2019 statusin line with Cycle 3 2021-2027 RBMPs once published. 6) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham 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.	3	Yes	Yes	Yes	No	

GB205030062426	TRUE	Lower Witham – conf Bain to Grand Sluice	3	Low	Low	1) On-going refinement of the design. 2) Hydrology study to understand the impact ofincreased flow in the catchment on hydrological regime and biological status elements, INNS treatment has been provided between the River Trent 3) Water quality modelling and monitoring (bothabstraction and the transfer to the River Witham continuous and spot sampling) to understand the impact of changes in water quality and therefore Implementation of best practice mitigation measures for the biology due to the discharge, intake structure. Further water quality modelling (both 4) request for further specific details of mitigationcontinuous and spot sampling) is required to determine the measures assessment and RBMP measures (including extent of impacts within this catchment. This will help A/HWMB measures where relevant) from EA determine appropriate mitigation measures. 5) update to WFD baseline data to include 2019 statusin line with Cycle 3 2021-2027 RBMPs once published. 6) Hydraulic modelling to understand the impact on flow and velocity as a result of the abstraction	3	Yes	Yes	Yes	No	Assumes that abstraction from this waterbody will be timed to coincide with the discharges into the upstream waterbody (GB105030056780) to ensure no net loss in flow downstream of abstraction point

Option	SLR 41	Go to RNAG/PoM table at bottom of the page
[redacted]	GB105030056520	
Waterbody name Waterbody type	South Beck River	
Hydromorphological designation	Heavily Modified	Action: Obtain HMWB measures information from the Environment Agency to add to the RNAG/PoM table.
Overall status	Poor	
Overall status objective	Moderate by 2027	

[redacted] Construction, Operation or Decommissioning activity	New impounding reservoir (in line/next to watercourse, or large compared to watercourse) - excluding abstraction/discharge				Maintenance of pipe lines (including draining pipeline)					New pipe lines involving watercourse crossings with no in channel modifications		Below ground structures (shaft/retaining wall) with associated dewatering
Potential Impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint	Noise and vibration	and operation Changes in flow velocity and volume (increase or decrease)	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Noise and vibration	Changes in flow velocity and volume (increase or decrease)	Operation Changes in sedimentation deposition	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	Changes in sedimentation deposition	and operation Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Operation Change in water quality due to discharge of groundwater to a surface water body
Biological Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓
Physicochemical Effects	✗	✗	✗	✗	✗	✓	✓	✓	✓	✗	✗	✓
Chemical effects	✗	✗	✗	✗	✗	✓	✓	✓	✓	✗	✗	✗

Does the component comply with WFD objectives (post mitigation)

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score
Biological quality elements	Fish		Poor in 2015	Moderate by 2027	1	Low	Low	No	No	No	Further water quality modelling is required to determine the extent of impacts within this catchment	1
	Invertebrates	Guidance document available	Good in 2015	Good by 2015	1	Low	Low	No	No	No		1
	Macrophytes and Phytobenthos Combined	Calculator available	Poor in 2015	Moderate by 2015	1	Low	Low	No	No	No		1
Hydromorphological Supporting Elements	Hydrological Regime		Does Not Support Good in 2015	Does Not Support Good by 2015	1	Low	Low	No	No	No	Assumes best practice measures will be implemented	1
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027	1	Low	Low	No	No	No	Further specific details of mitigation measures assessment will be requested at the next stage.	1
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	Good by 2015	1	Low	Low	No	No	No	Further water quality modelling is required to determine the extent of impacts within this catchment	1
	Dissolved oxygen pH Phosphate	Numerical limits for classes Calculator available	High in 2015 High in 2015 Poor in 2015	Good by 2015 Good by 2015 Moderate by 2027	1 1 1	Low Low Low	Low Low Low	No No No	No No No	No No No		1 1 1
	Temperature	Numerical limits for classes		Good by 2015	1	Low	Low	No	No	No		1
Specific pollutants	Mecoprop				0	Low	Low	Possible	Possible	Possible		0

WFD quality 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 in flow velocity and volume (increase or decrease)' 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 'Noise and vibration' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element
Fish	The reservoir footprint will result in a loss of some small field drainage channels. This will lead to the localised loss of habitat. Since all the channels lost are maintained field ditches, regular dredging and	Noise and vibration may impact the biological quality elements within this waterbody as a result of the construction of of the reservoir. Potential temporary disturbance during	The reservoir footprint will result in a loss of approximately 4% of the catchment and the loss of some small field drainage channels. This loss will	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 South Beck which these channels drain into. The scale of this reduction in flow is likely to be minor compared	Noise and vibration may impact the biological quality elements within this waterbody as a result of the construction of the pipelines. Potential temporary	No measurable effects anticipated as a
Invertebrates	maintainance are likely to already impact on the habitat value, and therefore this is assessed to be minor localised effects on	construction, though fish are likely to move away from the area and macrophytes and invertebrates	lead to small reduction in flow and velocity, which could impact on biological quality elements.	to the catchment size for these watercourses, but could lead to minor localised effects on biological quality elements due to	disturbance during construction, though fish are likely to move away from the area and macrophytes and intvertebrate unlikely to be sensitive to impact	result of changes in flow and velocity
Macrophytes and Phytobenthos Combined	biological quality elements.	unlikely to be sensitive to impact		changes in hydromorphology		
Hydrological Regime	No measurable effects anticipated as a result of change in channel footprint	No measurable effects anticipated as a result of noise and vibration	The size of the reservoir footprint will result in a loss of approximately 4% of the catchment and the loss of some small field drainage channels. This loss will lead to small reduction in flow and velocity in a waterbody where hydrological regime already does not support good	No measurable effects anticipated as a result of change in hydromorphology		
Mitigation Measures Assessment	The size of the reservoir footprint will result in a loss of some small field drainage channels, which could impact on the mitigation measures assessment.	No measurable effects anticipated as a result of noise and vibration	Minor localised impacts are expected to the mitigation measures assessment due to the increase in physical modification	Minor localised impacts are expected to the mitigation measures assessment due to the increase in physical modification		
Ammonia (total as N)						
Dissolved oxygen pH Phosphate						No measurable effects anticipated as a
Temperature						result of changes in flow and velocity
Mecoprop						

WFD quality element	Comment of the impact of 'Changes in sedimentation deposition' 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	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 discharge of groundwater to a surface water body' on each element
Fish	No measurable effects anticipated as a result	No measurable effects anticipated as a result of changes in water quality due to new changes in	No measurable effects anticipated as a result of changes in INNS present in the surface water body	No measurable effects anticipated as a result of changes in sedimentation deposition on the biological quality elements.	No measurable effects anticpated as a result of changes in hydromorphology on the biological quality elements. At this	Discharge of groundwater to surface water during construction has the potential to impact on water quality
Invertebrates	of changes in sedimentation deposition	existing discharge of surface water into surface water body		At this stage it is assumed cosntruction will involve trenchless activities.	stage it is assumed cosntruction will involve trenchless activities.	which could lead to temporary minor localised effects on biological quality elements
Macrophytes and Phytobenthos Combined						
Hydrological Regime				No measurable effects anticipated as a result of changes in sedimentation deposition on the hydrological regime and mitigation measures assessment. At this stage it is assumed construction will involve trenchless activities.	No measurable effects anticipated as a result of changes in hydromorphology on the hydrological regime and mitigation measures assessment. At this stage it is assumed construction will involve trenchless activities.	Discharge of groundwater to surface water during construction has the potential to impact the hydrological regime and therefore is assessed to be a minor localised beneficial effect.
Mitigation Measures Assessment						No measurable effects anticipated as a result of changes in water quality
Ammonia (total as N)		No measurable effects anticipated as a result of changes in water quality due to new changes in				Discharge of groundwater to surface water during construction has the potential to have a temporary impact the physico-chemical elements and therefore is assessed
Dissolved oxygen pH Phosphate	No measurable effects anticipated as a result		No measurable effects anticipated as a result of changes in INNS present in the			
Temperature	of changes in sedimentation deposition	existing discharge of surface water into surface water body	surface water body			to be a minor localised effect. No measurable effects anticipated
Mecoprop						as a result of changes in water quality

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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: Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (-2 to 3)	Note: Merge columns if activity appears multiple times New impounding reservoir (in line/next to watercourse, or large compared to watercourse) - excluding abstraction/discharge
Reasons for Not Achieving Good (RNAG)	486198	Phosphate	No sector responsible	Pollution from waste water	No									
Reasons for Not Achieving Good (RNAG)	486196	Phosphate	Water Industry		No									
Reasons for Not Achieving Good (RNAG)	520646	Macrophytes and Phytobenthos Combined	Water Industry	Pollution from waste water	No									
Reasons for Not Achieving Good (RNAG)	520790	Fish	Agriculture and rural land management	Physical modifications	Yes	0	Low	Low	No	No	No	None	0	Presence of a new physical modification (reservoir) is largely
Reasons for Not Achieving Good (RNAG)	520642	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Physical modifications	Yes	0	Low	Low	No	No	No	None	0	located away from the watercourse and is not expected to conflict with waterbody scale measures to reduce modifications

