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Welsh Water

Welsh Water (Dŵr Cymru Cyfyngedig) PR19 Business Plan: DPC Assessment

—

August 2018

PRIVATE AND CONFIDENTIAL

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1. Executive Summary

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Executive Summary

Introduction

— Dwr Cymru Welsh Water has considered whether the projects included in its investment programme are eligible for Direct Procurement for Customers ("DPC") as defined by Ofwat in its PR19 methodology statement and if so whether those projects are likely to realise customer value for money if delivered under a DPC model.

— We have undertaken an assessment for projects that may be suitable for DPC based on with Ofwat's PR19 methodology and engaged independent external advisors to recommend factors that it should consider in its assessment and evaluation of the projects against this framework.

— We have identified two schemes that are likely candidates from its investment plan and that are large enough and more likely to be suitable for DPC. The first is a new wastewater treatment works called Gwili Gwendraeth treatment works (GTW) and the second is a new water treatment works called Merthyr Water treatment works (MTW) which is part of the wider South East Wales Conjunctive Use System (SEWCUS).

The assessment methodology used to evaluate the projects comprises of three tests as set out below (based on Ofwat's methodology):

1. **Size text:** The value of the scheme relative to Ofwat's suggested threshold of £100m whole-life totex.
2. **Technical suitability:** The suitability of the asset for DPC given how discrete the project can be considered and the level of integration with the wider network.
3. **Value for Money:** The potential for the scheme to reduce costs to customers if delivered under a DPC model compared with the conventional approach under our ownership.

Results

— The results of the assessments are set out below and findings are presented on the following page.

More suitable for DPC
Less suitable for DPC

	Projects	
Assessment	**Gwili Gwendraeth**	**Merthyr (SEWCUS)**
1. Size test	— Borderline on most measures and relatively low initial capex at only £50m	— Exceeds £100m threshold on all measures and significant initial capital investment. Lowest result is £256m
2. Technical assessment	— More separable and less integrated with wider network. — Only one criteria considered 'less suitable for DPC'.	— Highly integrated and strategically important asset. — Three out of the four criteria were considered 'less suitable for DPC'.
3. Potential scope for realising customer Value for money	— Base case and sensitivities suggest VfM case is challenging and is unlikely to realise value for money for customers under a DPC model.	— Likely to provide value for money based on current input assumptions and nearly all sensitivities. — If gearing is held at 60%, in line with Ofwat notional gearing levels, it is unlikely that the project will provide customer value for money under a DPC delivery route.

Executive Summary (cont.)

Key findings

GTW

- GTW will be based on conventional technology and there is a mature supply chain established in the UK market.
- The contractual outputs could be well specified with relatively high levels of certainty over potential variability and which are easily measurable and manageable under a contract.
- There are connections with seven separate catchments but these are relatively passive and downstream of the network, reducing the need for close integration. The sensitivity of the local environment and the impact of effluent discharges includes a number of stakeholders which creates greater interactions than is usual for a wastewater treatment scheme.
- Given the size of the scheme and its low initial capital value it is unlikely to realise customer value for money in comparison with the conventional price control approach.
- The timescale associated with delivery of GTW in order to meet the NRW requirements may be more challenging given the current immaturity of the DPC market.

MTW

- A contract could be developed between ourselves and a third party for the DBFO of MTW.
- However, the asset is embedded within a very critical water supply network (SEWCUS) and used conjunctively with other assets which makes it highly integrated and more challenging to manage via a DPC model with associated contractual interactions.
- The criticality of the asset and its strategic importance within the network suggests the impact of failure could result in significant costs and reputational impact for Welsh Water and this is likely to create a risk that may be challenging to transfer to a third party.
- The scheme could provide customer value for money under a highly leveraged model where project gearing is at 80-90%. When levels of gearing are modelled in line with Ofwat's notional gearing level (60%) delivery of the scheme under a DPC model would be more costly to customers than under a conventional price control model

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2. Introduction

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Introduction

We have developed a framework based on Ofwat's PR19 methodology to asses the suitability of projects for Direct Procurement for Customers ("DPC") that framework has been applied to its totex programme for AMP 7 to identify suitable DPC opportunities.

Objectives

- Develop a robust assessment approach against which to consider the suitability of projects for DPC, based on Ofwat's PR19 methodology.
- Provide an objective review of the suitability of selected projects against the framework, drawing on:
  - Our subject matter expertise with the specific knowledge of the project characteristics and asset and operational management experience; and
  - Support of expert external advisors.

Key assumptions

- We have identified two schemes within its investment programme that it considers have the potential to be eligible for DPC based on its own internal assessment.
- Expenditure associated with individual projects is forecast at this early stage in the project development cycle and costs and optioneering are supported by investment studies.
- Mike Davis, Regulation Director and Executive team member provided senior executive sponsorship for the project.

Scope

- Establish a robust approach for assessing the eligibility of projects for DPC based on Ofwat's guidance as set out in the PR19 Methodology and DPC appendices.
- Review and assess the Merthyr Water treatment works ("MTW") and Gwili Gwendraeth Wastewater treatment works ("GTW") schemes against the proposed methodology to assess DPC suitability against the specific tests.
- Consider how the analysis could form part of a wider business case methodology under a 5 Case model to support a business case for the selected delivery approach.

Output

- The output from the project is a Welsh Water report setting out the assessment methodology adopted to consider project suitability for DPC and the evaluation of GTW and MTW against this methodology.
- The report is based on input from our subject matter experts, gathered through meetings, workshops and access to key documentation associated with the specific projects under consideration as well as advice from external advisors.

The key analyses, summary results and findings are contained in the main body of the report with supporting documentation contained in the appendix

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3. Ofwat Methodology

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Ofwat's DPC methodology framework

Ofwat's PR19 Final methodology statement published in December 2017 sets out guidance on how companies should assess projects for DPC, however the onus is on companies to demonstrate they have evaluated projects based on a robust methodology and set of criteria.

