



# ANNEX E8

## Design Principles

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 and Affinity 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 and Affinity 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.

Overarching	Principle	G2 Indicator	Where documented in G2 submission?	Target
Climate	Nature knows no boundaries: Water is essential to all life and managing our response to climate change is a collective and urgent activity. Projects must be developed to work across companies and/or legislative boundaries to develop sustainable solutions and environmental enhancement for the wider benefit of society.	1. Evidence of collaborative working across companies.	1.1 The CDR (Annex A1) details how the project is a collaboration between STW (source of treated effluent), Canal and River Trust (the canal transfer asset) and Affinity Water (recipient of the resource in the scheme). The gate two submission documents reports on how we have continued to engage with the EA and NE throughout gate two, with regular meetings, input into scope, and presenting and receiving reviews on written reports	1.1. Collaborative working across companies and with stakeholders.
		2. Evidence of working with Regulatory, Statutory (and, where practicable, local) stakeholders including Catchment Partnerships where appropriate.	1.2 The scheme is shown in CDR (Annex A1) to be delivered by 2030. Design principles and outcomes have been developed based on WRMP modelling (see Appendix A1) and making reference to the NIC Design Principles.	1.2. Timely - preparation of proposals ready to construct in 2025-2030 will involve early and rigorous development of design objectives followed by proposals.
		3. Design Vision and Principles informed by this engagement (Stages 1-6 of design process).	1.3 The gate two submission records how the decision to select the site for treatment is site was supported through engagement with the Environment Agency (EA). The submission notes how the scheme will provide a new revenue stream for the Trust, enabling asset improvements to the existing GUC, which will extend the life and improve the performance of this valuable heritage asset.	1.3. Alignment with other relevant environmental policy, plans and strategies such as Catchment Management and Local Nature Recovery Plans (see also Place 2).
Climate	Resource and carbon efficient throughout: Projects shall seek to reuse existing assets, eliminate waste (including waste of water) and make efficient use of materials and transport across the whole of the project lifecycle.	1. Submissions to meet expectations of RAPID Gate 2 Guidance.	2.1 In the Cost and Carbon report (Annex A1.11) the lifecycle of carbon in the project has been assessed in accordance with ACWG principles. There is commentary in the CDR and the Cost and Carbon report on opportunities to further reduce embodied and operational carbon in later stages of the design.	2.1. Lifecycle Carbon: Projects shall support the water industry commitment to achieve Net-Zero in terms of operational carbon in accordance with the industry roadmap. Projects must be efficient in embodied carbon in both construction and operation.
		2. Narrative on the SRO approach to avoiding and reducing the use of carbon and other resources and inclusion of the approach in the Design Vision and Principles.	2.2 As noted in the CDR (Annex A1) this project is based on the principle of making use of existing wastewater assets and existing CRT assets, which gives opportunities for updating and improving the heritage assets of the canal. 2.3 Avoiding construction and minimising materials is based on the use of existing assets. 2.4 The gate two submission notes the scheme control philosophy will ensure operation is minimised to match customer or process demand requirements. In the CDR we focus on minimising process water losses as the treatment works and there will be further design stages to refine this in Gate 3.	2.2. Projects should investigate if existing infrastructure assets could be repurposed and reused. 2.3. Projects should look to avoid unnecessary construction and minimise use of materials
				2.4. Projects should seek to minimise the use and waste of water
Climate	Resilient and adaptable: Design for anticipated future demand at the appropriate scale. Build in the resilience to absorb and recover from the impacts of the extreme events and incremental stresses likely to arise from climate change.	1. Submissions to meet expectations of RAPID Gate 2 Guidance noting the climate change scenario(s) the schemes have been designed to cope with.	3.1 In the CDR we have considered resilience aspects for each of the project elements and proposed mitigations or actions to improve resilience. The scheme as a whole is intended to be a resilient supply (treated effluent should always be available because domestic consumption is prioritised in all circumstances of drought or other emergency event) for the supply risks forecast by AFW. 3.2 It is noted in the gate 2 submission that capacity requirements and utilisation profiles have been used by AFW to establish that the scheme will improve the ADD of the AFW system by providing a drought-resilient supply source of 50 to 100 Mld ADD that could be used year-round. In the CDR the operational philosophy will be developed in the later stages to ensure that waste, energy & carbon etc will be minimised by tightly controlled operations and forecasting. 3.3 In the CDR (Annex A1) we mention the opportunity to substitute flows from CRT's existing reservoirs with flows from the proposed scheme thereby reducing the need to draw down the reservoirs, meaning more storage in the system and more resilience. 3.4 In the CDR (Annex A1) we note that all route and site options have been tested against current local plans so as to avoid conflict. 3.5 To be refined and developed at Gate 3; there may be opportunities for offline storage ponds to improve operational control by minimising pump switching.	3.1. Designs should be developed to include proportionate measures to anticipate future extreme events and stresses so that they can resist, absorb, recover and, where necessary, be adapted
		2. Review of local plans and strategies that may impact resilience, (G2 or G3 depending on scheme maturity)		3.2. Designs shall support the digitisation of the network at a catchment level using data to inform design, optimise solutions and improve operational efficiency in real time.