Option	SLR 41	Go to RNAG/PoM table at bottom of the page
	GB105030056515	
Waterbody name	Swaton Drains	
Waterbody type	River	
Hydromorphological designation	Heavily Modified	
Overall status	Moderate	
Overall status objective	Good by 2027	

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): Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score
Biological quality elements	Invertebrates	Guidance document available	Good in 2015	Good by 2015	3	Low	Low	Yes	Yes	Yes	Any substantial watercourses should be realigned where appropriate.	3
Hydromorphological Supporting Elements	Hydrological Regime		High in 2015	Supports Good by 2015	3	Low	Low	Yes	Yes	Yes	Any substantial watercourses should be realigned where appropriate.	3
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027	3	Low	Low	Yes	Yes	Yes	Any substantial watercourses should be realigned where appropriate.	3
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	Good by 2015	1	Low	Low	No	No	No		1
	Dissolved oxygen	Numerical limits for classes	Moderate in 2015	Good by 2015	1	Low	Low	No	No	No		1
	pH		High in 2015	Good by 2015	1	Low	Low	No	No	No		1
	Phosphate	Calculator available	Moderate in 2015	Good by 2027	1	Low	Low	No	No	No		1
	Temperature	Numerical limits for classes	Moderate in 2015	Good by 2015	1	Low	Low	No	No	No		1

	New impounding reservoir (in line/next to watercourse, or large compared to watercourse) - excluding abstraction/discharge			
Construction, Operation or Decommissioning activity	Construction and operation			
Potential Impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint ✓	Noise and vibration ✓	Changes in flow velocity and volume (increase or decrease) ✓	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream ✓
Hydromorphological supporting elements	✓	✓	✓	✓
Physicochemical Effects	✗	✗	✗	✗
Chemical effects	✗	✗	✗	✗
WFD quality 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 in flow velocity and volume (increase or decrease)' 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
Invertebrates	The reservoir footprint will result in a loss of approximately 2.5km of open watercourse, and will effectively sever the headwaters of the one main Swaton Drain watercourse from their upper catchment (loss of appoximately 28% of total water body length). This will lead to the loss of habitat for invertebrates and therefore this is assessed to be major adverse effect.	Noise and vibration may impact the biological quality elements within this waterbody as a result of the construction of the reservoir. Potential temporary disturbance during construction, though invertebrates unlikely to be sensitive to impact	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of approximately 28% of the waterbody catchment directly lost beneath the reservoir. This would lead to an major adverse reduction in flow in the watercourse, which would impact on the biological quality elements.	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of approximately 28% of the waterbody catchment directly lost beneath the reservoir. This would lead to an major adverse reduction in flow in the watercourse, which would impact on hydromorphology and in turn on the biological quality elements.
Hydrological Regime	Reservoir will be constructed over the footprint of the watercourse, and will result in the loss of approximately 28% of the waterbody length within the catchment. This would lead to a loss of catchment and the severance of the headwaters from the lower catchment, which is assessed to be a major adverse impact on the hydrological regime.	No measurable effects anticipated as a result of noise and vibration	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of 28% of the waterbody catchment directly lost beneath the reservoir. This would lead to an major adverse reduction in flow in the watercourse, which would impact on the hydrological regime.	No measurable effects anticipated as a result of hydromorphology changes
Mitigation Measures Assessment	Reservoir will be constructed over the footprint of the watercourse, and will result in the loss of approximately 28% of the waterbody length within the catchment. This would lead to a major adverse loss of open channel, which is likely to lead to a derogation in the mitigation measures assessment	No measurable effects anticipated as a result of noise and vibration	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of approximately 28% of the waterbody catchment directly lost beneath the reservoir. This would lead to an major adverse reduction in flow and therefore changes to the regime in the catchment. Some impacts on mitigation measures due to flow changes may occur	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of approximately 28% of the waterbody catchment directly lost beneath the reservoir. This would lead to an major adverse reduction in flow and therefore changes to the hydromophological regime in the catchment. Some impacts on mitigation measures due to sedimentation changes may occur
Ammonia (total as N)				
Dissolved oxygen				
pH				
Phosphate				
Temperature				

	Maintenance of pipe lines (including draining pipeline)			
Construction, Operation or Decommissioning activity	Operation			
Potential Impacts of asset (following consideration of embedded mitigation)	Changes in flow velocity and volume (increase or decrease) ✓	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 ✓
Hydromorphological supporting elements	✗	✗	✗	✗
Physicochemical Effects	✓	✓	✓	✓
Chemical effects	✓	✓	✓	✓
WFD quality 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 INNS present in surface water body' on each element
Invertebrates	No measurable effects anticipated to biological quality elements as a result of temporary and infrequent change in flow due to pipeline draining	No measurable effects anticipated to biological quality elements as a result of temporary and infrequent noise and vibration due to pipeline draining.Invertebrates likely to be insensitive to change	No measurable effects anticipated to biological quality elements as a result of temporary and infrequent change in water quality due to pipeline draining	No measurable effects anticipated to biological quality elements as a result of temporary and infrequent discharges due to pipeline draining
Hydrological Regime	No measurable effects anticipated as a result of temporary and infrequent change in flow due to pipeline draining			
Mitigation Measures Assessment				
Ammonia (total as N)				
Dissolved oxygen				
pH	No measurable effects anticipated as a result of the changes in flow velocity and volume	No measurable effects anticipated as a results of the noise and vibration	No measurable impact anticipated as a result of new or changes to existing discharge of surface water into surface water body	No measurable impact anticipated as a result of a change in INNS present in the surface water body
Phosphate				
Temperature				

	New pipe lines involving watercourse crossings with no in channel modifications		New WTW (set back from a watercourse)		Below ground structures (shaft/retaining wall) with associated dewatering
Construction, Operation or Decommissioning activity	Construction and operation		Construction		Construction
Potential Impacts of asset (following consideration of embedded mitigation)	Changes in sedimentation deposition ✓	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream ✓	Noise and vibration ✓	Change in water quality due to new or changes to existing disc ✓	Change in water quality due to discharge of groundwater to a surface water body ✓
Hydromorphological supporting elements	✓	✓	✗	✗	✓
Physicochemical Effects	✗	✗	✓	✓	✓
Chemical effects	✗	✗	✓	✓	✗
WFD quality 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 '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 water quality due to discharge of groundwater to a surface water body' on each element
Invertebrates	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 activities.	No measurable effects anticpated as a result of changes in hydromorphology on the biological quality elements. At this stage it is assumed construction will involve trenchless activities.	No measurable effects anticipated to biological quality elements as a result of noise and vibration during construction of the new WTW. Invertebrates likely to be insensitive to change	No measurable effects anticipated to biological quality elements as a result of construction of the new WTW	Discharge of groundwater to surface water during construction has the potential to impact the potential habitat for biological quality elements and therefore this is assessed to be a minor localised effect
Hydrological Regime	No measurable effects anticipated as a result of changes in sedimentation deposition on the hydrological regime and mitigation measures assessment. At this stage it is assumed construction will involve trenchless activities.	No measurable effects anticipated as a result of changes in hydromorphology on the hydrological regime and mitigation measures assessment. At this stage it is assumed construction will involve trenchless activities.			Discharge of groundwater to surface water during construction has the potential to impact the hydrological regime and therefore is assessed to be a minor localised effect.
Mitigation Measures Assessment					Discharge of groundwater to surface water during construction, is unlikely to impact the mitgation measures assessment.
Ammonia (total as N)					
Dissolved oxygen					
pH			No measurable impact anticipated on the physicochemcials as a result of noise and vibration	No measurable impacts anticipated on the physico-chemcials as a result of changes to water quality.	Discharge of groundwater to surface water during construction has the potential to impact the physicochemcials and therefore is assessed to be a minor localised effect.
Phosphate					
Temperature					

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Note: Merge columns if activity appears multiple times