ASPECT	OFWAT CRITERIA	DESCRPTION/ FURTHER GUIDANCE
Part of value chain	**Any part of value chain except bioresources**	— DPC eligible projects can come from any part of the water or wastewater value chain except bio resources as Ofwat is planning to develop this market with different proposals
Size	**£ 100m wholelife totex**	— £100m (soft) whole-life totex threshold — While Ofwat notes that not all projects above this threshold will be necessarily suitable for DPC, they expect companies to use this threshold as a trigger for exploring DPC as an option for the project delivery
Type	**'Discrete' or technically feasible**	— Technical guidance on criteria based on asset characteristics to determine asset's suitability from a technical point of view for DPC — 5 main criteria: manageable interactions with stakeholders and statutory obligations, limited interaction points with existing network, well understood contributions to supply/capacity and easily specified outputs, well understood asset and operational failures
Value for money to customers	**Delivering customer value for money**	— Considerations suggested by Ofwat for the value for money assessment include • Project-specific risk factors which could erode customer benefits; • The extent to which the project can drive innovation and therefore realise customer benefits; • Indirect customer benefits through tendering the project — Companies are required to outline and justify the assumptions used in their assessment.

— Our proposed eligibility assessment framework is based on Ofwat's high level criteria

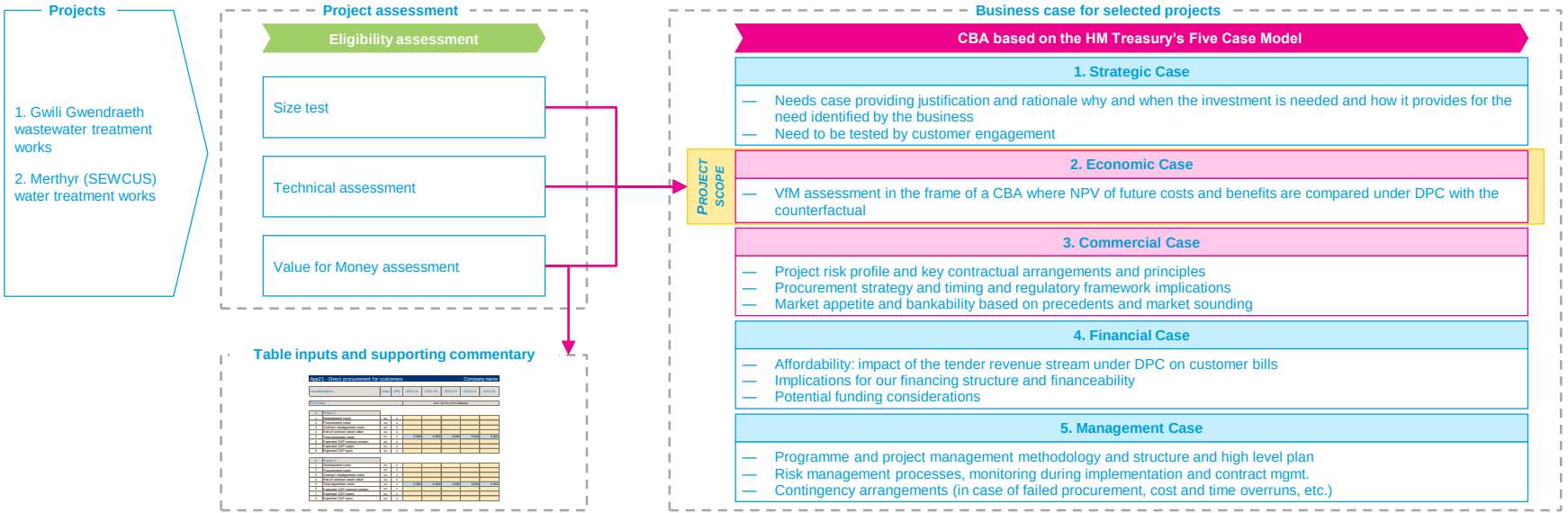
— We have interpreted some aspects of the criteria to enable a practical application as part of our assessment

— Ofwat's Initial Assessment of Business plans will include a review of companies DPC proposals and which will impact on plan business classification

Further details of the Ofwat PR19 Methodology are set out in Appendix 1

5 Case Model and PR19 Submission

Welsh Water will need to provide a robust business case to Ofwat around the projects and investments that it plans to put forward for the next AMP. Part of that process will involve an assessment of whether projects are suitable for delivery under a DPC model. Ofwat has indicated that HMT's Five Case Model is a robust approach to developing a business case, and would expect companies to cover similar considerations. The focus of scope was principally linked to the economic and commercial cases of that framework.



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4. Assessment Framework

DPC Eligibility Methodology

The eligibility assessment methodology is based on Ofwat's PR19 Final Methodology as set out below

	Step 1: Initial filter to identify projects that should be subject to full value for money assessment under step 2		**Step 2:** Cost benefit assessment of value for money for customers
	1a: Size test	**1b: Technical assessment**	**2: Quantitative VfM assessment**
Objective	Asses the expenditure of the projects against the £100m whole life totex threshold suggested by Ofwat	Consider and asses technical suitability for projects based on Ofwat guidance published as part of PR19 methodology	Compare the value for money for customers of the project delivered under a DPC model versus under a PR19 model based on a number of input assumptions.
Test	Using projected expenditure for the scheme to assess total project value Considerations include: — Scope of costs: Development costs, initial capex, renewal capex, opex, financing costs. — Life-span over the proposed concession period (25 years) — Discounting impact — Opex and capex split	— Consider specific operational and technical considerations of the asset within the wider context of Welsh Water's network including: • Interactions with the network • Asset and operational failures • Contributions to supply capacity and ability to specify outputs • Stakeholder interactions and statutory obligations	— To determine if a scheme will have greater scope to deliver value for money to customers if undertaken via DPC, schemes will undergo a CBA using two scenarios: • Scenario A: will be a scheme carried out by a third party provider under DPC arrangements • Scenario B: will assume the scheme is carried out by ourselves under the PR19 framework — A number of assumptions are considered under both scenarios — A value for money assessment provides the impact on the costs to customers of completing the schemes under different approaches (scenario A and B)
Outcome	— Schemes that are within close proximity to the Ofwat threshold and are technically suitable will be progressed to Step 2		— Schemes that are eligible and pass assessment tests 1a) and 1b) and shown to provide customer value for money through a DPC delivery route will be put forward for DPC delivery and moved to a full business case under DPC.

