

ANNEX A5 Netheridge Cost Report

This document has been written in line with the requirements of the RAPID gate two guidance and to comply with the regulatory process pursuant to Severn Trent Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in this document be taken forward, Severn Trent Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.

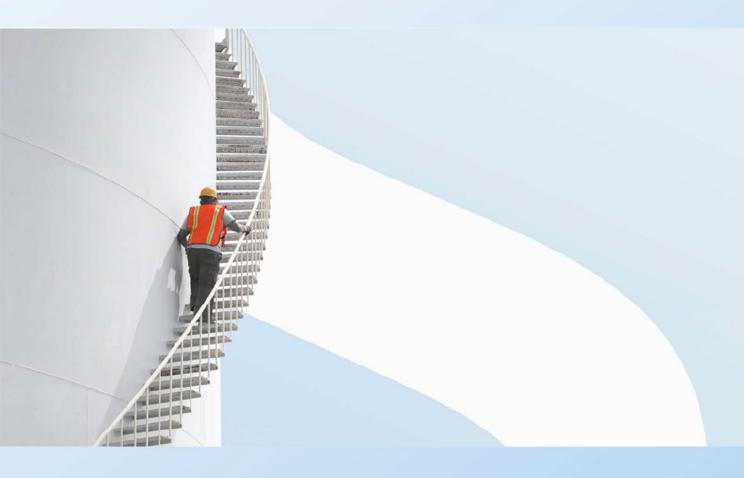




Severn Trent Water

SEVERN TRENT SOURCES STRATEGIC RESOURCE OPTIONS

Netheridge Cost Report



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ABBREVIATION AND ACRONYM LIST

Table 1 – Abbreviation and Acronym List

Abbreviation or Acronym	Meaning
ACWG	All Company Working Group
AIC	Average Incremental Cost
BAF	Biologically active filtration
BAF	Biologically active filter
CAPEX	Capital expenditure
CDR	Concept design report
GAC	Granular activated carbon
ICA	Instrumentation, Control and Automation
kWh	Kilowatt hour
MBBR	Moving Bed Biofilm Reactor
MCC	Motor control centre
MLD	Megalitres per day
N/A	Not applicable
no.	Number
NPV	Net present value
ОВ	Optimism Bias
OPEX	Operational expenditure
PLC	Programmable logic controller
PS	Pumping station
QCRA	Qualitative Costed Risk Assessment
RAPID	Regulator's Alliance for Progressing Infrastructure Development
SCADA	Supervisory control and data acquisition system
SRO	Strategic resource option
STS	Severn Trent sources
STW	Severn Trent Water

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Abbreviation or Acronym	Meaning
UV	Ultraviolet
VAT	Value added tax
WRMP	Water Resource Management Plan
WTW	Water treatment works
WwTW	Wastewater Treatment Works

1 INTRODUCTION

1.1 CONTEXT

This Cost Report sets out the cost estimation and risk assessment carried out for the Severn Trent Sources Strategic Resource Option Netheridge (Netheridge SRO) Concept Design.

It should be read in conjunction with the Severn Trent Sources Strategic Resource Option Netheridge Concept Design Report and is part of a suite of reports completed in support of Severn Trent Water's (STW) RAPID Gate 2 Submission.

Other reports completed as part of the Gate 2 concept design development include:

- Severn Trent Source SRO Netheridge Concept Design Report (Annex A1)
- Severn Trent Source SRO Netheridge Process Basis of Design (Annex A3)
- Severn Trent Source SRO Pipeline Route Appraisal Report (Annex A2) and
- Severn Trent Source SRO Netheridge Carbon Report (Annex A4).

1.2 REPORT SCOPE

This report details the cost estimates for the Netheridge SRO and includes calculation of:

- Capital Cost estimates (Capex);
- Optimism Bias (OB);
- Qualitative Costed Risk Assessment (QCRA);
- Operational Cost Estimates (Opex);
- Net Present Value (NPV); and
- Average Incremental Cost (AIC).

1.3 GATE 2 OPTIONS

The options developed for the Netheridge SRO are as follows:

- Option 1 Treatment (MBBR, CoMag, Ozone, BAF, GAC) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the River Severn downstream of the new STT SRO Deerhurst WTW.
- Option 2 Treatment (MBBR, CoMag, Ozone, BAF, GAC) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the River Severn upstream of the gauging station at Haw Bridge.
- Option 3 Treatment (MBBR, CoMag, Ozone, BAF, GAC, Ion Exchange) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the East Channel of the River Severn downstream of the intake for Gloucester Docks.

- Option 4 Treatment (MBBR, CoMag, Ozone, BAF, GAC, Ion Exchange, UV) of effluent at Netheridge WwTW with transfer via 600mm dia. pipeline and discharge to direct to the G&S Canal adjacent to the Netheridge WwTW.
- Option 5 Additional pipeline for diversion of flows form the main STT SRO pipeline for discharge to the East Channel of the River Severn downstream of the intake for Gloucester Docks.

2 CAPITAL COSTS

2.1 CAPEX COST ESTIMATION APPROACH

2.1.1 TREATMENT PLANT UPGRADE

The treatment capital cost estimate was developed using the STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022. The STW team provided uplifts to be applied where items fell outside the limits of the cost graphs within the tool. The STW 'Cost Tool Lite' applies a Non-Standard Adjustment, as well as Internal and External Costs as On-Costs, the percentage values of those applied were provided by STW.

Severn Trent's Cost Tool Lite is an in-house tool that contains more than 20 years of historic project cost data and cost models (generated by the Severn Trent Unit Cost Analysis tool) as well as historic uplifts for prelims and client costs.

Option 5 is costed as additional to Options 1 and 2; therefore, it has been costed as the additional pipeline and the additional treatment required for discharging to this location.

2.1.2 PIPELINE

The pipeline capital cost estimate was developed using the STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022.

The lengths for the pipeline, tunnel sections and crossings were measured off the Civil 3D drawing for the pipeline route.

'Watercourse crossings' were included in the model wherever the pipeline crosses a river, stream, or land drain that is not tunnelled, this is intended to cover the additional costs incurred when crossing a watercourse.

The pipeline will require several access tracks to drain points to facilitate draining the pipeline during standby periods as outlined in the Pipeline Route Appraisal Report. Access track, and security fencing was included for access to the drain-down chambers that will be included along the length of the pipeline.

The estimated cost for the outlets were compiled using SPONS and includes the excavation (including coffer dam), concrete surround, pipework, and wall penetration for the canal outlets.

The STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022, applies a Non-Standard Adjustment, as well as Internal and External Costs as On-Costs, the percentage values applied were provided by STW.

2.2 ASSUMPTIONS

2.2.1 TREATMENT PLANT UPGRADE

The key assumptions made during completion of the Cost Tool Lite are outlined below:

- Process and connection pipeline size has been assumed.
- All electrical new equipment will be housed in one building.
- A single CoMag process stream is provided.
- For Option 5 it is assumed that Option 1 or 2 is also provided.

2.2.2 PIPELINE

The assumptions that have been made during the cost build-up of the pipeline are outlined below:

- The pipeline will be constructed using the open cut method with tunnelled sections required only for the railway, canal, and river crossings.
- Small watercourse crossings will be constructed open cut with flows managed through pumping.
- The pipeline is 700mm diameter for all open cut sections (Option 4 is mm dia.).
- The tunnelled sections are more more diameter to facilitate construction with a more more pipeline within.
- All washout, air value and isolation valves are to STW standard specification.
- The outfall to the River Severn requires eel screens.
- The surge vessel has been sized without detailed surge analysis.

2.3 EXCLUSIONS

No allowance has been made for modifications required to the existing WwTW site or equipment to facilitate the construction, operation, or maintenance of the new facilities.

2.4 ON-COSTS

The on-costs applied to Capex cost build up are the STW values provided on the standard 'STW Cost Tool Lite' template PR24, there is no functionality provided on the tool to break this down further.

The on-costs applied to the treatment and the pipeline estimates differ due to the complexity of the treatment upgrade and the relative simplicity of the pipeline.

2.5 SUMMARY

 Table 2-1 summarises the overall Capex costs for the five options presented in the Concept Design

 Report. Option 5 includes only the Capex cost of the additional treatment (ion exchange) required to

 discharge into the River Severn East Channel and the additional pipeline required.

All costs stated exclude the optimism bias and risk which is addressed separately in this report.

Table 2-1 – Capital Cost Summary (Excluding OB and Risk)

Option No.	Option Name	Treatment Capex	Pipeline Capex	Overall Capex Cost
Option 1	Deerhust	£69,797,800	£32,625,300	£102,423,100
Option 2	Haw Bridge	£69,797,800	£28,595,700	£98,393,500
Option 3	East Channel	£78,240,000	£9,921,500	£88,161,500
Option 4	Canal	£79,535,400	£2,421,400	£81,956,800
Option 5	SW Branch	£8,442,200	£848,600	£9,290,800

Figures have been rounded to the nearest hundred as this is the level of detail the Cost Tool Lite provides. Full spreadsheets are available in **Appendix A**.

3 RISK ASSESSMENT AND OPTIMISM BIAS

3.1 APPROACH TO RISK ASSESSMENT AND OPTIMISM BIAS

The Optimism Bias (OB) and Qualitative Costed Risk Assessment (QCRA) assessment have been carried out in accordance with the approach outlined in the Mott McDonald ACWG Cost Constituency Methodology (Rev E Feb 2022) and the Optimism Bias and Qualitative Costed Risk Assessment Template (Rev C Feb 2022).

This approach has been developed by Mott McDonald to specifically address how OB and QCRA should be assessed for water resource schemes included in the WRMPs and SRO schemes for RAPID submissions at Gates 1 and 2.

The overall approach follows the HM Treasury Green Book methodology and advocates for a reduction in optimism bias as the project risks become better understood and therefore better quantified.

3.1.1 OPTIMISM BIAS

The ACWG methodology outlines an OB process in three stages¹:

- **Stage 1:** The first stage defines the project type with regard to standard and non-standard engineering project to define the upper bound of OB
- **Stage 2:** The second stage scales back the OB based on the contributory factors outline in the Green Book methodology
- **Stage 3:** The third stage reassess the OB based on the output of the QCRA to ensure that the OB allowance takes into account the risks that have now been costed and included separately to avoid overestimation of the OB and Risk costs.

The ACWG methodology suggests that the level of optimism bias at the conclusion of the first, second and third stages should be recorded as this will provide a point of reference for comparison across the companies.

3.1.2 QUALITATIVE COSTED RISK ASSESSMENT

The ACWG methodology for a qualitative costed risk assessment follows a typical risk assessment process with standardisation of the risk breakdown structure, risk status, likelihood estimation and impact scoring². The ACWG mythology suggests a Monte-Carlo analysis to aggregate risk with the P10, P50 and P90 risk percentiles being recorded. The P50 output from the QCRA should be used to determine the total capital cost estimates for appraisal.

¹ Refer to ACWG Cost Consistency Methodology Rev E Section 6.2.

² Refer to ACWG Cost Consistency Methodology Rev E Section 3.8.



3.2 OPTIMISM BIAS RESULTS

3.2.1 OPTIMISM BIAS SCORING SUMMARY

Based on the ACWG recommendations, the STT SRO options were split into standard and nonstandard civil engineering project elements for the calculation of optimism bias; the pipeline elements are considered as standard, and the treatment elements of the project are considered as non-standard.

The options were then assessed on the confidence in the following areas: Procurement, Project Specific, Client Specific, Environment and External Influences to allow for scaling back of the upper bound of the OB based on the specifics of each option. The confidence gradings in these areas were reviewed with the Client and project team to ensure they were suitable for the current project stage.

The options underwent a final OB assessment taking into account the QCRA to give the final OB value.

Option No.	Option Name	STAGE 1 Combined Upper Bound OB (%)	STAGE 2 Adjusted OB (%)	STAGE 3 Adjusted OB Inc Risk (%)
Option 1 Treatment	Deerhurst	58.96	37.10	30.49
Option 2 Treatment	Haw Bridge	59.62	37.47	30.62
Option 3	East Channel	63.58	39.65	31.41
Option 4	Canal	65.34	40.62	31.77
Option 5	SW Branch	64.02	39.89	31.50

Table 3-1 – Optimism Bias Summary

The full analysis of optimism bias is included in Appendix B.

3.3 COSTED RISK REGISTER

The risk register has been progressed over the course of the concept design development to capture the key issues and uncertainties affecting the Netheridge scheme. There are three categories of risk: those affecting the health and safety of personnel during construction and operation, and which must be addressed as part of the CDM regulations, those affecting the construction of the project and those that impact the overall viability or scope of the project or the premise on which the project has been developed.

Risks that affect H&S, but do not have a significant impact on the overall project cost or delivery, have not been included in the QCRA. These have been identified in the Significant H&S Risk Schedule included in the Netheridge Concept Design Report.

Risks that affect the delivery of the design and construction phase of the project have been identified and appropriate cost and likelihood values were assigned to enable a Monte-Carlo analysis to be completed.

Risks that impact the overall viability or scope of the project or the premise on which the project has been developed have not been included in the QCRA, as the impact of the realisation of these risks cannot be satisfactorily quantified.

Risks in the latter category include:

 Operating regime of the Severn to Thames Transfer SRO project changes impacting the design assumptions used for the design of the treatment process, pipeline and pump station.

It is not possible to anticipate or quantify potential changes that may occur to the operation and requirements of the STT SRO. Given that the Netheridge scheme output is entirely dependent upon the STT SRO requirement, any changes will impact the overall design premise and project viability.

 Changes to influent quality at Netheridge WwTW that require alteration to existing and proposed treatment processes to continue to meet consent standards.

It is possible that changes to the influent quality at Netheridge WwTW could impact the ability of the proposed new treatment plant to meet the required STT SRO discharge consent conditions at the discharge location. For example, increase in trace metals from an industrial process in the catchment. It is not possible to quantify or cost this risk.

Installation of new assets at Netheridge WwTW site to meet other project needs (i.e., Gas to Grid and AMP8 Phosphorus removal) that impact on the availability of land, power, potable water and sludge handling facilities for the proposed STS SRO treatment process.

It is understood that upgrades may occur at Netheridge WwTW in the AMP8 period. The extent and nature of these upgrades is not known but they may either utilise power, land, resources such as potable water or sludge handling, or they may render elements of the new SRO treatment process unnecessary or inappropriate. This risk cannot be costed or quantified.

Issues relating to access to land required for the construction of the pipeline and valve chambers, and wayleaves and easements for ongoing operation and maintenance of the pipeline.

Options 1, 2, 3 and 5 pipelines are up to 18km long and pass-through land owned by numerous stakeholders. It is possible that the selected pipe route cannot be constructed due to issues obtaining access or wayleaves. This will be addressed fully at Gate 3 when engagement with stakeholders will be undertaken. No engagement has been undertaken at Gate 2 and so this risk cannot be quantified or costed.

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3.4 RISK RESULTS

3.4.1 RISK SUMMARY

The following tables show the output from the ACWG template Risk Register and @Risk Tabs. Note that Option 5 covers the risk for the construction of the additional branch only.

Table 3-2 – Risk Va

Option No.	Option Name	P10	P50	P90
Option 1	Deerhurst	£8,107,084.06	£20,012,655.77	£34,089,166.92
Option 2	Haw Bridge	£7,731,351.65	£19,122,964.60	£32,677,017.83
Option 3	East Channel	£3,965,783.46	£12,647,664.09	£23,032,875.76
Option 4	Canal	£597,119.45	£8,196,285.07	£16,917,953.62
Option 5	SW Branch	£348,123.71	£1,261,008.16	£2,338,110.59

The full analysis of optimism bias is included in Appendix B.

3.5 SUMMARY OF CAPEX COSTS (INCLUDING OB AND RISK)

The OB value, risk value and Overall Capex cost have been summed to determine the Total Project Capex cost for each option.

Option No.	Option Name	OB Value	Risk Value (P50)	Total Project Capex Cost
Option 1	Deerhurst	£31,228,800	£20,012,656	£153,664,600
Option 2	Haw Bridge	£30,128,100	£19,122,965	£147,644,600
Option 3	East Channel	£27,691,500	£12,647,664	£128,500,700
Option 4	Canal	£26,037,700	£8,196,285	£116,190,800
Option 5	SW Branch	£2,926,600	£1,261,008	£13,478,400

4 OPERATIONAL COST ESTIMATES

4.1 COST ESTIMATION APPROACH

The annual operating expenditure has been calculated by assessing the electrical power used on site by the equipment, the cost of labour to operate and maintain the equipment and the cost of any consumables such as chemicals and media.

4.2 ASSUMPTIONS

The basis for the estimation of the operating costs includes a number of key assumptions on the operation of the plant:

- Netheridge SRO treatment plant will treat a minimum of 20MLD on a continual basis to ensure viability of the biological treatment process.
- 35MLD of treated effluent will be pumped to the STT SRO abstraction point on 35 days of the year throughout the 80-year operational period.
- 20MLD of 'sweetening' flows to the STT SRO abstraction point will be pumped for 120 days per year.
- For the remaining 210 days per year, a sweetening flow will be provided through the SRO treatment process and will be discharged to the existing outfall.

This is a simplification of the expected operating conditions, as the number of days on which the STT SRO will call for flow over the lifetime of the project is not currently confirmed, and the treatment process flexibility to operate at a lower flowrate on days in which there is no STT SRO call for flow has not been assessed. Without further detail on the demand profile establishing how the operating costs will vary with flowrate this cannot inform the annual cost. Additionally, certain technical assumptions as part of the preliminary process design have an influence on the operating costs, for instance power costs associated with blowers are based on an estimated oxygen demand of the effluent. Consequently, the annual operating costs estimated at this stage are suitable only for the comparison of options.

Other assumptions made during build-up of the Opex cost include:

- The GAC, Ion Exchange and UV units will not operate during days that the STT SRO does not call for flow, this reduces the replacement rate of media and power consumption.
- The STT SRO will only call for flow for one period during the year.
 - It is anticipated that during the notice period prior to transfer, greater operator input will be required due to bringing process units back online, and the Opex includes additional labour for this period.
 - It is also expected that when this is complete the transfer pipeline will be drained, the Opex includes labour cost for one drain down per year.
- Operator and maintenance time are assumptions made from previous project experience and expected levels of operator input.
- For Option 5, it is assumed that 35MLD of effluent will be pumped to Haw Bridge for 35 days of the year, 20MLD of sweetening flow will be pumped for 120 days of the year and 35MLD will be provided to the East Channel for 35 days of the year.

 The cost per unit of power used was 0.20 £/kWh and labour £38.11 per hour as provided by STW.

4.3 SUMMARY

Table 4-1 summarises the overall operational costs for the five options developed during the concept design.

The treatment process accounts for most of the annual Opex costs, Option 3 and 4 treatment Opex is increased due to the additional process units.

The pipeline Opex tends to decrease with the decrease in pipe length, however there are hydraulic differences between the Option 3 and 4 discharge point that affect the power consumption – this is discussed further in the Pipeline Hydraulics Assessment report.

Option 5 shows the additional Opex cost of the SW Branch.

Table 4-1 – Operational Cost Summary

Option No.	Option Name	Treatment Opex	Pipeline Opex	Annual Opex
Option 1	Deerhurst	£1,447,915	£217,745	£1,665,660
Option 2	Haw Bridge	£1,447,915	£171,422	£1,619,337
Option 3	East Channel	£1,485,967	£90,203	£1,576,170
Option 4	Canal	£1,504,087	£92,374	£1,596,462
Option 5	SW Branch	£38,052	£180,786	£218,838

The full breakdown of Opex costs is included in Appendix C.

5 NET PRESENT VALUE & AVERAGE INCREMENTAL COST

5.1 APPROACH

To calculate the Net Present Value (NPV) the Capex costs were split out into categories based on their purpose and construction. Each category has an expected asset life associated as outlined in the All Company Working Group Mott MacDonald Cost Consistency Methodology Rev E (Feb 2022).

The asset categories and the corresponding expected asset life are outlined below:

- Process-Related Carbon Media Including GAC (4 years);
- Building Services (10 years);
- Fencing (10 years);
- ICA (Instrumentation, Control & Automation) (10 years);
- Plant and Machinery (15 years) This has been used to represent IX resin replacement only;
- M&E (Mechanical and Electrical) Works on Pumping Stations and Treatment Works (20 years);
- Power Supply (25 years);
- Steel/Timber/GRP Structures (30 years);
- Brick/Concrete Office Structures (50 years);
- Headworks/Valves (60 years);
- Roads and Car Parks (60 years); and
- Treatment and Pumping Station Civils (incl. Intakes) (60 years).

The costs were then inputted into the Mott MacDonald NPV and AIC template (Rev C, May 2021) provided by STW. The discount factor was provided in the template, the factor used was 3.5% for years 1-30, 3% for years 31-75 and 2.5% for years 76-80 as per the Green Book recommendation.

The minimum flow used was 20MLD and the deployable output was 35MLD. The construction Capex cost was split over years 1 and 2 to represent the expected construction timeframe of c. 24 months, and Opex costs, split into fixed and variable, were shown to start from Year 3.

5.2 SUMMARY TABLES

Table 5-1 summarises the NPV and AIC outputs for the five options developed during the concept design. Note that the AIC template assumes that the WwTW flows 365 days of the year which may not be the correct operating scenario for this scheme. This scheme is anticipated to transfer 35MLD for 35 days, 20MLD for 120 days and to run on 'standby' treating 20MLD but to the existing discharge not transferring for the remainder of the year.

Note Option 5 outputs are just for the SW branch, and therefore are in addition to Option 1 or 2.

Table 5-1 – NPV and AIC Template Output

Option No.	Option Name	NPV Fi	nance (£)	NPV O	pex (£)	NPV WAFU (m ³)	AIC (p/m ³)			
		Min utilisation	Max utilisation	Min utilisation	Max utilisation		Min utilisation	Max utilisation		
Option 1	Deerhurst	£168,185,540	£168,185,540	£51,419,650	£76,874,965	£263,267,297	£83.42	£93.08		
Option 2	Haw Bridge	£163,915,721	£163,915,721	£49,468,463	£73,460,388	£263,267,297	£81.05	£90.17		
Option 3	East Channel	£154,520,009	£154,520,009	£47,582,008	£70,083,464	£263,267,297	£76.77	£85.31		
Option 4	Canal	£146,993,167	£146,993,167	£48,328,872	£71,329,031	£263,267,297	£74.19	£82.93		
Option 5	SW Branch	£15,146,408	£15,146,408	£8,731,577	£15,016,144	£263,267,297	£9.07	£11.46		



6 COST SUMMARY

The following Table 6-1 combines all of the costs estimates for the five Netheridge SRO options.

Option No.	Option Name	Capex	OB	QCRA (P50)	Total Project Capex Cost	Annual Opex	NPV Finance	NPV Opex	AIC (p/m ³)
Option 1	Deerhurst	£102,423,100	£31,228,800	£20,012,656	£153,664,600	£1,665,660	£168,185,540	£76,874,965	93.08
Option 2	Haw Bridge	£98,393,500	£30,128,100	£19,122,965	£147,644,600	£1,619,337	£163,915,721	£73,460,388	90.17
Option 3	East Channel	£88,161,500	£27,691,500	£12,647,664	£128,500,700	£1,576,170	£154,520,009	£70,083,464	85.31
Option 4	Canal	£81,956,800	£26,037,700	£8,196,285	£116,190,800	£1,596,462	£146,993,167	£71,329,031	82.93
Option 5	SW Branch	£9,290,800	£2,926,600	£1,261,008	£13,478,400	£218,838	£15,146,408	£15,016,144	11.46

Table 6-1 – Cost Summary Tables

7 FUTURE WORK COST ESTIMATES

The anticipated next steps for Gate 3 and Gate 4 are outlined in the Concept Design report. The below table outlines these next steps and provides a high-level budget cost for the items of work.