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: Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (-2 to 3)	New impounding reservoir (in line/next to watercourse, or large compared to watercourse) - excluding abstraction/discharge
Reasons for Not Achieving Good (RNAG)	533184	Hydrological Regime	No sector responsible	No further action (Flow is below the EFI but NOT causing an ecological failure)	Yes		Low	Low	No	Yes	Yes	Any substantial watercourses should be realigned where appropriate.		
Reasons for Not Achieving Good (RNAG)	533186	Hydrological Regime	No sector responsible	No further action (Flow is below the EFI but NOT causing an ecological failure)	Yes		Low	Low	No	Yes	Yes			
Reasons for Not Achieving Good (RNAG)	531036	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Physical modifications	Yes	2	Low	Low	No	Yes	Yes		2	Reservoir will be constructed over the footprint of the watercourse, introducing new physical modifications to the waterbody, leading to a reduction in the improvements that can be made.
Reasons for Not Achieving Good (RNAG)	531034	Macrophytes and Phytobenthos Combined	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Yes	Yes		2	
Reasons for Not Achieving Good (RNAG)	531035	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Yes	Yes		2	Reservoir will be constructed over the footprint of the watercourse, effectively severing the headwaters from the lower reaches of the catchment. This will result in the loss of approximately 28% of the waterbody catchment directly lost
Reasons for Not Achieving Good (RNAG)	528820	Macrophytes and Phytobenthos Combined	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Yes	Yes		2	
Reasons for Not Achieving Good (RNAG)	528606	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Yes	Yes	Any substantial watercourses should be realigned where appropriate. Flow support release of water from the reservoir could be considered to support flows, but would need consideration of water quality.	2	beneath the reservoir. This would lead to an major adverse reduction in flow in the watercourse, leading to less dilution of pollution, potentially leading to a reduction in the improvements that can be made.
Reasons for Not Achieving Good (RNAG)	528607	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Yes	Yes		2	
Reasons for Not Achieving Good (RNAG)	531033	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Yes	Yes		2	

Option	SLR 41	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB104028053110	
Waterbody name	Trent from Soar to The Beck	
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	

Activity	New or modified pumping station and/or river intake	New or increased surface water abstraction	New or modified pumping station and/or river intake	Maintenance of pipe lines (including draining pipeline)	New or increased surface water abstraction	New or modified pumping station and/or river intake	Maintenance of pipe lines (including draining pipeline)	New pipe lines involving watercourse crossings with no in channel modifications	New or increased surface water abstraction	New or modified pumping station and/or	Maintenance of pipe lines (including draining pipeline)	New or modified pumping station and/or river intake	New pipe lines involving watercourse crossings with no in channel modifications	Maintenance of pipe lines (including draining pipeline)	New or increased surface water abstraction	Maintenance of pipe lines (including draining pipeline)
Construction, Operation or Decommissioning activity	Construction	Operation	Construction	Operation	Operation	Construction	Operation	Construction and operation	Operation	Construction	Operation	Construction	Construction and operation	Operation	Operation	Operation
Potential impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint	Changes to channel footprint	Changes in flow velocity and volume (increase or decrease)	Changes in flow velocity and volume (increase or decrease)	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Changes in sedimentation deposition	Changes in sedimentation deposition	Changes in sedimentation deposition	Noise and vibration	Noise and vibration	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	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	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	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✓	✗	✗	✓	✗	✗

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact Score	Data confidence	Design certainty	Deterioration from status classes	Impediments to GES/GEP	Compromises water body mitigation measures	Mitigation applied	Post mitigation impact score	Comment of the impact of 'Changes to channel footprint ' on each element	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 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 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes in sedimentation deposition' 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 '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 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 '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
Biological quality elements	Invertebrates	Guidance document available	Good in 2015	Good by 2015	2	Low	Low	Possible	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	2	New intake structure anticipated to have limited footprint, minimal effect on biological quality elements	New abstraction anticipated to have limited footprint, minimal effect on biological quality elements	Localised changes to flow velocity around intake expected to have minimal effect on to invertebrates	Temporary infrequent localised changes to flow velocity expected to have minimal effect on invertebrates	Changes in flow and velocity caused by the new abstraction may have impacts downstream. It should be noted that intake is located downstream from new outfall./ discharge into the River Witham and it is assumed that it will abstract the same if not similar amount of water as is discharged upstream. Despite this supporting flow, changes in local velocity and flow between the discharge and abstraction may still have an impact on biological quality elements, but to an uncertain extent. Further investigation is required.	Changes in flow volume and velocity as a result of new intake could lead to localised changes in sediment deposition which is anticipated to have minimal effect on the biological quality elements	Temporary infrequent localised changes to flow unlikely to effect sedimentation and expected to have minimal effect on invertebrates	No measurable effects anticipated as a result of changes in sedimentation deposition on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless activities.	Changes in flow volume and velocity could change sedimentation pattern, downstream of the abstraction, this could lead to changes in habitat effecting invertebrates.	Potential temporary disturbance during construction, though invertebrates likely to insensitive to noise	Temporary infrequent localised noise unlikely to effect invertebrates	New structure not anticipated to affect hydromorphology up and downstream, minimal effect on biological quality elements	No measurable effects anticipated as a result of changes in changes to the hydromorphology on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless activities.	Temporary infrequent localised changes to water quality unlikely to as pipeline would contain raw water from this waterbody. No impact anticipated on invertebrates	Changes in water quality could occur due to the new abstraction due to changes in dilution. Further investigation is required to determine the potential impacts of biological quality elements.	Temporary infrequent discharges from pipeline maintenance unlikely to impact on INNS as pipeline would contain raw water from this waterbody. No impact anticipated on invertebrates.
	Macrophytes and Phytobenthos Combined	Calculator available	Moderate in 2015	Good by 2027	2	Low	Low	Possible	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	2	New intake structure anticipated to have limited footprint, minimal effect on biological quality elements	New abstraction anticipated to have limited footprint, minimal effect on biological quality elements	Localised changes to flow velocity around intake expected to have minimal effect on to invertebrates	Temporary infrequent localised changes to flow velocity expected to have minimal effect on invertebrates	Changes in flow and velocity caused by the new abstraction may have impacts downstream. It should be noted that intake is located downstream from new outfall./ discharge into the River Witham and it is assumed that it will abstract the same if not similar amount of water as is discharged upstream. Despite this supporting flow, changes in local velocity and flow between the discharge and abstraction may still have an impact on biological quality elements, but to an uncertain extent. Further investigation is required.	Changes in flow volume and velocity as a result of new intake could lead to localised changes in sediment deposition which is anticipated to have minimal effect on the biological quality elements	Temporary infrequent localised changes to flow unlikely to effect sedimentation and expected to have minimal effect on invertebrates	No measurable effects anticipated as a result of changes in sedimentation deposition on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless activities.	Changes in flow volume and velocity could change sedimentation pattern, downstream of the abstraction, this could lead to changes in habitat effecting invertebrates.	Potential temporary disturbance during construction, though invertebrates likely to insensitive to noise	Temporary infrequent localised noise unlikely to effect invertebrates	New structure not anticipated to affect hydromorphology up and downstream, minimal effect on biological quality elements	No measurable effects anticipated as a result of changes in changes to the hydromorphology on the biological quality elements. At this stage it is assumed construction methods will comprise of trenchless activities.	Temporary infrequent localised changes to water quality unlikely to as pipeline would contain raw water from this waterbody. No impact anticipated on invertebrates	Changes in water quality could occur due to the new abstraction due to changes in dilution. Further investigation is required to determine the potential impacts of biological quality elements.	Temporary infrequent discharges from pipeline maintenance unlikely to impact on INNS as pipeline would contain raw water from this waterbody. No impact anticipated on invertebrates.
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015	1	Low	Low	Possible	Possible	Possible	It is assumed best practice design will be implemented for the intake structure. Further investigation is required to determine the extent of impacts.	1	It anticipated there will be minimal effects on the hydrological regime.	It anticipated there will be minimal effects on the hydrological regime.	Minor localised impacts are expected on the hydrological regime due to the changes in flow velocity and volume rates as a result of the intake	Temporary infrequent discharges are anticipated to have minimal effects on the hydrological regime.	Minor impacts are expected on the hydrological regime due to the change in flow velocity and volume rates as a result of the abstraction.	Potential increased sedimentation due to distinction not expected to have significant effect on the hydrological regime		No measurable effects anticipated as a result of changes in sedimentation deposition on the hydrological regime and mitigation	No measurable impact anticipated on the hydrological regime			New structure not anticipated to affect hydromorphology up and downstream, no effect on hydrological regime		No measurable impact anticipated on the hydrological regime	
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027	1	Low	Low	No	No	No	It is assumed best practice design will be implemented for the intake structure. At the next stage, the mitigation measures assessment will need to be requested.	1	Minor localised impacts are anticipated, due to the intake structure increasing the physical modification pressures.	Minor localised impacts are anticipated, due to the intake structure increasing the physical modification pressures.	Changes in flow and velocity unlikely to significantly affect physical modifications pressure		Changes in flow and velocity unlikely to significantly affect physical modifications pressure	Potential increased sedimentation due to distinction not expected to have significant effect on mitigation measures		measures assessment. At this stage it is assumed construction methods will comprise of trenchless activities.	Potential increased sedimentation due to abstraction not expected to have significant effect on mitigation measures	No measurable impact anticipated on the mitigation measures assessment		New structure not anticipated to affect hydromorphology up and downstream, no effect on the mitigation measures assessment.		No measurable impact anticipated on the mitigation measures assessments	
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	Good by 2015	2	Low	Low	Uncertain	Uncertain	Uncertain	Further water quality modelling is required to determine the extent of impacts within this catchment	2		It anticipated there will be minimal effects on the physico-chemical elements		No measurable effects anticipated as a result of changes in flow velocity and volume on the physico-chemicals		No measurable effects anticipated as a result of changes in the sedimentation deposition on the physico-chemicals										
	Biochemical oxygen demand	Numerical limits for classes	Good in 2015	No data available	2	Low	Low	Uncertain	Uncertain	Uncertain		2								No measurable effects anticipated as a result of changes in the sedimentation deposition on the										
	Dissolved oxygen	Numerical limits for classes	Good in 2015	Good by 2015	2	Low	Low	Uncertain	Uncertain	Uncertain		2									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 noise and vibration on the physico-chemicals			No measurable effects anticipated as a result of changes to the hydromorphology on the physicochemical elements. At this stage it is assumed construction methods will comprise of trenchless activities.		Changes in water quality due to new abstraction has potential to affect physico-chemical conditions, effects uncertain and would be subject to further assessment	
	pH		High in 2015	Good by 2015	2	Low	Low	Uncertain	Uncertain	Uncertain		2																	
	Phosphate	Calculator available	Poor in 2015	Moderate by 2027	2	Low	Low	Uncertain	Uncertain	Uncertain		2																	
	Temperature	Numerical limits for classes	Moderate in 2015	Good by 2015	0	Low	Low	No	No	No		0																No measurable effects anticipated	
	Acid Neutralising Capacity	Numerical limits for classes	High in 2015	Good by 2015	0	Low	Low	No	No	No	None required.	0																	
Priority hazardous substances	Anthracene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volume on priority hazardous substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority hazardous substances				No measurable effects anticipated as a result of changes in noise and vibration on priority hazardous substances			No measurable effects anticipated as a result of changes in water quality on priority hazardous substances			
	Benzo (b) and (k) fluoranthene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Benzo (ghi) perylene and indeno (123-cd) pyrene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Benzo(a)pyrene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Brominated diphenylether (BDPE) Calc	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Cadmium and its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Hexachlorobenzene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Hexachlorobutadiene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Hexachlorocyclohexane	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volume on priority hazardous substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority hazardous substances				No measurable effects anticipated as a result of changes in noise and vibration on priority hazardous substances			No measurable effects anticipated as a result of changes in water quality on priority hazardous substances			
	Mercury and its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
	Nonylphenol	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0																	
Priority substances	1,2-dichloroethane	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volume on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority substances				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances			
	Benzene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volume on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority substances				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances			