Full details of the methodology are set out in more detail within Appendix 2

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5. Project Overview

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Projects for Consideration: Initial Filtering by Welsh Water

Four projects were identified from the long-list of AMP 7 schemes that were of sufficient scale to be examined for DPC (based on the indicative £100m totex threshold). Two of these projects were dismissed as unsuitable given their specific project characteristics, in particular the projects involved upgrades to a large number of different assets based on a common problem. Overall therefore two schemes Merthyr Water Treatment Works (1) and Gwili Gwendraeth Wastewater Treatment Works (2) were considered further in the assessment.

Scheme	Approximate value (Whole life totex)	Description	Examined further for DPC suitability	
1. Merthyr Water treatment works (SEWCUS network)	£455m	New water treatment woks consolidating 3 existing works which will be decommissioned.	✓	
2. Gwili Gwendraeth Wastewater treatment works	£100m	New wastewater treatment woks and connecting network consolidating 7 existing works which will be decommissioned.	✓	
3. Improving the Customer Acceptability of Water	£160m	Upgrades to 17 water resource zones over three amps targeting different interventions based on results of zonal studies.	✗	***Not included as part of the assessment***
4. Reservoir safety	£347m	Upgrades to 21 reservoirs over three AMPs to improve reservoir condition.	✗	

Merthyr Water Treatment Works (1) and Gwili Gwendraeth Wastewater Treatment Works (2) were considered further in the DPC assessment. Projects 3 and 4 were not considered suitable candidates for DPC by Welsh Water given the nature of these projects and therefore they were not taken any further as part of the assessment.

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Project Overview

5a. Gwili Gwendraeth Wastewater Treatment Works

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Gwili Gwendraeth Wastewater Treatment Works: Project Overview

Project overview: The Gwili Gwendraeth Wastewater treatment works (GTW) project is planned to replace seven of the existing treatment works with a single wastewater treatment works (WwTW). The project will include the new network to transport the sewerage GTW. After treatment water will be discharged into the Carmarthen Bay estuary.

Drivers: Natural Resource Wales (NRW) set lower (0.5mg/l) phosphorous limits for Cross Hands and Cwmgwili WwTW for 2021 and can issue uncapped fines for non-compliance.

The seven existing WwTW currently discharge into the Gwili and Gwendraeth rivers, neither of which has achieved a 'Good' status under the Water Framework Directive (WFD).

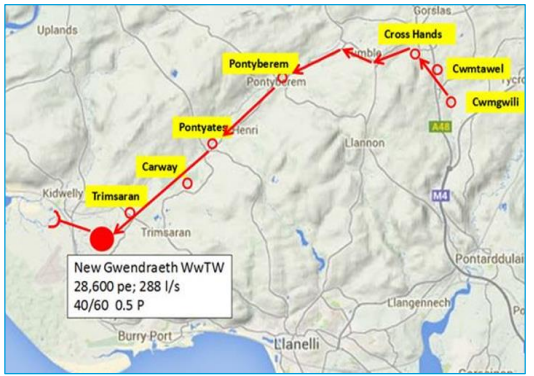
Most of the existing seven WwTW were constructed in the 1950s or earlier and the deteriorating asset conditions will require significant expenditure to maintain services at stricter limits. The historical modifications have created a complex series of treatment works which are expensive to maintain.

In addition to this, significant capacity enhancement is required to meet future demand driven by the development of a commercial and industrial cost centre.

Discussions are ongoing with NRW over when the scheme is completed and the requirements to deliver the planned improvements. Under the National Environment Programme 2021 was the initial date set by NRW.

Project progress: We have undertaken preliminary assessments, commissioned a detailed feasibility study and are currently undertaking environmental studies and impact assessments.

Replacing: 7 existing wastewater treatment works
Treatment works serves: 40,000 PE in 2026
Location: Carmarthenshire, South Wales
Initial capital expenditure: £50m
Asset life: 60 years
Construction period: 3 years
Plant details: Conventional WwTW on brownfield site
In use date: 2023



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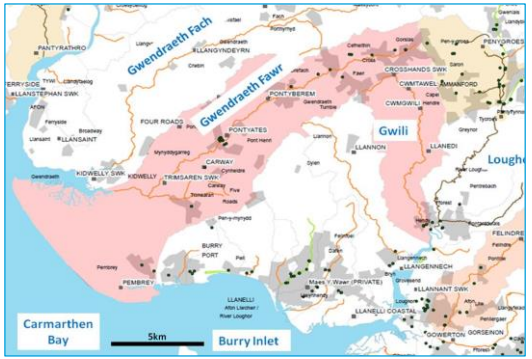
Gwili Gwendraeth Wastewater Treatment Works: Project Details

A detailed feasibility study identified the most cost efficient option for the seven existing WwTW is to rationalise the seven current works into a single new asset discharging directly into the Carmarthen Bay estuary.