	Item of Work	Cost Estimate
	Design Development	£250,000
	Inflow flow availability review	£15,000
	Netheridge WwTW upgrades review	Inc in design development
	Advanced treatment performance pilot plant	£100,000
	Operations and Control system review and development	£15,000
	Potable water supply investigation	£7,000
	Ground investigation for pipeline & treatment site – incl. soil resistivity	£600,000
ŝ	Topographic survey for pipeline and treatment site	£75,000
Gate	Utilities survey for treatment site	£30,000
	Pipeline LiDAR	£25,000
	Pipeline bathymetric survey	£100,000
	Discharge from drain down points	By others
	Utilities service provider engagement	By others
	Stakeholder and Landowner engagement	By others
	Environmental Surveys and reporting	By others
	Permitting Applications & consideration of permitting route	By others
	Water Resources Benefit	By others
	Design Development	
Gate 4	Permit and planning applications	
Ö	Preparation of tender documents – incl. H&S Information	
	Land Purchase	By others

Appendix A

CAPEX COST ESTIMATE

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Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

mo	Rate		B&C	M&E	Mains & Sewers	Total
d fi		Standard Cost	£ 12,868,900	£ 6,896,800	£ -	£ 19,765,700
uste		Non-Standard Cost	£ 32,159,900	£ 2,982,200	£ -	£ 35,142,100
adj es	0.5%	Non-Standard Adjustment	£ 64,300	£ 34,500	£ -	£ 98,800
be ialu		Construction Cost	£ 45,093,100	£ 9,913,500	£ -	£ 55,006,600
ultv	0.0%	Design Fee	£ -	£ -	£ -	£ -
es r efa		Contractor D&B Cost	£ 45,093,100	£ 9,913,500	£ -	£ 55,006,600
rat le d	18.3%	Internal Costs	£ 8,238,500	£ 1,811,200	£ -	£ 10,049,700
tt tt	8.6 %	External Costs	£ 3,887,000	£ 854,500	£ -	£ 4,741,500
<u>-uo</u>		Project Total	£ 57,218,600	£ 12,579,200	£ -	£ 69,797,800
ese	30.5%	Optimism Bias	£ 17,446,000	£ 3,835,400	£ -	£ 21,281,400
£		Business Case Cost Estimate	£ 74,664,600	£ 16,414,600	£ -	£ 91,079,200

These rates and notes may be adjusted from the standard rates

Costs are calculated using a formula of M x (Quantity)^P + C

 ${\bf M}$ is a multiplier adjuster, ${\bf P}$ is a power adjuster, ${\bf C}$ is a constant

For Linear Cost Curves set P = 1

	For Unit Rate Items set P = 1, C = 0																				
Level 1	Level 2	Level 3	Level 4	Units			В&	C				M	λE					Mains an	d Sewers		Notes
Level 1	Leverz			onits	M	Р	С	Quantity	Cost	M	Р	С	Quantity		Cost	м	Р	С	Quantity	Cost	
	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,496	172,940	0	0	120 m3		353,493	0		0) m3	#VALUE!	Ferrous Sulphite
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW		420,550					£ -	MBBR PS
	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3	£	318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,767	19,179	0	0	475 m3	f	244,095					£ -	
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0		£ 526,172	17,996	1	0	150 kW		420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,794	3,057	1	0	m3	#∖	/ALUE!					£ -	BAFF Tank
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW		420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3	,228,311					£ -	
	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d		178,910	0	0	2 kg/d		203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,115	19,179	0	0	142 m3	£	148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	19 kW	£	186,443					£ -	Sludge Thickener Feed Pumps
			Sludge Thickener Drum	1																	
FREE ENTRY	Sludge Treatment	No	& Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£	390,284					£ -	Sludge Thickener Drum & Belt
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£	115,648					£ -	Thickened Sludge Pumps
FREE ENTRY	Outlet to River	No	Outlet		145,000	#N/A	#N/A	1	£ 145,000					£	-					£ -	Outlet
FREE ENTRY	MBBR	No	MBBR		#######################################	#N/A	#N/A	1	£ 11,353,500					£	-					£ -	MBBR
FREE ENTRY	Comag	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,198					£	-					£ -	Comag
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000	#N/A	#N/A	1	£ 2	,175,000					£ -	BAFF M&E
NON-	Site wide SCADA /																				
STANDARD	control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#∖	/ALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,902					£	-					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£ -	164,503	#N/A	#N/A	1	£	164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£	252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£	479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW	£	258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	15 kW	£	98,825					£ -	Dirty backwash

TRENT WATER **CAPEX** Costs



ARUP



Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

mo	Rate		B&C	M&E	Mains & Sewers	Total
i pi		Standard Cost	£ 12,868,900	£ 6,896,800	£ -	£ 19,765,700
uste		Non-Standard Cost	£ 32,159,900	£ 2,982,200	£ -	£ 35,142,100
adj es	0.5%	Non-Standard Adjustment	£ 64,300	£ 34,500	£ -	£ 98,800
be ialu		Construction Cost	£ 45,093,100	£ 9,913,500	£ -	£ 55,006,600
ult v	0.0%	Design Fee	£ -	£ -	£ -	£ -
es r efa		Contractor D&B Cost	£ 45,093,100	£ 9,913,500	£ -	£ 55,006,600
rat le d	18.3%	Internal Costs	£ 8,238,500	£ 1,811,200	£ -	£ 10,049,700
th th	8.6 %	External Costs	£ 3,887,000	£ 854,500	£ -	£ 4,741,500
-40		Project Total	£ 57,218,600	£ 12,579,200	£ -	£ 69,797,800
ese	30.6%	Optimism Bias	£ 17,520,300	£ 3,851,800	£ -	£ 21,372,100
Ę.		Business Case Cost Estimate	£ 74,738,900	£ 16,431,000	£ -	£ 91,169,900

These rates and notes may be adjusted from the standard rates

Costs are calculated using a formula of M x (Quantity)^P + C

 ${\bf M}$ is a multiplier adjuster, ${\bf P}$ is a power adjuster, ${\bf C}$ is a constant

For Linear Cost Curves set P = 1

	For Unit Rate Items set P = 1, C = 0																				
Level 1	Level 2	Level 3	Level 4	Units			B&	C				М	&E					Mains an	d Sewers		Notes
Level 1		Levers	Level 4	Units	M	Р	С	Quantity	Cost	м	Р	С	Quantity		Cost	М	Р	С	Quantity	Cost	Notes
	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,				0 120 m3	£	353,493	0		0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,	68 17,99	6 1		0 150 kW	£	420,550					£ -	MBBR PS
	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,				0 60 m3	£	318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,	67 19,17	9 0) 475 m3	£	244,095					£ -	
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,	.72 17,99	6 1		0 150 kW	£	420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC, RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,	794 3,05	7 1) m3	#	VALUE!					£ -	BAFF Tank
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,				0 150 kW	£	420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,	002 3,05	7 1		0 1,056 m3	f :	3,228,311					£ -	
	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d			_) 2 kg/d	l £	203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,:	15 19,17	90) 142 m3	£	148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£	- 35,37	3 1	(0 19 kW	£	186,443					£ -	Sludge Thickener Feed Pumps
			Sludge Thickener Drum																		
	Sludge Treatment	No	& Belt		75,838	#N/A	#N/A	1	£ 75,8		4 #N/A	#N/A	1	£	390,284					£ -	Sludge Thickener Drum & Belt
	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£	- 35,37	3 1		0 8 kW	£	115,648					£ -	Thickened Sludge Pumps
	Outlet to River	No	Outlet		145,000	-	#N/A	1	£ 145,					£	-					£ -	Outlet
FREE ENTRY		No	MBBR		##########		#N/A	1	£ 11,353,					£	-					£ -	MBBR
FREE ENTRY	<u> </u>	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,					£	-					£ -	Comag
FREE ENTRY		No	BAFF M&E						£	- 2,175,00	0 #N/A	#N/A	1	£	2,175,000					£ -	BAFF M&E
NON-	Site wide SCADA /																				
	control system	No.	x	No.	27,783	1	0		£ 14,502,		3 1		D No.	#	VALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,					£	-					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£		3 #N/ A	#N/A	1	£	164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£	- 252,43	8 #N/A	#N/A	1	£	252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,4	30 343,82	3 0) 28 kg/d	l £	479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,			(0 69 kW		258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,	607 17,99	6 1	(0 15 kW	£	98,825					£ -	Dirty backwash

TRENT WATER **CAPEX** Costs



ARUP

SEVERN TRENT WATER

Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

Rate		B&C	M&E	Mains & Sewers
	Standard Cost	£ 13,395,000	£ 7,317,400	£
	Non-Standard Cost	£ 33,935,100	£ 6,908,600	£
0.5%	Non-Standard Adjustment	£ 67,000	£ 36,600	£
	Construction Cost	£ 47,397,100	£ 14,262,600	£
0.0%	Design Fee	£ -	£ -	£
	Contractor D&B Cost	£ 47,397,100	£ 14,262,600	£
18.3%	Internal Costs	£ 8,659,500	£ 2,605,800	£
8.6 %	External Costs	£ 4,085,600	£ 1,229,400	£
	Project Total	£ 60,142,200	£ 18,097,800	£
31.4%	Optimism Bias	£ 18,890,700	£ 5,684,500	£
	Business Case Cost Estimate	£ 79,032,900	£ 23,782,300	£

These rates	and notes	may be a	ndjusted j	from the	standard i	rates

Costs are calculated using a formula of M x (Quantity)^P + C

M is a multiplier adjuster, P is a power adjuster, C is a constant

For Linear Cost Curves set P = 1For Unit Rate Items set P = 1 C = 0

														or Unit Rate It	ems set P = 1, C	= 0					
Level 1	Level 2	Level 3	Level 4	Units			B	&C					M	&E				Mains an	d Sewers		Notes
Level 1	Level 2	Levers	Level 4	Units	м	Ρ	С	Quantity		Cost	Μ	Ρ	С	Quantity	Cost	м	Ρ	С	Quantity	Cost	Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	() 120 m3	£	153,496	172,940	0		0 120 m3	£ 353,493	(0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	() 330 kW	£	770,868	17,996	1	-	0 150 kW	£ 420,550					£ -	MBBR PS
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	() 60 m3	£	138,666	172,940	0		0 60 m3	£ 318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	() 475 m3	£	102,767	19,179	0	1	0 475 m3	£ 244,095					£ -	
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	(0 165 kW	£	526,172	17,996	1		0 150 kW	£ 420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	() 1,132 m3	£	4,822,794	3,057	1		0 m3	#VALUE!					£ -	BAFF Tank
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	() 165 kW		526,172	17,996	1		0 150 kW	£ 420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	() 1,056 m3	£	4,499,002	3,057	1		0 1,056 m3	£ 3,228,311					£ -	
								I						I							
	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	() 2 kg/d		15,178	178,910	0		0 2 kg/d						£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	() 142 m3	£	45,115	19,179	0		0 142 m3	£ 148,295					£ -	Thickened Sludge Tank
											05 070										
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£	-	35,373	1		0 19 kW	£ 186,443					£ -	Sludge Thickener Feed Pumps
	Chudes Treatment	N	Sludge Thickener Drur	m	75 020		4461/4			75 020	200.204	HN1/A	446176		c 200.204					c	Chudes Thislance David & Dalk
	Sludge Treatment Sludge Treatment	No Sludge Dumping	& Belt	kW	75,838	#N/A	#N/A	1	f	75,838	390,284 35,373	#N/A	#N/A	1 0 8 kW	£390,284£115,648					£ -	Sludge Thickener Drum & Belt Thickened Sludge Pumps
	Outlet to River	Sludge Pumping No	Sludge Pumping Outlet	KVV	145,000	#NI/A	#N/A	1	Ľ	145,000	33,373	1		Ο Ο ΚΥΥ	£ 115,046					E -	Outlet
		No	MBBR		#######################################		#N/A #N/A	1		143,000					г - С					<u>г</u> -	MBBR
		No	Comag		3,327,198	· ·	#N/A #N/A	1	_	3,327,198					<u>г</u> -					<u>г</u> -	Comag
	BAFF M&E	No	BAFF M&E		3,327,190	#N/A	#N/A	1	L L	3,327,130	2,175,000	#NI /Λ	#N/A	1	£ 2,175,000					f -	BAFF M&E
NON-	Site wide SCADA /								L.		2,173,000	#19/74	#IN/A	1	1 2,175,000					L -	DATTIVICE
STANDARD	control system	No.	x	No.	27,783	1	(522 No	f 1	14,502,465	27,783	1		D No.	#VALUE!					£-	
FREE ENTRY	Ozone Curve	No	Ozone	110.	2,755,902	#N/A	#N/A	1	_	2,755,902	21,105	1		110.	f -					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor		2,700,002			-	f	-	164,503	#N/A	#N/A	1	£ 164,503					- f -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£	-	252,438		#N/A	1	£ 252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	() 28 kg/d	f	79,430	343,823	0		0 28 kg/d	£ 479,789					£ -	CoMag Poly dosing
		, ,							\vdash												
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	(206 kW	£	594,607	17,996	1		0 69 kW	£ 258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579		(206 kW	£	594,607	17,996	1		0 15 kW	£ 98,825					£ -	Dirty backwash
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		1,775,152		#N/A	1	£	1,775,152	2,610,651	#N/A	#N/A	1	£ 2,610,651					£ -	Ion Exchange
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	IX Uplift						£	-	1,315,741	#N/A	#N/A	1	£ 1,315,741					£ -	Uplift oor
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	() 165 kW	f	526,172	17,996	1		0 150 kW	£ 420,550					£ -	IX Lift PS

CAPEX Costs

ATKINS ARUP

	То	otal
-	£	20,712,400
-	£	40,843,700
-	£	103,600
-	£	61,659,700
-	£	-
-	£	61,659,700
-	£	11,265,300
-	£	5,315,000
-	£	78,240,000
-	£	24,575,200
-	£	102,815,200

	Rate		B&C	M&E	Mains & Sewers
		Standard Cost	£ 13,395,000	£ 7,317,400	£
		Non-Standard Cost	£ 34,114,100	£ 7,750,400	£
es	0.5%	Non-Standard Adjustment	£ 67,000	£ 36,600	£
		Construction Cost	£ 47,576,100	£ 15,104,400	£
	0.0%	Design Fee	£ -	£ -	£
efa		Contractor D&B Cost	£ 47,576,100	£ 15,104,400	£
e d	18.3%	Internal Costs	£ 8,692,200	£ 2,759,600	£
t,	8.6%	External Costs	£ 4,101,100	£ 1,302,000	£
		Project Total	£ 60,369,400	£ 19,166,000	£
:	31.8%	Optimism Bias	£ 19,179,400	£ 6,089,000	£
		Business Case Cost Estimate	£ 79,548,800	£ 25,255,000	£

SEVER TREN	г																	(CAPEX Cost	s	ATKINS
WATER	3	Element Reference: Date Issued:	19 October 2022																		ARUP
Notice	Values are rounded																				
E E	Rate						B8	kC				M	&E				Mains	& Sewers			Total
adjusted fro es			Standa	ard Cost	£				13,395,000	£				7,317,400	£				-	£	20,712,400
juste			Non-Standa						34,114,100					7,750,400					-	£	41,864,500
be ad alues	0.5%		Non-Standard Adju						67,000					36,600					-	£	103,600
may b ult va	0.0%		Construction	on Cost sign Fee					47,576,100	f				15,104,400	f				-	f	62,680,500
			Contractor D&	-					47,576,100	£				15,104,400	£				•	£	62,680,500
st rates the defo	18.3%			al Costs					8,692,200					2,759,600					-	£	11,451,800
t t	8.6%			al Costs					4,101,100					1,302,000					-	£	5,403,100
e ou	24.0%		Project	sm Bias					60,369,400 19,179,400					19,166,000 6,089,000					-	£	79,535,400
These	31.8%		Business Case Cost E						79,548,800					25,255,000					-	f f	25,268,400 104,803,800
					-				,,	-					-					1-	
														adjusted from t							
														formula of M x a power adjust							
											111 15 0			st Curves set P =		instant					
														ems set P = 1, C	= 0						
Level 1	Level 2	Level 3	Level 4	Units	м		B8 C	kC Quantity	Cost	м	P	C M8	&E Quantity	Cost	м	в	Mains a C	nd Sewers Quantity	/ Cost		Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	P 0	0	120 m3	£ 153,496	172,940	P 0	0	120 m3			0		0 m		Ferrous S	alphite
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW						£ -	MBBR PS	
	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3						£ -	Ferric Su	phate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538		0	475 m3	£ 102,767	19,179		0	475 m3	£ 244,095					I -		
				1																	
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0		£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	_	Well & Pumps Ozone
	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,152 m5	£ 4,822,794	3,057	1	0	m3	#VALUE!					L -	BAFF Tar	ĸ
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	BAFF PS	
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3,228,311					£ -		
NON-INFRA	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d	£ 15,178	178,910	0	0	2 kg/d	£ 203,484					f -		
	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0			19,179	0	0	142 m3	-					£ -	Thickene	d Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping Sludge Thickener Drum	kW					£ -	35,373	1	0	19 kW	£ 186,443					£ -	Sludge 1	nickener Feed Pumps
FREE ENTRY	Sludge Treatment	No	& Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£ 390,284					£ -	Sludge T	nickener Drum & Belt
	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£ 115,648					£ -	_	d Sludge Pumps
FREE ENTRY	Outlet to River MBBR	No No	Outlet MBBR		145,000 #########		#N/A #N/A		f 145,000 f 11,353,500					f -					f -	Outlet MBBR	
FREE ENTRY		No	Comag		3,327,198	_	#N/A		£ 3,327,198					£ -					£ -	Comag	
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000 #	#N/A	#N/A	1	£ 2,175,000					£ -	BAFF M8	E
NON- STANDARD	Site wide SCADA / control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#VALUE!					f		
	Ozone Curve	No	Ozone	140.	2,755,902	#N/A	#N/A		£ 2,755,902	21,105	1	0	110.	f -					f -	Ozone	
	Interstage Pumps	No	Uplift oor						£ -	164,503		#N/A	1	£ 164,503					£ -	Uplift oo	
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£ 252,438					£ -	Uplift oo	r
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£ 479,789					£-	CoMag P	oly dosing
								20 18/ 0	. 5,150										_		
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW						£ -	Clean ba	
	Sewage Treatment	Interstage Pumping ITEM UNITS	Interstage Pumping OTHER DETAILS	kW	31,579 1,775,152	1 #N/A	0 #N/A	206 kW	£ 594,607 £ 1,775,152	17,996 2,610,651	1	0 #N/A	15 kW	£ 98,825 £ 2,610,651					f -	Dirty bac Ion Excha	
	ITEM DESCRIPTION	ITEM UNITS	IX Uplift		1,775,152	- N/A	πN/A	1	f -	1,315,741		#N/A #N/A	1	f 1,315,741					£ -	Uplift oo	
	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	IX Lift PS	
FREE ENTRY	ITEM DESCRIPTION		OTHER DETAILS		179,055	_	#N/A	1	£ 179,055	501,504		#N/A	1	£ 501,504		marte			£ -	UV	
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	UV uplift			#N/A	#N/A		#VALUE!	340,279	#N/A	#N/A	1	£ 340,279		#N/A	#N/A		#VALUE!	Uplift oo	r



Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

Rate		B&C	M&E	Mains & Sewers
	Standard Cost	£ 1,217,300	£ 1,398,600	£
	Non-Standard Cost	£ 853,700	£ -	£
19.3%	Non-Standard Adjustment	£ 234,900	£ 269,900	£
	Construction Cost	£ 2,305,900	f 1,668,500	£
0.0%	Design Fee	£ -	£ -	£
	Contractor D&B Cost	£ 2,305,900	f 1,668,500	£
12.8%	Internal Costs	£ 294,900	£ 213,400	£
18.1%	External Costs	£ 416,900	f 301,700	£
	Project Total	£ 3,017,700	£ 2,183,600	£
30.5%	Optimism Bias	£ 920,100	£ 665,800	£
	Business Case Cost Estimate	£ 3,937,800	£ 2,849,400	£

											These	e rates and i	notes may be	adjusted from t	he standard	l rates				
				-									-	formula of M x						
											M is			a power adjust		nstant				
														st Curves set P =						
				<u> </u>			B&	c				F0 M&		ems set P = 1, C	= 0		Mains and	Sewers		1
Level 1	Level 2	Level 3	Level 4	Units	м	Ρ	с	Quantity	Cost	м	Ρ	с	Quantity	Cost	м	Ρ	С	Quantity	Cost	Notes
		Pressure Mains in																		
		Rural/Suburban																		Includes 650m from Transfer
INFRA	Distribution	Highway	Diameter: 700mm	m					£ -					£ -	950	1	11,113	650 m	£ 628,328	PS to pipeline Ch 0
		Pressure Mains in Field																		
INFRA	Distribution	/ Verges	Diameter: 700mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	772	1	11,113	17,750 m	£ 13,722,163	
		Tunnelling /																		
	Distribution	Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	4,223	1	0	450 m	£ 1,900,405	
NON-		CROSSINGS.																		
STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£ -					£ -	55,565	1	0	24 Nr	£ 1,333,560	
																		1		
			Overhead Electric																	
NON-		CROCCINICS	Crossings (Pylons						c .					c	44.443		0	20 N-	c 222.200	
STANDARD	PIPELINE EXTRA OVERS	CRUSSINGS	supported)	Nr					£ -					£ -	11,113		0	20 Nr 9	£ 222,260	
																		9		
																		1		
NON-	PERMANENT SITE			- 1														1		
	WORKS	ACCESS	Access Track	m	4,137	1	0	2,400 m	£ 441,400					f -					f -	
5171107110		100200	necess muck	<u> </u>	1,137	- 1		2,100 m	1 11,100					2					-	
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
		PERMANENT SITE			-,					,	-	_							_	
STANDARD		FEATURES	Security fencing	m	78	1	0	400 m	£ 31,116					£ -					£ -	
	Submerged Outlet	item	Submerged Outlet						£ -					£ -	12,000	#N/A	#N/A	1	£ 12,000	Submerged Outlet
			Installation of new																	
NON-		WORK ON EXISTING	pumping station on																	Pump chambers to drain down
STANDARD	OTHERS	MAINS	existing main	Nr	38,896	1	0	8 Nr	£ 311,164					£ -					£ -	pipeline
																				Eel weir chamber and flow
FREE ENTRY	Eel screen	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	metering
FREE ENTRY	Hydraulic Break	ITEM UNITS	OTHER DETAILS		20,000	#N/A	#N/A	1	£ 20,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Hydraulic break chamber
		Major Water Pumping																		
NON-INFRA	Water Treatment	Station	Major Water Pumping	kW	31,579	1	0	719 kW	£ 1,183,913	17,996	1	0	719 kW	£ 1,126,951					£ -	Transfer Lift PS

		AI
rs		Total
	16,250,900	£ 18
	1,567,800	£ 2
	3,136,400	£ 3
	20,955,100	£ 24
	-	£
	20,955,100	£ 24
	2,680,200	£ 3
	3,788,700	£ 4
	27,424,000	£ 32,6
	8,361,600	£ 9
	35,785,600	£ 42
ers antity	Cost	Notes
		Includes 650m from

CAPEX Costs

ATKINS

ARUP

18,866,800

2,421,500

3,641,200

24,929,500

24,929,500 3,188,500

4,507,300

32,625,300 9,947,500

42,572,800

SEVERN TRENT WATER

Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

ξ F	Rate		B&C	M&E	Mains & Sewers
2		Standard Cost	£ 1,089,200	£ 1,260,400	£ 1
		Non-Standard Cost	£ 959,700	£ -	£
້ ຈິ 1	19.3%	Non-Standard Adjustment	£ 210,200	£ 243,300	£
alu		Construction Cost	£ 2,259,100	£ 1,503,700	£ 1
	0.0%	Design Fee	£ -	£ -	£
efa		Contractor D&B Cost	£ 2,259,100	£ 1,503,700	£ 1
1 1	12.8%	Internal Costs	£ 288,900	f 192,300	£
\$ 1	18.1%	External Costs	£ 408,400	£ 271,900	£
		Project Total	£ 2,956,400	£ 1,967,900	£
3	30.6%	Optimism Bias	£ 905,200	£ 602,600	£
		Business Case Cost Estimate	£ 3,861,600	£ 2,570,500	£

											Thes	e rates and	notes may be	adjusted from	the standard	rates				
											Cos	ts are calcu	lated using a	formula of M x	(Quantity)^I	P + C				
											M is			a power adjust		nstant				
														st Curves set P =						
														ems set P = 1, C	= 0					
Level 1	Level 2	Level 3	Level 4	Units			B&					M8	kΕ				Mains an			Notes
					M	Р	С	Quantity	Cost	М	P	С	Quantity	Cost	M	Р	c	Quantity	Cost	
		Pressure Mains in																		
		Rural/Suburban																		Includes 650m from Transfer
INFRA	Distribution	Highway	Diameter: 700mm	m					£ -					£ -	950	1	11,113	650 m	£ 628,328	PS to pipeline Ch 0
		Pressure Mains in Field																		
INFRA	Distribution	/ Verges	Diameter: 700mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	772	1	11,113	15,100 m	£ 11,675,161	
		Tunnelling /																		
INFRA	Distribution	Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	4,223	1	0	450 m	£ 1,900,405	
NON-									-											
STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£ -					£ -	55,565	1	0	16 Nr	£ 889,040	
			Overhead Electric																	
NON-			Crossings (Pylons																	
STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	supported)	Nr					£ -					£ -	11,113	1	0	12 Nr	£ 133,356	
NON-	PERMANENT SITE	A.C.C.F.C.C	A		4 4 2 7			2.000	C 504 637										f-	
STANDARD	WORKS	ACCESS	Access Track	m	4,137	1	0	3,000 m	£ 504,637					£ -					± -	Assuming 9 chambers
NON-INFRA	Distribution	Curra Manaal	Curren Manual		8,577			F0 2	£ 33,407	67,007		0	50 m3	C 271 CEO					6	
		Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-		PERMANENT SITE	Coourity for -in-		70		0	450	C 35.000					c .					c .	Assuming 0 shows have
	WORKS Submerged Outlet	FEATURES	Security fencing	m	78		0	450 m	£ 35,006					f -	120,000	#NL/A	#N/A	1		Assuming 9 chambers Submerged Outlet
FREE ENTRY	Submerged Outlet	item	Submerged Outlet Installation of new											I -	120,000	#IN/A	#N/A	1	120,000	Submerged Outlet
NON-		WORK ON EXISTING	pumping station on																	Pump chmabers to drain down
STANDARD	OTHERS	MAINS		Nr	38,896	1		9 Nr	£ 350,060					c					£ -	pipeline
JIANUARU	OTHENS	CMINING	existing main	INI	36,690	1	0	9 11	L 330,000					L -						Eel Weir Chamber and Flow
	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£					£	Metering
	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		20,000	-		1	£ 20,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Hydraulic break chamber
	TEM DESCRIPTION				20,000	- my A	THIN/PC	1	20,000		may A			#VALUE!		#N/A	min//		#VALUE!	nyuraulic break chamber
		Major Water Pumping		+																
NON-INFRA	Water Treatment	Station	Major Water Pumping	kW	31,579	1	0	584 kW	£ 1,055,747	17,996	1	0	584 kW	£ 988,782					£ -	Transfer Lift PS

CAPEX Costs

ATKINS ARUP

		Total
14,203,900	£	16,553,500
1,142,400	£	2,102,100
2,741,400	£	3,194,900
18,087,700	£	21,850,500
-	£	-
18,087,700	£	21,850,500
2,313,400	£	2,794,600
3,270,300	£	3,950,600
23,671,400	£	28,595,700
7,248,200	£	8,756,000
30,919,600	£	37,351,700



Element Reference:

Date Issued: 19 October 2022

Notice Values are rounded

mo	Rate		B&C	M&E	Mains & Sewers	Total
d fr		Standard Cost	£ 504,500	£ 665,200	£ 4,144,400	£ 5,314,100
uste		Non-Standard Cost	£ 452,400	£ -	£ 789,000	£ 1,241,400
adj es	19.3%	Non-Standard Adjustment	£ 97,400	£ 128,400	£ 799,900	£ 1,025,700
, be ialu		Construction Cost	£ 1,054,300	£ 793,600	£ 5,733,300	£ 7,581,200
ult v	0.0%	Design Fee	£ -	£ -	£ -	£ -
es r efa		Contractor D&B Cost	£ 1,054,300	£ 793,600	£ 5,733,300	£ 7,581,200
rat ne d	12.8%	Internal Costs	£ 134,800	£ 101,500	£ 733,300	£ 969,600
tt t	18.1%	External Costs	£ 190,600	£ 143,500	£ 1,036,600	£ 1,370,700
on-c		Project Total	£ 1,379,700	£ 1,038,600	£ 7,503,200	£ 9,921,500
ese	31.4%	Optimism Bias	£ 433,400	£ 326,200	£ 2,356,800	£ 3,116,400
4L		Business Case Cost Estimate	£ 1,813,100	£ 1,364,800	£ 9,860,000	£ 13,037,900

These rates and notes may be adjusted from the standard rates

Costs are calculated using a formula of M x (Quantity)^P + C

M is a multiplier adjuster, P is a power adjuster, C is a constant

For Linear Cost Curves set P = 1

												F	or Unit Rate It	tems set P = 1, C	= 0					
Level 1	Level 2	Level 3	Level 4	Units			B&	ίC				M	&E				Mains an			Notes
					м	Р	С	Quantity	Cost	м	Р	С	Quantity	Cost	м	<u>Р</u>	С	Quantity	Cost	
		Pressure Mains in																		
		Rural/Suburban																		Including 650m from Transfer
INFRA	Distribution	Highway	Diameter: 700mm	m					£	·				£ -	950	0 1	11,113	650 m	£ 628,328	PS to pipeline Ch 0
		Pressure Mains in Field																		
INFRA	Distribution	/ Verges	Diameter: 700mm	m	0		0	m	#VALUE!		0	() m	#VALUE!	772	2 1	11,113	4,100 m	£ 3,178,172	
INFRA	Distribution	Tunnelling / Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!		0	0) m	#VALUE!	4,223	1	0	80 m	£ 337,850	
NON-																				
STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£					£ -	55,565	1	0	12 Nr	£ 666,780	
			Overhead Electric																	
NON-			Crossings (Pylons																	
STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	supported)	Nr					£					£ -	11,113	1	0	11 Nr	£ 122,243	
NON-	PERMANENT SITE																			
STANDARD	WORKS	ACCESS	Access Track	m	4,137	1	0	350 m	£ 139,04	2				£ -					£ -	
	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,40	7 67,0	07 () () 50 m3	£ 271,650					£ -	
NON-	PERMANENT SITE	PERMANENT SITE																		
STANDARD	WORKS	FEATURES	Security fencing	m	78	1	0	600 m	£ 46,67					£ -					£ -	
			Installation of new																	
NON-		WORK ON EXISTING	pumping station on																	Pump chambers to drain down
STANDARD	OTHERS	MAINS	existing main	Nr	38,896	1	0	3 Nr	£ 116,68	7				£ -					£ -	b.benne
	Folgeroon	ITEM UNITS	OTHER DETAILS		50,000	#NI / A	#N/A	1	£ 50,00					c					c	Eel Weir Chamber and Flow
FREE ENTRY		ITEM UNITS			100,000	-	#N/A #N/A	1	_		#N/A	#N/A		± #VALUE!		#N/A	#NI/A		± -	Metering Submerged Outlet
	Outlet		OTHER DETAILS		100,000	#IN/A	#IN/A	1	£ 100,00		#N/A	#N/A		#VALUE!		#IN/A	#N/A		#VALUE!	Submerged Outlet
		Major Water Pumping																 		
NON-INFRA	Water Treatment		Major Water Pumping	kW	31,579	1	0	135 kW	£ 471,09	9 17,9	96 1		135 kW	£ 393,585					£ -	Transfer Lift PS

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CAPEX Costs



Element Reference: Date Issued: 19 October 2022

Notice Values are rounded

un la	Rate		B&C	M&E	Mains & Sewers	Total
d f		Standard Cost	£ 504,500	£ 665,200	£ 195,700	£ 1,365,400
uste		Non-Standard Cost	£ 221,200	£ -	£ -	£ 221,200
adj les	19.3%	Non-Standard Adjustment	£ 97,400	£ 128,400	£ 37,800	£ 263,600
alu Jalu		Construction Cost	£ 823,100	£ 793,600	£ 233,500	£ 1,850,200
nay ult v	0.0%	Design Fee	£ -	£ -	£ -	£ -
efa		Contractor D&B Cost	£ 823,100	£ 793,600	£ 233,500	£ 1,850,200
rat e d	12.8%	Internal Costs	£ 105,300	£ 101,500	£ 29,900	£ 236,700
th th	18.1%	External Costs	£ 148,800	£ 143,500	£ 42,200	£ 334,500
o-uo		Project Total	£ 1,077,200	£ 1,038,600	£ 305,600	£ 2,421,400
ese	31.8%	Optimism Bias	£ 342,200	£ 330,000	£ 97,100	£ 769,300
É		Business Case Cost Estimate	£ 1,419,400	£ 1,368,600	£ 402,700	£ 3,190,700

These rates and notes may be adjusted from the standard rates

Costs are calculated using a formula of M x (Quantity)^P + C

M is a multiplier adjuster, P is a power adjuster, C is a constant

For Linear Cost Curves set P = 1

												F .	or Unit Data H	come cot D = 1 C	- 0					
	1		1					_						ems set P = 1, C	= 0		Mains an			
Level 1	Level 2	Level 3	Level 4	Units	B&C							M	λE				Notes			
Level 1					м	Р	С	Quantity	Cost	M	Р	С	Quantity	Cost	M	P	С	Quantity	Cost	Notes
		Pressure Mains in Field																		
INFRA	Distribution	/ Verges	Diameter: 600mm	m					£ -					£ -	391	ι 1	0	500 m	£ 195,745	
NON-	PERMANENT SITE																			
STANDARD	WORKS	ACCESS	Access Track	m	4,137	1	0	200 m	£ 99,386	0		0	m	#VALUE!					£ -	
NON-																				
STANDARD						#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-	PERMANENT SITE	PERMANENT SITE																		
STANDARD	WORKS	FEATURES	Security fencing	m	78	1	0	280 m	£ 21,781					£ -					£ -	
																				Outlet will be through the
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	existing canal wall
																				Eel Weir Chanber and Flow
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Metering
		Major Water Pumping																		
NON-INFRA	Water Treatment	Station	Major Water Pumping	kW	31,579	1	0	135 kW	£ 471,099	17,996	1	0	135 kW	£ 393,585					£ -	Transfer Lift PS

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CAPEX Costs

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Element Reference:

Date Issued: 19 October 2022

Notice Values are rounded

mo	Rate		B&C	M&E	Mains & Sewers	Total
ed fi		Standard Cost	£ -	£ -	£ 320,100	£ 320,100
uste		Non-Standard Cost	£ 266,600	£ -	£ -	£ 266,600
adj les	19.3%	Non-Standard Adjustment	£ -	£ -	£ 61,800	£ 61,800
, be valu		Construction Cost	£ 266,600	£ -	f 381,900	£ 648,500
ult y	0.0%	Design Fee	£ -	£ -	£ -	£ -
efa		Contractor D&B Cost	£ 266,600	£ -	£ 381,900	£ 648,500
rat e d	12.8%	Internal Costs	£ 34,100	£ -	£ 48,800	£ 82,900
tt post	18.1%	External Costs	£ 48,200	£ -	£ 69,000	£ 117,200
o-uo		Project Total	£ 348,900	£ -	£ 499,700	£ 848,600
ese	31.5%	Optimism Bias	£ 109,900	£ -	£ 157,400	£ 267,300
É		Business Case Cost Estimate	£ 458,800	£ -	£ 657,100	£ 1,115,900

											These	e rates and	notes may be	adjusted from t	he standard	l rates				
											Cos	sts are calcu	lated using a	formula of M x	(Quantity)^	P + C				
											M is	a multiplie	adjuster, P is	a power adjust	er, C is a coi	nstant				
													For Linear Cos	st Curves set P =	1					
												F	or Unit Rate It	ems set P = 1, C	= 0					
Level 1	Level 2	Level 3	Level 4	Units			B&	с				M	kΕ.				Mains an	d Sewers		Notes
Level I	Level 2	Levers	Level 4	Units	м	Ρ	С	Quantity	Cost	м	Р	С	Quantity	Cost	м	Р	С	Quantity	Cost	Notes
		Pressure Mains in Field																		
INFRA	Distribution	/ Verges	Diameter: 700mm	m					£ -					£ -	772	2 1	11,113	400 m	£ 320,094	4
NON-	PERMANENT SITE																			
STANDARD	WORKS	ACCESS	Access Track	m	4,137	1	0	50 m	£ 43,260	0		0	m	#VALUE!					£ -	
NON-	PERMANENT SITE	PERMANENT SITE																		
STANDARD	WORKS	FEATURES	Security fencing	m	78	1	0	300 m	£ 23,337					£ -					£ -	
																				Eel Weir Chamber and Flow
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		100,000	#N/A	#N/A	1	£ 100,000		#N/A	#N/A	1	#VALUE!					£ -	Metering
FREE ENTRY	Outlet	ITEM UNITS	OTHER DETAILS		100,000	#N/A	#N/A	1	£ 100,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Submerged Outlet



CAPEX Costs

ARUP

Appendix B

ACWG TEMPLATE FOR OB AND QCRA

Confidential

wsp

2. Optimism Bias Tab

	Netheridge SRO - Deerhurst
Option Reference	Option 1
Date of OB Review 1	
Date of OB Review 2	

Contr butory factors																					
Contr butory factors		• I	1								Non-Standa	rd Civil Engineering		1	Standard C	Uv I Engineering					
Contr butory factors				1					Combined Upper Bound Optimism Bias (%)		n-Standa d C v I Eng ne	e ng Capex	68%	P opo t on of Stand	ad CviEng nee ng Cu	apex	32%	Adjusted Optimism Bias (%)			
Contr butory factors	3	11	1	11		Confidence Grade Criteria			Optimism Bias (%)	Uppe Bound Lowe bound			66% 6%	Uppe Bound Lowe bound			44%		Check whether cost prope	ortions have been provided	
	8	3 T	a di	1				Additional Guidance		Proportio	n of cost n each conf	idence band		Proportion of	of cost in each confide	ince band			across the require	d confidence bands	Scor ng comment
	1	2 2	31	N DE					Result f om		Ovil Engineer ng Comp	conents included -		Standard Civil E		nts included -		Result f om			
			28	- do						Required	Required	Required	â.	Required	Required	Required			Check for Non-Standard	Check for Standard	-
			1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		High Confidence	Medium Confidence	Low Confidence		58.96%	High	Medium	Low	a s	High	Medium	Low	a de la companya de la compan	37.10%	components	components	
										inse t p opo t on	inse t p opo t on	inse t p opo t on	Coloridade da la coloridade da	inse t p opo t on	Insetp opot on In	se t p opo t on	Calculated m t gat on		Check p opo t on sums to 1	Check p opo t on sums to 1	
Desc pt on	F xed v	values - do	o not adjust		Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce I	n conf dence	n conf dence	n conf dence	facto s	n conf dence	n conf dence n	conf dence	facto s	Calculated cell	whe e opt on conta ns Non-	whe e opt on conta ns	Desc be the eason ng beh nd ass gnment to conf dence bands
Procurement										Regu ed	band (0 - 1) Requ. ed	Regu ed		Regu ed	Regu ed	Regu ed			Standa d components	Standa d components	
Complex ty of cont act st	t uctu e				Clea , well establ shment	Cont act st ategy o outline		Fo bus ness as usual opt ons that w II be p ocu ed th ough ex st ng wate		1			1			1	0		OK	ОК	Cu ently unknown at th s p oject stage.
					p ocu ement oute and p ocesses and/o deta led p ocu ement plan o	comme c al bus ness case n place,	bus ness case in place.	company f amewo is then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nyolve mult pie wate compan es / asset													KPMG that will not be ploculed via DPC oute.
					ful comme c al bus ness case n	but deta is st il to be developed		owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and													
Late cont acto molvem					place			whe e detailed p ocu ements plans have not been developed											ОК	ок	Cost models fo t eatment elements may not be el able at this scale. No contiacto involvement to date. ECI s
des en			,		a e based upon accu ate cost	a e based upon cost models w th	Design is not bus ness as usual fo company and the cont acto has not	Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equivalent				•	l v			•	, v		, w	, w	now a well established plocess the efolie, this isk should be minimal and will be mit gated. No ECI yet.
					models, o s gn f cant cont acto	med um conf dence, o n t al	been molved n des gn	level of conf dence n the est mate													
					nvolvement n des gn	cont acto involvement n key aspects of design															
Poo cont acto capabit	tes					Cont acto s and suppl e s expected		Opt on types whe e the e s I m ted ecent expe ence n the UK (ndud ng ia ge			1		0.5	1			1		OK	ОК	The physical work of the project is not unusual.
					to b d fo wo k have ecent expe ence of s m la const uct on	to b d to wo k have i m ted ecent experience of s m la const uct on		ese vo s euse and desal nat on opt ons) should be sco ed as med um/low conf dence													Howeve cont acto s will have I mited experience of constructing these assets on a wastewate is te
					p o ects and supply of s m la	p ojects and supply of s m la	p ojects and supply of s m la														
					p ocess plant and equ pment	p ocess plant and equ pment	p ocess plant and equ pment														
Gove nment gu del nes					The ea emutple ecentp ecedent	Some ecent p ecedents of p ocu n	g The e sim ted ecent experience of	Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s				1	0			1	0		ОК	OK	Lm ted expe ence of schemes of this natule, howeve the nf ast ucture tself should be familia .
					of p ocu ng p ojects of a s m la natu e and deta led p ocu ement	p ojects of a s m la natu e and deta led p ocu ement gu dance s n	p ocu ng p ojects of a s m la natu e and deta led p ocu ement	o othe less we l establ shed p ocu ement outes then low conf dence should be ass gned													
					gu dance s n place	place	gu dence s not n place														
D sputes & cla ms occu	ed		21			Scope and payment mechan sm pa t ally def ned and the e a e no					1		0.5			1	0		ок	ок	Unclea at this ploject stage.
					dependenc es on th d pa t es	majo dependences on th d pa t e															
info mat on management					info mat on management extense	Some has stakeholde s fe	pates Verstakabolda sifa a oos ement	When a sile met on menonement outpass for cost act and stakeholds		<u> </u>			0.5				0.5	-	~	04	lindes, at the prelect state bounds, come stakeholds a boundees, deat fields, on the Concept Decision
info mat on management	-				between key stakeholde s a e n	Some key stakeholde s fo p ocu ement dent f ed and	Keystakeholde s fo p ocu ement not dent f ed, o nfo mat on	Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low conf dence											oĸ	ок	Unclea at this ploject stage howeve some stakeholde shave been dent field uring the Concept Design Investigations
1					place, clea ly defined and effect ve	nfo mat on management system	management systems not n place and effect ve (e.g. p oject spec f c, o	1													1
					ex sting fo a ploject under an	st II to be developed befo e t can b	e al eady ex sting fo a pio ect unde	1													1
Othe	-	,			ex st ng f amewo k)	effect ve.	an existing f amework)														
Othe P ocu ement comb ned	2	4		13.0%					7.66%		Ave age M t gat on Fac	to	0.417	Av	age M t gat on Facto		0.250	5.028N	Ave age M t	get on Fecto	
Project specific							-				Requ ed	Regu ed		Regu ed	Regu ed	Regu ed					
Des gn complex by						Des gn s not bus ness as usual due to seve al complex t es. The des gn	Design is complex, for example due to the nature of the projection	Opt ons with sign f cantides gn complexities or consition ned sites and sign f cant nteg at on with existing aper at onal inflast ucture may be assigned low				1	0		1		0.5		ОК	ок	T eatment des gn const a nts a e st II not dea ly def ned. P pei ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
					well unde stood and deta led plans		nte faces with existing assets, o	conf dence. Opt ons that a e bus ness as usual on g eenfeld unconst a ned s tes													P per ne const a nts a e pette lunde scool nowever uney a e not yet tu ly add essed
1					and designs a e in place to add ess	complex t as have only been pa t ally unde stood and add assed.	const a nts. Des gn m t gat ons a e	may be ass gned h gh conf dence													1
	8	8			Unem																
Deg ee of innovat on						Design noo po ates technology /		Opt ons us ng technolog es that a e well establ shed n the UK should be ass gned			1		0.5	1			1		ОК	ОК	P ocess technology s established - but not on a wastewate is te.
					tested for the specific application	tested and n oven for the specific	been fully tested and n oven for the	h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es s less well establ shed n the UK (e.g. euse desal nat on) should be ass gned													
-	9	9				appl cat on.	spec f c appl cat on.	med um confidence Except foi opt ons that a efiee fiom environmental const a ntu/ sks t s uni kely													
Env onmental mpact					Env onmental mpacts well unde stood (e.g., mpact on .ece v.m	Some assessment of env onmental mpacts has been called out and	Env onmental impacts poolly unde stood (e.e. moact on lecelying	Except to opt one that a effect om env onmental const a nts/ sks t s uni kely that act one at Gate 1 would ach eve a h abe level of confidence than med um at				1	•			1	0		ОК	ОК	Env onmental assessments not yet ava alable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess now designed to meet all poss ble consent ng needs.
					wate bod es, no se, INNS t ansfe ,	m t gat ons have been dent f ed an	d wate bod es, no se, INNS t ansfe ,	that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent fed deta led and costed n the QCRA. Fo opt ons with s gn f cant env onmental sks that equ e nvest gat on													
					des gnated s tes, v sual amen ty etc; m t gat ons dent f ed whe e	s gn f cant of these. Othe		QCRA Fo opt ons with sign f cantienv onmental sks that equie investigation a low confidence scole would be mole applicable befole accounting for the QCRA													
					equ ed and included in costs	m t gat ons w II be equ ed that	dent f ed w thout ag eement on														
		.	22			have not yet been built into the	m t gat on to be built into costs														
Othe			18			CONS.															
P oject spec f c comb ned	đ			31.0%					18.28%	4	Ave age M t gat on Fac	to	0.167	Av	age M t gat on Facto		0.500	14.136%	Ave age M t	gat on Facto	
Client specific Inadequacy of the Bus net	ess Case 3	5	10		Needs have been clea ly dent f ed.	Pa t al dent f cat on of needs and	In t all dent f cat on of needs and	Conf dence I kely to be low at Gate 1 unless n t al stakeholde equ ements		Required	Requ ed	Regu ed	0.5	Kegu ed	Regu ed	Regu ed	0.5		OK	ОК	As one of 17 SROs, the need fo this pait cula scheme (o any othe) will be unclear until the gated process s
					Key stakeholde s needs dent f ed	n t al engagement w th	output spec f cat on, w thout	dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA													much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
					and ncluded n scope whe e appl cable.	stakeholde s to ef ne equ ements	engagement with stakeholde s to efine equiements														
La ge numbe of stakehol	olde s				Stakeholde app ovals not equ ed.	Some key stakeholde s dent f ed	Stakeholde s not clea ly dent f ed.			1			1		0.7	0.3	0.35		OK	ОК	Many stakeholde s not yet engaged, full I st of stakeholde s not developed so the e may be un dent f ed
					o key stakeholde app ovals obta ned. o key stakeholde s la gel	and v ews obta ned, howeve some othe stakeholde s ema n	v ews not known o some stakeholde s a e n act ve oppost on														stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have designed fo wo st case.
					suppo t ve	un dent f ed.															
Fund ng ava lab I ty	5				Fund ng fo the p oject s secu e	P oject fund ng unce ta n e.g.	P oject fund ng not secu e, e.g.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed app op ate					0.5		1		0.5		ОК	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance with add t one
		`				a sinct subject to all supprise					1										En cauca
		`			(e.g. p o ect fully funded th ough p ce ev ew / pass th ough	p oject subject to eff c ency challenges at p ce ev ew wh ch	p oject dependent n pa t on pa the sh p fund ng wh ch s not				1										
		,				p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be					1										
P oject management tear	im 2	2			p ce ev ew / pass th ough a angement) Scope of wo k s bus ness as usual	p oject subject to eff c ency challenges at p ce ev ew wh ch	pa the sh p fund ng wh ch s not secu e.				1		0.5		1		0.5		ок	ОК	In house ploject management team have no experience of deliveiing plojects of this nature where eclean water
P oject management tear	im 2	2			p ce ev ew / pass th ough a angement)	p oject subject to eff c ency challenges at p ce ev ew which may equ e bus ness case to be ev s ted Company del ve y team has some expe ence in implement ng p o ect	pa the sh p fund ng wh ch s not secu e. Company del ve y teams a e not s expe enced n mplement ng				1				1		0.5		ок	ОК	In house p oject management team have no experience of deliveiing p ojects of this neture where clean wate esserts a e constituted on a westewate is the.
P oject management tear	im 2	2			p ce ev ew / pass th ough a angement) Scope of wo k s bus ness as usual	p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be ev s ted Company del ve y team has some expe ence n mplement ng p o ect of th s natu e, but the elevant	pa the sh p fund ng wh ch s not secu e. Company del ve y teams a e not s expe enced n mplement ng				1				1		0.5		ок	ок	
		2			p ce evew / pass th ough a angement) Scope of wo k s bus ness as usual fo company del ve y teams.	p opert subject to eff cency challenges at p ce even which may equi a bus ness case to be evised. Company delive y team has some expe ence in mplement ng p o ect of this nature, but the elevant expe ence is not extensive.	pa tne sh p fund ng wh ch s not secu e. Company del ve y teams a e not s cope encod n mplement ng p ojects of th s natu e				1				1						assets a e const uded on a wastewate s s te.
P oject management tear Poo p oject stell gence		2	7		p ce evew / pass th ough a angement) Scope of wo k s bus ness as usual fo company del ve y teams. Good unde stand ng of key p o ect	p oject subject to eff cency challenges at p ce even which may equi e bus ness case to be evisited Compary delive y team has some expe ence n mplement ng p o ect of this nature, but the elevant expe ence is not extensive. Pa t al unde standing of key p oject	pa the sh p fund ng wh ch s not secu e. Company del ve y teams a e not s expe enced n mplement ng p ejects of th s netu e S gn f cant gaps n p oject data and				1	1			1	1	0.5		ОК	ок	
		2	7		p on ever / pass th cogh a angement) Scope of wo k is bus ness as usual fo company del ve y teams. Good unde standing of key p o ect data and no key assumpt ons made where ethe e s is p f cant	popic tubject to eff c ency challenges at pop evalues and the set of the set of evalues at the Company delive y team has some experence in mplementing poet of this nature, but the elevent experence is not extensive. Part all unde standing of key poject data and the in has been some wo but not takk not educe the	pe time ship funding which is not secure. Company delive y teams a e not is oppe encod in implement ng ip djedta of this natu e gin f cant gaps in p oject data and kay assumpt onis made where it here is sign f cant unce the re				1	1			1	1					esants a e const uded on a wastewate s s ta. A s gn f cant number of easurpt ons have been made by all d sc pl nes at th s stage, howeve two st case
		2	7		p on ever / pass th cogfi a angement) Scope of work is bus ness as usual for company delive y teams. Good unde standing of key p o ect data and no key assumpt ons made when ethe e s s gn f cant unce tant (in ge, g cound cont d tous	p oject subject to eff c ency challenges at p c even with d may equ e bus ness case to be even sted Company dei ve y team has some espe ence in mylement (g p o ect of th s natu e, but the elevant espe ences in mylement (g p o ject data and the e has been some vo unde taken to educe the unde taken to educe the unde taken to educe the unde taken to educe the unde taken to educe the	pa the sh p fund ng which is not secure. Company delive y teams a e not o oper encied in implement ng p ojicits of this natu e 5 gn f canti gaps in p ojicit data and kay assumpt onsimade where the e is sign f cant unce ta rety				1	1			1	1					esants a e const uded on a wastewate s s ta. A s gn f cant number of easurpt ons have been made by all d sc pl nes at th s stage, howeve two st case
		2	7		p on ever / pass th cogfi a angement) Scope of work is bus ness as usual for company delive y teams. Good unde standing of key p o ect data and no key assumpt ons made when ethe e s s gn f cant unce tant (in ge, g cound cont d tous	p opic subject to eff c ency challenges at p or everwith of may equi a bus ness case to be any stad Company del ve y team has some sage enci a molecular del post offs s natio, abotte elevant experisor a to delan six. Pa ti unde stade ofg of hey p opic dels and the has been some very unde taken to educe the unde taken to educe the under taken to be under the under taken to educe th	pa the sh p fund ng which is not secure. Company delive y teams a e not o oper encied in implement ng p ojicits of this natu e 5 gn f canti gaps in p ojicit data and kay assumpt onsimade where the e is sign f cant unce ta rety				1	1			1	1					esants a e const uded on a wastewate s s ta. A s gn f cant number of easurpt ons have been made by all d sc pl nes at th s stage, howeve two st case
		2	7		p on ever / pass th cogh a angement) Scope of work is bus new as usual for company del ve y teams. Good unde stand ng of key p o ect data and no key assumpt ons made when e the o s is prif cant unce ta nity (e.g. g ound cont) cont ond to on of est ne awats,	p opic tubject to eff c ency challenges at p c even which may equ e bus ness case to be even sted Company del ve y team has some espe ence n mojement (p p ooi of this statu e, but the elevant espe ence a not extensive. Pe t al unde stand ng of key p opict data and the e has been some wo 1 unde taken to educe the unce ta my a courd key assumpt on (e.g. g ound courd to no, courd to m o	pa the sh p fund ng which is not secure. Company delive y teams a e not o oper encied in implement ng p ojicits of this natu e 5 gn f canti gaps in p ojicit data and kay assumpt onsimade where the e is sign f cant unce ta rety				1	1			1	1					esants a e const uded on a wastewate s s ta. A s gn f cant number of easurpt ons have been made by all d sc pl nes at th s stage, howeve two st case
	9	2	7		p on ever / pass th cogh a angement) Scope of work is bus new as usual for company del ve y teams. Good unde stand ng of key p o ect data and no key assumpt ons made when e the o s is prif cant unce ta nity (e.g. g ound cont) cont ond to on of est ne awats,	p opic subject to eff c ency challenges at p or everwith of may equi a bus ness case to be any stad Company del ve y team has some sage enci a molecular del post offs s natio, abotte elevant experisor a to delan six. Pa ti unde stade ofg of hey p opic dels and the has been some very unde taken to educe the unde taken to educe the under taken to be under the under taken to educe th	pa the sh p fund ng which is not secure. Company delive y teams a e not o oper encied in implement ng p ojicits of this natu e 5 gn f canti gaps in p ojicit data and kay assumpt onsimade where the e is sign f cant unce ta rety		20.55%		1 1				1	1		11.460%	ок		esants a e const uded on a wastewate s s ta. A s gn f cant number of easurpt ons have been made by all d sc pl nes at th s stage, howeve two st case
Poo p oject ntell genos Othe C1 ent spec f c comb red Environment	9	2	7		p ex ever / pass th cuph a negrement) Scope of the h s bus ness assussal for company del ve y teams. Good unde stand ng of kay p o exit dets and no key assumpt one mode where there is sign f cant unce the high sign duration of the sign grant cond tion of esting assets, t extranet equi ementa)	p opic subject to eff c ency challenges at p or ever with ch may equ a bus ness care to be ave sted Company del ve y team has some sage ence in adjenesit to a p out of this natio, but the elevant expension a not estima via. Pa t il under stated ng of hery o opic data and the elevant de rep opic data and the elevant some some vor unde taken to educe the unde taken to educe the under taken to be under taken to educe the under taken to under taken taken to under taken taken to under taken tak	as the ship funding which is not sector e. Company delive y teams a e not oppe encod in implementing projects of this nature Sign f cant gaps in project deta and lawy assumpt comade while e the e is sign f cant unce ta rety		20.05%	l Megu ed		1 to Required	0.5	Ave Regu ed	1 age M t gat on Facto Required	1 Required	0.370	11.460%	OK Ave age M t	OK get on Facto	esarts a e const udeef on a westewale is ite. A sign f cant number of assumptions have been made by all d scipt nes at this stage, howeve wo st case t eatment scare is used.
Poo p oject stell gence Othe	9	2	7		p as every jeast though an expense of the second second second for company def ve y teams. Coord under standing of twy p o exit data and no twy assumption model when the ve is a provided second conditions. It estiment expenses and conditions the second to ord est at presents).	p oject subject to eff c ency challenges at p or ever with ch may equ a bus ness case to be ave a ted Company del ve y team has some ease ence in molecular del postenti tea of this natio a, but the elevant eage ence is not extensive. It is it under state ing of hay p oject dels and the tea be hern some vor unde taken to educe the south at hay a outdel y assumpt on (rag, g ound const t one, cond t on cas it age assets). I elevant is attended and the eight energies of the some local oppost to in, howeves the shab beas in the local beat to some local oppost to in, howeves the shab beat local	ea the ship funding which is not exce a. Company del ve y learns a e not experienced in mplementing policit of this nature is gin f canti gays in p oject dete and kay assumpt ons made while a the s is gin f canti unce ta while a the project on once local atakhindes is		20.65%	Required 1			0.5	An Regu ed		1 Requ. ed 0.5	0	11.460	ок	ок	esants a e const uded on a wastewate s s te. A s gn f cant number of easumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case
Poo p oject ntell genos Othe CI ent spec f c comb med Environment	9	2	7		p as every jess th ough an expensivel. Scope of work is bus ness as usual for company del very teams. Good under standing of hay p o exit data service on any personnel of the service data service on any service of the service and the original service on any service unce to into (is a service) as each of the extension equipation of the service on any service of the service on any service on any service on any service of the service on any service on any service on any service of the service on any service on any service on any service on any service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on the service on any service on any service on any service on any service on the service on any service on a	p oject subject to eff c ency challenges at p c even with the may regul = bus ness case to be any ited case most in uplements pp o ext eff bs nature, put the missions experiments in uplement pp o ext eff bs nature, put the missions experiments in uplement pp o ext eff bs nature, put the missions experiments in the sub-ext mission regulated and the ext be the unde taken to extrem the unde taken to extrem the subscription of the extension (seg. g ound conditions, candition our ext in grants), te extension experiments) P oject conditioned to some local opposition, however, the e has been come engineement with kay	ea the ship funding which is not sector e. Company delive y teams a e not ope encod in mplament ng princts of this nature e Sign Foant gaps in project data and lawy assumpt on smade while a the e is gin Foant unce to rety Project could lead to local opposition once local attachedies serve e. e.		20.05%				0.5	Ave Regu ed		1 Requ. ed 0.5	0.370	11.480%	OK Ave age M t	OK get on Facto	esants a e const udeel on a westewate s s to. A s gn f cant numbe of exampt ons have been made by all d sc pl nes at th s stage, howeve wo st case t extment scene o used. The scheme s is greenough that the e could be local opposition, sco ed med um as the e s no evidence of
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2. Optimism Bias Tab