				3.3. Where proposals add to the resilience of the broader system this should be accounted for in its social value (see Value 3). 3.4. The layout and design of specific elements of infrastructure should be taken in cognisance of planned future development of the immediate area. 3.5. Deploy nature-based approaches to resilience wherever possible (see also Place 2).

Overarching	Principle	G2 Indicator	Where documented in G2 submission?	Target
People	Understand and respond to your Community's needs. Develop a full understanding of the social context that will be impacted by the project over its lifecycle. Design for how local communities will encounter the infrastructure in their everyday lives during both construction and operation.	1. Indicator for Target 1.1 to be decided by others	1.1 The gate two report confirms that the draft WRSE Regional Plan requires a scheme DO of 50 Ml/d in 2031/32, with a potential further requirement of 50 Ml/d by 2040 to 2050. The GUC SRO can be developed to meet these objectives. 1.2 At the Gate 2 level we have examined impacts of the scheme at high level against levels of social deprivation and we have considered a range of environmental and access improvements at the upgrade sites along the canal where there are opportunities for local employment and recreational and DDA access.	1.1. Reliable supply of water to customers
		2. Initial appraisal of the scheme and its potential to contribute to the UN's Sustainable Development Goals - or other Social Value evaluation process (see also Value 2 and 3).	1.3 It is noted in the gate two report that there are opportunities at many locations along the canal to provide wider benefit to the environment, local communities and canal user groups. Advantage could be taken of remediation and upgrading work along the route to improve interaction between the canal and the wider environment	1.2. Designs developed to maximise their social value.
		3. Review of relevant regional/local policy and demographic information and narrative around how it has shaped the draft Vision and Principles for the option		1.3. Proposals reflect local community views as to how they interact with and experience the infrastructure as far as possible
People	Engage widely, early and meaningfully. Work with stakeholders and local communities to develop their understanding of the importance of nature and water conservation. Develop co-design approaches to aspects of the design of infrastructure and associated landscape where practicable.	1. Summary of feedback from stakeholders (either project specific or received to date through the WRMP/Regional Plan process) and narrative around how it has shaped the draft Vision and Principles for the option.	2.1 The gate two report notes that initial consultation has taken place with canal community and users, and there is no known opposition. It is also noted that the planning and consenting phase to follow will involve a significant increase in engagement as we move through the DCO process.	2.1 Stakeholders and communities understand the need for the scheme and the nature/appearance of the proposed solution(s).
		2. Inclusion of engagement activities within the design programme of the project plan for Gate 3 and beyond showing adequate time for community (public) consultation to inform both site selection (where possible) and developed design.	2.2 In the CDR we report on a range of opportunities which could be designed into the scheme at the canal work sites informed to some extent by early engagement with the Canal Users Group, representing boaters, kayakers, anglers and wildlife interests.	2.2 The views of local stakeholders have shaped the design, where possible.
		3. The development of tools that will enable successful engagement (e.g. digital models for visualisation/animation, GIS systems, precedent pictures of similar schemes/components) - activity may occur at G2 or G3.	2.3 In the CDR we have referenced early engagement, but further engagement will be required at Gate 3 to ensure community views are fully taken into account.	2.3 Engagement and consultation with communities has influenced the design (including but not limited to site selection, layout, materials, detailing) making it more acceptable to them.