- A detailed feasibility study undertaken by MMB (Mott MacDonald Bentley) has identified that conveying the full flow from the existing works and building a new works (GTW) to include storm treatment and storage, will have a lower whole life cost than upgrading the seven individual works in order to meet discharge consents.
- The proposed scheme will redirect the flows from the existing catchments to the new wastewater treatment plant which will allow for the decommissioning and abandonment of the existing seven wastewater treatment works.
- The scheme will be constructed on an existing brownfield site, which will allow discharges to be made into the estuary rather than inland rivers.
- We undertook a preliminary costing exercise which was used as a basis for the detailed feasibility study. The totex costing was broken down in the study by:
  - Initial capex using our solution target pricing tool (STPT);
  - Renewal capex replacing asset parts at the end of their design life from STPT and similar reference schemes/costs; and
  - Opex costs including power, chemical, potable water, routine MEICA (Mechanical, Electrical, Instrumentation, Control, Automation maintenance), site labour, business rates and consent charges.
- The project has been under development since 2014. Feasibility is complete, environmental studies and impact assessments are underway, and scheme completion is planned for March 2023.
- The scheme will impact a number of our ODI's, notably WwTW compliance, Km of river improved, and asset health indicators.

Existing WwTW Locations



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Project Overview

5b. Merthyr Water Treatment Works

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Merthyr Water Treatment Works: Project Overview

Project overview: The Merthyr Water treatment works (MTW) will replace three existing works at Pontsticill, Llwynon and Cantref and associated raw and treated water pipelines. The three sites provide potable water to the South East Wales Conjunctive Use System (SEWCUS) which serves Cardiff, Newport and a number of smaller valley towns. It serves approximately 1.43m people which equates to nearly half the population of Wales. We identified a single scheme with multi-stream capability replacing all three as the most cost beneficial option.

Drivers: Current WTW at Pontsticill, Llwynon and Cantref require major refurbishment or replacement of assets. Capital expenditure for the 3 sites over the next 40 years was significant based on asset monitoring, deterioration modelling and ICA (Instrumentation, Control, Automation) replacement costs.

The raw water quality of the sources feeding the three sites has deteriorated over the past decade and has led to an increase in customer contacts. The DWI has served notices at Pontsticill and Cantref for taste, odour and catchment management and there have been increased levels of 2-Methylisoborneol (MIB).

The multi-stream capability at the site allowing more flexibility for maintenance outages and the additional 24 hour proposed clean water storage which increases storage in the area by 68% will significantly improve the resilience of SEWCUS. Resilience was highlighted as a core issue for our customers in our Welsh Water 2050 research.

The construction of a new site was shown to be more cost beneficial when considered against alternative options including site upgrades to existing works.

Project progress: High level feasibility study has been completed with impact assessments, planning applications and a detailed feasibility study planned for 2020.

Output: 225 Mld
Treatment works serves: SEWCUS serves 1.4m
Location: Merthyr Tydfil, South East Wales
Initial capital expenditure: £238m
Asset life: 60 years
Construction period: 7 years
Plant details: Conventional WTW on brownfield site
In use date: 2030

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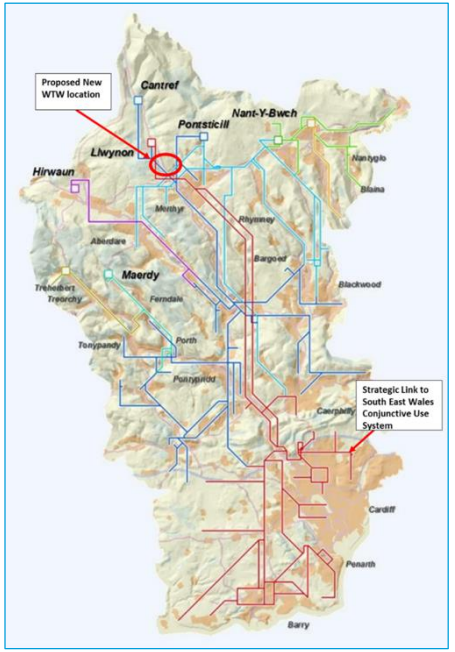
Merthyr Water Treatment Works

Welsh Water's high level feasibility study identified that the most cost beneficial option was to replace three of the five existing WTW with a single multi-stream WTW with a new water storage tank with 24 hours of storage of the average level of demand.

- A feasibility study considered that the most cost efficient option over a 40 year time horizon was the development of new works for 3 of the existing WTW.
- The Merthyr Water treatment works is a c.£300m scheme that will have a capacity of 225 Ml/d across three separate treatment streams. Merthyr will provide capability to shut down a production stream to allow maintenance activities to be undertaken including refurbishment and replacement work.
- The solutions from the high level feasibility study were costed using the our Unit Cost Database (UCD) model and benchmarked using water industry costs from Scottish Water, Mott MacDonald and the Water Research Council.
- Opex costs were calculated using cost data for existing sites; chemical, power, sludge and operator costs from the Felindre site which has a similar capacity for Merthyr.
- Planning permission is expected to be completed in the first year of AMP7. Construction is planned to take 8 years, starting in 2022 with the scheme becoming operational in 2030.
- We have noted that benefits of the Merthyr WTW include improving operating efficiency, reducing maintenance, providing options to address deteriorating water quality issues and improving resilience in the supply zone through improved network connectivity and increased water storage of 68% in the area.



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6. Project Assessment

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1a. Size Test

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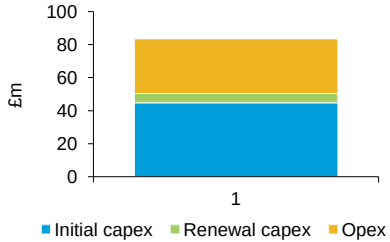
1a. Size Test: GTW

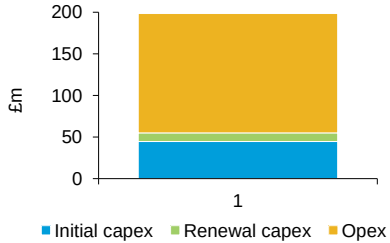
This section presents the results of the size test for GTW based on Welsh Water data. Initial capex includes development costs including land surveying, acquisition, planning and impact assessments. Costs were provided for the first forty years of the asset life broken down by capex, opex, renewal capex and base maintenance capex and this profile was projected out over the remaining twenty years on the same basis to enable an analysis of total costs over the full asset life to be considered. The NPV for the concession period and asset life totex was calculated to the start of construction, 2022, using the HMT Green Book social discount rate.