	Netheridge SRO - Haw Bridge
Option Reference	Option 2
Date of OB Review 1	
Date of OB Review 2	

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		11		4 I					Combined Upper Bound		-Standa d C v I Eng ne	ee ng Capex	71%		ndad CviEng nee ng	g Capex	29%	Adjusted Optimism Bias (%)			
						Confidence Grade Criteria			Optimism Bias (%)	Uppe Bound			66%	Uppe Bound			44%	Aufentes obrauges and ful	Check whether cost prop	ortions have been provided	4
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	25								Result f om		vil Engineer ng Comp	idence band		Standard Chill	I Engineer ng Compon	noence band		Result f om			Scor ng comment
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	1 1 1	1		41 I					50.000/				1.				1 1.	07.470/	Check for Non-Standard	Check for Standard	
	23	8		81	High Confidence	Medium Confidence	Low Confidence		59.62%	High	Medium	Low	N 2	High	Medium	Low	1	37.47%	components	components	
		_								inse t p opo t on	inse t p opo t on	inse t p opo t on	Calculated m t aat on	inse t p opo t on	inse t p opo t on	Inse t p opo t on	Calculated m t aat on		Check p opo t on sums to 1	Check p opo t on sums to 1	1
Desc pt on	F xed values -	i - do not adju	52		Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce I	n conf dence	n conf dence	n conf dence	facto s	n conf dence	n conf dence	n conf dence	facto s	Calculated cell	whe e opt on conta ns Non-	whe e opt on conta ns	Desc. be the eason ng beh nd ass gnment to conf dence bands
Procurement	-			_			-			Requ ed	Requied	band (0 - 1)		band (0 - 1)	Regu ed	Regu ed			Standa d components	Standa d components	
Complex ty of cont act st uctu e	•	_	_		Gea , well establ shment	Cont act st ategy o outline	No cont act st ategy o comme c al	Fo bus ness as usual opt ons that w II be p ocu ed th ough ex st ng wate		1			1			1	0		ОК	ОК	Cu ently unknown at this ploject stage.
					p ocu ement oute and p ocesses	comme c al bus ness case n place,	bus ness case in place.	company f amewo ks then these may be assessed as h gh conf dence Opt ons													Potent al to be p ocu ed v a DPC as pa t of STT SRO
					and/o deta led p ocu ement plan o	but deta is st II to be developed		should sco e low conf dence whe e they nuolve mult ple wate compan es / asset													
					full comme call bus ness case in			owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e detailed p ocu ements plans have not been developed													
Late cont acto involvement in		3		1	Design is bus ness as usual and cost	Design is business as usual and cost	s Design is not bus ness as usual fo	Whe e the e has not been ea ly cont acto nvolvement then low conf dence				1	0			1	0		OK	ОК	Cost models fo t eatment elements may not be el able at this scale. No contiacto involvement to date. ECI
des gn					a e based upon accu ate cost	a e based upon cost models w th	company and the cont acto has not	should be ass gned unless the conf dence n the cost models g ves an equ valent													now a well established plocess the efole, this isk should be minimal and will be mitigated. No ECI yet.
					models, o s gn f cant cont acto nvolvement n des gn	med um confidence, o n t al	been rivolved in design	level of confidence in the est mate													
					nvorvement n des gn	cont acto involvement n key aspects of design															
Poo cont acto capabiltes					Cont acto s and suppl e s expected	Cont acto s and suppl e s expected	Cont acto s and suppl e s expected	Opt on types whe e the e s i m ted ecent expe ence n the UK (ndud ng ia ge			1		0.5	1			1		OK	ОК	The physical work of the project is not unusual.
					to b d fo wo k have ecent	to b d fo wo k have i m ted ecent	to b d fo wo k have i ttle/no ecent	ese vo s euse and desai nat on opt ons) should be sco ed as med um/low													Howeve cont acto s w II have I m ted expe ence of const uct ng these assets on a wastewate s te. t s I ke
					experience of similar construction projects and supply of similar	expe ence of s m la const uct on p ojects and supply of s m la	experience of similar construction projects and supply of similar	conf dence													that the tende p ocess w II be a staged OJEU p ocess w th only competant cont acto s pass ng th ough the second tende stage.
					p ocess plant and equipment	p ocess plant and equ pment	p ocess plant and equ pment														active server stage.
Gove nment gu del nes								Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s				1	0			1	0		ок	ОК	Th s p oject cons de ed unusual, n te ms of p ocu ement, based on s ze and scale. KPMG have conf med that
					of p ocu ng p ojects of a s m la natu e and deta led p ocu ement	p ojects of a s m la natu e and deta led p ocu ement gu dance s r		o othe less we lestablished p ocu ement outes then low confidence should be assigned													p ocu ement w II not be v a DPC outes
					u dence s n place	place	gu dance s not n place														
D sputes & cla ms occu ed		21		5	Scope and payment mechan sm	Scope and payment mechan sm	Scope and payment mechan sm				1		0.5			1	0		OK	ОК	No cont acts in place howeve , this is a lisk which will be mit gated as the ploject ploceduless.
					dea ly defined in contract and no		cu ently II-def ned and/o the e a e														
				4	dependencies on thild parties	majo dependences on th d pate	s s gn f cant dependenc es on th d pa t es														
info mat on management					info mat on management systems		Key stakeholde s fo p ocu ement	Whe e nfo mat on management systems fo cont act and stakeholde			1		0.5		1		0.5		ок	ОК	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the
	1				between key stakeholde s a e n		not dent f ed, o nfo mat on	management have not been n t ated then ass gn low conf dence													Concept Design rivest gat ons. This isk will be mit gated as the scheme advances through the Gate process. A
1	1			1	place, clea ly defined and effective (e.g. p.o.ectispec f.c., o. al eady	nfo mat on management system has been n t ated, but deta is a e	management systems not in place														set up but not effect ve yet.
1	1				eg.poectspectc,oaleady exstng foapojectunde an	st II to be developed befo e t can b															
		_			ex st ng f amewo k)	effect ve.	an existing f amewoik)														
Othe	2	-											0.417	-			0.250	-		Lord on Ends	
P ocu ement comb ned Project specific				13.0%					7.75%		ve age M t gat on Fac	Bass of	0.41/	A Real of	we age M t gat on Fac	Base of	0.250	5.057%	Ave age M	t gat on Facto	
Project specific Des gn complex ty		-			Des gn s bus ness as usual o des av	Design is not bus ness as usual due	Design is complex, fo example due	Opt ons with sign f cant design complexities in const a ned sites and sign f cant		Requ ed	Regu ed	1	0	All and	1	-argu ed	0.5		ОК	ОК	T eatment des gn const a nts a e st il not dea ly def ned.
	1				conta ns complex t es but these a e	to seve al complex t es. The design	to the natu e of the p oject o	nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low													P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
1	1				well unde stood and deta led plans	m t gat ons to add ess these	nte faces with existing assets, o	conf dence Opt ons that a e bus ness as usual on g eenfeid unconst a ned s tes													
	1			1	and designs a e in place to add ess	complex t es have only been pa t ally unde stood and add essed	const ants. Des gn m t gat ons a e	may be ass gned h gh conf dence													
	8																				
Deg ee of innovat on				1	Des gn s bus ness as usual and/o	Design noo po ates technology /	Design inco po ates new	Opt ons us ng technolog es that a e well establ shed n the UK should be as gned			1		0.5	1			1		ОК	ОК	P ocess technology s established - but not on a wastewate is te.
								h gh conf dence. Opt ons whe e technolog es o the appl cat on of technolog es													
				1	tested fo the spec f c appl cat on	tested and p oven fo the spec f c	been fully tested and p oven fo the	s less well established in the UK (e.g. euse desal nation) should be assigned													
Env onmental mpact		-		1	Env onmental mpacts well	Some assessment of env onmental	Env onmental mpacts poo ly	med um conf dence Except fo opt ons that a ef eef om env onmental const a ntu/ sks t s uni kely				1	0			1	0		OK	ОК	Env onmental assessments not yet ava alable, potent al fo mpacts and m t gat on s not yet spec f ed. P oce
					unde stood (e.g. mpact on ece vin	g mpacts has been ca ed out and	unde stood (e.g. mpact on ece ving	that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at													now designed to meet all possible consenting needs.
					wate bod es, no se, INNS t ansfe ,	m t gat ons have been dent f ed an	d wate bod es, no se, INNS t ansfe ,	Gate 1 unless env onmental six have been dent fed deta led and costed n the													
					des gnated s tes, v sual amen ty etc m t gat ons dent f ed whe e	s gn f cant of these. Othe	designated sites, visual amenity etc),	QCRA Fo opt ons with s gn f cant env onmental sks that equ e nvest gat on a low confidence sco e would be mo e applicable befo e accounting fo the QCRA													
					equ ed and included in costs	m t gat ons will be equied that		e low congreence score would be more approache bejore accounting jor the good													
		-				have not yet been built into the															
	5	22	\rightarrow	-		costs.															
Othe P oject spec f c comb ned		16		31.0%					18.48N		ve age M t gat on Fac	cto	0.167		we age Mitigation Fac	do	0.500	14.438N	Ave are M	t get on Fecto	
Client specific											Regu ed			Regu ed	Regu ed	Regu ed		1000			
Inadequacy of the Bus ness Case	35	10			Needs have been clea ly dent f ed.	Pa t al dent f cat on of needs and	In t all dent f cat on of needs and	Conf dence I kely to be low at Gate 1 unless n t al stakeholde equ ements			1		0.5		1		0.5		OK	ОК	As one of 17 SROs, the need to this pait cula scheme (o any othe) will be unclear until the gated process s
					Key stakeholde s needs dent f ed	n t al engagement w th	output spec f cat on, w thout	dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA													much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
					and included in scope where	stakeholde s to ef ne equ ements															
La genumbe of stakeholde s	-	-	-		appi cable. Stakeholde app ovals not equ ed	Some key stakeholde s dent f ed	ef ne equ ements Stakeholde s not clea ly dent f ed,			1			1		0.7	0.3	0.35		ОК	ОК	Many stakeholde s not yet engaged, full I st of stakeholde s not developed so the e may be un dent f ed
-					o key stakeholde app ovals	and views obtained, howeve isome	v ews not known o some						-								stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
					obta ned, o key stakeholde s la gei	y othe stakeholde s ema n	stakeholde s a e n act ve opposit on														
Fund on our lab lits	5		\rightarrow	1	suppot ve Funding foithe ploject sisecule	un dent f ed.	P oject fund ng not secu e, e.g.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce		L			0.5				0.5		ок	ОК	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance with add t o
Fund ng ava lab I ty	•				e g, p o ect fully funded th ough		p oject dependent n pa t on	Fo opt ans to be junded to ough the RAPID gated SHO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed app op ate			•		0.5				0.5		a a	, w	P oject to be runded through the KAPID gated SKO process so assessed as med um in accordance with addit of su dance
					p ce ev ew / pass th ough		pa the sh p fund ng wh ch s not	· · · · · · · · · · · · · · · · · · ·													
					a angement)	may equ e bus ness case to be	SECU E.														
P oject management team	2		-+		scope of wo k s bus ness as usual	ev s ted Company del ve y team has some	Company del ve y teams a e not			<u> </u>	1		0.5		1	<u> </u>	0.5		ОК	ОК	In house p oject management team have no expe ence of del ve ng p ojects of this natu e whe e clean wate
	-			1	fo company del ve y teams.	expe ence n mplement ng p o ect	ts experienced in implementing														assets a e const ucted on a wastewate s s te. P pel ne ristallat on s bus ness as usual p oject
						of this natule, but the elevant	p ojects of this natu e														
						expe ence s not extens ve.															
Poo p oject ntell gence	9	7			Good unde standing of key pio ect	Pa t al unde stand ng of key p oject	t San frant gaps n p oject data and			<u> </u>		1	0			1	0		OK	ОК	A sign ficant number of assumptions have been made by all disciplines at this stage, however, wo sticase
	-	1.					k key assumpt ons made whe e the e										-			1	t eatment scena o used.
					whe e the e ssgn f cant		s s gn f cant unce ta nty														
					unce ta nty (e.g. g ound cond t ons, cond t on of existing assets,	 unce ta nty a ound key assumpt on (e.g. g ound cond t ons, cond t on o 															
	1				t eatment equ ements)	ex st ng assets, t eatment															
	-	_		ľ		equ ements)															
Othe				24.000							and the second second		0.700		and the second second		0.775			Luid as Ends	
CI ent spec f c comb ned				34.0N					20.27%		ve age M t gat on Fac Requ ed		0.500		we age Mitigation Fac Required	Ctó	0.370	11.539N	Ave age M	t get on Fecto	
Public elations	1	9			P o ect bus ness as usual and not	P oject could lead to some local	P oject could lead to local			1			1		0.5	0.5	0.25		ОК	ОК	The scheme s la ge enough that the e could be local oppost on, sco ed med um as the e s no ev dence of
	1				expected to a selocal opposition, o	opposition, howeve the e has been	opposition once local stakeholde s														s gn f cant local opposition at this point and it is likely concerns can be resolved.
1	1			1	iocal stakeholde s awa e and la get	some engagement w th key stakeholde s and t s l kely that the	awa e, o stakeholde s awa e and														
1	1				p maily suppot we, no potest expected.	stakeholde s and t s i kely that the majo conce ns a sed can be	e ev dence of s gn f cant local opposit on														
						esolved															
S te cha acte st cs	5	3			Ste nfo mat on well unde stood	S te nfo mat on pa t ally	S te nfo mat on poo ly unde stood					1	0			1	0		ОК	ОК	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng
1	1				e g. a chaeology, he tage assets,	unde stood (e.g. a chaeology, he tage assets, contam nat on etc.)	(e.g. a chaeology, he tage assets,														the p pel ne oute s poo, based solely on desktop study.
	1				dent fed whe e equed and	he tage assets, contam nat on etc., m t gat ons dent f ed whe e	not dent fed														
		_			ncluded n costs	equ ed and included in costs															
Pe m ts / consents / app ovals					No pe m ts and consents equ ed,	Pe m ts and consents equ ed, but	Perm ts, consents and approvals	Conf dence I kely to be low at Gate 1 unless opt on s bus ness as usual o sks		1			1		0.5	0.5	0.25		ок	ок	Pe m tsa e equ ed, unce ta n of autho t es suppo t at this stage. T eatment is BAT designed fo wo st case
	1			4	permits and consents obtained.	egulato s, plann ng autho t es and Gove nment suppo t ve	d equ ed f om egulato s, plann ng autho t es and/o Gove nment and	wes asymophic and cases in citra													although pe m t not ssued, no fu the m t gat on s possible
1	1			I		and a second sec	autho t es and/o Gove nment and obta n ng these p esents a mate al														
			_				sk														
Othe Env onment combined												10	0.667				0.167			Last as Extra	
		-		85%					5.07%		ve age M t gat on Fac		0.667		we age M t gat on Fac	Law	0.167	2.485N	Ave age M	t get on Fecto	
External influences Pol t cal	-	-			Poect se the unikely to att art	P oject could att act poi t cal	P giect has the potent al to att art	P ojects that a e h gh p of ie and cons de ed i kely to be cont ove s al should be		Alequied	Regu ed	Negu ed	1	Angu ed	Regu ed	1	0		ОК	ОК	P oject could lead to political attention, pait cually under a netize o lense. Under fithe es cui entity closs-p
	1				poit cal attent on, o poit cal	attent on, while the e s not c oss-	poit cal attent on and lacks c oss-														suppot o not. When compa ed to othe SROs this poject s uni kely to att act poit cal attent on
1	1			1	takeholde s a e suppo t ve	pa ty pol t cal suppo t the ma o ty	pa ty pol t cal suppo t														
	1					of poilt calistakeholde s a elikely to be suppoit ve															
Econom c	3	7		-	P o ect has a sho t lead t me and s	P oject has a med um lead t me so	P oject has long lead t me and	When cons de ng lead t mes { nclud ng plann ng and development t me} assume			1		0.5			1	0		ОК	ОК	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
		1		•	iess vulne able to changes in fund n	g the e s some sk that a change n	change n econom c env onment	sho t fo ≤5 yea s Med um fo 6-10 yea s Long fo >10yea s													
	1				and nput costs		could mpact demands and/o nput														
	1					mpact demands and / o nput costs.	costs														
Leg slat ons/ egulat ons	8	-		- 1	P o ect s bus ness as usual and /o	Requ ed standa ds and egulat ons	Key standa ds and egulat ons a e	Fo new technolog es o novel appl cat ons of exst ng technolog es n the UK that			1		0.5		0.5	0.5	0.25		ОК	ОК	The cu ent key standa ds a e unde stood and have been pa t ally investigated. Howeve , issues such as the
	1				equ ed standa ds and egulat ons	a e elat vely new and the efo e les		potent ally equ e egulato y app ovals (e g fo env onmental o d nk ng wate													equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y ssues ema n
1	1				a e well established and uni kely to	well establ shed.	change.	qual ty easons) then a med um o low conf dence should be appled. High													(DCO/Put & Take). These external influences could also change sign ficantly over the life cycle of the scheme which every fical-stated manual her called users for decider.
	1			4	dange			conf dence should be appl ed fo bus ness as usual schemes whe e no equiato y o leg slat ve sits a e env saged													wh ch, even f selected, may not be called upon fo decades.
Technology	8	-		1	Technology (e.g. t eatment	Technology (e.g. t eatment	Technology (e.g. t eatment	T eated wate t ansfe s and convent onal t eatment p ocesses should be sco ed			1		0.5	1			1		ОК	ОК	T eatment p ocesses p oposed a e established, howeve p lot t als needed to conf m v abit y of t eatment
					p ocesses, sma t mete ng	p ocesses, sma t mete ng	p ocesses, sma t mete ng	h gh conf dence. Fo novel t eatment p ocesses o novel appl cat on of tested													p oposed
	1				technology) s well establ shed,			t extment p ocesses (e g fo INNS t ansfe m t gat on desai nat on o euse)													
1	1				accepted by egulato s and uni kely to change du ng the p oject lead		to ap d nnovat on which may lead to changes n equiements	med um conf dence s cons de ed app op ate													
1	1				time	egulato s, t s I key to be and the efo e a change n the	a compare in equi enterità														
				ľ		equ ements s uni kely.															
Othe	1			47.777																	
Reference in the second s		100		13.5%					8.05%	4 I	ve age M t gat on Fac	cto	0.625	A 4	we age Mitigation Fac	άΰ	0.313	3.953N	Ave age M	t gat on Facto	
Exte nal influences comb ned		_																			

2. Optimism Bias Tab

	Netheridge SRO - East Channel
Option Reference	Option 3
Date of OB Review 1	
Date of OB Review 2	
-	