	Chlorpyrifos	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Dichloromethane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Fluoranthene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Lead and Its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Nickel and Its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Pentachlorophenol	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Trichlorobenzenes	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Trichloromethane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on priority substances			No measurable effects anticipated as a result of changes in sedimentation deposition on priority				No measurable effects anticipated as a result of changes in noise and vibration on priority substances			No measurable effects anticipated as a result of changes in water quality on priority substances		
	Arsenic		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on specific pollutants			No measurable effects anticipated as a result of changes in sedimentation deposition on				No measurable effects anticipated as a result of changes in noise and vibration on specific pollutants			No measurable effects anticipated as a result of changes in water quality on specific pollutants		
	Copper		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on specific pollutants			No measurable effects anticipated as a result of changes in sedimentation deposition on				No measurable effects anticipated as a result of changes in noise and vibration on specific pollutants			No measurable effects anticipated as a result of changes in water quality on specific pollutants		
	Iron		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on specific pollutants			No measurable effects anticipated as a result of changes in sedimentation deposition on				No measurable effects anticipated as a result of changes in noise and vibration on specific pollutants			No measurable effects anticipated as a result of changes in water quality on specific pollutants		
	Manganese		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on specific pollutants			No measurable effects anticipated as a result of changes in sedimentation deposition on				No measurable effects anticipated as a result of changes in noise and vibration on specific pollutants			No measurable effects anticipated as a result of changes in water quality on specific pollutants		
Specific pollutants	Tetrachloroethylene		Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on specific pollutants			No measurable effects anticipated as a result of changes in sedimentation deposition on				No measurable effects anticipated as a result of changes in noise and vibration on specific pollutants			No measurable effects anticipated as a result of changes in water quality on specific pollutants		
	Zinc		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on other chemicals			No measurable effects anticipated as a result of changes in sedimentation deposition on other				No measurable effects anticipated as a result of changes in noise and vibration on other chemicals			No measurable effects anticipated as a result of changes in water quality on other chemicals		
Other chemicals	Aldrin, Dieldrin, Endrin & Isodrin	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on other chemicals			No measurable effects anticipated as a result of changes in sedimentation deposition on other				No measurable effects anticipated as a result of changes in noise and vibration on other chemicals			No measurable effects anticipated as a result of changes in water quality on other chemicals		
	Carbon Tetrachloride	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on other chemicals			No measurable effects anticipated as a result of changes in sedimentation deposition on other				No measurable effects anticipated as a result of changes in noise and vibration on other chemicals			No measurable effects anticipated as a result of changes in water quality on other chemicals		
	DDT Total	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on other chemicals			No measurable effects anticipated as a result of changes in sedimentation deposition on other				No measurable effects anticipated as a result of changes in noise and vibration on other chemicals			No measurable effects anticipated as a result of changes in water quality on other chemicals		
	Trichloroethylene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes in flow velocity and volumne on other chemicals			No measurable effects anticipated as a result of changes in sedimentation deposition on other				No measurable effects anticipated as a result of changes in noise and vibration on other chemicals			No measurable effects anticipated as a result of changes in water quality on other chemicals		

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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: Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (-2 to 3)	Note: Merge columns if activity is multiple times appea — New or modified pumping station and/or river intake	New or increased surface water abstraction
Reasons for Not Achieving Good (RNA	533184	Mitigation Measures Assessment	Navigation	Physical modifications	No										
Reasons for Not Achieving Good (RNA	533186	Mitigation Measures Assessment	Urban and transport	Physical modifications	Yes	1	Low	Low	No	No	No		1	New intake structure will be constructed in the footprint of the watercourse, introducing new physical modifications to the waterbody.	
Reasons for Not Achieving Good (RNA	531036	Mitigation Measures Assessment	Local and Central Government	Physical modifications	Yes	1	Low	Low	No	No	No		1	However, this is a minor change to the physical structure with minor potential to affect other scheme to improve modification status	
Reasons for Not Achieving Good (RNA	531034	Macrophytes and Phytobenthos Combined	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Uncertain	Uncertain		2		Reduction in flow from new abstraction could lead to changes in water quality in the river, leading to a reduction in the improvements that
Reasons for Not Achieving Good (RNA	531035	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Uncertain	Uncertain		2		can be made to water quality. Further investigation needed to understand impacts on water quality.

Option	SLR 41	
Waterbody ID	GB105030056780	
Waterbody name	Witham - conf Cringle Bk to conf Brant	
Waterbody type	River	
Hydromorphological designation	Heavily Modified	Action: Obtain HMWB measures information from the Environment Agency to add to the RNAG/PoM
Overall status	Moderate	
Overall status objective	Moderate by 2015	

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Activity	Maintenance of pipe lines (including draining pipeline)					New discharge/transfer to a watercourse or reservoir						New pipe lines involving watercourse crossings with no in channel modifications	
Construction, Operation or Decommissioning activity	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Construction and operation	Construction and operation
Potential Impacts of asset (following consideration of embedded mitigation)	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	Change in INNS present in surface water body	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	Change in INNS present in surface water body	Changes in sedimentation deposition	Changes in flow velocity and volume (increase or decrease)	Changes to channel footprint	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream	Changes in sedimentation deposition
Biological Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✗	✗	✗	✗	✓	✗	✗	✓	✓	✓	✓	✓
Physicochemical Effects	✓	✓	✓	✓	✗	✓	✓	✗	✓	✗	✗	✗	✗
Chemical effects	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗

Does the component comply with WFD objectives (post mitigation)