Different interpretations of whole-life totex are considered in the analysis and based on costs over both the contract life and asset life and using both discounted and non-discounted approaches. Perhaps the most obvious interpretation of the Ofwat threshold is the 'undiscounted asset life' result which is highlighted below in a dashed red box.

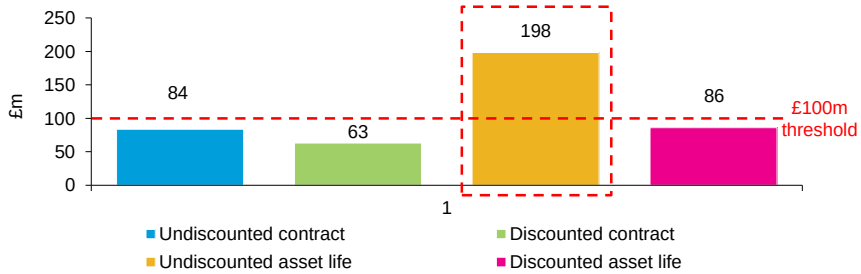
Capex/opex breakdown over the contract life (28 years including construction and contract) undiscounted



Capex/opex breakdown over asset life (63 years) undiscounted



GTW size test over contract period and asset life undiscounted and discounted to 2020 NPV



Totex on an undiscounted basis over the contract life is £16m below the threshold. On a discounted whole life of the asset it is within £14m of the threshold. On an undiscounted basis over the entire life of the asset, the threshold is significantly surpassed. However, it is noteworthy that under this scenario opex makes up 72% of total expenditure, compared with 40% of totex under the concession period. GTW is in close proximity to the threshold under two of the measures for wholelife totex and exceeds it under one measure. Further examination of the scheme suitability may therefore be warranted.

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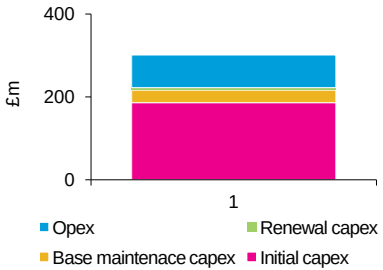
1a. Size Test: MTW

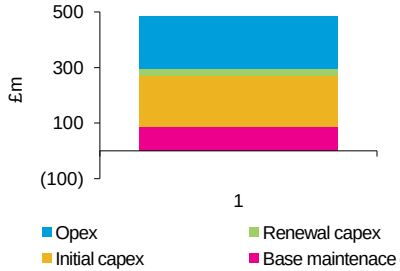
This section presents the results of the size test for MTW based on Welsh Water data. Initial capex includes development costs including land surveying, acquisition, planning and impact assessments. Costs were provided over the entirety of the asset life broken down by capex, opex, renewal capex and base maintenance capex. The NPV for the concession period and asset life totex was calculated to the start of construction, 2022, using the HMT Green Book social discount rate.

Different interpretations of whole-life totex are considered in the analysis and based on costs over both the contract life and asset life and using both discounted and non-discounted approaches. Perhaps the most obvious interpretation of the Ofwat threshold is the 'undiscounted asset life' result which is highlighted below in a dashed red box.

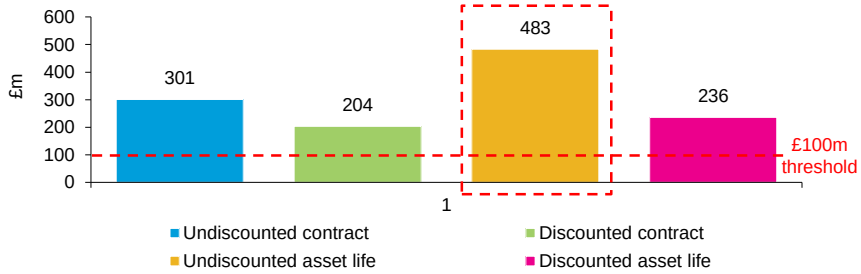
Capex/opex breakdown over the concession period (32 years including construction and contract period) undiscounted



Capex/opex breakdown over the asset life (67 years) undiscounted



Size test over the concession period and asset life undiscounted and discounted to 2022 NPV



Expenditure costs for all four scenarios are substantially over the £100m threshold. Even on a discounted basis over the concession period, the 2022 NPV of totex is still over twice the threshold.

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1b. Technical Assessment

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Technical Assessment: Process Overview

The technical assessment process is set out below and details the approach taken to evaluate projects and assess DPC suitability against the eligibility methodology.

1	Development of structured assessment framework and process for evaluation using Ofwat's PR19 Methodology and technical guidance for DPC projects.
2	Validation of framework and process with internal Welsh Water team and external advisors for further refinement.
3	Review of project documentation and interviews with project leads within asset management to identify key project characteristics and the role of the scheme within the context of the wider Welsh Water network.
4	Workshop with key operational and asset management staff to evaluate projects against the framework to establish the position across framework dimensions. Follow up on specific areas where further understanding was required to inform the assessment.
5	Write up of assessment against key criteria with supporting assumptions and rationale for review and validation with Welsh Water SMEs and external advisors.