		4. Survey information on local needs and preferences in design	2.4 These aspects will be dealt with at Gate 3 onwards.	2.4 The project provides the public with information on the importance of water and/or nature conservation (e.g. through information boards, artwork or digital information).
People	Improve access and inclusion: Consider how people move around your works. Maximise opportunities to support active travel and improve recreational access to waterside and green spaces that can improve outcomes for wellbeing, health, local economy, social inclusion and education	1. Mapping of interface with ProW network*	3.1 In the CDR we have looked at opportunities for improving access to the site including DDA aspects and improving low paths and marginal flora/habitat.	3.1 Find opportunities to improve people's health, wellbeing and understanding of the natural environment, through access to waterside and green spaces for recreational and other purposes (see Note 1).
		2. Evidence of engagement with local access groups*	3.2 In the CDR (Annex A1) and the Cost and Carbon report. (Annex 1.11) we have considered sustainable transport options in particular for works along the canal banks but this will be refined further in Gate 3 onwards.	3.2 Maximise opportunities for workers to access sites via sustainable transport during construction and operation. Minimise disruption to travel routes in areas affected by a project during construction and operation.
		3. Review of Local Cycling and Walking and Infrastructure Plans (LCWIPs) information or similar and note of how the project may impact/enhance it.*		n/a

Overarching	Principle	G2 Indicator	Where documented in G2 submission?	Target
Place	Take care: Develop proposals in the spirit of stewardship looking to both the past and future of each context to understand and develop its landscape, cultural heritage, health and sustainability. Work with partners to secure the long-term success of all measures.	<p>1. Evidence of place-based balanced, holistic and long-term decision making in the description of design considerations and development of design vision and principles.</p> <p>2. Statement on SRO approach to achieving Environmental Net Gain within the Design Vision and Principles.</p> <p>3. Evidence of review of adopted (or emerging) spatial plans, strategies for the areas impacted by your works (May occur at G2 or G3 depending on scheme maturity).</p> <p>4. Landscape/townscape character assessments and approach to design specific to context. (May occur at G2 or G3 depending on scheme maturity).</p>	<p>1.1 During Gate 3 our outline plans reported in the CDR will be further developed to ensure that statutory requirements at least are met.</p> <p>1.2 In the CDR we have assumed allowances for good practises for surface water management and infiltration. These will be further developed in Gate 3 onwards in order to optimise the widest possible range of benefits such as carbon sequestration, access and water quality/management.</p> <p>1.3 For Gate 3 onwards.</p> <p>1.4 In the CDR at Gate 2 we have reviewed at high level the heritage and visual impact aspects of the works along the canal and have identified opportunities and risks for further discussion and development at Gate 3 and beyond.</p>	<p>1.1. Achieve Environmental Net Gain (ENG)</p> <p>1.2. Adopt measures in the design that enhance the environment and help avoid future problems - e.g. adoption of SuDS solutions that improve cooling, attenuate surface water run-off and improve infiltration and biodiversity.</p> <p>1.3. Have clear and realistic long-term strategies for how operational and mitigation proposals will be managed and maintained. Develop partnerships with local communities where this has a mutual benefit.</p> <p>1.4. Develop proposals in light of a clear understanding of the area's landscape and history.</p>
Place	Protect and promote the recovery of nature: Focus on the role of landscape, its capacity to accommodate infrastructure and shape places. Work collaboratively and employ holistic, landscape-scale approaches that support and deliver biodiversity net gain as well as multiple other benefits.	<p>1. Statements on your approach to achieving BNG and aspirations to contribute to the recovery of nature within Design Vision and Principles. May include specific reference to local Green-Blue Infrastructure Strategies/ (emerging) Local Nature Recovery Plans, catchment management plans and other measures to improve watercourse quality.</p>	<p>2.1 During Gate 3 our outline plans reported in the CDR will be further developed to ensure that statutory requirements at least are met.</p> <p>2.2 In the CDR we have proposed that to overcome any operational difficulties arising from changing flow rates we will investigate the use of offline ponds (nature based solutions) to reduce system 'hunting'. Such ponds represent opportunities for multiple outcomes.