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective		Impact score	Data confidence	Design certainty	Overcommitted between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score	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	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 'Change in INNS present in 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 flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes to channel footprint' 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 sedimentation deposition' on each element
Biological quality elements	Fish		Good in 2015	Good by 2015		2	Low	Low	Possible	Possible	Possible	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham. Further water quality modelling is required to determine the extent of impacts within this catchment	2	Temporary infrequent localised changes to flow velocity expected to have minimal effect on fish	Temporary infrequent localised changes to flow unlikely to effect sedimentation and expected to have minimal effect on fish	Temporary infrequent localised noise unlikely to effect fish as they will move away from the source of the noise	Temporary infrequent localised changes to water quality unlikely to impact on fish	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	Discharge of water into River Witham may lead to localised changes in sedimentation patterns and bathymetry. This could be impactful to fish and invertebrates due to changes in habitat	The source of the water from the River Trent is expected to decrease the water quality into the River Witham. It is anticipated there will be an amber adverse impact to fish and invertebrates. Further investigation is required to fully understand the water quality in the discharge area.	The water sourced from the River Trent and will be treated for INNS to ensure no INNS transfer into the River Witham.	Discharge of water into River Witham may lead to localised changes in sedimentation patterns and bathymetry. This could lead to changes in habitat in the watercourse impacting on invertebrates and fish	Changes in flow and velocity caused by the new discharge may have impacts downstream. Changes in local velocity and flow between the discharge and abstraction may still have an impact on the biological quality elements, but to an uncertain extent, further investigation is required. Hydroecology study suggests that increased flow could make barriers less passablefor fish species.	Impacts are expected to fish and invertebrates as a result of a new structure within the watercourse	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 acttivies.	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 acttivies.
	Invertebrates	Guidance document available	High in 2015	Good by 2015		2	Low	Low	Possible	Possible	Possible	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham. Further water quality modelling is required to determine the extent of impacts within this catchment	2	Temporary infrequent localised changes to flow velocity expected to have minimal effect on invertebrates	Temporary infrequent localised changes to flow unlikely to effect sedimentation and expected to have minimal effect on invertebrates	Temporary infrequent localised noise unlikely to effect invertebrates	Temporary infrequent localised changes to water quality unlikely to impact on invertebrates									
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015		2	Low	Low	Possible	Possible	Possible	It is assumed best practice design will be implemented for the intake structure. Hydraulic modelling required to understand the impact of increased flow.	2	Temporary infrequent discharges are anticipated to have minimal effects on the hydrological regime.					No effects are anticipated on the hydrological regime		No effects are anticipated on the hydrological regime	No effects are anticipated on the hydrological regime	Changes to flow velocity and volume: Hydromorphology of the channel would be changed by additional flow in channel, altering channel processes and conditions such as water depth and	No effects are anticipated on the hydrological regime	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 acttivies.	
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027		2	Low	Low	Possible	Possible	Possible	It is assumed best practice design will be implemented for the intake structure. At the next stage, the mitigation measures assessment will need to be requested.	2						Changes in hydromorphology could lead to impacts on mitigation measures assessment		No effects are anticipated on the mitigation measure assessment	Changes in sedimentation could lead to impacts on mitigation measures assessment	Changes in flow and velocity unlikely to significantly affect physical modifications pressure	Mitigation measures assessment include assessment of physical modification (water industry). The new discharge outfall structure could potentially increase the physical modification pressures of this waterbody.	No measurable effects anticipated as a result of changes in hydromorphology on the mitigation measures assessment. At this stage it is assumed construction methods will comprise of trenchless acttivies.	No measurable effects anticipated as a result of changes in sedimentation deposition on the mitigation measures assessment. At this stage it is assumed construction methods will comprise of trenchless acttivies.
Physico-chemical quality element	Ammonia (total as N)		High in 2015	Good by 2015		3	Low	Low	Yes	Yes	Yes	Further water quality modelling is required to determine the extent of impacts within this catchment	3	No measurable effects anticipated as a result of changes in flow and velocity on the physico-chemical elements	No measurable effects anticipated as a result of changes in sedimentation deposition on the physico-chemical elements	No measurable effects anticipated as a result of changes in noise and vibration 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 hydromorphology on the physicochemical elements	A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, suggests there could be an increase in ammonia concentration of 69% in this catchment due to the new transfer from the River Trent. Under the WFD guidance, Regulation 1(1) of Schedule 2, this waterbody is catagorised as a type 7 river for ammonia standards (ammonia concentration < 0.1mg/l is high status, good status is less than 0.6mg/l). The water quality review for this waterbody suggests that 90 percentile concentration of ammonia could rise from 0.09mg/l to 0.302mg/l. There is therefore a risk of deterioration from high to good status. Further investigation is required to fully understand the impacts the discharge will have on the catchment. On a precautionary basis an amber	No measurable effects anticipated as a result of changes in the hydrological regime	Minor localised impacts are expected to the physico-chemicals					
	Biochemical oxygen demand	Numerical limits for classes	High in 2015	No data available		1	Low	Low	No	No	No		1							A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, suggests that BOD could decrease by 13%. Further investigation is required to fully understand the impacts the discharge will have on the catchment, but a reduction in BOD is expected to have no impact.							
	Dissolved oxygen	Numerical limits for classes	High in 2015	Good by 2015		1	Low	Low	No	No	No		1							A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, concludes there is an expected 1% decrease in dissolved oxygen by the time it reaches the Lower Witham - conf Cringle Bk to conf Brant catchment. Further investigation is required to fully understand the impacts the discharge will have on the catchment. On a precautionary basis an negligible							
	pH		High in 2015	Good by 2015		1	Low	Low	No	No	No		1							A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, concludes there is an expected 1% increase in pH by the time it reaches the Lower Witham - conf Cringle Bk to conf Brant catchment. Further investigation is required to fully understand the impacts the discharge will have on the catchment. On a precautionary basis an negligible impact is							
	Phosphate	Calculator available	Moderate in 2015	Moderate by 2015		3	Low	Low	Possible	Possible	Possible		3							A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, concludes there is an expected 17% increase in Phosphate by the time it reaches the the Lower Witham - conf Cringle Bk to conf Brant catchment. Under the WFD guidance, Regulation 1(1) of Schedule 2, the annual mean reactive phosphorous concentration status boundarys would be <50ug/l high, <90ug/l is good, <211ug/l moderate and <1093ug/l is poor. This waterbody is currently at moderate status with concentration close to the good/moderate boundary. A high level review of water wuality data suggests that with the transfer in place concentrations of phosphate would remain in moderate. Further investigation is required to fully understand the impacts the discharge will have on the							
	Temperature	Numerical limits for classes	Good in 2015	Good by 2015		1	Low	Low	No	No	No		1							A high level water quality assessment of the proposed transfer from the River Trent to the River Witham, concludes there is an expected 1% increase in temperature by the time it reaches the Lower Witham - conf Cringle Bk to conf Brant catchment. Further investigation is required to fully understand the impacts the discharge will have on the catchment. On a precautionary basis an negligible							
	Acid Neutralising Capacity	Numerical limits for classes	High in 2015	Good by 2015		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							
Priority hazardous substances	Nonylphenol	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							
Priority substances	Diuron	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							
Specific pollutants	Copper		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							
	Iron		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							
Other chemicals	Zinc		High in 2015	High		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised			No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges							

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RNAG/PoM/HHWMM	Id	Relevant WFD Quality Element (RNAG) / Category (RNAG)/Lead organisation Measure category 1 (PoM)	(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 Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (2 to 3)	New discharge
Reasons for Not Achieving Good (RNAG)	533186	Mitigation Measures Assessment	Agriculture and rural land management	Physical modifications	Yes	1	Low	Low	No	No	No		1	New intake structure will be constructed over the footprint of the watercourse, introducing new
Reasons for Not Achieving Good (RNAG)	531036	Mitigation Measures Assessment	Local and Central Government	Physical modifications	Yes	1	Low	Low	No	No	No		1	physical modifications to the waterbody, affecting other scheme to improve modification status
Reasons for Not Achieving Good (RNAG)	533184	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Possible	Possible		2	A high level water quality review suggests that the new discharge into this waterbody will increase
Reasons for Not Achieving Good (RNAG)	531034	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible		2	the phosphate concentration, potentially leading to a reduction in the improvements
Reasons for Not Achieving Good (RNAG) Reasons for Not Achieving	531035	Phosphate To control or manage point source	Agriculture and rural land management	Pollution from rural areas P limit at Long	Yes	2	Low	Low	No	Possible	Possible		2	that can be made to water quality. Further investigation into water quality needed
Good (RNAG)	528820	inputs		Bennington STW	No									

Option	SLR 41
Waterbody ID	GB105030062370
Waterbody name	Witham - conf Brant to conf Catchwater Drain
Waterbody type	River
Hydromorphological designation	Heavily Modified
Overall status	Moderate
Overall status objective	Moderate by 2015

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Action: Obtain HMWB measures information from the Environment Agency to add to

Activity	New transfer in the watercourse					
Construction, Operation or Decommissioning activity	Operation	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	Change in INNS present in surface water body
Biological Effects	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✓	✓
Physicochemical Effects	✓	✗	✓	✓	✓	✓
Chemical effects	✗	✗	✗	✗	✓	✗