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1b. Technical Assessment

GTW

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Technical Assessment: GTW Summary

A summary of the technical assessment for GTW is set out below alongside the findings and based on project information, interviews and workshops with key SMEs at Welsh Water

Criteria	Rationale	Overall assessment
Interactions with stakeholders	— The scheme has a number of key stakeholders including the NRW and given the local environmental impacts and discharges into bathing waters and shellfish waters from the proposed treatment works which may require complex interactions and incur risk and costs for the CAP. — Timing of the scheme could make DPC delivery challenging given the lead time and immature state of the market and discussions with NRW are ongoing to establish a mutually agreeable timetable. — Regular and ongoing interactions with NRW would need to continue and involve the DPC provider which could create duplication of costs and some challenges given Welsh Water will retain the licence obligations.	Less suitable for DPC
Interactions with existing network	— Relatively passive connections with the network reduces costs of interoperability and need for control to ensure flexibility. However GTW would be connected downstream of seven separate catchments that will impact on treatment works performance. — Potential loss of synergies associated with management and shared operations across multiple sites. — Some complexity associated with bio-resources assets that would form part of scheme and which are not eligible for DPC under Ofwat proposals which could reduce efficiency of build costs but expect this could be overcome.	More suitable for DPC
Contributions to supply/capacity	— Predictable capacity and quality standards that are easily measurable albeit some risk of future changes based on changes to consent requirements and impact on upstream discharges from customers etc. This should enable a contract to be more easily developed. — Unlikely to be material changes in capacity requirements over the asset life based on projections and plant sizing which reduce potential volatility and risks to the CAP.	More suitable for DPC
Asset and operational failures	— Well established supply chain and a number of recent UK precedents providing greater certainty over costs of construction and operation and reducing risks that could be passed into pricing. — Impacts of failure well understood but potential for fines given local environmental challenges could be costly but likely to be manageable.	More suitable for DPC

GTW will be based on conventional technology and there is a mature supply chain established. The contractual outputs could be well specified with relatively high levels of certainty over potential variability and which are easily measurable. There are connections with 7 separate catchments but these are relatively passive and downstream of the network, reducing the need for close integration. The sensitivity of the local environment and the impact of effluent discharges involves a number of stakeholders which creates greater interactions than a typical wastewater treatment scheme

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1b. Technical Assessment

MTW

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Technical Assessment: MTW Summary

A summary of the technical assessment for MTW (SEWCUS) is set out below alongside the findings and based on project information, interviews and workshops with key SMEs at Welsh Water

Criteria	Rationale	Overall assessment
Interactions with stakeholders	— Merthyr would contribute up to 20% of the overall company supply output, making it a strategically important asset serving two major Welsh cities (Cardiff and Newport) and increases the risk profile of the scheme. — Project will attract high level of scrutiny from stakeholders given scale and proximity to Cardiff and as such, is likely to require more complex interactions which could create risks for the CAP. — Scheme has very high potential impact on statutory obligations in terms of quality and availability and failure will impact significantly on ODIs and could have significant reputational impacts with regulators.	Less suitable for DPC
Interactions with existing network	— The management of the SEWCUS network is complex and highly integrated in nature. Network management requires dynamic production planning between works and the distribution network to balance supply input and distribution demand. The Merthyr scheme will include five raw water input feeds and which are controlled under Welsh Water's existing abstraction licences. In addition, three of the direct feeds for Merthyr include associated storage and utilise impounding reservoirs which have DWI undertakings with respect to taste and odour and therefore require close management by Welsh Water. Third party operation could reduce flexibility, increase costs, impact network optimisation and delay failure response. — The maintenance team serving MTW and the other local works would be sized to support the standby arrangements for multiple sites. If the MTW team was operated by a third party, additional resource would still be needed to cover out of hours standby operations for other works in the near vicinity, increasing costs to serve or creating dis-economies of scale. — Balancing of supply output between works on the SEWCUS network requires daily production plans and close co-ordination between teams in order to manage seasonal fluctuations, periods of planned and reactive outages, potential issues with raw water input quality and availability and impacts of cold and dry weather which impact on demand. As such, it would be more challenging to operate MTW where a third party was involved and a contractual relationship could constrain flexibility and responsiveness.	Less suitable for DPC

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Technical Assessment: MTW Summary (cont.)

A summary of the technical assessment for MTW (SEWCUS) is set out below alongside the findings and based on project information, interviews and workshops with key SMEs at Welsh Water

Criteria	Rationale	Overall assessment
Contributions to supply/capacity	— Supply output is well understood and variations are limited to normal seasonal variations making outputs easier to specify in a contractual arrangement — Outputs can be clearly defined and are well specified however inputs could change due to deteriorating raw water quality upstream of works which could create additional costs of treatment over time. — Unlikely future growth would impact on asset over its lifetime based on projections.	More suitable for DPC
Asset and operational failures	— Connection into SEWCUS network means a pollution incident could impact up to 1.4 million customers which would be a significant risk for a third party to accept and maybe reflected in higher pricing and return expectations. — Supply chain is well established but limited precedents of plants of this scale recently in the UK and which may create greater uncertainty of costs. — Failure relatively well understood but potential for very significant impacts given size and scale of scheme from both a financial and reputational perspective (ODIs and fines) which is likely to be challenging to transfer to a third party	Less Suitable for DPC

A contract could be developed between ourselves and a third party for the DBFO of MTW. However, the asset is embedded within a critical water supply network (SEWCUS) and used conjunctively with other assets which makes it highly integrated. The criticality of the asset and its strategic importance within the network suggests the impact of failure could result in significant costs and reputational impact for Welsh Water and is a risk that may be challenging to transfer to a third party at a reasonable cost.