		1																		
	1		1								rd Civil Engineering				d Civ I Engineering					
	1							Combined Upper Bound Optimism Bias (%)	P opo t on of Nor Uppe Bound	n-Standa d C v i Eng n	ee ng Capex		P opo t on of Stand Uppe Bound	dad CviEng nee ng	Capex	11% 44%	Adjusted Optimism Bias (%)			
Contr butory factors	an a	l 🧯	1		Confidence Grade Criteria		Additional Guidance		Lowe bound			6%	Lowe bound			3%		Check whether cost propo across the require	ortions have been provided of confidence bands	
	100	1 1	1 1 1					Result f om		n of cost in each conf Gvill Engineering Com		1	Proportion Standard Civil E	of cost in each confi Engineer ng Compon	idence band nents included -	-	Result f om			Scor ng comment
	2 8	2 2	a de la				1			Required		5		Required		5				
	1 1	100	1	High Confidence	Medium Confidence	Low Confidence		63.58%	Hete	Medium	Low	1	High	Medium	Low		39.65%	Check for Non-Standard components	Check for Standard	
	2 5		0 5	-					inse t p opo t on	inse t.p. opp t.on	inse t.p. opp. t.on	26	inse tip opp tion	Insetp app tan	inse tip oppition	22		Components Check p cop t on sums to 1	components Oreck p opo t on sums to 1	1
Desc pt on	F xed values	- do not adjust		Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce l	n conf dence	n conf dence	n conf dence	Calculated m t gat on facto s	n conf dence	n conf dence	n conf dence	Colculated m t gat on facto s	Colculated cell	whe e opt on conta ns Non-	whe e opt on conta ns	Desc be the eason ng beh nd ass gnment to conf dence bands
Procurement	-								Band (0 - 1) Reau ed	Requ ed	band (0 - 1) Regular		Bond (0 - 1) Regular	Requ ed	Requed			Standa d components	Standa d components	
Complex ty of cont act st uctu e	•			Clea, well establ shment	Cont act st ategy o outline	No cont act st ategy o comme c al	Fo bus ness as usual opt ons that w II be p ocu ed th ough ex st ng wate		1			1			1	0		OK	ОК	Cu ently unknown at th s p oject stage. Potent al to be p ocu ed v a DPC as pa t of STT SRO
				and/o deta led p ocu ement plan	comme c al bus ness case n place, but deta is st il to be developed	bus ness case in place.	company f amewo iss then these may be assessed as h gh conf dence. Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset													Potent el to de ploca en viel declas pel cor si i sito
				fu i comme c al bus ness case n			owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e detailed p ocu ements plans have not been developed													
Late cont acto involvement in		3			Design is business as usual and costs		Whe e the e has not been ea ly cont acto nvolvement then low conf dence				1	0			1	0		ОК	ОК	Cost models fo t eatment elements may not be el able at this scale. No contiacto involvement to date. ECI s
des gn				a e based upon accu ate cost models, o s gn f cant cont acto	a e based upon cost models with med um confidence, o in t al	company and the cont acto has not been revolved n des gn	should be ass gned unless the conf dence n the cost models g ves an equ valent level of conf dence n the est mate													now a well established plocess the efole, this is skishould be minimal and will be mitigated. No ECI yet.
				nvolvement n des gn	cont acto involvement n key															
Poo cont acto capabites	+	+	+	Cont acto s and suppl e s expected	aspects of des gn Cont acto s and suppl e s expected	Cont acto s and suppl e s expected	Opt on types whe e the e s I m ted ecent expe ence n the UK (ndud ng ia ge		L	1	<u> </u>	0.5	1			1		ОК	ОК	The physical work of the project is not unusual.
				to b d fo wo k have ecent experience of s m la const uction		to b d fo wo k have i ttie/no ecent experience of s m la const uct on	ese vo s euse and desal nat on opt ons) should be sco ed as med um/low conf dence													Howeve cont acto s w II have I m ted expe ence of const uct ng these assets on a wastewate s te. t s I kely that the tende p ocess w II be a staged OIEU p ocess w th only competant cont acto s pass ng th ough the
				p o ects and supply of s m la	p ojects and supply of s m la	p ojects and supply of s m la														second tende stage.
				p ocess plant and equ pment	p ocess plant and equ pment	p ocess plant and equ pment														
Gove nment gu del nes				The eaemutple ecentp eceder of pocung pojects of asmia	ts Some ecent p ecedents of p ocu n p ojects of a s m la natu e and	g The e sim ted ecent experience of	Whe e an opt an may be mplemented though D ect P ocu ement fo Custome s o othe less we l establ shed p ocu ement outes then low conf dence should be				1	0			1	0		OK	ОК	This ploject conside ed unusual, in terms of ploculement, based on size and scale. KPMG have confirmed that ploculement will not be via DPC outes
				natu e and deta led p ocu ement	deta led p ocu ement gu dance s n	natu e and deta led p ocu ement	ass gned													
D sputes & cla ms occu ed		21	-	guidance s niplace	place Scope and payment mechan sm	gu dance s not n place Score and narment merhan sm			<u> </u>	1	<u> </u>	0.5			1	0		ОК	ОК	No cont acts n place howeve , this is a skiwhich will be mit gated as the ploject ploceduless.
		-		clea ly defined in contract and no	pa t ally defined and the e a e no	cu ently Il-def ned and/o the e a e	•			1 1										
				dependenc es on th d pa t es	majo dependences on th d pates	s s gn f cant dependenc es on th d pa t es														
info mat on management				Info mat on management systems between key stakeholde s a e n	Some key stakeholde s fo	Keystakeholde s fo p ocu ement not dent f ed, o nfo mat on	Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then as an low confidence			1		0.5		1		0.5		ок	ок	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn nvest gat ons. Th s sk w II be m t gated as the scheme advances th ough the Gate p ocess. A
				place, clea ly defined and effect ve	nfo mat on management system	management systems not n place	nonsymmetric nore not been in t used with this gri low conj dence													Concept Design rivest gat ons. This is is will be mit gated as the scheme advances through the Gate process. A set up but not effect ve yet.
1	1			(e.g. p o ect spec f c, o al eady ex st ng fo a p oject unde an	has been n t ated, but deta is a e st il to be developed befo e t can be	and effect ve (e.g. p oject spec f c, o	1													
04 -	-	_	_	ex st ng f amewo k)	effect ve.	an ex st ng f amewo k)														
Othe P ocu ement comb ned	2		13	0%				8.27%		Ave age M t gat on Fa	cto	0.417	Av	re age M t gat on Fac	do	0.250	5.226%	Ave age M t	gat on Facto	
Project specific					Decen construction	Des en concerten de	Out one with a set front day or		Requ ed	Requ ed	Regu ed		Regu ed	Regu ed	Regu ed					Tastaset das as const a site a set II y to day to defend
Des gn complex ty				conta ns complex t es but these a	to seve al complex t es. The des gn	Design scomplex, fo example due to the natu e of the ploject o	nteg at on with existing ope at onal inflast ucture may be assigned low				1	0		1		0.5		OK	OK	T eatment des gn const a nts a e st il not dea ly def ned. P pei ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
	1			well unde stood and deta led plans	m t gat ons to add ess these	nte faces with existing assets, o	confidence Opt ons that a e bus ness as usual on g eenfield unconst a ned s tes													
				and designs a e in place to add ess them	pa t ally unde stood and add essed.	const a nts. Des gn m t gat ons a e not yet n place.	may we was given in gin congraence													
Deg ee of innovat on	8		-	Design is bus ness as usual and/o	Design noo po ates technology/		Opt ons us ng technolog es that a e well establ shed n the UK should be ass gned			1		0.5	1			1		ОК	ок	P ocess technology s established - but not on a wastewate is te.
				nnovat ons a e we I developed and	nnovat ons that have been pa t ally	technolog es and these have not yet	h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es													
L	9				anni cation	specific application.	s less well established in the UK (e.g. euse desal nation) should be assigned med um confidence													
Env onmental mpact				Env onmental mpacts well	Some assessment of env onmental	Env onmental mpacts pooly	Except fo opt ons that a efeef om env onmental const a ntu/ sks t s uni kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at				1	0			1	0		ОК	ОК	Env onmental assessments not yet ava alable, potent al fo mpacts and m t gat on s not yet spec f ed. P oces now des gned to meet all poss ble consent ng needs.
				wate bod es, no se, INNS t ansfe ,	m t gat ons have been dent f ed and	d wate bod es, no se, INNS t ansfe ,	concope ons at oute 1 would one even an give revering complement must write Gate 1 unless environmental sits have been dentifed detailed and costed in the QCRA fo options with sign f canterniv ommental skis that equire meet gation													now designed to meet all possible consent ng needs.
				des gnated s tes, v sual amen ty etc m t gat ons dent f ed whe e	, costed to add ess the most s an f cant of these. Othe		, QCRA Fo opt ons with sign f cant environmental skis that equile investigation a low confidence scole would be mole applicable befole accounting for the QCRA													
				equ ed and ncluded n costs	m t gat ons will be equed that	dent f ed w thout ag eement on	· · · · · · · · · · · · · · · · · · ·													
	5	22			have not yet been built into the costs.	m t gat on to be built into costs														
Othe P oject spec f c comb ned		18						19.71%		Ave age M t gat on Fa		0.167		re age Mit gat on Fac		0.500	16.252%	Ave age Mit	ant en Forte	
Client specific		_						13./18		Requ ed				Regu ed			18.2528	one age in a		
Inadequacy of the Bus ness Case	35	10		Needs have been clea ly dent f ed. Key stakeholde s needs dent f ed	Pa t al dent f cat on of needs and n t al engagement w th	In t all dent f cat on of needs and output spec f cat on, w thout	Conf dence I kely to be low at Gate 1 unless n t al stakeholde equ ements dent f ed and effected n apt on scope and/o spec f cally accounted fo n QCRA			1		0.5		1		0.5		OK	ОК	As one of 17 SROs, the need to this pait cula scheme (o any othe) will be unclear until the gated p occess a much further developed. Needs pait ally dentified and some stakeholde singaged
				and included in scope where	stakeholde s to ef ne equ ements	engagement w th stakeholde s to	dency eo ana legiecteo in apic on scope anayo specificany accounted to in QUIA													much tu the developed, Needs pait any dentitied and some stakeholde's engaged
La genumbe of stakeholde s				applicable. Stakeholde and mais not enu ed	Some key stakeholde s dent f ed	ef ne equ ements Stakeholde s not clea ly dent f ed,						1		07	0.3	0.35		ОК	ОК	Many stakeholde s not yet engaged, full i st of stakeholde s not developed so the e may be un dent f ed
ca genuinee of statisticities				o key stakeholde app ovals	and v ews obta ned, howeve some othe stakeholde s ema n	v ews not known o some			· ·									~	⁰	stakeholde s. Fo Nethe dge t eatment the only stakeholde is the EA, and we have designed fo wo st case.
				obta ned, o key stakeholde s la ge suppo t ve	y othe stakeholde s ema n un dent f ed.	stakeholde s a e n act ve opposit on	1													
Fund ng ava lab I ty	5			Fund ng fo the p oject s secu e	P oject fund ng unce ta n e.g.	P oject fund ng not secu e, e.g.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce			1		0.5		1		0.5		OK	ОК	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance with add t or
				(e.g. p o ect fully funded th ough p ce ev ew / pass th ough	p oject subject to eff c ency challenges at p ce ev ew wh ch	p oject dependent n pa t on pa tne sh p fund ng wh ch s not	ev ew a med um conf dence sco e s cons de ed app op ate													gu dance
				a angement)	may equ e bus ness case to be ev s ted	secu e.														
P oject management team	2	-		Scope of wo k s bus ness as usual	Company del ve y team has some	Company del ve y teams a e not				1		0.5		1		0.5		OK	ОК	In house p oject management team have no expe ence of del ve ng p ojects of this natu e whe e clean wate
				fo company del ve y teams.	experience in implementing projects of this nature, but the relevant	s experienced in implementing projects of this nature														assets a e const ucted on a wastewate s s te. P pel ne installat on is bus ness as usual p oject
					expe ence s not extens ve.															
Poo p oject ntell gence	9	7	+	Good unde stand ng of key p o ect	Pa t al unde stand ng of key p oject	Sgn f cant gaps n p oject data and			L		1	0			1	0		ОК	ОК	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case
				data and no key assumpt ons made where the e sis gn f cant	data and the e has been some wo k unde taken to educe the	key assumpt ons made whe e the e s s gn f cant unce ta nty														t extment scene o used.
				unce ta nty (e.g. g ound cond t ons	unce ta nty a ound key assumpt one	•														
				cond t on of ex st ng assets, t eatment equ ements)	(e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment	(]														
Othe			-		equ ements)															
Client spec fic combined			34	0%				21.62%	4 4	Ave age M t gat on Fa	cto	0.500	Av	e age Mitigation Fac	đo	0.370	11.972%	Ave age M t	gat on Facto	
Environment Public elations				P o ect bus ness as usual and not	P oject could lead to some local	P oject could lead to local				Requ ed	Regu ed		Regu ed	Requied	Regu ed	0.25				The scheme s is go enough that the e could be local opposit on, sco ed med um as the e s no ev dence of
Full C Bat ons		, ,		expected to a selocal opposition,	opposition, howeve the e has been	opposition once local stakeholde s	1					1			45	0.25		OK	ок	The scheme s la ge enough that the e could be local oppost on, sco ed med um as the e s no ev dence of s gn f cant local oppost on at th s po nt and t s i kely conce ns can be esolved.
	1			local stakeholde s awa e and la gel p ma ly suppo t ve, no p otest	some engagement w th key stakeholde s and t s I kely that the	awa e, o stakeholde s awa e and ev dence of s en f cant local	1													
	1			expected.	majo conce ns a sed can be	opposition	1													
S te cha acte st cs	5	3		S te nfo mat on well unde stood		S te nfo mat on poo ly unde stood					1	0			1	0		ОК	ОК	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of
				(e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons		(e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons														the p pel ne oute s poo , based solely on desktop study.
				dent f ed whe e equ ed and	m t gat ons dent f ed whe e	not dent f ed	1													
Pe m ts / consents / app ovals			-	ncluded n costs No pe m ts and consents equ ed,	equ ed and included in costs Pe mits and consents equiled, but	Pe m ts, consents and app ovals	Confidence I kely to be low at Gate 1 unless opt on s bus ness as usual o sks		1			1		0.5	0.5	0.25		ОК	ОК	Permits a ellequied, uncertain of authorities support at this stage. Treatment is BAT designed for worst case s
					egulato s, plann ng autho t es and	equ ed f om egulato s, plann ng	well developed and costed n QRA													although pe m t not ssued, no fu the m t gat on s possible
1	1				Gove nment suppo t ve	autho t es and/o Gove nment and obta n ng these p esents a mate al	1													
Othe						*														
Env onment comb ned			8	5%				5.40N		Ave age M t gat on Fa		0.667		e age Mitigation Fac		0.167	2.314%	Ave age M t	gat on Facto	
External influences Pol t cal				Poect se the unikely to att act	P oject could att act poi t cal	P oject has the potent al to att act	P ojects that a e h ph p of ie and cons de ed i kelv to be cont over s al should be		Requied	Requ ed	Regu ed	1	Regu ed	Regu ed	Regu ed	0		OK	OK	Poiect could lead to poit cal attent on, pait cually unde a net ze o lense. Unclear fithe es cui ently coss-pa
	1			poit cal attent on, o poit cal	attent on, while the e s not c oss-	poit cal attent on and lacks c oss-														suppo to not. When compa ed to othe SROs th s p oject s uni kely to att act poi t cal attent on
1	1			stakeholde s a e suppo t ve	pa ty poi t cal suppo t the mao ty of poi t cal stakeholde s a e i kely to	pe ty poit cal suppot	1													
Econom c	•			Poet has a she than the state	be suppo t ve P oject has a med um lead t me so		When cons de ng lead t mes (nclud ng plann ng and development t me) assume			1		0.5			1	0		ОК	ОК	Point lead time sions 6-10 yea ho zon, unce tain economic pei od ahead.
	1	1		less vulne able to changes in fund i	g the e s some sk that a change n	change n econom c env onment	When conside ing lead times (induding planning and development time) assume sho t for sS yea s. Med um for 6-10 yea s. Long for >10 yea s.													- specificative strate a nong, or any peer now zoon, unce us in economic per Od antead.
1	1			and nput costs	the econom c env onment could mpact demands and / o nput	could mpact demands and/o nput costs	1													
las dat and as to	-			B and always and a lot	costs.	Keysterde de se forste ser	En any technology of a good and out or a first state of the second state of the													The second biometerials do a standard and have been as a Biometerial Dimensional Dimension
Leg slat ons/ egulat ons	8			equ ed standa ds and egulat ons	Requed standa ds and egulations a eleatively new and the effore less	Key standa ds and egulat ons a e s unde development, o subject to	Fo new technolog es o novel appi cat ons of ex st ng technolog es n the UK that potent ally equ e egulato y app ovais (e.g. fo env onmental o d nk ng wate			1		0.5		0.5	0.5	0.25		ок	ОК	The cu ent key standa ds a e unde stood and have been pa t ally rivest gated. Howeve, ssues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y ssues ema n
	1			a e well establ shed and uni kely to	well establ shed.	change.	potent ally equ e equiato y app ovais (e g fo env onmental o d nk ng wate qual ty easons) then a med um o low conf dence should be appi ed H gh													(DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the I fe cycle of the scheme
				change			conf dence should be appl ed fo bus ness as usual schemes whe e no egulato y o leg slat ve sks a e env saged													which, even if selected, may not be called upon foil decades.
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	o legislative skala e envisaged Teated wate tansfe s and conventional teatment processes should be scored high candidence for novel teatment processes o novel application of tested			1		0.5	1			1		ОК	ок	T eatment p ocesses p oposed a e established, howeve p lot t als needed to conf m v ability of t eatment in concert
				technology) s well establ shed,	technology) s elat vely new. While	technology) s new and/o s subject	t extment p ocesses (e g fo INNS t ansfe m t gat on desai nat on o euse)													
1	1				t has not yet been accepted by	to ap d nnovat on which may lead to changes in equilements														
1	1			t me	the efo e a change n the		1													
Othe	1		-		equ ements s uni kely.															
			13	5N				8.58N	4 4	Ave age M t gat on Fa	cto	0.625	Av	e age Mit gat on Fad	do	0.313	3.887N	Ave age M t	gat on Facto	
ate nal influences comb ned																				