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Data certainty	Does the component comply with WFD objectives (post mitigation)? Deterioration between status classes	Impediments to GES/GEP	Compromises 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 'Change in INNS present in surface water body' on each element
Biological quality elements	Fish		Poor in 2015	Good by 2027	2	Low	Low	Possible	Possible	Possible	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham. Further water quality modelling is required to determine the extent of impacts within this catchment	2	No effects are anticipated as a result of a channel in footprint	Changes in local velocity and flow in this waterbody may have an impact on biological quality elements, further investigation is required to determine this.	Changes in flow volume and velocity could change sedimentation pattern. This could affect biological quality elements, further investigation would be required.	Changes in flow volume and velocity could change sedimentation pattern. This could affect biological quality elements, further investigation would be required.	Changes in water quality as a result of the discharge, has the potential for impacts on fish and invertebrates, already impacted by poor water quality	The water sourced from the River Trent and will be treated for INNS to ensure no INNS transfer into the River Witham.
	Invertebrates	Guidance document available	Good in 2015	Good by 2015	1	Low	Low	No	No	No		1					Changes in water quality as a result of the discharge, has the potential for impacts on invertebrates	
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015	2	Low	Low	Possible	Possible	Possible	Hydraulic modelling required to understand the impact of additional flow on watercourse	2	No effects are anticipated on the hydrological regime	Changes to flow velocity and volume: hydromorphology of the channel would be changed by additional flow in channel, altering channel processes and conditions such as water depth and flow velocity	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	No effects are anticipated on the hydrological regime	No effects are anticipated on the hydrological regime
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027	0	Low	Low	No	No	No	None required	0	No effects are anticipated on the mitigation measure assessment	Changes in flow velocity and volume will unlikely significantly affect the mitigation measures assessment	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	No effects are anticipated on the mitigation measure assessment	No effects are anticipated on the mitigation measure assessment
Physico-chemical quality element	Ammonia (total as N)		High in 2015	Good by 2015	3	Low	Low	Possible	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	3	No measurable impact anticipated on the physico-chemicals as a result in the change in channel footprint		No measurable impact anticipated on the physico-chemicals as a result in the change in sediment deposition	No measurable impact anticipated on the physicochemical as a result in the change in hydromorphology	A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in ammonia of 7% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Under the WFD guidance, Regulation 1(1) of Schedule 2, this waterbody is catagorised as a type 7 river for ammonia standards (ammonia concentration <0.3mg/l is high status, good status is less than 0.6mg/l). The water quality review for this waterbody suggests that 90 percentile concentration of ammonia could rise from 0.09mg/l to 0.302mg/l. There is therefore a risk of deterioration from high to good status. Within this catchment, Ammonia levels are expected to be higher, however further investigation is required to determine the predicted %. On a precautionary basis an amber adverse impact is	No measurable effects anticipated as a result of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in ammonia of 7% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, Ammonia levels are expected to be higher, however further investigation is required to determine the predicted %. On a precautionary basis an amber adverse impact is expected.
	Biochemical oxygen demand	Numerical limits for classes	High in 2015	No data available	0							0					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be a decrease in Dissolved Oxygen of 2% due to the	
	Dissolved oxygen	Numerical limits for classes	High in 2015	Good by 2015	0	Low	Low	No	No	No		0					discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, BOD levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary	
	pH		High in 2015	Good by 2015	1	Low	Low	No	No	No		1					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in pH of 4% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, pH levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a minor	
	Phosphate	Calculator available	Poor in 2015	Moderate by 2027	3	Low	Low	Yes	Yes	Yes		3					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in phosphate of 46% due to the discharge from the River Trent into the upstream Witham (GB105030056780). This waterbody is already at Poor statsus for phosphate and this increase in phosphate concentration could lead to a further worsening of this status element. On a precautionary basis a major adverse impact is expected.	
	Temperature	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Low	No	No	No		1					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in temperature of 1% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, temperature is expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a negligible impact is expected.	
	Acid Neutralising Capacity	Numerical limits for classes	High in 2015	Good by 2015	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
Priority hazardous substances	Benzo (b) and (k) fluoranthene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Benzo (ghi) perelyene and indent (123-c	#N/A	#N/A	#N/A	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Benzo(a)pyrene	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Brominated diphenylether (BDPE) Calc	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Cadmium and Its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Mercury and Its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Nonylphenol	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
Specific pollutants	Triclosan		High in 2015	High	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	

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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: Assists attainment of water body objectives	Does the component comply with WFD objectives: Impediment to GES/GEP	Does the component comply with WFD objectives: Compromises water body objectives	Mitigation applied	Post mitigation impact score (2 to 3)	New transfer in the watercourse
Reasons for Not Achieving Good (RNAG)	533184	Mitigation Measures Assessment	Agriculture and rural land management	Physical modifications	No									
Reasons for Not Achieving Good (RNAG)	533186	Mitigation Measures Assessment	Local and Central Government	Physical modifications	No									
Reasons for Not Achieving Good (RNAG)	531036	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Possible	Possible		2	A high level water quality review
Reasons for Not Achieving Good (RNAG)	531034	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible		2	suggests that the new discharge into this waterbody will increase the
Reasons for Not Achieving Good (RNAG)	531035	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	2	phosphate concentration, potentially leading to a reduction in the
Reasons for Not Achieving Good (RNAG)	486239	Phosphate	Urban and transport	Pollution from towns, cities and transport	Yes	2	Low	Low	No	Possible	Possible		2	improvements that can be made to water quality. Further investigation
Reasons for Not Achieving Good (RNAG)	528607	Fish	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible		2	into water quality needed
Reasons for Not Achieving Good (RNAG)	528820	Fish	No sector responsible	Non-native invasive species	No									
Reasons for Not Achieving Good (RNAG)	528606	Fish	No sector responsible	Non-native invasive species	No									
Reasons for Not Achieving Good (RNAG)	531033	Fish	Agriculture and rural land management	Physical modifications	No									

Option	SLR 41	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB205030062425	
Waterbody name	Witham - conf Catchwater Drain to conf Bain	
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	

Activity	New transfer within the watercourse					
Construction, Operation or Decommissioning activity	Operation	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	Change in INNS present in surface water body
Biological Effects	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✓	✓
Physicochemical 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)** Deterioration between status classes	Impediments to GES/GEP	Compromises 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 'Change in INNS present in surface water body' on each element
Biological quality elements	Fish	Guidance document available	Moderate in 2015	Good by 2027		1	Low	Low	No	No	No	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham. Further water quality modelling is required to determine the extent of impacts within this catchment	1	No effects are anticipated as a result of a channel in footprint	Changes in local velocity and flow due to the transfer of water may still have an impact on biological quality elements, further investigation is required to determine this.	Changes in flow volume and velocity could change sedimentation pattern. This could affect biological quality elements, further investigation would be required.	Changes in flow volume and velocity could change hydromorphology. 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	The water sourced from the River Trent and will be treated for INNS to ensure no INNS transfer into the River Witham.
	Invertebrates		Good in 2015	Good by 2015		1	Low	Low	No	No	No		1						
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015		2	Low	Low	No	No	No	Hydraulic modelling required to understand the impact of additional flow on watercourse	2	No effects are anticipated as a result of a channel in footprint	Changes to flow velocity and volume: hydromorphology of the channel would be changed by additional flow in channel, altering channel processes and conditions such as water depth and flow velocity	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	No effects are anticipated on the hydrological regime	No effects are anticipated on the hydrological regime
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027		0	Low	Low	No	No	No	None required	0	No effects are anticipated as a result of a channel in footprint	Changes in flow velocity and volume will unlikelly significantly affect the mitigation measures assessment	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	No effects are anticipated on the mitigation measure assessment	No effects are anticipated on the mitigation measure assessment
Physico-chemical quality element	Ammonia (total as N)	Numerical limits for classes	Good in 2015	Good by 2015		3	Low	Low	Possible	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	3	No effects are anticipated on the physico-chemicals as a result of a channel in footprint	No effects are anticipated on the physicochemicals as a result of changes to the hydromorphology	No measurable impact anticipated on the physicochemicals as a result in the change in hydromorphology	A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in ammonia of 7% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, Ammonia levels are expected to be higher, however further investigation is required to determine the predicted %. On a precautionary basis an amber adverse impact is expected.	No measurable effects anticipated as a result of changes in temporary infrequent localised pipeline discharges
	Biochemical oxygen demand		High in 2015	No data available		0	Low	Low	No	No	No		0				A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be a decrease in BOD of 2% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, BOD levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a negligible impact is expected.	
	Dissolved oxygen		Good in 2015	Good by 2015		0	Low	Low	No	No	No		0				A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be a decrease in Dissolved Oxygen of 2% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, BOD levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a negligible impact is expected.	
	pH		High in 2015	Good by 2015		1	Low	Low	No	No	No		1				A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in pH of 4% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, pH levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a minor localised impact is expected.	
	Phosphate	Calculator available	Moderate in 2015	Moderate by 2015		3	Low	Low	Yes	Yes	Yes		3				A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in phosphate of 46% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, Phosphate levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a major adverse impact is expected.	
	Temperature	Numerical limits for classes	High in 2015	Good by 2015		1	Low	Low	No	No	No		1				A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in temprature of 1% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, temperature is expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a negligible impact is expected.	
Priority hazardous substances	Acid Neutralising Capacity	Numerical limits for classes	High in 2015	Good by 2015		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Benzo (b) and (k) fluoranthene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Benzo (ghi) perelyene and indeno (123-cd) pyrene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Benzo(a)pyrene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Brominated diphenylether (BDPE) Calc	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Cadmium and Its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Endosulfan	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Hexachlorocyclohexane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
Priority substances	Mercury and Its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No	None required.	0				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	