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1b. Technical Assessment

Summary Position (GTW and MTW)

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Key:
MTW
GTW
Less suitable for DPC
More suitable for DPC

Discreteness: Comparative Analysis

Criteria	Indicator	Assessment	Commentary
Interactions with stakeholders	What is the nature of the stakeholder interactions?		— Multiple stakeholders exist on both schemes however potential for financial and reputational impacts makes nature of interactions under MTW more significant given scale of project, the fact it is water supply and its location. .
	Does the scheme have an impact on our statutory obligations?		— Impacts to statutory obligations under both projects however potential impact is greater for MTW due to scale and importance of drinking water obligations and associated risks of failure.
	Are stakeholder interactions particularly complex?		— Both schemes have a number of complex and ongoing interactions given the nature of schemes but scale and size of MTW compared with GTW suggest interactions are likely to be more complex.
Interactions with existing network	How many connections to the wider network are there?		— MTW has a slightly higher number of input and outputs connections than GTW however MTW is part of conjunctive use system and therefore more heavily integrated than GTW which is downstream of catchments.
	What is the nature of the interactions with the network – passive asset vs. complex asset?		— MTW sits within an actively managed dynamic network. GTW interactions with the wider network are less integrated requiring less frequent interactions.
	Are there economies of scope/scale from the incumbent delivering the scheme?		— Merthyr is part of the highly integrated conjunctive use network which requires daily production plans and close operational management between teams across the SEWCUS network. GTW has more limited inter-operability issues being downstream from catchments although management of flows and loads will require some co-ordination.
Contributions to supply/ capacity	Can the schemes output be easily and accurately measured?		— Output measures including water quality, supply volume, volume treated and effluent quality etc.) for both schemes are well understood with established techniques and measurement procedures exist.
	Can the schemes output be easily defined/specified?		— Definition of required outputs for both projects are clear and measurable.
	Is the output expected to vary over time?		— Variability in output for both projects is relatively low but a deterioration in raw water quality could have significant impact on MTW's output/treatment costs.
Asset and operational failures	How mature is the schemes supply chain?		— Supply chain for both is mature but MTW may employ unconventional technology following detailed feasibility study which could impact supply chain capability available.
	Have similar schemes been delivered before?		— Delivery of technology employed in both projects is well understood but Ofwat's analysis of previous AMP projects[1] suggest no WTW of this scale have been built in the UK.
	Is robust historic data on failure rates available for similar schemes?		— Robust historical data is available for both schemes but scale of failure impact resulting from Merthyr creates very significant risks and would result in high costs and reputational impacts.

[1]Ofwat, May 2016, Water 2020: Regulatory framework for wholesale markets & PR19

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2. Value for Money Assessment

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Quantitative Value for Money Assessment: Value Drivers

This section presents a quantitative analysis of the potential value for money for customers that may be realised through delivery of the schemes under a DPC model versus a PR19 conventional model. For the purposes of this analysis, a number of assumptions have been made. In some cases these are based on market observations more widely and experience of project finance across sectors. The quantitative analysis is based on a financial model that compares the present value cost to customers for delivery of the project under both a conventional PR19 framework and a project finance (DPC) framework based on the cost to customer profiles discounted at the social time preference rate. The analysis does not contain a detailed risk allocation or pricing of risk given the early stage of the projects and the uncertainty in estimating this.

An explanation of the drivers of results, assumptions in the model and the key dynamics of customer value is set out below:

Key assumptions and drivers of results

- The two models inherently imply different profiles of revenues and costs.
- The profile of revenues under DPC is based on a realistic project finance model, which is most likely to be used by potential bidders, including all relevant financing assumptions and checks.
- The terminal value under the DPC model is adjusted to reflect the fact that investors are unlikely to accept the risk of a very high residual value at the end of the contract period.
- The PR19 route assumes Ofwat's 'early view' of the cost of capital for PR19.
- We vary the cost of capital assumptions under the DPC model to isolate potential financing benefits and test different assumptions.
- PAYG rates are project specific.
- We test the impact of different assumptions of potential cost efficiencies under both models.

Key dynamics of customer value

- The Social Time Preference Rate is higher than both the PR19 cost of capital and the DPC cost of capital, which means that postponement of revenues always benefits customers, under both models.
- In general, lower costs of financing benefits customers under the DPC model, unless DPC is subject to limitations on gearing.
- The DPC model assumes additional cost efficiencies but also implies additional costs to the incumbent.
- Any capex and opex savings translate into greater value to customers in present value terms.
- Overall, the results are largely driven by 3 effects:
  - (1) The benefits of lower costs of financing under the DPC model;
  - (2) The benefits of a longer profile of revenues under the PR19 model; and
  - (3) The net effect of efficiencies and additional costs under the two models.

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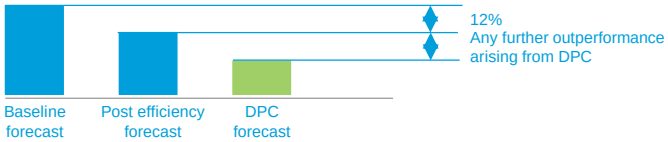
Quantitative Customer Value for Money Assessment: Value Drivers

The value for money analysis is sensitive to a number of key input assumptions that will drive customer value for money under the DPC model versus the conventional price review approach and which we have shown as sensitivities in the modelling results. Below we set out the key value drivers and considerations.

Capital and operating efficiency



- The level of capital and operating cost efficiency that could be realised through a DPC model versus a conventional in-house delivery approach is highly uncertain and hence a number of sensitivities on efficiency have been modelled.
- Ofwat referenced 20% opex savings achieved on OFTOs but this is based on comparisons with a hypothetical counterfactual position not observed levels.
- Ofwat may add an efficiency challenge under PR19 which will need to be factored into the counterfactual position in addition to our targeted efficiency levels (12% on capital).

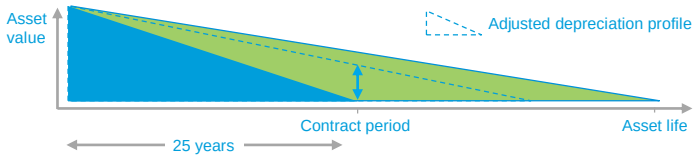
Financing costs

DPC	PR19
Equity IRR 9-12%	5.37% (PR19 Methodology on CPI basis) **or** 4.83% (excluding allowance for embedded debt)
Cost of debt Construction: 3.2 to 3.7 Operations: 2.8 to 2.9	

- A significant component of the value could come from financing benefits.
- Different and innovative financing solutions may be realised as part of the procurement.
- Project finance on highly geared assets (80-90%) could achieve the rates shown in the table left and compares favourably to both PR19 estimates even when embedded debt is removed from the WACC.