2. Optimism Bias Tab

	Netheridge SRO - Canal
	Option 4
Date of OB Review 1	
Date of OB Review 2	

	1	1																		
		1									rd Civil Engineering				Civ I Engineering					
	8							Combined Upper Bound Optimism Bias (%)		n-Standa d C v I Eng ne	ee ng Capex	97%		dad Cvi Engineeing C	Capex	3%	Adjusted Optimism Bias (N)			
	33	1	1 1		Confidence Grade Criteria			Optimism bias (%)	Uppe Bound Lowe bound			66% 6%	Uppe Bound Lowe bound			44%		Check whether cost propo	ortions have been provided	
Contr butory factors	3	a di	1				Additional Guidance		Proportio	n of cost n each confi	fidence band		Proportion	of cost in each confide	ence band			across the required	ed confidence bands	Scor ng comment
	120	31	3 2					Result f om		Dvil Engineer ng Comp	ponents included -		Standard Civil E		ints included -		Result f om			
			ě ř				4		Required	Required	Required	- ÷.	Required	Required	Required	å.				-
		22	11	High Confidence	Medium Confidence	Low Confidence		65.34%	High	Medium	Low	1	High	Medium	Low		40.62%	Check for Non-Standard components	Check for Standard components	
									inse t p opo t on	inse t p opo t on	inse t p opo t on	Coloridation (see to coloridate	inse t p opo t on	Insetp opot on a	hse t p opo t on	Calculated m t gat on		Check p opo t on sums to 1	Check p opo t on sums to 1	
Desc pt on	F xed values -	do not adjust		Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce I	n conf dence	n conf dence	n conf dence	facto s	n conf dence	n conf dence	n conf dence	facto s	Calculated cell	whe e opt on conta ns Non-	whe e opt on conta ns	Desc be the eason ng beh nd ass gnment to conf dence bands
Procurement	<u> </u>								Requ ed	Band (0 - 1) Requied	Regu ed		Band (0 - 1) Regular	Regu ed	Regu ed			Standa d components	Standa d components	
Complex ty of cont act st uctu e	•			Gea , well establ shment	Cont act st ategy o outline	No cont act st ategy o comme c al	Fo bus ness as usual opt ons that w II be p ocu ed th ough ex st ng wate	1	1			1			1	0		OK	OK	Cu ently unknown at this ploject stage.
			1	p ocu ement oute and p ocesses	comme c al bus ness case n place, o but deta is st il to be developed	bus ness case in place.	company f amewo is then these may be assessed as h gh conf dence Opt ons													Potent al to be p ocu ed v a DPC as pa t of STT SRO
			1	and/o detailed p ocu ement plan o fu i comme c al bus ness case n	o but deta is st il to be developed		should sco e low conf dence whe e they nvolve mult ple wate compan es / asset owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and													
				place			whe e detailed p ocu ements plans have not been developed													
Late cont acto involvement n		3		Desgn s bus ness as usual and costs	ts Design is bus ness as usual and cost	s Design is not bus ness as usual fo	Whe e the e has not been ea ly cont acto nvolvement then low conf dence				1	0			1	0		OK	OK	Cost models fo t eatment elements may not be el able at this scale. No cont acto involvement to date. EC
des gn			1	a e based upon accu ate cost models, o s gn f cant cont acto	a e based upon cost models with med um confidence, o in t al	company and the cont acto has not been rivolved in design	t should be ass gned unless the conf dence n the cost models g ves an equivalent level of conf dence n the est mate													now a well established plocess the efole, this isk should be minimal and will be mitigated. No ECI yet.
			1	nvolvement n des gn	cont acto involvement n key															
Poo cont acto capabites				Cost acto s and supplie s expected	aspects of design	Cost acto s and sund a semected	Opt on types where there is I mited ecent exprenence in the UK (including large		<u> </u>		<u> </u>	0.5				1		OK	ОК	The physical work of the project is not unusual.
			1				t ese vo s euse and desai nat on opt ons) should be sco ed as med um/low									•		Ŭ.		Howeve cont acto s will have I m ted experience of const ucting these assets on a wastewate is te. t s i ket
			1	expe ence of s m la const uct on			conf dence													that the tende p ocess w II be a staged QJEU p ocess w th only competant cont acto s pass ng th ough the
			1	p o ects and supply of s m la p ocess plant and equ pment	p ojects and supply of s m la p ocess plant and equ pment	p ojects and supply of s m ia p ocess plant and equ pment														second tende stage.
																			L	
Gove nment gu del nes			1	The e a e multiple ecent plecedent of plocul perployed of a similar	ts Some ecent p ecedents of p ocu n p ojects of a s m la natu e and	ing The e sim ted ecent experience of a court page of estimate	f Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s o othe less we l establ shed p ocu ement outes then low conf dence should be				1	•			1	0		OK	OK	This plotect conside ed unusual, in terms of plocul ement, based on size and scale. KPMG have confirmed that plocul ement will not be via DPC outes
			1	natu e and deta led p ocu ement	deta led p ocu ement gu dance s i	natu e and deta led p ocu ement	ass gred													
Dente Data and		~		gu dence s n plece	place	gu dance s not n place		-			<u> </u>							~ ~ ~		No service in a star because the second star it is the star in the second star second second
D sputes & cla ms occu ed		21	1		Scope and payment mechan sm pa t ally defined and the e a e no					1		0.5			1	0		OK	ок	No cont acts n place howeve, this sai sk which will be mit gated as the ploject ploceduless.
			1	dependenc es on th d pa t es		s s gn f cant dependenc es on th d	1													
info mot on manual				info mat on many		pa t es	When a sets must be more some set out and the set of the back-									0.5		(**		info mat an management at an instance of development from which is in a from the second of the second
info mat on management	1	1	1	between key stakeholde s a e n	p ocu ement dent f ed and	Keystakeholde s fo p ocu ement not dent f ed, o nfo mat on	Whe e info mat on management systems fo cont act and stakeholde management have not been in t ated then ass gn low conf dence			1		0.5				0.5		ОК	ок	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn rivest gat ons. This is kin li be mit gated as the scheme advances through the Gate p ocess.
1	1		1	place, clea ly defined and effect ve	nfo mat on management system	management systems not in place														set up but not effect ve yet.
	1	1	1	(eg.poectspecfc,oaleady exstng foapojectunde an	has been in t ated, but deta is a e st il to be developed hefe e t can b	and effect ve (e.g. p oject spec f c, o e al eady ex st ng fo a p o ect unde														1
				ex sting f amewo k)	effect ve.	an existing f amework)														
Othe	2											A.113				0.550				
P ocu ement comb ned Project specific			13.0					8.49%		Ave age M t gat on Fac		0.417	Av	e age M t gat on Facto Retuined	Renu ed	0.250	5.302%	Ave age M t	get on hecto	
Project specific Des gn complex ty				Des gn s bus ness as usual o des gr	n Des gn s not bus ness as usual due	Des gn s complex, fo example due	Opt ons w th s gn f cant des gn complex t es o const a ned s tes and s gn f cant		nequ ec	Regu ed	Regu ed	0		1	nego ec	0.5		ОК	ОК	T eatment des gn const a nts a e st II not clea ly def ned.
	1	1	1	contains complex t es but these a e	to seve al complex t es. The des gr	to the natu e of the p oject o	nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low													P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
			1	well unde stood and deta led plans and des gns a e n place to add ess		nte faces with existing assets, o	confidence. Opt ons that a e bus ness as usual on g eenfield unconst a ned s tes													
			1	and designs a e in place to add ess them	pa t ally unde stood and add essed	const a nts. Des gn m t gat ons a e not vet n place.	may be ass gred h gh conf dence													
	8																		L	
Deg ee of Innovat on			1		Design noo po ates technology /		Opt ons us ng technolog es that a e well established in the UK should be assigned thigh confidence. Opt ons where technolog es o the application of technolog es			1		0.5	1			1		ок	ок	P ocess technology s established - but not on a wastewate is te.
1	1		1	tested to the specific and cation	tested and n oven for the specific	been fully tested and n oven for the	s less well established a the LIK fe a lesse desai ant on should be assured													1
	9				appl cat on.	spec f c appl cat on.	med um conf dence Except fo opt on that a ef eef om env onmental const a ntu/ sks t s uni kely													
Env onmental mpact			1	Env onmental mpacts well	Some assessment of env onmental	Env onmental mpacts poolly	Except fo opt ons that a ef eef om env onmental const a nts/ sks t s uni kely a that ant ans at fasts 1 world ach are a h abs. Isual of confidence than med up at				1	°			1	0		ок	ок	Env onmental assessments not yet ava alable, potent al fo mpacts and m t gat on s not yet spec f ed. P oces now designed to meet all possible consent na needs.
			1	wate bod es, no se, INNS t ansfe ,	m t gat ons have been dent f ed an	wate bod es, no se, INNS t ansfe ,	g that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sis have been dent f ed deta led and casted n the , QCRA. Fo opt ons with s gn f cant env onmental sis that equ e nvest gat on													now designed to meet all poss die consent ng needs.
			1																	
			1	mt gat ons dent f ed whe e equ ed and ncluded n costs	s gn f cant of these. Othe m t gat ons w ii be equ ed that	o s gn f cant env onmental ssues dent f ed w thout ag eement on	a low conf dence sco e would be mo e appl cable befo e account ng fo the QCRA													
			1	equi es ansi nobseti n'osta	have not yet been built nto the	m t gat on to be bu it nto costs														
	5	22			costs.														L	
Othe P oject spec f c comb ned		18	31.0					20.26%		Ave age M t gat on Fac	da	0.167	4	e age Mit gat on Facto		0.500	17.058%	Ave are Mit	t gat on Facto	
Client specific									Regu ed	Requ ed	Regu ed		Regu ed	Regu ed	Regu ed					
Inadequacy of the Bus ness Case	35	10			Pa t al dent f cat on of needs and		Conf dence I kely to be low at Gate 1 unless n t al stakeholde equ ements			1		0.5		1		0.5		OK	ОК	As one of 17 SROs, the need fo this pait cula scheme (o any othe) will be unclear until the gated plocess s
			1	Key stakeholde s needs dent f ed and included in scope where	n t al engagement w th stakeholde s to of ne onu ement	output spec f cat on, w thout s. engagement w th stakehoide s to	dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA													much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
				appl cable.		efne equ ements														
La genumbe of stakeholde s				Stakeholde app ovals not equ ed.	d, Some key stakeholde s dent f ed	Stakeholde s not clea ly dent f ed,			1			1		0.7	0.3	0.35		OK	ОК	Many stakeholde s not yet engaged, full I st of stakeholde s not developed so the e may be un dent f ed
			1	o key stakeholde app ovals obta ned, o key stakeholde s la gel	and v ews obta ned, howeve some othe stakeholde s ema n	stakeholde s a e n act ve oppost of														stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have designed fo wo st case.
				suppo t ve	un dent f ed.															
Fund ng ava lab I ty	5			Fund ng fo the p oject s secu e	P oject fund ng unce ta n e.g.	P oject fund ng not secu e, e.g.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce			1		0.5		1		0.5		OK	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance with add t on
			1	(e.g. p o ect fully funded th ough p ce ev ew / pass th ough	p oject subject to eff c ency challenges at p ce ev ew wh ch	p oject dependent n pa t on pa tne sh p fund ng wh ch s not	ev ew a med um conf dence sco e s cons de ed app op ate													gu dance
			1	a angement)	may equ e bus ness case to be	secu e.														
P oject management team	2		+	Scope of wo k s bus ness as usual	ev s ted Company del ve y team has some	Company del ve y teams a e not				1		0.5		1		0.5		OK	ОК	In house p oject management team have no expe ence of del ve ng p ojects of this natu e where clean wate
	-		1	fo company del ve y teams.	expe ence n mplement ng p o ech															assets a e const ucted on a wastewate s s te. P pel ne ristallat on s bus ness as usual p oject
			1		of this natule, but the elevant	p ojects of this natu e														
			1		expe ence s not extens ve.															
Poo p oject ntell gence	9	7		Good unde stand ng of key p o ect	Pa t al unde stand ng of key p ojec	t Sgn f cant gaps n p oject data and		1			1	0			1	0		OK	ОК	As gn f cant numbe of assumpt ons have been made by all d sc pl nes at this stage, howeve wo st case
			1	data and no key assumpt ons made	data and the e has been some wo	k key assumpt ons made whe e the e														t eatment scena o used.
			1	where the essgn f cant unce tanty (eg. g ound cond t ons.	unde taken to educe the unce ta nty a ound key assumpt on	s s gn f cant unce ta nty														
1	1		1	cond t on of ex st ng assets,	(e.g. g ound cond t ons, cond t on a		1													1
	1	1	1	t eatment equ ements)	ex st ng assets, t eatment equ ements)		1													1
Othe																				
CI ent spec f c comb ned			34.0					22.225	4 4	Ave age M t gat on Fac		0.500	Av	e age M t gat on Facto	0	0.370	12.167%	Ave age M t	gat on Facto	
Environment Public elations		9		P o ect bus ness as usual and not	P oject could lead to some local	P oject could lead to local			nequ ed	nequ ed	Regu ed	1	Regulard	Requied 0.5	0.5	0.25		OK	ОК	The scheme s is ge enough that the e could be local opposition, scoled medium as the elision evidence of
	1	1	1	expected to a se local opposition, o	o opposit on, howeve the e has been	opposition once local stakeholde s	1													sign f cart local opposition at this point and it is likely concerns can be esolved.
	1	1	1	local stakeholde s awa e and la gely p ma ly suppot ve, no p otest	ly some engagement with key stakeholde s and it s likely that the	awa e, o stakeholde s awa e and	1													1
1	1		1	expected.	stakeholde s and t s i kely that the majo conce ns a sed can be	opposition	1													1
Charles and the state		-		Charles and second	esolved	fits of and and														Hade stand as of the transmission are to the order should be the
S te cha acte st cs	,	3	1	S te nfo mat on well unde stood (e.g. a chaeology, he tage assets,		S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets,	1				1	•				0		OK	ок	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the muest gat on s equ ed. Unde stand ng of the p pel ne oute s poo, based solely on desktop study.
1	1		1	contam nat on etc.), m t gat ons	he tage assets, contam nat on etc.), contam nat on etc.) and m t gat ons														
	1	1	1	dent f ed whe e equ ed and included in costs	m t gat ons dent f ed whe e equ ed and ncluded n costs	not dent fed	1													1
Pe m ts / consents / app ovals	1	1	1	No pe m ts and consents equ ed,	Pe m ts and consents equ ed, but		Conf dence I kely to be low at Gate 1 unless opt on s bus ness as usual o sks		1			1		0.5	0.5	0.25		ОК	ОК	Pe m ts a e equ ed, unce ta n of autho t es suppot at this stage. T eatment is BAT designed fo woist case s
	1	1	1	o pe m ts and consents obta ned.		d equ ed f om egulato s, plann ng														although pe m t not ssued, no fu the m t gat on s possible
	1	1	1		Gove nment suppo t ve	autho t es and/o Gove nment and obta n ng these p esents a mate al														1
						sk														
Othe Env onment comb ned			85					5.55%		Ave age M t gat on Fac	da.	0.667		e age Mitigation Facto		0.167	2.238%	Ave age M t	ant on Farth	
External influences			85					3.55%		Ave age M t gat on had Requied		0.00/	Regu ed	e age Mit gat on Facto Requied	Repu ed	0.407	2.238%	AVE age M I		
Pol t cal				P o ect se the unikely to att act	P oject could att act poi t cal	P oject has the potent al to att act			1			1			1	0		OK	ОК	P oject could lead to pol t cal attent on, pa t cua ly unde a net ze o lense. Undea f the es cu ently c oss-pa
	1		1	poit cal attent on, o poit cal stakeholde s a e suppot ve	attent on, while the e s not c oss- pa ty poil t cal suppot the mao by	poit cal attent on and lacks c oss-	ass gned low conf dence													suppot o not. When compared to othe SROs this project is unlikely to attract poil tical attent on
	1	1	1	sammonue s a e suppo t ve	of political stakeholde s a elikely t	o per al por e can suppor e	1													1
					be suppo t ve															
-		_	1		P oject has a med um lead t me so ng the e s some sk that a change n		When conside inglead times (including planning and development time) assume sho t for sS yea's Medium for 6-10 yea's Long for >10 yea's			1		0.5			1	0		ок	ок	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
Econom c	3	7	1	and nput costs	the econom c env onment could		t a set a													1
Econom c	3	7			mpact demands and / o nput	costs	1													1
Econom c	3	7			Recu of stands de and equist one	Key standa ds and equilat one a a	Fo new technolog es o novel appi cat ons of ex st ng technolog es n the UK that			1		0.5		0.5	0.5	0.25		ОК	OK	The cu ent key standa ds a e unde stood and have been pa t ally investigated. Howeve, ssues such as the
	3	7		P o ect s bus ness as usual and for	the second of such and all the such all the such as th	winds development a subject to	potent ally equ e equiato y app avais (e g fo env onmental o d nk ng wate					~							-	equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y ssues ema n
Econom c Leg slat ons/ egulat ons	3	7	<u> </u>	equ ed standa ds and egulat ons	a e elat vely new and the efo e let	a unde development, o subject to	qual ty easons) then a med um o low conf dence should be appl ed H gh													(DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the I fe cycle of the scheme
	3	7		P o ect s bus ness as usual and /o equ ed standa ds and egulat ons a e well establ shed and uni kely to	a e elat vely new and the efo e les well established.	change.														
	3	7		equ ed standa ds and egulat ons	a e elat vely new and the efo e les well establ shed.	change.	conf dence should be appl ed fo bus ness as usual schemes whe e no equiato y													wh ch, even f selected, may not be called upon fo decades.
	8	7		equ ed standa ds and egulat ons a e well establ shed and uni kely to change Technology (e.g. t eatment	Technology (e.g. t eatment	Technology (e.g. t eatment	conf dence shouid be appl ed fo bus ness as usual schemes whe e no equiato y o leg slat ve sks a e env saged T eated wate t ansfe s and convent onal t eatment p ocesses shouid be sco ed	-		1		0.5	1			1		ок	ОК	which, even if selected, may not be called upon fo decades. T extment picenses picposed a elestablished, howeve ip lot ti als needed to confinitive ability of tieatment
	8	7		equ ed stande ds and egulat ons a e well established and uni kely to change Technology (e.g. t extment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	conf dence should be appled fo bus ness as usual schemes whe e no equiato y o leg slot ve sis a e env saged T exted wate t ansfe s and convent onal t eatment p ocesses should be sco ed h sh and fence. Fo novel t eatment p ocesses o novel appl ast on of tested			1		0.5	1			1		ок	ОК	
	8	7		equ ed standa ds and egulat ons a e well establ shed and uni kely to change Technology (e.g. t extment p ocesses, sma t mete mg technology) s well establ shed,	Veill established. Technology (e.g. t. eatment p. ocasses, smalt metering technology) s. elat vely new. While	change. Technology (e.g. t extment p ocesses, sma t mete ng e technology) s new and/o s subject	confinence should be applied for business as usual schemes whe e no equilato y o leg slat ver sits a entri vagned T eater water t analje s and comment onal t estiment p occuses should be soo ed h gh and dence. Fo novel i estiment p occuses o novel applicat on aftested t externet p occuses for § 0. MVC analje m i zgot on deal nat on a cusej			1		0.5	1			1		ок	ок	
	8	7		equ ed standa ds and egulat ons a e well establ shed and uni kely to change Technology (e.g. t extment p ocesses, sma t mete mg technology) s well establ shed,	 well established. Technology (e.g. t eatment p occases, sma t meteing technology) s elatively new. Whi y thas not yet been accepted by equate s, t s likely to be and 	change. Technology (e.g. t extment p ocesses, sma t mete ng e technology) s new and/o s subject	conf dence should be appled fo bus ness as usual schemes whe e no equiato y o leg slot ve sis a e env saged T exted wate t ansfe s and convent onal t eatment p ocesses should be sco ed h sh and fence. Fo novel t eatment p ocesses o novel appl ast on of tested			1		0.5	1			1		OK .	ок	
	8	7		equ ed standa ds and egulat ors a e well established and uni kely to change Technology (e.g. t eatment p ocesses, sma t mete ng technology) swell established, accepted by egulato s and uni kely	 well established. Technology (e.g. t extment p cosses, sma t mete ng technology) s elat wely new. Whit t thas not yet been accepted by eguiato s, t si lieby to be and the efor ea change n the 	change. Technology (e.g. t eatment p cosses, sme t mete ng e technology) s new and/o subject to apd neovat on which may lead	confinence should be applied for business as usual schemes whe e no equilato y o leg slat ver sits a entri vagned T eater water t analje s and comment onal t estiment p occuses should be soo ed h gh and dence. Fo novel i estiment p occuses o novel applicat on aftested t externet p occuses for § 0. MVC analje m i zgot on deal nat on a cusej			1		0.5	1			1		ОК	OK	
	8	7		equ ed standa ds and egulat ors a e well established and uni kely to change Technology (e.g. t eatment p ocesses, sma t mete ng technology) swell established, accepted by egulato s and uni kely	 well established. Technology (e.g. t eatment p occases, sma t meteing technology) s elatively new. Whi y thas not yet been accepted by equate s, t s likely to be and 	change. Technology (e.g. t eatment p cosses, sme t mete ng e technology) s new and/o subject to apd neovat on which may lead	confinence should be applied for business as usual schemes whe e no equilato y o leg slat ver sits a entri vagned T eater water t analje s and comment onal t estiment p occuses should be soo ed h gh and dence. Fo novel i estiment p occuses o novel applicat on aftested t externet p occuses for § 0. MVC analje m i zgot on deal nat on a cusej			1		0.5	1			1		OK .	ок	
	8	7	13.57	equ ed standa ds and egulat ors a e well established and uni kely to change Technology (e.g. t eatment p ocesses, sma t mete ng technology) swell established, accepted by egulato s and uni kely	 well established. Technology (e.g. t extment p cosses, sma t mete ng technology) s elat wely new. Whit t thas not yet been accepted by eguiato s, t si lieby to be and the efor ea change n the 	change. Technology (e.g. t eatment p cosses, sme t mete ng e technology) s new and/o subject to apd neovat on which may lead	confinence should be applied for business as usual schemes whe e no equilato y o leg slat ver sits a entri vagned T eater water t analje s and comment onal t estiment p occuses should be soo ed h gh and dence. Fo novel i estiment p occuses o novel applicat on aftested t externet p occuses for § 0. MVC analje m i zgot on deal nat on a cusej	1429		1 Ave age M t gat on Fac		0.5	1	n age Mitgat on Facto		0.313	3.85ex	OK Ave age M t		

2. Optimism Bias Tab

Option Name	Netheridge SRO - East Channel SW Branch
Option Name Option Reference	Option 5
Date of OB Review 1	
Date of OB Review 2	
-	

									_				_				-	_		
	3		1					Combined Upper Bound	P opo t on of Nor	Non-Standa n-Standa d C v I Eng n	rd Civil Engineering ne ng Capex	91%	P opo t on of Stand		Civ Engineering	95	Adjusted Optimism Bias (%)			
	1	1	The second		Confidence Grade Criteria			Optimism Bias (%)	Uppe Bound Lowe bound			66% 6%	Uppe Bound Lowe bound			44%	Adjusted Optimism Bias (%)	Check whether cost prop	ortions have been provided	
Contr butory factors	a di	1					Additional Guidance		Proportio	n of cost n each conf			Proportion of	of cost in each confid	idence band	3%		across the require	ed confidence bands	Scor ng comment
	100		a de A de					Result f om		Civil Engineer ng Com Required		5		ngineer ng Compon Required		5	Result f om			
	a training	100	ten a	High Confidence	Medium Confidence	Low Confidence		64.02%	High	Medium	Low	1	High	Medium	Low	A DE LA DE	39.89%	Check for Non-Standard components	Check for Standard components	1
	2 5	0.0	05						inse t p opo t on	Insetp opoton	inse t p opo t on	a calculated m t act on	inse t p opo t on	Inse t p opo t on	Inse t p opo t on	Calculated m t gat on		Check p opo t on sums to 1	Check p opo t on sums to 1	
Desc pt on	P xed values	i - do not adjust		Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce I	n conf dence band (0 - 1)	n conf dence band (0 - 1)	n conf dence band (0 - 1)	facto s	n conf dence band (0 - 1)	n conf dence band (0 - 1)	n conf dence band (0 - 1)	facto s	Calculated cell	whe e opt on conta ns Non- Standa d components	whe e opt on conta ns Standa d components	Desc. be the eason ng beh nd ass gament to confidence bands
Procurement Complex ty of cont act st uctu e	•	-	-	Clea , well establ shment	Cont act st ategy o outline	No cont act st ategy o comme c al	Fo bus ness as usual opt ons that w ll be p ocu ed th ough ex st ng wate		Regu ed	Requ ed	Regu ed	1	Regu ed	Regu ed	Regu ed	0		ОК	ОК	Cu ently unknown at this ploject stage.
				p ocu ement oute and p ocesses and/o deta led p ocu ement plan o	comme c al bus ness case n place, but deta is st II to be developed	bus ness case in place.	company f amewo is then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset													Potent al to be p ocu ed v a DPC as pa t of STT SRO
				fu i comme c al bus ness case n place			owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e detailed p ocu ements plans have not been developed													
Late cont acto involvement n design		3				s Design is not bus ness as usual fo company and the contractor has not	Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equ valent				1	0			1	0		ок	ОК	Cost models fo t eatment elements may not be el able at this scale. No conti acto involvement to date. ECI s now a well established p ocess the efo e, this isk should be minimal and will be mit gated. No ECI yet.
				models, o sgn f cant cont acto nvolvement n des gn	med um confidence, o n t al contiacto involvement n key	been nvolved n des gn	level of confidence n the est mate													
Poo cont acto capabites				Cont acto s and suppl e s expected	aspects of design Contractors and suppliers expected	Cont acto s and suppl e s expected	Opt on types whe e the e s i m ted ecent expe ence n the UK (ndud ng ia ge		<u> </u>	1		0.5	1			1		ок	ОК	The physical work of the project is not unusual.
				to b d fo wo k have ecent experience of s m la construction	to b d fo wo k have I m ted ecent	to b d fo wo k have I ttle/ho ecent experience of s m la const uct on	ese vo s euse and desal nat on opt ons) should be sco ed as med um/low									-				Howeve cont acto s will have I m ted expe ence of const uct ng these assets on a wastewate site. It si kely that the tende p ocess will be a staged OJEU p ocess with only competant cont acto s passing th ough the
				p o ects and supply of s m ia p ocess plant and equ pment	p ojects and supply of s m la p ocess plant and equ pment	p ojects and supply of s m la p ocess plant and equ pment														second tende stage.
Gove nment gu del nes		+					Whe e an opt an may be mplemented though D ect P ocu ement fo Custome s		<u> </u>		1	0			1	0		ОК	ОК	This ploject conside ed unusual, in terms of plocul ement, based on size and scale. KPMG have confilmed that
				of p ocu ng p ojects of a s m la natu e and deta led p ocu ement	p ojects of a s m la natu e and deta led p ocu ement gu dance s n	p ocu ng p ojects of a s m la	o othe less we i established p ocu ement outes then low confidence should be assigned													p ocu ement w II not be va DPC outes
D sputes & cla ms occu ed		21	_	gu dance s n place	place Scope and payment mechan sm	gu dance s not n place			<u> </u>			0.5				0		ОК	ОК	No cont acts n place howeve , this is a skiwhich will be mit gated as the project proceduress.
		-		clea ly defined in contract and no dependencies on thild parties	pa t ally defined and the e a e no majo dependencies on thi d pa t er	cu ently II-def ned and/o the e a	•			1					•	, i				no contracts in parce increase, this are as which will be in tigated as the property output eac.
info mat on management		_	_	Info mat on management systems		pa t es Key stakeholde s fo p ocu ement	Whe e nfo mat on management systems fo cont act and stakeholde		<u> </u>			0.5				0.5		ок	ок	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the
				between key stakeholde s a e n	p ocu ement dent f ed and	not dent f ed, o nfo mat on	management have not been in t ated then ass gn low confidence			1				· · ·				Ĩ		Concept Design investigations. This is kin libe mit gated as the scheme advances through the Gate process. A s
				place, clea ly defined and effect ve (e.g. p o ect spec f c, o al eady existing fo a ploject unde an	nfo mat on management system has been n t ated, but deta is a e st il to be developed befo e t can b	and effect ve (e.g. p oject spec f c, o	1													set up but not effect ve yet.
Othe				ex sting for a project under an ex sting framework)	st II to be developed before it can be effective.	e al eady existing to a polect unde an existing flamewolk)														
P ocu ement comb ned	-		13.	×				8.325	• •	Ave age M t gat on Fa	to	0.417	Av	e age Mit gat on Fact	10	0.250	5.245%	Ave age M	t get on Fecto	
Project specific Des gn complex ty						Design sicomplex, fo example due	Opt ons with sign f cantides gn complexities o const a ned sites and sign f cant		Regu ed	Requ ed	Regu ed	0	Regu ed	Regu ed	Regu ed	0.5		ОК	ОК	T eatment des gn const a nts a e st Il not clea ly def ned.
				well unde stood and deta led plans	to seve al complex t es. The design m t gat ons to add ess these	nte faces with existing assets, o	nteg at on with existing ope at onal inf ast ucture may be assigned low confidence. Opt ons that a e bus ness as usual on greenfield unconst a ned sites													P pel ne const a nts a e bette unde stood howeve they a e not yet fully add essed
				and designs a e in place to add ess them	complex t es have only been pa t ally unde stood and add essed.	const a nts. Des gn m t gat ons a e not yet n place.	may be ass gned h gh conf dence													
Deg ee of Innovation	8	-		Des gn s bus ness as usual and/o	Des gn nco po ates technology/	Des gn nco po ates new	Opt ons us ng technolog es that a e well establ shed n the UK should be ass gned h ah confidence. Opt ons whe e technolog es o the application of technolog es			1		0.5	1			1		ОК	ОК	P ocess technology s established - but not on a wastewate is te.
					tested and p oven fo the spec f c	been fully tested and p oven fo the	s less well established in the UK feig euse desail not onlishould be assigned													
Env onmental mpact	9	+	+	Env onmental mpacts well	appl cat on. Some assessment of env onmental	spec f c appl cat on. Env onmental mpacts poo ly	med um conf dence Except fo opt ons that a e f ee f om env onmental const a nts/ sks t s uni kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at				1	0			1	0		ок	ОК	Env onmental assessments not yet ava alable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess
				unde stood (e.g. mpact on ece vin wate bod es, no se, INNS t ansfe ,	g mpacts has been ca ed out and m t gat ons have been dent f ed an	d wate bod es, no se, INNS t ansfe ,	that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent fed deta led and costed n the QCRA fo opt ons with 5 gn f cant env onmental sks that equ e nvest gat on													now des gned to meet all poss ble consent ng needs.
				mtgatons dentfed whe e	s gn f cant of these. Othe	o s gn f cant env onmental ssues	QCRA Fo opt ons with s gn f cant env onmental sks that equ e revest gat on a low conf dence sco e would be mo e applicable befo e account ng fo the QCRA													
				equ ed and ncluded n costs	m t gat ons will be equied that have not yet been built into the	dent f ed w thout ag eement on m t gat on to be bu it nto costs														
Othe	,	18			costs.															
P oject spec f c comb ned Client specific		_	31.	×				19.85%		Ave age Mit gation Fa Requied		0.167		e age Mitigation Fact Requied		0.500	16.453N	Ave age M1	t get on Fecto	
Inadequacy of the Bus ness Case	35	10		Key stakeholde s needs dent f ed	Pa t al dent f cat on of needs and n t al engagement w th	output spec f cat on, w thout	Conf dence I kely to be low at Gate 1 unless n t al stakeholde equ ements dent f ed and eflected n opt on scope and/o spec f cally accounted fo n QCRA			1		0.5		1		0.5		ок	ок	As one of 17 SROs, the need to this pait cuia scheme (o any othe) will be unclear until the gated piocess s much furthe developed. Needs pait ally dent field and some stakeholde siengaged
				and included in scope where applicable.	stakeholde s to ef ne equ ements	 engagement w th stakeholde s to efine equiements 														
La genumbe of stakeholde s				Stakeholde app ovals not equ ed	Some key stakeholde s dent f ed and v ews obta ned, howeve some othe stakeholde s ema n	Stakeholde s not clea ly dent f ed, v ews not known o some			1			1		0.7	0.3	0.35		ок	ОК	Many stakeholde s not yet engaged, full I st of stakeholde s not developed so the e may be un dent f ed stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
				obta ned, o key stakeholde s la ge suppo t ve	y othe stakeholde s ema n un dent f.ed.	stakeholde s a e n act ve opposit or														
Fund ng ava lab I ty	5			(e.g. p o ect fully funded th ough		P oject fund ng not secu e, e.g. p oject dependent n pa t on	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed app op ate			1		0.5		1		0.5		ок	ок	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance w th add t onal gu dance
				p ce ev ew / pass th ough a angement)	challenges at p ce ev ew wh ch may equ e bus ness case to be	pa the sh p fund ng wh ch s not secu e.														
P oject management team	2	-	-	Scope of wo k s bus ness as usual	ev s ted Company del ve y team has some	Company del ve y teams a e not				1		0.5		1		0.5		ок	ОК	In house p oject management team have no expe ence of delive ng p ojects of this natu e whe e clean wate
				fo company del ve y teams.	expe ence n mplement ng p o ect of th s natu e, but the elevant	s experenced in implementing projects of this nature														assets a e const ucted on a wastewate s s te. P pei ne installat on s bus ness as usual p oject
			_		expe ence s not extens ve.															
Poo p oject ntell gence	,	1 1		data and no key assumpt ons made		key assumptions made where the e					•	, °			•	Ů		ок	ОК	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case t eatment scena o used.
				whe e the e ssgn f cant unce ta nty (e.g. g ound cond t ons	unce ta nty a ound key assumpt on	s s gn f cant unce ta nty														
				cond t on of ex st ng assets, t eatment equ ements)	ex st ng assets, t eatment	'														
Othe			-	*	equ ements)									Mar a st						
Cl ent spec f c comb ned Environment			34					21.775		Ave age Mit gation Fa Requied	Requ ed	0.500	Ave Regu ed	e age Mitgation Fact Requied	to Requied	0.370	12.021%		t get on Fecto	
Public elations		9			opposition, howeve the e has been		1		1			1		0.5	0.5	0.25		ок	ок	The scheme s la ge enough that the e could be local oppost on, sco ed med um as the e s no ev dence of s gn f cant local oppost on at th s po nt and t s i kely conce ns can be esolved.
					y some engagement w th key stakeholde s and t s i kely that the	awa e, o stakeholde s awa e and ev dence of s gn f cant local	1													
				expected. S te nfo mat on well unde stood	majo conce ns a sed can be	opposition														
S te cha acte st cs	5	3		(e.g. a chaeology, he tage assets,	unde stood (e.g. a chaeology,	S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets,					1	0			1	0		ОК	ОК	Unde stand ng of the t eatments te s pa t ally unde stood, fu the mest gat on s equ. ed. Unde stand ng of the p pel ne oute s poo, based solely on desktop study.
				contam nat on etc.), m t gat ons dent f ed whe e equ ed and	he tage assets, contam nat on etc.) m t gat ons dent f ed whe e	, contam nat on etc.) and m t gat ons not dent f ed	1													
Pe m ts / consents / app ovals	-		-			Pe m ts, consents and app ovals	Confidence I kely to be low at Gate 1 unless opt on s bus ness as usual o sks		1			1		0.5	0.5	0.25		ок	ОК	Pe m ts a e equ ed, unce ta n of autho t es suppot at this stage. T eatment is BAT designed fo woist case so
				o pe m ts and consents obta ned.	egulato s, plann ng autho t es and Gove nment suppo t ve	equ ed f om egulato s, plann ng autho t es and/o Gove nment and	well developed and costed n QRA													although peim t not issued, no fuithe imitigation is possible
						obta n ng these p esents a mate al sk														
Othe Env onment combined			8	x				5.44%		Ave age M t gat on Fa	to	0.667	Ave	e age Mitigation Fact	10	0.167	2.295×	Ave age M t	t gat on Facto	
External influences Pol t cal				P o ect se the unikely to att act		P oject has the potent al to att act			Requ ed	Requ ed	Regu ed	1	Regu ed	Regu ed	Regu ed	0		ОК	ОК	Poject could lead to poit cal attent on, pat cually unde a net ze o lense. Unclear fithe escurently coss-pat
				poi t cal attent on, o poi t cal stakeholde s a e suppo t ve	pa ty poit cal suppot the mao ty	pol t cal attent on and lacks c oss- pa ty pol t cal suppo t	ass gned low conf dence													suppot o not. When compared to othe SROs this project is unlikely to att act poit call attent on
					of pol t cal stakeholde s a e l kely to be suppo t ve															
Econom c	3	7			P oject has a med um lead t me so		When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t fo sS yea s Med um fo S -10 yea s Long fo >10yea s			1		0.5			1	0		ОК	ОК	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
				and nput costs	the econom c env onment could mpact demands and / o nput	could mpact demands and/o nput costs														1
Leg slat ons/ egulat ons	8		-	P o ect s bus ness as usual and /o	costs. Requ. ed standa ds and egulat ons	Key standa ds and egulat ons a e	Fo new technolog es o novel appi cat ons of ex st ng technolog es n the UK that			1		0.5		0.5	0.5	0.25		ок	ОК	The cu ent key standa ds a e unde stood and have been pa t ally invest gated. Howeve , issues such as the
				equ ed standa ds and egulat ons a e well establ shed and uni kely to	a e elat vely new and the efo e les	s unde development, o subject to change.	potent ally equ e equiato y app ovais (e g fo env onmental o d nk ng wate qual ty easons) then a med um o low conf dence should be appl ed H gh													equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y ssues erna n (DCO/Put & Take). These exte nal influences could also change sign f cantly ove the l fe cycle of the scheme
				change			conf dence should be appl ed fo bus ness as usual schemes whe e no equiato y													wh ch, even f selected, may not be called upon for decades.
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	Technology (e.g. t eatment p ocesses, sma t mete ng	o leg slat ve sks a e env saged T eated wate t ansfe s and convent onal t eatment p ocesses should be sco ed h gh conf dence. Fo novel t eatment p ocesses o novel appi cat on of tested			1		0.5	1			1		ок	ок	T eatment p occases p oposed a e established, howeve p lot t als needed to conf m v abity of t eatment p oposed
				technology) s well established,		e technology) s new and/o s subject to ap d nnovat on wh ch may lead	t extment p ocesses (e g fo INNS t ansfe m t gat on desai nat on o euse)													
				to change du ng the p oject lead		to danges n equiements	and a state of the													
Othe	1				equ ements s uni kely.															
Exte nal influences comb ned	•		13.	x				8.64%	4	Ave age M t gat on Fa	to	0.625	Aw	e age Mitigation Fact	to	0.313	3.880N	Ave age M1	t gat on Facto	

