

Gate two query process

Strategic solution(s)	Grand Union Canal
Query number	GUC009
Date sent to company	14/12/2022
Response due by	16/12/2022 (extended until 20/12/2022)

Query

This query is in regards to Annex A1.11 Costs and Carbon.

1. Have fixed Opex and variable Opex costs been considered?
2. What factors are considered within your Opex calculations? For instance, have you accounted for labour costs, power and replacement parts?
3. Have you accounted for inflation as per the agreed ACWG approach?
4. Provide description and tables for how costs have changed since gate one and what factors are driving cost changes.
5. Do you have any calculations available to send for average incremental costs?
6. Can you confirm whether Monte Carlo analysis has been included in your risk calculations?
7. Have activities been planned post Gate 2 to inform risk assessment?
8. How have you considered indirect costs in your calculations?
9. Have you considered annual operational maintenance costs by considering common assumptions used across the water industry for such infrastructure? E.g. with civil maintenance being calculated as 0.30% of the infra and non-infra civil costs, whilst mechanical and electrical (M&E) maintenance being calculated as 1.5% of infra and non-infra M&E costs.

Solution owner response

Q1. Have fixed Opex and variable Opex costs been considered?

A1. We have fixed and variable opex costs for purchasing the water from Severn Trent Water, and a fixed opex cost from the Trust for utilising their asset. The regional planning process (WRSE) takes these opex values into account. As noted in paragraph 8.2 of our gate two submission, Annex A1.11 (Cost and Carbon Assessment) does not include opex from Severn Trent Water or the Trust.

For other opex components, the staff costs are covered by a fixed opex whereas the opex associated with power, chemicals and other consumables are flow related.

Q2. What factors are considered within your Opex calculations? For instance, have you accounted for labour costs, power and replacement parts?

A2. Opex calculations include labour, power, chemicals (at the treatment works), routine service spares and consumables, and periodic asset replacement of life expired equipment.

Q3. Have you accounted for inflation as per the agreed ACWG approach?

A3. We have followed the ACWG consistency methodology when costing the GUC SRO for the Gate two submission. In accordance with the guidance, adjustments for inflation are used to normalise project costs to 2022 price base. We have included forecast RPI for all costs according to the ACWG approach.

Q4. Provide description and tables for how costs have changed since gate one and what factors are driving cost changes.

A4. Gate one costs were built up from:

- unit costs for canal upgrade works
- cost curves for pipeline installation, intermediate storage and treatment units
- estimates from similar projects

Costing was prepared for three potential routes for connecting the GUC to Minworth WwTW in the northern section and three abstraction points in the southern section, and two alternative sizes: 57Ml/d and 115Ml/d. The cost estimates used the All Company Working Group methodology, containing a standardised optimism bias (OB). This approach was continued in gate two until the preferred option was identified. On this basis the lowest overall cost for abstraction, treatment and transfer is for a site at Leighton Buzzard, with a

transfer pipeline to Chaul End SR as summarised in tables 1 and 2 below, and as shown in paragraph 8.5 of our gate two report. All figures are rounded to the nearest multiple of 10.

Table 1: Comparison of options – Transfer route selection

Description	Units	Route 1		Route 3		Route 6	
Option	MI/d	57	115	57	115	57	115
CAPEX	£ (million)	160	250	100	180	290	350
OPEX^e	£ (million)	300	320	230	480	670	830
NPV	£ (million)	230	330	160	290	420	540
NPV + OB	£ (million)	300	420	200	370	540	690

Table 2: Comparison of options – Site for abstraction, treatment and transfer

Description	Units	Leighton Buzzard		Tring		The Grove		Hemel	
Option	MI/d	57	115	57	115	57	115	57	115
CAPEX	£ (million)	90	140	110	160	120	180	110	160
OPEX	£ (million)	540	680	570	1020	610	1160	580	1070
NPV	£ (million)	230	310	260	430	280	490	260	440
NPV + OB	£ (million)	310	410	340	570	380	650	340	580

In gate two the preferred option has been re-costed using bills of quantities for concept designs. This highlights a refinement in costs from the two tables above which generated a preferred option CAPEX of £320m (Route 3 + Leighton Buzzard, 115 MI/d), in comparison to the CAPEX value shown in Table 3 below.