</p> <p>2.3 At the Gate 2 CDR this is very high level but we have proposed some options at a number of the sites which can be developed in Gate 3 onwards.</p> <p>2.4 This is for Gate 3 onwards; at this stage we have only identified land parcels and ownership, and have had no engagement with land owners.</p>	<p>2.1. Achieve at least 10% Biodiversity Net Gain(BNG)</p> <p>2.2. Deploy nature-based approaches to integration and mitigation as the first-choice solution where possible</p> <p>2.3. When looking at options to provide compensation or enhancement prioritise measures that support achieving good ecological condition for affected watercourses and bodies as a whole. When making an intervention, mitigate infrequent impacts by developing proposals that keep them local and short lived.</p> <p>2.4. Work with landowners and land managers to develop mutually beneficial solutions where practicable.</p>
Place	Design all features beautifully, with honesty and creativity. Our utility infrastructure can be a source of pride and a positive contribution to its context. Develop proposals that reveal and celebrate its importance, provide visual delight and leave a positive legacy.	<p>1. Set out with opportunities and aspirations for high quality design within Design Vision and Principles.</p> <p>2. Development of a project plan stating how these aspirations will be developed/achieved.</p> <p>3. Favourable independent design review outcomes.</p>	<p>3.1 In the CDR (Annex 1) at Gate 2 this is fairly high level and has been tested only for 'red flags', and will be further developed at Gate 3.</p> <p>3.2 To be developed at Gate 3.</p> <p>3.3 In the CDR we note that the canal is a heritage structure and all works will need to be developed sympathetically to its heritage, access/recreational value.</p>	<p>3.1. Develop a utilites architecture that speaks to its purpose and enhances its context. This applies to buildings, structures and landscape.</p> <p>3.2. Develop designs and, where appropriate, artworks that bring narrative (meaning), beauty and interest to the proposals.</p> <p>3.3. Consideration of context in every aspect of design including its location, layout, form, scale, appearance, landscape, materials and detailing.</p>

Overarching	Principle	G2 Indicator	Where documented in G2 submission?	Target
Value	Maximise embedded value: Work collaboratively across specialists and with stakeholders to maximise the benefits of the scheme by being smart with the location and arrangement of elements and design of mitigation within the project scope and budget.	1. Evidence of multi-disciplinary input into site selection, this may include architects, ecologists, artists, planning professions etc.	1.1 In the CDR we refer to the pioneering and selection works which have had wide multidisciplinary inputs (ecologists, heritage specialists, hydrologists, planners) to identify obstacles and opportunities for the development.	1.1. Early multidisciplinary input informing a design that solves multiple problems at once.
		2. Initial project and, where appropriate, site appraisals (including constraints and opportunities) undertaken by a multi-disciplinary team (steps 1-5 in design development process).	1.2 The existing design in the CDR assumes peak capacity flows only for relatively short durations in summer months but clearly it could be operated at higher flow rates for longer with changes to the operational control system, storage capacity - to be considered at Gate 3.	1.2. Design of infrastructure capable of adaptation to reasonable future demands (see also Climate 3).
		3. A statement within the Design Vision on the SRO's aspirations and capability to deliver embedded value which should include Social Value, BNG and ENG.	1.3 In the CDR (Annex A1) we note that all route and site options have been tested against current local plans so as to avoid conflict. 1.4 In the CDR we have assumed allowances for good practices for surface water management and infiltration. These will be further developed in Gate 3 onwards in order to optimise the widest possible range of benefits such as carbon sequestration, access and water quality/management. 1.5 The use of side ponds to support asset operation has been outlined in the CDR and other infrastructure opportunities will be explored at Gate 3.	1.3. Site selection processes and layouts that assist (or as a minimum, do not prevent) local development except where absolutely necessary. 1.4. Reinstatement, landscape and mitigation proposals that improve the existing situation, - e.g. through better biodiversity, carbon sequestration, surface water infiltration and reduced run-off. 1.5. Deliver benefits efficiently by exploiting the two-way relationship between infrastructure and natural capital to enable multiple benefits to be delivered simultaneously.