	Netheridge SRO - Deer	rhurst]														
	Option 1							4														
Date of QCRA Review	26/07/2022																					
Score - Description	Probability	Cost Impact	Schedule Impact	Score	Min Cost	Max Cost	1	Capes		inse t total scheme	e capex excluding of	pt m am b as										
1 - Ve y Low	Imp obable (1-10%)	Minimal (1%) effection piolect cost	No delay to ploject del ve y							-												
2 - Low	Remote (11-30%)	Small (1-2%) effect on p oject	Mn mai (1-2%) effect on	-																		
		cost Mode ate (2 1-5%) nc ease n	p oject del ve y	2					R sk (Stat c) value													
3 - Med um	Poss ble - L kely (\$1-50%)		p oject del ve y	3				P10	0	inse t output f om	e sk epotfo 10	pe cent le										
4 - H gh	P obable (51-70%)	Sgnfcant(51-15%) nc ease	S gn f cant (5 1-15%) delay to							Income to construct of come	@ sk epotfo 50;	na cant la										
5 - Ve y Hgh	Almost ce ta n (71-99%)								~													
2 - ve y ngn	Amost de la n (71-33%)	poetcost	p oject del ve y	5				PSC	0	inse t output f om	∉ sk epotfo 90	pe cent le										
						_																_
								1	1	1	1		Volues p ov ded f om soo e but f bette nfo mat on	fusng a tangula dist buta	n Volues p ov ded f om sco es but f					Should be set by default to	Should be set by default to th	he .
								1	1	1	1		ava lable then should be	then enter most i kely volue	bette nfo mat on available then					the p e-m t gat on value	p e-m t gat on value	·
								1	1	1	1		ove w tten	he e	should be over written			Set by defalut to the p e-m t gat on value. Howeve, can over w te to	Should be set by defalut to the p e- m t gat on value Howeve can	Howeve can ove w te to eco d the ant c pated most	Howeve can ove w te to eco d the ont c pated	
								1	1	1	1							eco d the ant c pated p abab I ty of	ove w te to eco d the ant c pated	I kely cost mpact f dent fed	max mum cost mpact f	
Inse t Rak ID	Select e the Th eat o Oppo tun ty	Select akatotua	inse t. sk catego y	Select alcotego y	Select alicatego y	Desc be natu e of sk including cause and event	Desc be consequences f sk s eal sed	Caludated based on Quant P ob %	Inse Laco e	inse taco e	Colculated at	inse t p obability as pe centage that at cars a		Cost Est mates		Not used on Tab 3a - see Tab 3b	e the steps equ ed to m t gate the sk	the skoccu ng f dent fed sk esponse act ons a e successful	m n mum cost mpact f dentfed s esponse act ons a e successful	k sk esponse act ons a e successful	dent f ed sk esponse act ons a e successful	Not used on Tab 3a - see Tab 3b
D	Туре	Status	Category	R851	R852	Description	Consequence	Prob score	Costacore	Schedule score	Score	Quant Prob N	Min £	MLE	Max 6	Risk	Risk response action	Post M t Quent Prob %	Post Mit Min £	Post Mit MLE	Post M t Max E	Post Mit Risk
																						1
																						1
																						1
Nethe dge WwTW Influent Volume	Th est	X = Est mate	Caper	Technical	Site che acte stics and pioject data	Insdequate flow into Nether dge WwTW duing diy	STS SRO unable to supply equ. ed volume		4		4	15	×				Sto age tank to buffe flows ove 24	5	×			
N th g W TWI 6 tQ ity	Th eat	I = Igno ed					to STT SRO Scheme New t extment p ccess does not meet STS			· ·						See Tab 3b.	hou pe od Cannot quant fy potent al					See Tab Sb.
						charges/dete o stes	SRO d sche ge pe m t stande ds. P coss				0						'dete o at on' so cannot quant fy to	Ŭ				
U.g. +N th. g. W. TW	Th eat	I = Igno ed				Upg ede occu et Nethe dge WwTW that ut i se ex st ng	upg ades equ ed.				-						action o cost Cannot quantify to action o cost					
		1-10-0				land, powe , wate , sludge escu ces assumed to be	layout. Add t onal power and water aquies	4			0						Carried quart ly to act on or cost	, i i i i i i i i i i i i i i i i i i i				
STSSROD scha ge Pe m t Requiements	Th ant	X = Est mate	Contra .	Techn cal	Enderson antal mostralate	eve lable fo the SRO scheme Wate quality stands ds fo the STS SRO d sche ge a e	to site.										Inc ease Opt ons 1,2,3 to Opt on 4	16	×			1
						hghe than ant c pated	SRO d scha ge pe m t standa ds. P coss	1	4	2							t estment p coss	-				1
STS SRO T extment P costs Effluent	The set	X = Est mate		Techn cal	Design uncertainty / complexity	The new STS SRO t extment p costs does not p oduce	upg ades equ ed.										Inc ease Opt ons 1,2,3 to Opt on 4					
Quelity	In eas	A CIT MADE	Capes	Technical	Delign uncertainty / completery	affuent to the quality ant c pated at design stage	SRO d scha ge pe m t standa ds. P coass	1	4	2	1 A	~					t estment p coss.	~				
STSSROT extment P costs Layout at		X = Est mate		Barbar and			upg ades equ ed. Additional pipewo k and anc lis es equ ed										Assume add t onal 20% p pewo k					1
STSSRUT extremt P coess Layout at WwTW	In est	A + Cat mate	Capes	Techn cal	Design uncertainty / complexity	p oposed WwTW layout equiling ledes gn	detosite ed layout.				1		`				equ ed.	15				
									•	· ·							Assume 20% mo e oed/he dstand/d a nage etc					
Nethe dge WwTW Powe Upg ade	Th eat	X = Est mate	Capez	Techn cal	Design uncertainty / complexity	Specific t extment picess units equi ed additional	Add t onel substat on/elect cal equipment	1	2	2	2	50	×				Engagement with powe supplie	50	6			
Nethe dge WwTW Potable Wate	Th eat	X = Est mate	0.00	Techn cel			equ ed. Upg ade to ncom ng wate supply to	•	•	· ·	_						equ ed. Upg ade to ncom ng wate supply					
Upg ade						potable wate equing upg ade to nooming wate		1	1	1		~					p pel ne - study equ ed	~				
	Th eat	I = Igno ed				supply Issues elating to landowne ship, wayleaves and access.	Alte stop of a per oute delevito										Cannot quantify to act on o cost					
							const uct on o d file ent const uct on				0							, i i i i i i i i i i i i i i i i i i i				
	Th eat	I = Igno ed				Issues eleting to obtain ng planning pelim sa ona fo	methods.				0						Cannot quant fy to act on o cost					
<u> </u>		1 - Igno eo					s ze/location, diffe enticonst uction				, v						Carried quark ly to act on or cost	, i i i i i i i i i i i i i i i i i i i				
Env onmental Pe m ts (Ainey)?	Th eat	X = Est mate	0.00	Exte nal	Planning and approvals	Opt ons 1.2 and 3 must pass th ough Alney Natu e	methods.										Assume add t onal cost fo m c o	40				
			Cape.		and the opposite	Rese ve at Ch.300L Pe m ss ons have not been g anted/	nc easing pipeline length. Alte native				-						tunnel OR double enstatement ate	~				
						const uct on methods ag eed.	const uct on methods equ. ed. Add t onal m t get on and e nstatement equ. ed.	1	2	2												
P pel ne - Ra I C oss ng	Th est	X =Est mate	Capes	Techn cal	Design uncertainty / complexity	Opt ons 1 and 2 must pass under the a lway at Ch XXX. Perm ss ons have not been granted/ construct on	Alte nat ve location equied for clossing increasing previous length. Alte part ve	1		2	4	40	×					40	۰			
						methods ag eed.	const uct on methods eau ed.															
P pei ne - Roed C css ng	Th est	X =Est mate	Caper	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass unde the A40 at Ch.300. Pe m ss ons have not been g anted/ const uct on	Alte nat ve locat on equ ed fo c ossing increasing pipel ne length. Alte nat ve	1	1	1	1	50	`					50	C			
						methods ag eed.	const uct on methods equ ed.															
Ppeine - Rve Coss ng	Th est	X = Est mate	Capex	Techn cal		Opt ons 1 2 and 3 must pass unde East Channe R Seve n at Ch XXX. Pe m ss ons have not been g anted/		1		1	1	50						50	·			
						const uct on methods ag ead.	const uct on methods equ ed.															
Ppeine - Utites Dive sons	Th est	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough sem u al and u ban a eas. P paine oute could uncove unknown		2	,	1	4	60					Assume an add t onal % fo add t onal se v ce d ve s ons	60				
						se v ces/utites		-														
P pel ne - Contam nated Land	Th est	X = Est mate	Capes	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough old landf II s te at Ch.XXX. Pe m ss ons have not been g anted/ const uct or		2	2	1	4	40	×					40	۲			
						methods ag eed.	methods equ ed.		-													
P pel ne - Contam nated Land	Th est	X =Est mate	Capes	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough old a larey s d ng at Ch.300c. Pe m ss ons have not been g anted/ const uct on	t Alte native oute equied no easing	1		1	1	30	×					50	۰			
						methods ag eed.	methods eou ed.															
P pel ne G ound Wate	Th eat	X =Est mate	Capez	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass dose to R Seve n and East Channel R Seve n. T ench excevat on could expe ence	Alte nat ve const uct on method o	2		2	6	60	×					60	<u>د</u>			
						escess ve g oundwate ng ess.																
P pel ne D a nage Ponts	Th est	X = Est mate	Capes	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 equ ed a nage points along the outs to allow the pipe to be d a ned when not in use.	P pel ne could not be d a ned when not n use leading to ope at onal source.				3	45	×					45	۲			
							Alte nat ve p pel ne oute equed to	1	3	2												
							eccommodate feas ble d a n po nts.															
BLANK ROW - rise t own above to add						BLANK ROW - nae t ows above to add sks			1	1 .	#VALUE!		×					0	c			
		1	1													See Tab Sh.						See Tab Sh

tion Name	Netheridge SRO - Haw Bridge		
tion Reference	Option 2		
te of QCRA Review	25.7.22		
Score - Description	Max Cost		Capex: 98 393 500 Insert total scheme capex excluding optimism bias
1 - Very Low	983 935		
2 - Low	1 967 870		Risk (Static) values:
3 - Medium	4 919 673		P10 7 731 351.65 Insert output from @risk report for 10 percentile
4 - High	14 759 025		P50 19 122 964.60 Insert output from @risk report for 30 percentile
3 - Very High	29 518 050		P90 32 677 017.83 Insert output from @risk report for 90 percentile
	tion Reference te of QCRA Review Score - Description 1 - Very Low 2 - Low 3 - Medium 4 - High	Score - Description Max Cost 1 - Very Low 963 933 2 - Low 1967 870 3 - Medium 4915 673 4 - High 14 779 023 5 - Low Kin 14 779 023	Score - Description Max Cost 1 - Very Low 983 933 2 - Low 1967 870 3 - Medium 4 919 673 4 - High 14 759 023

								Values provided from scores but if better information		Values provided from scores but if							
										values provided from scores out if	1				Should be set by defalut to the		
								available then should be	if using a thangular distribution	better information available then					pre-mitigation value.	Should be set by defaiut to the	
								overwritten	then enter most likely value here	Should be over written			Set by defalut to the pre-mitigation value. However can overwrite to	Should be set by defalut to the pre- mitigation value. However can	However can overwrite to record the anticipated most	pre-mitigation value. However can overwrite to record the	
												Insert specific r sk response actions	record the anticipated probability of	overwrite to record the anticipated	like y cost impact if identified	anticipated maximum cost	
			Caluciated based			Calculated risk	Insert probabil ty as percentage that					i.e. the steps required to mitigate the	the risk occurring if identified risk	minimum cost impact if identif ed risk	risk response actions are	impact if identified risk	Not used on Tab 3a - see Tab
	escribe nature of risk including cause and event.	Describe consequences if risk is realised	on Quant Prob %	Insert score	Insert score	score	risk occurs		Cost Estimates		Not used on Tab 3a - see Tab 3b.	risk.	response actions are successful.	response actions are successful.	successful.	response actions are successful.	. 3b.
	escription	Consequence	Prob score	Cost score	Schedule score	Score	Quant Prob %	Min £	MLE	Max £	Risk	Risk response action	Post Mit Quant Prob %	Post Mit Min £	Post Mit ML £	Post Mit Max £	Post Mit Risk
																	4
Netheridge WWTW Influent Volume Inad	adequate flow into Netheridge WwTW during dry	STS SRO unable to supply required volume	1	4	2		15%					Storage tank to buffer flows over 24					
	eather flow to supply 35 MI/d	to STT SRO Scheme									See Tab 3b.	hour period	0%				See Tab 3b.
Netheridge W TW Influent Quality Qual		New treatment process does not meet STS SRO discharge permit standards. Process				0						Cannot quantify potential 'deterioration' so cannot quant fy to	0%				
· · · · · · · · · · · · · · · · · · ·		upgrades required.										action or cost					
pg d N h idg T Upr	pgrade occur at Netheridge WWTW that utilise existing					0						Cannot quantify to action or cost	0%				
land	nd power water sludge resources assumed to be	Additional power and water required to site.				-											
	vailable for the SRO scheme																
	ater quality standards for the STS SRO discharge are						25%					Increase Options 1 2 3 to Option 4	25%	•			
high	gher than anticipated	SRO discharge permit standards. Process	1	4	2							treatment process					
STS SRO Treatment Process Effluent The	he new STS SRO treatment process does not produce	upgrades required. New treatment process does not meet STS					40%					Increase Options 1 2 3 to Option 4	40%				
		SRO discharge permit standards. Process	1	4	2							treatment process.					
		upgrades required.			-												
/TS SRO Treatment Process Layout at Spe	pecified treatment process units do not fit with	Additional pipework and ancillaries required					15%					Assume additional 20% pipework	15%	6			
wwtw prop	roposed WwTW layout requiring redesign	die to altered layout.	1	1								required.					
			-	-	-							Assume 20% more					
The second s							50%					road/hardstand/drainage etc					
		Additional substation/electrical equipment	1	2	2		204					Engagement with power supplier required.	50%				
	ower requiring additional electrical upgrades pecific treatment process units required additional	Upgrade to incoming water supply to					70%					Upgrade to incoming water supply	70%				
	otable water requiring upgrade to incoming water	increase volume of water supplied	1	1	1							pipeline - study required					
	ipply 1 5 15 5																
andownership/Weyleaves Issu	sues relating to landownership wayleaves and access.	Alteration of pipe route delay to				0						Cannot quantify to action or cost	0%	6			
		construction or different construction															
		methods.												-			
Planning Permission Issue		Alteration of building/structure				0						Cannot quantify to action or cost	0%				
	WTW or pipeline buildings and structures	size/location different construction															
Environmental Permits (Alney)? Opti	ptions 1 2 and 3 must pass through Ainey Nature	Alternative location required for crossing				2	40%					Assume additional cost for micro	40%				
Rese	eserve at Ch.XXX. Permissions have not been granted/	increasing pipeline length. Alternative										tunnel OR double reinstatement rate					
con	onstruction methods agreed.	construction methods required. Additional	1	2	2												
		mitigation and reinstatement required.															
tion inc. Brit Counting	tion (and) and a second state with a second state way	a theorem is a second					40%						40%				
	ptions 1 and 2 must pass under the railway at Ch.XXX. ermissions have not been granted/ construction	increasing pipeline length. Alternative	1	4	,								-407	•			
me	ethods agreed.	construction methods required.	-														
	ptions 1 2 and 3 must pass under the A40 at Ch.XXX.	Alternative location required for crossing					30%						30%				
Perm	ermissions have not been granted/ construction	increasing pipeline length. Alternative	1	1	1												
met	ethods agreed.	construction methods required.												-			
	ptions 1 2 and 3 must pass under East Channe R Severn		1	1			30%						30%				
at O	t Ch.XXX. Permissions have not been granted/ onstruction methods agreed.	increasing pipeline length. Alternative construction methods required.															
	ptions 1 2 and 3 must pass through semi rural and	Services require diversion or pipe route					60%					Assume an additional % for additional	603				
	rban areas. Pipeline route could uncover unknown	altered to avoid service/utility.	2	2	1							service diversions					
	ervices/utilities	-															
Pipe ine - Contaminated Land Opti	ptions 1 2 and 3 must pass through old landfill site at	Alternative route required increasing					40%						40%	•			
a.	h.XXX. Permissions have not been granted/ construction	pipeline length. Alternative construction	2	2	1												
	ethods agreed. ptions 1 2 and 3 must pass through old railway siding at	methods required. Alternative route required increasing					30%						30%				
ch'	h.XXX. Permissions have not been granted/ construction	pipeline length. Alternative construction	1	1	1								307				
met	ethods agreed.	methods required.															
Pipe ine Ground Water Opti	ptions 1 2 and 3 must pass close to R Severn and East					6	60%						Roa				
	hannel R Severn. Trench excavation could experience	dewatering method required.	2	3	2												
excr	cessive groundwater ingress.	Sector and a star sector sector															
	ptions 1 2 and 3 require drainage points along the route						43%						43%				
		use leading to operational issues. Alternative pipeline route required to	1	3	2												
	0.000	accommodate feas ble drain points.															
						#VALUE!							0%				
BLANK ROW - insert rows above to add BLA	LANK ROW - insert rows above to add risks		1	1	1 1		0%						0%				
risks											See Tab 3b.						See Tab 3b.

Option Name Option Reference	Netheridge SRO - East Channel Option 3]														
Date of QCRA Review	26/07/2022]														
Score - Description	Max Cost		Cape	a:	insert total scheme	copex excluding opt	imism bias										
1 - Very Low																	
2 - Low				Risk (Static) values	5												
3 - Medium			P1	10	Insert output from	@risk report for 10 p	ercentile										
4 - High			PS	50	Insert output from	@risk report for 30 p	ercentile										
5 - Very High			PS	90	Insert output from	Ørisk report for 90 p	ercentile										
								Values provided from scores but if better information		Values provided from scores but if					Should be set by defalut to th		
								available then should be overwritten	If using a triangular distribution then enter most likely value here	better information available then			Set by defalut to the pre-mitigation	Should be set by defaiut to the pre-	pre-mitigation value. However can overwrite to	Should be set by default to the pre-mitiaation value. However	
								Cher Written	chair ancer most intely voice here	Should be over written			value. However can overwrite to	mitigation value. However can	record the anticipated most	can overwrite to record the	
			Caluciated based			Calculated risk	Insert probability as percentage that					Insert specific r sk response actions i.e. the steps required to mitigate the	record the anticipated probability of the risk occurring if identified risk	overwrite to record the anticipated minimum cost impact if identif ed risk	like y cost impact if identified risk response actions are	d anticipated maximum cost impact if identified risk	Not used on Tab 3a - see Tab
Insert Risk ID	Describe nature of risk including cause and event.	Describe consequences if risk is realised	on Quant Prob %		Insert score	score	risk occurs		Cost Estimates		Not used on Tab 3a - see Tab 3b.	risk.	response actions are successful.	response actions are successful.	successful.	response actions are successful.	l. 3b.
ID	Description	Consequence	Prob score	Cost score	Schedule score	Score	Quant Prob %	Min E	MLE	Mex £	Risk	Risk response action	Post Mit Quant Prob %	Post Mit Min £	Post Mit ML £	Post Mit Max £	Post Mit Risk
Netheridge WwTW Influent Volume	Inadequate flow into Netheridge WwTW during dry	STS SRO unable to supply required volume					157					Storage tank to buffer flows over 24					
	weather flow to supply 35 MI/d	to STT SRO Scheme	-	4	2						See Tab 3b.	hour period					See Tab 3b.
Nethenidge W TW Influent Quality	Quality of the influent into Netheridge WwTW changes/deteriorates	New treatment process does not meet STS SRO discharge permit standards. Process				0						Cannot quantify potential 'deterioration' so cannot quant fy to	0	00			
Vee d N h ide T-		upgrades required.										action or cost		•			
• ••• •	Upgrade occur at Netheridge WwTW that utilise existing land power water sludge resources assumed to be	Additional power and water required to site.				0						Cannot quantity to action or cost	ľ	10			
STS SRO Discharge Permit Requirements	available for the SRO scheme Water quality standards for the STS SRO discharge are	New treatment process does not meet STS					255					Increase Options 1 2 3 to Option 4	25	%			
	higher than anticipated	SRO discharge permit standards. Process	1	4	2							treatment process					
STS SRO Treatment Process Effluent	The new STS SRO treatment process does not produce					4	40	6				Increase Options 1 2 3 to Option 4	40	8			
Quality	affluent to the quality anticipated at design stage	SRO discharge permit standards. Process upgrades required.	1	4	2							treatment process.					
	Specified treatment process units do not fit with	Additional pipework and ancillaries required	1			1	15	6				Assume additional 20% pipework	15	%			
WWTW	proposed WwTW layout requiring redesign	die to altered layout.	1	1	1							required. Assume 20% more					
Netheridge WwTW Power Upgrade	Specific treatment process units required additional	Additional substation/electrical equipment					505					road/hardstand/drainage etc Engagement with power supplier	50	A.			
	power requiring additional electrical upgrades	required.	1	2	2	2						required.					
Netheridge WwTW Potable Water	Specific treatment process units required additional potable water requiring upgrade to incoming water	Upgrade to incoming water supply to increase volume of water supplied	1	1	1	1	705					Upgrade to incoming water supply pipeline - study required	70	86			
	supply																
	Issues relating to landownership wayleaves and access.	construction or different construction				0						Cannot quantity to action or cost	ľ	60			
Planning Permission	Issues relating to obtaining planning permissions for WwTW or pipeline buildings and structures	Alteration of building/structure size/location different construction				0						Cannot quantify to action or cost	0	6			
		methods.															
Environmental Permits (Alney)?	Options 1 2 and 3 must pass through Alney Nature Reserve at Ch.XXX. Permissions have not been granted/	Alternative location required for crossing / increasing pipeline length, Alternative				2	35	•				Assume additional cost for micro tunnel OR double reinstatement rate	35	%			
	construction methods agreed.	construction methods required. Additional	1	2	2												
		mitigation and reinstatement required.															
Pipe ins Reil Cressing	Options 1 and 2 must pass under the railway at Ch.XXX. Permissions have not been granted/ construction	Alternative location required for crossing increasing pipeline length. Alternative															
alia ina ana ana i	methods agreed.	construction methods required.															
Pipe ins Road Crocsing	Options 1 2 and 3 must pass under the A40 at Ch.XXX. Permissions have not been granted/ construction	Alternative location required for crossing increasing pipeline length. Alternative															
Pipe ine - River Crossing	methods agreed. Options 1 2 and 3 must pass under East Channe R Sever	construction methods required.					30						30	5			
	at Ch.XXX. Permissions have not been granted/	increasing pipeline length. Alternative	1	1	1		~										
Pipe ine - Utilities Diversions	construction methods agreed. Options 1 2 and 3 must pass through semi rural and	construction methods required. Services require diversion or pipe route					505	6				Assume an additional % for additional	50	8			
	urban areas. Pipeline route could uncover unknown services/utilities	altered to avoid service/utility.	2	2	1							service diversions					
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old landfill site at					4	405	6					40	86			
	Ch.XXX. Permissions have not been granted/ constructio methods agreed.		2	2	1												
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old railway siding a	at Alternative route required increasing				1	157	6					15	%			
	Ch.XXX. Permissions have not been granted/ constructio methods agreed.	on pipeline length. Alternative construction methods required.	1	1	1												
Pipe ine Ground Water	Options 1 2 and 3 must pass close to R Severn and East	Alternative construction method or				6	43	•					45	8			
	Channel R Severn. Trench excavation could experience excessive groundwater ingress.		2	3	2												
Pipe ine Drainage Points	Options 1 2 and 3 require drainage points along the rout to allow the pie to be drained when not in use.	te Pipeline could not be drained when not in use leading to operational issues.				З	305	6					30	8			
	Permissions have not been granted.	Alternative pipeline route required to	1	3	2												
		accommodate feas ble drain points.				#VALUE!							0	8			
BLANK ROW - insert rows above to add	BLANK ROW - insert rows above to add risks			1	1 :	1 1	di	6					0	86			
risks											See Tab 3b.						See Tab 3b.