The tables below includes OB which has been calculated using the WRSE template. OB calculated in gate one and in the CDR submitted at gate two is higher because OB has been applied after the net present value has been calculated. We have communicated this update to RAPID prior to the submission of this query response.

Table 3: Cost of construction and whole-life operation (full capacity construction with flow ramp-up in 2040)

Scheme	CAPEX (£m)	CAPEX OB (£m)	OPEX (£m)	NPV (£m)
Full capacity	340	60	1,170	610

Table 4: Cost of construction and whole-life operation (phased scheme construction for full capacity by 2040)

Scheme	CAPEX (£m)	CAPEX OB (£m)	OPEX (£m)	NPV (£m)
Phased M&E	340	60	1,150	590

Table 5: Cost of construction and whole-life operation (phased construction in 2 x 57 MI/d capacity)

Scheme	CAPEX (£m)	CAPEX OB (£m)	OPEX (£m)	NPV (£m)
Phased civil and M&E	450	90	1,260	690

Q5. Do you have any calculations available to send for average incremental costs?

A5. Calculations for average incremental cost have been re-uploaded to the RAPID portal in Excel format.

Q6. Can you confirm whether Monte Carlo analysis has been included in your risk calculations?

A6. We have not undertaken a Monte Carlo analysis of the residual risks. Our OB percentage remains high at around 30% as we have yet to benefit from Early Contractor Involvement (ECI) input to allow risks to be more finely defined. The risk register has c60 lines with a residual risk value after mitigations of c£4m which is <1% of the current estimated CAPEX (base cost plus OB).

We followed the methodology outlined in the final version of the “Cost Consistency Methodology – Technical Note and Methodology” by Mott MacDonald.

Q7. Have activities been planned post Gate 2 to inform risk assessment?

A7. A number of activities have been planned in gate three to inform our risk assessment, these include:

- Early Contractor Involvement (ECI) to help further identify construction risk and establish the least risk programme of works
- Preparation of a costed Monte Carlo appreciation of residual risks to replace the Optimism Bias allowance.
- Further field work and surveys to reduce environmental, engineering and modelling risk
- Field testing to gain better understanding of seepage potential from the canal
- Asset condition surveys to understand the potential impact of the scheme on existing assets and necessary remedial work
- Pre-scoping discussions with regulators for a good understanding of their expectations on the scope of the assessment, as well as any concerns and to enable early gathering of a comprehensive suite of baseline data to provide a robust basis for the assessment.
- Flood risk assessment to outline suitable mitigation measures which could be incorporated (if required) so that flood risk is not increased as a result of the scheme.
- Market engagement early in gate three, in order to gain insight into the attractiveness of the project to prospective bidders and to gain perspective on where project risks are best placed.
- A comprehensive programme of early engagement with regulators and statutory consultees to understand and manage programme risks within the DCO phase of the project

- Early engagement with a suitably qualified advisor for land referencing, minimising the risk of the land referencing process dictating or elongating the programme.
- Early commercial/legal agreement to address the complexities of establishing bulk supply agreements between water companies and the formal agreement with the Trust for the utilisation of their assets.


Q8. How have you considered indirect costs in your calculations?

A8. The cost estimates in the CDR are for the engineering works and as such include the indirect costs associated with the works (e.g. contractor overheads, insurance, profit etc) but we have not included client costs (project management, rent, insurances, procurement etc) nor have we included costs for consenting (e.g. environmental surveys, ESIA, ESMP, EAR). At this stage of the project costs not associated with the works are covered by OB.

Q9. Have you considered annual operational maintenance costs by considering common assumptions used across the water industry for such infrastructure? E.g. with civil maintenance being calculated as 0.30% of the infra and non-infra civil costs, whilst mechanical and electrical (M&E) maintenance being calculated as 1.5% of infra and non-infra M&E costs.

A9. We have included annual operational maintenance costs. The percentages adopted are shown below:

- Pumping Stations, discharge to canal and abstraction – 0.5% Civil Costs and 2.0% M&E Costs.
- Storage – 0.35% of Civil, M&E included in abstraction point and in WTW etc.
- Pipelines – 0.06% of associated capital costs, M&E included in pumping stations

Date of response to RAPID	20/12/22
Strategic solution contact / responsible person	 GUC@severntrent.co.uk

Author name and email address redacted