Value	Understand how you could provide additional value: Identify opportunities to contribute wider regional benefits outside of the project scope. In particular look for synergies with relevant catchment management plans and proposals that support the delivery and enjoyment of a healthy water environment.	1. A description of potential opportunities to work with other projects/partners to achieve wider benefits.	2.1 Section 8.15 of the gate two report notes there are opportunities at many locations along the canal to provide wider benefit to the environment, local communities and canal user groups. Advantage could be taken of remediation and upgrading work along the route to improve interaction between the canal and the wider environment.	2.1. Strategic project selection is informed by cross-sectoral engagement to maximise social benefit and reduce the use of customers money (this may be engagement with other utilities that may be able to share pipeline trenches or land for renewables).
		2. A statement within the Design Vision on the SRO's aspirations and capability to deliver additional value.	2.2 In the CDR we have explored development opportunities, which have had wide multidisciplinary inputs (ecologists, heritage specialists, hydrologists, planners) to identify obstacles and opportunities for the development.	2.2. Work closely with partners and focus on landscape scale schemes that improve hydrology, aquatic ecology and reduce/sequester carbon and provide opportunities for access to recreation and visual delight.
			2.3 In section 8.15 of the gate two report it is noted that Advantage could be taken of remediation and upgrading work along the route to improve interaction between the canal and the wider environment, such as: • Additional wetland habitats that enhance the environment and provide operational benefit to the scheme (e.g. around managing surge flows and weir discharges). These have the potential to provide flood alleviation, habitat creation, the introduction of rare plants and reedbeds, and realignment of the river channel. • Protection and restoration of priority habitats (existing habitats of principal importance) and mitigation of carbon impacts, such as a series of wetland ponds, open mosaic habitats, living boundary wall and buffer planting, reedbeds, bird and bat boxes, and public access creation.	2.3. Be honest and realistic with partners as to what you might be able to offer as an organisation.
Value	Capture and measure embedded and additional value: Have clear narratives about how you are contributing to society beyond the core scope of your project. Quantify these benefits so they can be considered meaningfully in conversations on value, financing and risk. Share your experience and knowledge widely.	1. Details of the best-value metrics used in determination of the Regional Plans and WRMPs and a clear narrative on how these have influenced option selection so far.	3.1 Resilience metrics set within the wider best value decision making framework and are used to evaluate the scheme in the WRSE Regional Plan include reliability (the ability of the system to continue to provide its service in the face of shock events), adaptability (the ability of the system to adapt the way it delivers its service in the face of shock events, and to recover following unexpected system failure) and evolvability (the ability of the system to modify structure or function to cope with long-term stresses or trends). Section 8.11 of the gate two reports sets out best value metrics AWL to comment	3.1. Gathering of project specific data and improvement in the tools we have to measure and monitor added and additional value across the sector.
		2. Inclusion of a description within the project plan of how these will be developed and monitored at subsequent gates.	3.2 Section 3.7 of the gate two report notes that reuse of existing canal assets avoids unnecessary construction and minimises the use of materials, resulting in carbon and cost benefits. The GUC can be construction ready by Q3 2027, with an earliest DO date of Q2 2032, this is in line with requirements in the draft WRSE regional plan. Section 4.11 of the gate to report documents that the willingness-to-pay surveys undertaken show that customers see value in opportunities to incorporate low-cost benefits associated with schemes similar to the GUC SRO, such as facilities for walkers, cyclists and kayakers, that provide access to exercise, fresh air and mental health benefits. In addition, customers see the potential for environmental additions such as habitat creation for wildlife, and appreciate the limited disruption associated with utilising existing infrastructure. The outcome of these surveys will be used to inform subsequent design stages in gate three onwards.	3.2. Full consideration of potential benefits in the Cost Benefit analysis and investment case for the SRO.
		3. Initial narrative (description) of the value of the scheme in plain English.	3.3 As noted in section 9.4. of the gate two report, the engagement approach through gate two has three main parts: • Activity to inform the development of the WRSE Regional Plan to ensure stakeholders understand how the GUC SRO, and other SROs, fit within the strategic planning framework. • Engagement with regulators and strategic stakeholders on the scheme itself to inform the feasibility assessments and conceptual design of the scheme. • Early engagement more locally: engaging the neighbouring local authorities along the canal, engaging Historic England and Highways England, and beginning to build a relationship with canal users.	3.3. Clear communication of value of the scheme to stakeholders, communities and within the industry