Option Name	Netheridge SRO - Canal
Option Reference	Option 4
Date of QCRA Review	30.05.21

Score - Description	Probability	Cost impact	Schedule Impact	Score	Min Cast	Max Cost	Capex 81,956 800 inset total scheme capex excluding opt mism bias
1 - Ve y Low	Imp obable (1-10%)	M n mai (1%) effect on p o ect cost	No delay to ploject del ve y	1	409,784	819 568	
2 - Low	Remote (11-30%)	Small (1-2%) effect on p oject cost	Mn mai (3-2%) effect on p oject del ve y	2	819,568	1,639 136	R sk (Stat c) values
3 - Med um	Poss ble - L kely (31-50%)	Mode ate (2 1-5%) nc ease n p oject cost	Smail (2.1 - 5%) delay to polect del ve y	3	1,721,093	4,097 840	P10 597,119.45 inset output f om @ sk epo t fo 10 pe cent le
4 - H gh	P obable (51-70%)	Sgn fcant (5 1-15%) nc ease on p oject cost	S gn f cant (5 1-15%) delay to p cject del ve y	4	4,179,797	12,293 520	P50 8 196,285.07 Inset output f om (#) ak epo t fo 50 pe omt le
5 - Ve y High	Almost ce ta n (71-99%)	Majo (>15%) nc ease n p o ect cost	Majo (>15%) delays to p oject del ve y	5	12,375,477	24,587 040	

huar t R ak 40	Select e the 7h eat o Oppo tun ty	Select akatotua	inse t sk.colego y	Select skostego y	Select sk catego y	Desc. be note a of six noted ng cause and event	Desc. be consequences f at a eal and	Caludated based an Quant P ob %		has tack e	300 e	inse t p obability as pe centage that all case s	Volues p ov ded f om sco es but f bette nfo mot on ava lable then should be ove w tten		Values p ov ded f om sco es but f bette afo mot on available then should be over witten	Not used on Tab 3a - see Tab 3b	Inse tapecf c all exponse actions e the steps equied to mit pate the all	Set by default to the p e-m t got on value. Howeve can over w to to eco d the ont c poted p abab ity of the sk accur og f dent (ed sk exponse act ons a e successful	m t gat on value Howeve can ove w te to eco d the ant c pated	Should be set by default to the p e-m t gat on value Howeve can ove w te to eco d the ant c pated most I kely cost mpact f dent f ed sk exponse act ons a e successful	Should be set by default to the p e-mt pat on value Howeve can over whe to eco of the ant c-pated max mum cost mpach f dent fed sk esponse act ons o e successful	r Not used on Tab 3a - see Tab 3b
•	Турн	Statu	Catagory	RESI	RUS2	Description	Consequence	Prob score	Cost score	Schedule score	Scom	Quent Prob Si	Min £	MLE	Max E	The second s	flak response adžoti	Post M 1 Quant Prob S	Post MR Min £	Port Mit ML E	Port M t Max E	Post Mit Risk
Nethe dge WwTW Influent Volume	Th est	X = Est mate	Capez	Techn cal	S te cha acte st cs and p oject data	Inadequate flow nto Nethe dge WwTW du ng d y weathe flow to supply 35 M/d	STS SRO unable to supply equ. ed volume to STT SRO Scheme	1	4	2	4	159					Sto age tank to buffe flows ove 24 hou pe od	159				See Tab Sb.
• • • •	Th est	t = Igno ed				Quality of the influent into Nethel dge WwTW changes/dete o ates	New t estment p coss does not meet STS SRO d sche ge pe m t stande ds. P coss upg ades equ ed.				0						Cannot quant fy potent al 'dete o at or'so cannot quant fy to act on o cost	01				
	Th est	l =lgno ed				evalable for the SRO scheme	layout. Add t onal powe and wate equ ed to a te.				0						Cannot quant fy to act on o cost	01				
STS SRO D scha ge Pe m t Requ ements		X = Est mate	Capez	Techn cal	Environmental constraints	Wate quality stands ds fo the STS SROd scha ges e highe than anticipated	SRO discha ge pe mitistanda ds. Piccess upg ades equi ed.	1	4	2	4	259	•				Inclease Options 1,2,3 to Option 4 t estment plocess	259				
STSSROT extment P costs Effluent Quality		X = Est mate	Caper	Techn cal	Design uncertainty / complexity		SRO dische ge pe mit stande ds. Piocess upgiedes equi ed.	1	4	2	4	401					Inc ease Opt ons 1,2,3 to Opt on 4 t eatment p coase.	409				
STSSROT estment P costs Layout at WwTW	Th est	X = Est mate	Caper	Techn cal	Design uncertainty / complexity	Specfed teatment pocess un ta do not ft with poposed WwTW layout equing edes gn	Additional pipewok and ancila es equied die toalte ed layout.	1	1	1		159					Assume add t onal 20% p pewo k equ.ed. Assume 20% mo e oed/ha.dstand/d a naze etc.	159				
Nethe dge WwTW Powe Upg ade	Th est	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Specificit estment plocess units lequied additional powellequing additional electical upg ades	Add t onal substat on/elect cal equipment equi ed.	1	2	2	2	509					Engagement with powe supplie equ.	501				
Nethe dge WwTW Potable Wate Upg ade	Th est	X = Est mate	Caper	Techn cal	Site characteristics and pro ect data	Specific t estment plocess units legul ed edd tional	Upg ede to ncom ng wete supply to nc essevolume of wete suppl ed	1	1	1	1	709	•				Upg ade to ncom ng wate supply p pel ne - study equ ed	709				
<u> </u>	Th est	I = Igno ed				Issues elet ng to landowne sh p, weyleaves and access.	Alte at on of p pe outs, delay to const uct on o d file ent const uct on methods.				0						Cannot quant fy to act on o cost	Ch				
N gP	Th est	l = Igno ed					Alte at on of build ng/st uctu e s ze/locat on, d file ent const uct on methods.				0						Cannot quant fy to act on o cost	Ch				
											#VALUE!							01				
BLANK ROW - rise to ows above to add ska						BLANK ROW - nae t own above to add sks		1	1	1 1	1	01				See Tab 3b.		01				See Tab Sb.

0-6	Nothanidas SDO East Channel City Decast		1										
Option Name	Netheridge SRO - East Channel SW Branch		-										
Option Reference	Option 5		-										
Date of QCRA Review	30.05.21		1										
Score - Description	Max Cost	1	Capex:		Insert total scheme	copex excluding opt	imism bias						
1 - Very Low		1			-								
	92 908	-											
2 - Low	185 816			Risk (Static) values									
3 - Medium	464 340		P10		Incast output from (Ørisk report for 10 p	arrantila						
4 15-4	101 310	1	120		maart output point	erisk report for 20 pr							
4 - High	1 393 620	4	P50	-	Insert output from (@risk report for 30 p	ercentile						
5 - Very High	2 787 240		P90		Insert output from (@risk report for 90 p	ercentile						
		-											
								Values provided from scores					т
								but if better information		Values provided from scores but if			L
								available then should be overwritten	If using a triangular distribution then enter most likely value here	better information available then			
								over written	chen enter most intery volue here	should be over written			
												Insert specific r sk response actions	1
Insert Risk ID	Describe nature of risk including cause and event.	Describe consequences if risk is realised	Caluciated based on Quant Prob %	Insert score	Insert score	Calculated risk score	Insert probability as percentage that risk occurs		Cost Estimates		Not used on Tab 3a - see Tab 3b.	i.e. the steps required to mitigate the risk.	5
ID	Description	Consequence	Prob score	Cost score	Schedule score	Score	Quant Prob %	Min £	MLE	Max £	Risk	Risk response action	Ŀ
													4
Nethendge WwTW Influent Volume	Inadequate flow into Netheridge WwTW during dry weather flow to supply 35 Ml/d	STS SRO unable to supply required volume to STT SRO Scheme	1	4	2	4	15%				See Tab 3b.	Storage tank to buffer flows over 24 hour period	
Netheridge W-TW Influent Quality	Quality of the influent into Netheridge WwTW	New treatment process does not meet STS				0						Cannot quantify potential	T
	changes/deteriorates	SRO discharge permit standards. Process										'deterioration' so cannot quantify to	
Vee d N h ide T-	Upgrade occur at Netheridge WwTW that utilise existing	upgrades required. Redesign of proposed new treatment layout.				0						action or cost Cannot quantify to action or cost	+
	land power water sludge resources assumed to be	Additional power and water required to site.				, v							
CTC CDO Disabaras Baravita Baravita manta	available for the SRO scheme	New texter at an and days and much 575					25%					Insurant Options (3.24s Option 4	+
sis sho bischarge Permit Requirements	Water quality standards for the STS SRO discharge are higher than anticipated	New treatment process does not meet STS SRO discharge permit standards. Process	1	4	2	4	24					Increase Options 1 2 3 to Option 4 treatment process	
		upgrades required.										-	+
STS SRO Treatment Process Effluent Quality		New treatment process does not meet STS SRO discharge permit standards. Process	1	4	2	4	40%					Increase Options 1 2 3 to Option 4 treatment process.	
county	and chief and drawy and charge at a carbon stable	upgrades required.	-	-	-								
STS SRO Treatment Process Layout at	Specified treatment process units do not fit with	Additional pipework and ancillaries required				1	10%					Assume additional 20% pipework	T
WWTW	proposed WwTW layout requiring redesign	die to altered layout.	1	1	1							required. Assume 20% more	
												road/hardstand/drainage etc	
Netheridge WWTW Power Upgrade	Specific treatment process units required additional	Additional substation/electrical equipment	1	2	2	2	30%					Engagement with power supplier	
Netheridge WwTW Potable Water	power requiring additional electrical upgrades Specific treatment process units required additional	required. Upgrade to incoming water supply to					50%					required. Upgrade to incoming water supply	+
Upgrade	potable water requiring upgrade to incoming water	increase volume of water supplied	1	1	1	<u> </u>						pipeline - study required	
Landaurantin Miladauran	supply	Attention of size south delayte											+
	Issues relating to landownership wayleaves and access.	construction or different construction				0						Cannot quantify to action or cost	
		methods.											4
Planning Permission	Issues relating to obtaining planning permissions for WwTW or pipeline buildings and structures	Alteration of building/structure size/location different construction				0						Cannot quantify to action or cost	
	with or pipeline ballangs and strategies	methods.											
Environmental Permits (Alney)?	Options 1 2 and 3 must pass through Alney Nature	Alternative location required for crossing				2	25%					Assume additional cost for micro	
	Reserve at Ch.XXX. Permissions have not been granted/ construction methods agreed.	increasing pipeline length. Alternative construction methods required. Additional	1	2	2							tunnel OR double reinstatement rate	
		mitigation and reinstatement required.	-	-									
Disa ina Bait Crawina													+
	Options 1 and 2 must pass under the railway at Ch.XXX. Permissions have not been granted/ construction	Alternative location required for crossing increasing pipeline length. Alternative											
	methods agreed.	construction methods required.											_
Ripe ine Road Crossing	Options 1 2 and 3 must pass under the A40 at Ch.XXX. Permissions have not been granted/ construction	Alternative location required for crossing increasing pipeline length. Alternative											
	methods agreed.	construction methods required.											
Pipe ine - River Crossing	Options 1 2 and 3 must pass under East Channe R Severn	Alternative location required for crossing				1	30%						Т
	at Ch.XXX. Permissions have not been granted/ construction methods agreed.	increasing pipeline length. Alternative construction methods required.	1	1	1								
Pipe ine - Utilities Diversions	Options 1 2 and 3 must pass through semi rural and	Services require diversion or pipe route				4	40%					Assume an additional % for additional	ē.
	urban areas. Pipeline route could uncover unknown	altered to avoid service/utility.	2	2	1							service diversions	
Pipe ine - Contaminated Land	services/utilities Options 1 2 and 3 must pass through old landfill site at	Alternative route required increasing					40%						+
	Ch.XXX. Permissions have not been granted/ construction	pipeline length. Alternative construction	2	2	1	1							
	methods agreed.	methods required.						-					+
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old railway siding at Ch.XXX. Permissions have not been granted/ construction	Alternative route required increasing pipeline length. Alternative construction	1			0							
	methods agreed.	methods required.											
Pipe ine Ground Water	Options 1 2 and 3 must pass close to R Severn and East			_		6	45%						
	Channel R Severn. Trench excavation could experience excessive groundwater ingress.	oewatering method required.	2	3	2							1	
Pipe ine Drainage Points	Options 1 2 and 3 require drainage points along the route					3	20%						T
	to allow the pie to be drained when not in use. Permissions have not been granted.	use leading to operational issues. Alternative pipeline route required to	1	3	2							1	
	Construction and the second granted.	accommodate feas ble drain points.											
						#VALUE!							
	BLANK ROW - insert rows above to add risks		1		1 S	1	0%				See Tab 3b.		
risks		1									June 160 SU.	4	1

	Should be set by defalut to the		
	pre-mitigation value.	Should be set by defaiut to the	
Should be set by defalut to the pre-	However can overwrite to	pre-mitigation value. However	
mitigation value. However can	record the anticipated most	can overwrite to record the	
overwrite to record the anticipated	like y cost impact if identified	anticipated maximum cost	
minimum cost impact if identif ed risk	risk response actions are	impact if identified risk	Not used on Tab 3a - see Tab
response actions are successful.	successful.	response actions are successful.	3b.
response actions are successful. Post Mit Min £	successful. Post Mit ML £	Post Mit Max £	Post Mit Risk
			See Tab 3b.
			See Tab 3b.

Appendix C

OPEX COST ESTIMATES

wsp

Days pumping per annum					
Days pumping sweetening flow					
Days on standby					
Power Unit Cost (£/kWh)					
Operator Cost (£/hr)					



					nsumption - Va	riable			Person Costs - Fix	ked	Fixed		
				Used									
Deserve Facilitation and			35MLD	during	Daily Cost	Daily Cost	Annual Power	Operator Time		Annual Person	Consumables	Total Annual	Auron Dally Cast
Process Equipment	Power Rating (kW)			20MLD - kWh/d standby?	35 MLD	20MLD	Cost	(days)	Time (days)	Cost (£/pa)	Costs (£/pa)	Opex Cost	Average Daily Cost
Ferrous Sulphate		1	24					16		<u>'</u> -			
MBBR Lift Pump Station		150	1456					13		3			
ABBR, incl blowers		480	5760					39		3			
CoMag Equipment		16						26		H I I I I I I I I I I I I I I I I I I I			
Ferric Sulphate		1	24					16					
olymer		1	24					16					
/lagnetite			0					16		L			
ludge Recycle System			50					13					
Jzone Pump Station		150	1456					13					
Dzone Plant Equipment			2562					26					
BAFF Lift PS		150	1456					13		H			
BAFF, incl blowers		156	1806					39					
Backwash Pumps		69	18.5					13		H Contraction of the second se			
ackwash Return pumps		15	35	19.95 Yes				13		2			
GAC Equipment			43	24.51 no				26		H			
GAC Media			0	no				0		2			
odium Hypochlorite		1	24	13.68 Yes				16	12	2			
Sludge thickener (incl feed pum	ips)		39	22.23 Yes				13	12	2			
hickened Sludge Pumps		8	32	18.24 Yes				13	12	2			
Pump to Existing Outfall		74	1400	798 Yes				10)				
ransfer Pump Station (Pipeline	•												
Option 1)		645	7140	4069.8 no				15					

Treatment	Total annual	
Treatment	Total daily	
Dineline	Total annual	
Pipeline	Total daily	
	Rounded	
	combined Total	

	CHEMICALS BELOW:	
	Daily Cost A	nnual Cost
Ferrous Sulphate	yes	
Ferric Sulphate	yes	
Polymer	yes	
Magnetite	yes	
Liquid Oxygen	yes	
Sodium Hypo	yes	
Sludge polymer	yes	

Annual Fixed	
Annual Variable co	
Variable (£/ML)	

Days pumping per annum						
Days pumping sweetening flow						
Days on standby						
Power Unit Cost (£/kWh)						
Operator Cost (£/hr)						



						Power Costs		Person Costs							
			35MLD -	20MLD -		Daily Cost	Daily Cost				ance Time	Total Person Cost			
Process Equipment	Power Rating (kW)		kWh/d	kWh/d	Used during standby?	35 MLD	20MLD	Annual Cost	Operator Time (days)	(days)		(£/pa)	Consumables Cost	Total Annual	Average Daily Cost
Ferrous Sulphate		1	24	4 13.68	Yes				16	5	12				
MBBR Lift Pump Station		150	1450	6 829.92	Yes				13	3	3				
MBBR, incl blowers		480	576	0 3283.2	Yes				39)	3				
CoMag Equipment		16	200	0 114	Yes				26	5	10				
Ferric Sulphate		1	24	4 13.68	Yes				16	5	12				
Polymer		1	24	4 13.68	Yes				16	5	12				
Magnetite			(D	Yes				16	5	1				
Sludge Recycle System			50	0 28.5	Yes				13	3	12	2			
Ozone Pump Station		150	1450	6 829.92	Yes				13	3	12	2			
Ozone Plant Equipment			2562	2 1460.34	no				26	5	12				
BAFF Lift PS		150	1450	6 829.92	Yes				13	3	12	2			
BAFF, incl blowers		156	180	6 1029.42	Yes				39)	12	2			
Backwash Pumps		69	18.	5 10.545	Yes				13	3	12				
Backwash Return pumps		15	3	5 19.95	Yes				13	3	12				
GAC Equipment			43	3 24.51	no				26	5	12				
GAC Media			(D	no				C)	22				
Sodium Hypochlorite		1	24	4 13.68	Yes				16	5	12				
Sludge thickener (incl feed pum	ps)		39	9 22.23	Yes				13	3	12				
Thickened Sludge Pumps		8	32	2 18.24	Yes				13	3	12				
Pump to Existing Outfall		74	140	0 798	Yes				10)					
Transfer Pump Station (Pipeline															
Option 2)		510	490	0 2793	no				15	5					

		CHEMICALS BELOW:				
	Daily Cos	t		Annual Cost		
Ferrous Sulphate	yes					
Ferric Sulphate	yes					
Polymer	yes					
Magnetite	yes					
Liquid Oxygen	yes					
Sodium Hypo	yes					
Sludge Polymer	yes					

Treatment	Total annual	
Treatment	Total daily	
Pipeline	Total annual	
Fipeline	Total daily	
	Rounded	
	Combined Total	

Annual Fixed	
Annual Variable cos	
Variable (£/ML)	

Days pumping per annum
Days pumping sweetening flow
Days on standby
Power Unit Cost (£/kWh)
Operator Cost (£/hr)



							Power Costs			Person Costs				
			5MLD -	20MLD -		Daily Cost	Daily Cost			1	Total Person Cost	Consumables		
	Power Rating (kW)	k\			Used during standby?	35 MLD	20MLD	Annual Cost	Operator Time (days)		(£/pa)	Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate		1	24	13.68	Yes				16	12	2			
MBBR Lift Pump Station		150	1456	829.92	Yes				13	3	:			
MBBR, incl blowers		480	5760	3283.2	Yes				39		:			
CoMag Equipment		16	200			l			26					
Ferric Sulphate		1	24						16					
Polymer		1	24	13.68	Yes				16	12	2			
Vagnetite			0		Yes				16					
Sludge Recycle System			50						13					
Ozone Pump Station		150	1456						13					
Ozone Plant Equipment			2562						26					
BAFF Lift PS		150	1456						13					
BAFF, incl blowers		156	1806						39	12	2			
Backwash Pumps		69	18.5	10.545	Yes				13	12	2			
Backwash Return pumps		15	35						13					
GAC Equipment			43	24.51	no				26					
GAC Media			0)	no				C	22	2			
Sodium Hypochlorite		1	24	13.68	Yes				16	12	2			
Sludge thickener (incl feed pump		16	39		Yes				13					
Thickened Sludge Pumps		8	32		Yes				13	12	2			
on Exchange Pump Station		150	1456	829.92	no				13	3	:			
on Exchange			0	0	no				13	12	2			
									10					
Pump to Existing Outfall		74	1400	798	Yes				10					
		74	1400	798	Yes					,				

		CHEMICALS BELOW:				
	Daily C	Cost	Annual Cost			
Ferrous Sulphate	yes					
Ferric Sulphate	yes					
Polymer	yes					
Magnetite	yes					
Liquid Oxygen	yes					
Sodium Hypo	yes					
Sludge Polymer	yes					

Annual Fixed	
Annual Variable co	
Variable (£/ML)	

Days pumping per annum
Days pumping sweetening flow
Days on standby
Power Unit Cost (£/kWh)
Operator Cost (£/hr)



							Power Costs			Person Costs				
			1	20MLD -		Daily Cost	Daily Cost			Maintenance Time	Total Person Cost	Consumables		
	Power Rating (kW)				Used during standby?	35 MLD	20MLD	Annual Cost	Operator Time (days)		(£/pa)	Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate		1							. 16		2			
MBBR Lift Pump Station		150							13					
MBBR, incl blowers		480							39					
CoMag Equipment		16							26					
Ferric Sulphate		1							16					
Polymer		1	_						16		2			
Magnetite			0		Yes				16		-			
Sludge Recycle System			50						13					
Ozone Pump Station		150							13					
Ozone Plant Equipment			2562						26					
BAFF Lift PS		150							13					
BAFF, incl blowers		156							39					
Backwash Pumps		69							13					
Backwash Return pumps		15							13					
GAC Equipment			43						26					
GAC Media			0		yes					0 22				
Sodium Hypochlorite		1							16					
Sludge thickener (incl feed pump		16							. 13					
Thickened Sludge Pumps		8							. 13					
on Exchange Pump Station		150	1456						13		· .			
Ion Exchange					no				13	3 12	2			
UV		44	684	389.88	no				13	3 12	2			
Pump to Existing Outfall Transfer Pump Station (Pipeline		74	1400	798	Yes				10	0				
Option 4)		135	1225	698.25	20					5				
590014)		135	1225	098.25	no		-		-)				
												Treatment	Total annual Total daily	
												Pipeline	Total annual Total daily	
												L	Rounded	
													Combined Total	
													Compined rotal	

		CHEMICALS BELOW:
	Daily Cost	Annual Cost
Ferrous Sulphate	yes	
Ferric Sulphate	yes	
Polymer	yes	
Magnetite	yes	
Liquid Oxygen	yes	
Sodium Hypo	yes	
Sludge Polymer	yes	

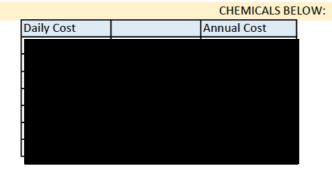
Annual Fixed	
Annual Variable co	
Variable (£/ML)	

Days pumping per annum	
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

					Power Costs	S		Person Costs				
	35MLD -	20MLD -	Used during	Daily Cost	Daily Cost			Maintenance Time	Total Person Cost	Consumables		
Process Equipment	kWh/d	kWh/d	standby?	35 MLD	20MLD	Annual Cost	Operator Time (days)		(£/pa)	Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate	24						16		2			
MBBR Lift Pump Station	1456						13		3			
MBBR, incl blowers	5760	3283.2	2 Yes				39		3			
CoMag Equipment	200		1 Yes				20		0			
Ferric Sulphate	24	13.68	3 Yes				16		2			
Polymer	24	13.68	3 Yes				10	5 1	2			
Magnetite	0		Yes				16		1			
Sludge Recycle System	50		5 Yes				13		2			
Ozone Pump Station	1456	829.92	2 Yes				13		2			
Ozone Plant Equipment	2562						20		2			
BAFF Lift PS	1456	829.92	2 Yes				13		2			
BAFF, incl blowers	1806	1029.42	2 Yes				39		2			
Backwash Pumps	18.5	10.545	5 Yes				13		2			
Backwash Return pumps	35	19.95	5 Yes				13		2			
GAC Equipment	43	24.51	l no				20		2			
GAC Media	0)	no				(2			
Sodium Hypochlorite	24	13.68	3 Yes				16	5 1	2			
Sludge thickener (incl feed pum	ıj 39	22.23	3 Yes				13		2			
Thickened Sludge Pumps	32	18.24	1 Yes				13	3 1	2			
Ion Exchange Pump Station	1456	829.92	2 no				13	3	3			
Ion Exchange	0) () no				13	3 1	2			
Pump to Existing Outfall	1400	798	3 Yes				10)				
Transfer Pump Station (Pipeline	9											
Option 2)	4900	2793	3 no				15	5				
Transfer Pump Station (Pipeline	<u>,</u>											
Option 3)	1120	638.4	1 no				5	5				
				_			-				Full system	
											Total annual	
										Treatment	Total daily	
											Total annual	
										Pipeline	Total daily	
										L	Rounded	
											Combined Tota	

Ferrous Sulphate
Ferric Sulphate
Polymer
Magnetite
Liquid Oxygen
Sodium Hypo
Sludge Polymer

yes yes yes yes yes yes yes



Annual Fixed	
Annual Variable co	
Variable (£/ML)	

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