	Nonylphenol	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Nickel and its Compounds	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
Specific pollutants	Chlorothalonil		High in 2015	High	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Copper		High in 2015	High	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Mecoprop		High in 2015	High	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
	Pendimethalin		High in 2015	High	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	
Other chemicals	Aldrin, Dieldrin, Endrin & Isodrin	EQS directive	Good in 2015	Good	0	Low	Low	No	No	No	None required.	0					No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	

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										Does the component comply with WFD objectives					
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**	**Assists attainment of water body objectives**	**Impediment to GES/GEP**	**Compromises water body objectives**	**Mitigation applied**	**Post mitigation impact score (2 to 3)**	New transfer within the watercourse
Reasons for Not Achieving Good (RNAG)	517843	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible	Further water quality modelling is required to determine the extent of changes in phosphate due to the transfer within this catchment	2	A high level water quality review suggests that the new discharge into this waterbody will increase the phosphate concentration, potentially leading to a reduction in the improvements that can be made to water quality. Further investigation into water quality needed
Reasons for Not Achieving Good (RNAG)	529207	Phosphate	No sector responsible		Yes	2	Low	Low	No	Possible	Possible		2	
Reasons for Not Achieving Good (RNAG)	517845	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible		2	
Reasons for Not Achieving Good (RNAG)	481844	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Possible	Possible		2	
Reasons for Not Achieving Good (RNAG)	530485	Fish	No sector responsible	Non-native invasive species	No									
Reasons for Not Achieving Good (RNAG)	530486	Fish	Other	Physical modifications	No									
Reasons for Not Achieving Good (RNAG)	520881	Fish	Agriculture and rural land management	Physical modifications	No									

Add the pipelines into this one

Option	SR 41	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB205030062426	
Waterbody name	Lower Witham - conf Bain to Grand Sluice	
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	

Activity	New or increased surface water abstraction					New transfer within the watercourse						Maintenance of pipe lines (including draining pipeline)					New pipe lines involving watercourse crossings with no in channel modifications			
Construction, Operation or Decommissioning activity	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Construction and operation	Construction	Construction	Construction
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 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	Change in INNS present in surface water body	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	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
Biological Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓
Physicochemical 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): Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score
Biological quality elements	Invertebrates	Guidance document available	Good in 2015	Good by 2015		2	Low	Low	Possible	Possible	Possible	INNS treatment has been provided between the River Trent abstraction and the transfer to the River Witham. Further hydraulic and water quality modelling is required to determine the extent of impacts within this catchment	2
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015		2	Low	Low	Possible	Possible	Possible	It is assumed best practice design will be implemented for the intake structure. Further investigation is required to determine the extent of impacts.	2
	Mitigation Measures Assessment		Moderate or less in 2015	Good by 2027		1	Low	Low	No	No	No	It is assumed best practice design will be implemented for the intake structure. At the next stage, the mitigation measures assessment will need to be requested.	1
Physico-chemical quality elements	Ammonia (total as N)		Good in 2015	Good by 2015		3	Low	Low	Possible	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	3
	Biochemical oxygen demand	Numerical limits for classes	High in 2015	No data available		0	Low	Low	No	No	No		0
	Dissolved oxygen	Numerical limits for classes	Good in 2015	Good by 2015		0	Low	Low	No	No	No		0
	pH		High in 2015	Good by 2015		1	Low	Low	No	No	No		1
	Phosphate	Calculator available	Moderate in 2015	Moderate by 2015		3	Low	Low	Yes	Yes	Yes		3
	Temperature	Numerical limits for classes	High in 2015	Good by 2015		1	Low	Low	No	No	No		1
Priority hazardous substances	Acid Neutralising Capacity	Numerical limits for classes	High in 2015	Good by 2015		0	Low	Low	No	No	No		0
	Benzo (b) and (k) fluoranthene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Benzo (ghi) perylene and indeno (123-cd) pyrene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Benzo(a)pyrene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Cadmium and its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Endosulfan	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Hexachlorocyclohexane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Mercury and its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
Priority substances	1,2-dichloroethane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Atrazine	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Fluoranthene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Lead and its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Nickel and its Compounds	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Pentachlorophenol	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Simazine	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Trichloromethane	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
Specific pollutants	Arsenic		High in 2015	High		0	Low	Low	No	No	No		0
	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
Other chemicals	Zinc		High in 2015	High		0	Low	Low	No	No	No		0
	Aldrin, Dieldrin, Endrin & Isodrin	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Carbon Tetrachloride	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0
	Trichloroethylene	EQS directive	Good in 2015	Good		0	Low	Low	No	No	No		0

New or increased surface water abstraction:

WFD quality element	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
Invertebrates	New abstraction anticipated to have limited footprint, minimal effect on biological quality elements	Changes in flow and velocity caused by the new abstraction may have impacts downstream. It should be noted that intake is located downstream from new outfall / discharge into the River Witham and it is assumed that it will abstract the same amount of water as is discharged upstream. Despite this supporting flow, changes in local velocity and flow between the discharge and abstraction may still have an impact on biology, but to an uncertain extent, further investigation is required.	Changes in flow volume and velocity could change sedimentation pattern, between the discharge and abstraction and 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, between the discharge and abstraction and 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 invertebrates
Hydrological Regime	It anticipated there will be minimal effects on the hydrological regime.	Minor localised impacts are expected on the hydrological regime due to the change in flow velocity and volume rates as a result of the abstraction (assumed to be counterbalanced by the discharge in waterbody upstream)	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	Minor localised impacts are anticipated, due to the intake structure increasing the physical modification pressures.	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 assessment
Physico-chemical quality elements (Ammonia to Temperature)	It anticipated there will be minimal effects on the physico-chemical elements		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
Priority hazardous substances, priority substances, specific pollutants, other chemicals					No measurable effects anticipated as a result of abstraction on chemicals

New transfer within the watercourse:

WFD quality element	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 'Change in INNS present in surface water body' on each element
Invertebrates	are anticipated as a result of a channel in	Changes in local velocity and flow between the discharge and abstraction may still have an impact on biological quality elements, further investigation is required to determine this.	Changes in flow volume and velocity could change sedimentation pattern, between the discharge and abstraction and downstream of the abstraction. This could affect biological elements, further investigation would be required.	Changes in flow volume and velocity could change hydromorphology, between the discharge and abstraction and 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 invertebrates	The water sourced from the River Trent and will be treated for INNS to ensure no INNS transfer into the River Witham.
Hydrological Regime	are anticipated as a result of a channel in	Changes to flow velocity and volume: hydromorphology of the channel would be changed by additional flow in channel between the upstream reach and the abstraction, altering channel processes and conditions such as water depths and flow velocity	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	Potential increase in sedimentation is not expected to have a significant effect on the hydrological regime.	No effects are anticipated on the hydrological regime	No effects are anticipated on the hydrological regime
Mitigation Measures Assessment	are anticipated as a result of a channel in	Changes in flow velocity and volume will unlikely significantly affect the mitigation measures assessment	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	Potential increase in sedimentation is not expected to have a significant effect on the mitigation measures assessment.	No effects are anticipated on the mitigation measure assessment	No effects are anticipated on the mitigation measure assessment
Ammonia (total as N)	No effects are anticipated on the physico-chemicals as a result of a channel in footprint		No effects are anticipated on the physico-chemicals as a result of a changes to the sedimentation	No effects are anticipated on the physico-chemicals as a result of a changes to the hydromorphology	A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in ammonia of 7% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Further investigation is required to determine the impact. On a precautionary basis an amber adverse impact is expected.	
Biochemical oxygen demand					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be a decrease in Dissolved Oxygen of 2% due to the discharge from the River Trent into the upstream	
Dissolved oxygen					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be a decrease in BOD of 2% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, BOD levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a negligible impact is expected.	
pH					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in pH of 4% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, pH levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a minor localised impact is expected.	
Phosphate					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in phosphate of 48% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, Phosphate levels are expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a major adverse impact is expected.	
Temperature					A high level water quality assessment of the proposed transfer from the River Trent to the River Witham suggests that there will be an increase in temperature of 1% due to the discharge from the River Trent into the upstream Witham (GB105030056780). Within this catchment, temperature is expected to be lower, however further investigation is required to determine the predicted %. On a precautionary basis a minor localised impact is expected.	
Priority hazardous substances, priority substances, specific pollutants, other chemicals					No measurable effects anticipated as a result of abstraction on chemicals	

Maintenance of pipe lines (including draining pipeline):

WFD quality 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
Invertebrates	Temporary infrequent localised changes to flow velocity expected to have minimal effect on fish	Temporary infrequent localised changes to flow unlikely to effect sedimentation and expected to have minimal effect on fish	Temporary infrequent localised noise unlikely to effect fish as they will move away from the source of the noise	Temporary infrequent localised changes to water quality unlikely to impact on fish	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.
Hydrological Regime	Temporary infrequent discharges are anticipated to have minimal effects on the hydrological regime.				
Mitigation Measures Assessment					
Physico-chemical quality elements (Ammonia to Temperature)	No measurable effects anticipated as a result of changes in flow and velocity on the physico-chemical elements	No measurable effects anticipated as a result of changes in sedimentation deposition on the physico-chemical elements	No measurable effects anticipated as a result of changes in noise and vibration 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 water quality on the physico-chemical elements
Priority hazardous substances, priority substances, specific pollutants, other chemicals				No measurable effects anticipated as a result of changes from temporary infrequent localised pipeline discharges	

New pipe lines involving watercourse crossings with no in channel modifications:

WFD quality 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 sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element
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.	Localised changes to flow velocity around intake expected to have minimal effect on invertebrates	Changes in flow volume and velocity as a result of new intake could lead to localised changes in sediment deposition which is anticipated to have minimal effect on the biological elements.	Potential temporary disturbance during construction, though invertebrates unlikely to be sensitive to impact
Hydrological Regime	No measurable effects anticipated as a result of changes in hydromorphology on the hydrological regime. At this stage it is assumed construction methods will comprise of trenchless activities.	No measurable effects anticipated as a result of changes in flow velocity and volume on the hydrological regime. At this stage it is assumed construction methods will comprise of trenchless activities.	No measurable effects anticipated as a result of changes in sedimentation on the hydrological regime. At this stage it is assumed construction methods will comprise of trenchless activities.	No measurable impact anticipated on the hydrological regime
Mitigation Measures Assessment	No measurable effects anticipated as a result of changes in hydromorphology on the mitigation measures assessment. At this stage it is assumed construction methods will comprise of trenchless activities.	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	No measurable impact anticipated on the mitigation measures assessment

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RNAG/PoM/HMWB	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: Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (-2 to 3)	New transfer within the watercourse
Reasons for Not Achieving Good (RNAG)	517914	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible	Further water quality modelling is required to determine the extent of impacts within this catchment	2	A high level water quality review suggests that the new discharge into this waterbody will increase the phosphate concentration, potentially leading to a reduction in the improvements that can be made to water quality. Further investigation into water quality needed
Reasons for Not Achieving Good (RNAG)	517906	Phosphate	Water Industry	Pollution from waste water	Yes	2	Low	Low	No	Possible	Possible		2	
Reasons for Not Achieving Good (RNAG)	517911	Phosphate	Agriculture and rural land management	Pollution from rural areas	Yes	2	Low	Low	No	Possible	Possible		2	

WFD standards for Phosphorous

standard in rivers:

Table 5

Phosphorus Standards in Rivers[i]	
Annual mean reactive phosphorus concentration (in µg per litre) is calculated as follows:	
High	10 to the power of ((1.0497 x $\log_{10}(0.702)$+1.066) x ($\log_{10}(RP_{ref})$ – $\log_{10}(3{,}500)$) + $\log_{10}(3{,}500)$)
Good	10 to the power of ((1.0497 x $\log_{10}(0.532)$+1.066) x ($\log_{10}(RP_{ref})$ – $\log_{10}(3{,}500)$) + $\log_{10}(3{,}500)$)
Moderate	10 to the power of ((1.0497 x $\log_{10}(0.356)$+1.066) x ($\log_{10}(RP_{ref})$ – $\log_{10}(3{,}500)$) + $\log_{10}(3{,}500)$)
Poor	10 to the power of ((1.0497 x $\log_{10}(0.166)$+1.066) x ($\log_{10}(RP_{ref})$ – $\log_{10}(3{,}500)$) + $\log_{10}(3{,}500)$)

[i]In this table, "Reactive phosphorus concentration" means the concentration of phosphorus as determined using the phosphomolybdenum blue colorimetric method. Where necessary to ensure the accuracy of the method, samples are recommended to be filtered using a filter not smaller than 0.45 µm pore size to remove gross particulate matter.

"RPref" represents the annual mean concentration of reactive phosphorus in µg/l estimated for the site under reference conditions using the equation: 10 to the power of (0.454 ($\log_{10}$Alkalinity) – 0.0018 (Altitude) + 0.476). If the value calculated for RPref using the equation above is less than 7 µg/l, it must be substituted for the purposes of calculating the standards for phosphorus by a value of 7 µg/l. For the purposes of calculating RPref:

(i) "Alkalinity" is the concentration of CaCO3 in mg/l. If a site has an alkalinity greater than 250 mg/l CaCO3, a value for alkalinity of 250 must be used for the purposes of calculating RPref. If a site has an alkalinity of less than 2, a value for alkalinity of 2 must be used for the purposes of calculating RPref.

(ii) "Altitude" means the site's altitude above mean sea level in metres. If a site has an altitude of greater than 355 metres, a value for altitude of 355 metres must be used for the purposes of calculating RPref.

WFD phosphorous standards for the River Witham (based on table 5):

Calculations:

Atomic weight Phosphorus	31	
Atomic weight orthophosphate	95	

Alkalinity @ Claypole (average)	208	mg/l CaCO3
Altitude	15	mAOD
Rpref	31.72494	ug/l

High	50	ug/l
Good	90	ug/l
Moderate	213	ug/l
Poor	1094	ug/l

Current status on catchment data explorer for River Witham is Moderate

Estimated changes in phosphate / phosphorus concentration due to proposed transfer:

Orthophosphate concentration			Phosphorus concentration	Standards as per calculations from table 5
baseline R Witham (average)	256	ug/l	83.5	Good/Moderate
baseline R Witham (max)	521		170.0	Moderate
Baseline R Trent (average)	389	ug/l	126.9	Moderate
Baseline R Trent (max)	1020		332.8	Poor

% of Source Water	
Witham	8%
Trent	92%

Potential orthophosphate concentration at River Witham with discharge from Trent			Potential phosphorus concentration at River Witham with discharge from Trent	Standards as per calculations from table 5
average conc	378.36	ug/l	123.5	Moderate
max conc	980.08	ug/l	319.8	Poor

Therefore, potential for dete

WFD standard for Ammonia:

Table 7

Ammonia standards for rivers (rivers categorised by type in accordance with paragraph 1(1) of Schedule 2)				
Total Ammonia as nitrogen (mg/l)				
(90 percentile)				
Type	High	Good	Moderate	Poor
1, 2, 4 and 6	0.2	0.3	0.75	1.1
3, 5 and 7	0.3	0.6	1.1	2.5

Table 1

Criteria for identifying the types of river to which the dissolved oxygen, biochemical oxygen demand and ammonia standards for rivers apply					
Site Altitude	*Alkalinity (as mg/l $CaCO_3$)*				
	Less than 10	≥10 to <50	≥50 to <100	≥100 to <200	Over 200
Under 80 metres	Type 1	Type 2	Type 3	Type 5	Type 7
Over 80 metres			Type 4	Type 6	

River Witham is at 17mAOD with an average alkalinity of 208mg/l therefore would be a type 7 river **WFD ammonia standards for the River Witham (based on table 7):**

High	0.3	mg/l as N
Good	0.6	mg/l as N
Moderate	1.1	mg/l as N
Poor	2.5	mg/l as N

Estimated changes in ammonia concentration due to proposed transfer:

90%ile			Standards as per calculations from table 7
baseline R Witham (average)	0.06	mg/l as N	High
baseline R Witham (90%ile)	0.09	mg/l as N	High
Baseline R Trent (average)	0.184	mg/l as N	High
Baseline R Trent (90%ile)	0.32	mg/l as N	Good

Potential ammonia concentration at Witham w discharge from Trent		
90%ile conc	0.3016	ug/l
Therefore, potential for deterioration in River Witham from high to good