Source: Market observations on infra deals and PR19 Final Methodology

Residual value and depreciation



- Ofwat has suggested assets should be paid for over their full economic life but which creates risk for investors where contract periods are much shorter (e.g. 25 years).
- Assets funded under a project finance model are typically fully depreciated over the contract period.
- Accelerating depreciation of assets is likely to improve attractiveness and reduce investor risk but impacts on customer value for money.

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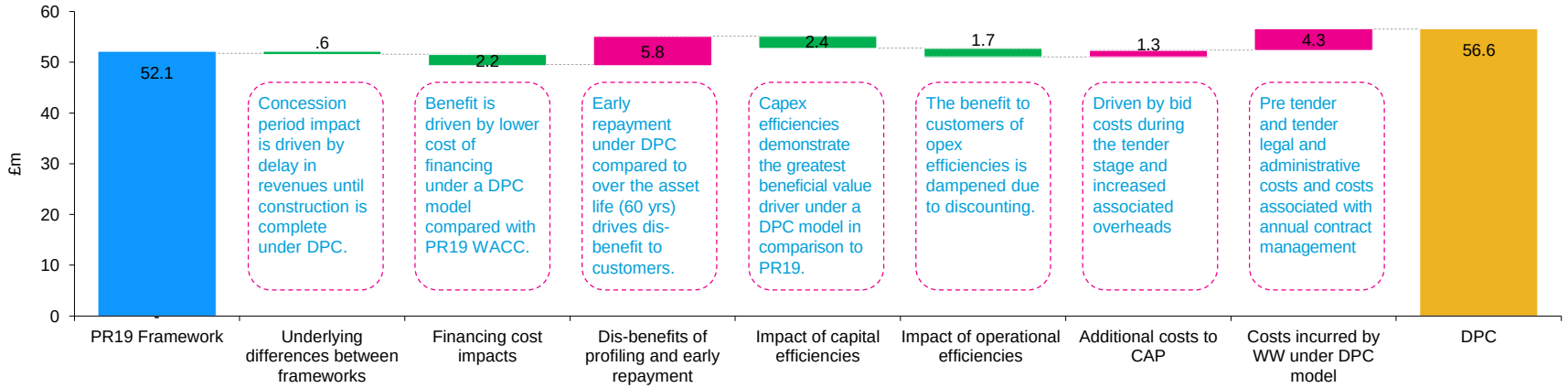
Gwili Gwendraeth Wastewater Treatment Works: Results

- This chart presents the VfM analysis results as the 2020 NPV difference in customer value for money for the base case assumptions for GTW between delivery under a PR19 framework and a DPC model.
- The VfM analysis excludes the pre-construction developmental costs as these will not be incurred by the CAP under a 'late' model, equivalent to £7m of the initial capex costs.
- Under the base case assumptions the DPC model results in a greater cost to customers with a total NPV difference of £4.5m.
- There are limited financial benefits given the size of the scheme. accelerated depreciation and additional costs to the CAP and our offset potential efficiencies.

Movements in PR19 v DPC



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Gwili Gwendraeth Wastewater Treatment Works: Sensitivity Analysis

This below table presents a summary of the sensitivity testing of the three key input assumptions that drive customer value for money under the DPC model versus delivery under a PR19 model. Only when considering more aggressive assumptions does GTW demonstrate customer value for money under a DPC model.

Sensitivities		Low end of range	Base case	High end of range
Financing	Cost of debt – construction	3.5%	3.7%	3.9%
	Cost of debt – operation	2.8%	2.85%	2.9%
	Cost of equity	9%	10%	12%
Depreciation	Depreciation period	Depreciated over asset life (60 years)	60% of the asset is depreciated over the contract	100% of the asset is depreciated over the contract
DPC cost efficiency	Opex and capex efficiencies	Capex 0% Opex 0%	Capex 6% Opex 10%	Capex 12% Opex 20%

This table presents the key input assumptions for financing, depreciation and cost efficiency under the base case and the high and low ranges based on comparable precedents and market observations.

The below table presents the results of the sensitivity analysis. Each of the three key input assumptions is tested against the high and low end of the ranges individually. The final two rows of the table demonstrate the most and least beneficial that delivery under the DPC model could be within the ranges of the key input assumptions.

Inputs			Outputs	
Financing costs	Depreciation period	Assumed expenditure efficiencies	Difference between PR19 and DPC	Commentary
High	High	Low	(£26.7m)	**Conservative scenario**: High financing costs, low levels of efficiency, and shorter depreciation period
Base case	Base case	Base line	(£4.5m)	**Base case**: Mid-range financing costs and efficiencies and 40% of the residual asset remains at the end of the concession period.[1]
Low	Low	High	£4.3m	**Aggressive scenario**: Achieving low financing costs, high levels of efficiency and depreciation over the full asset life produces some benefit to customers but will be challenging to achieve.

Key

DPC	*Lower cost to customers under DPC*
PR19	*Lower cost to customers under PR19*

1. 40% residual value is the approximate midpoint between 100% depreciation over the contract period (25 year concession period plus 3 years construction) and the asset life (60years)

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Gearing Sensitivity

In addition to the value for money analysis presented, Welsh Water also wanted to understand the impact on the value for money analysis if the gearing under the DPC model was reduced to 60% in line with Ofwat's recent statements in the 'Putting the Sector back in balance Consultation' published in April 2018.

Results

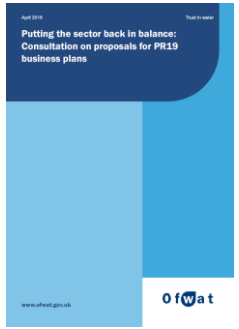
- Gearing under the DPC scenario base case is an optimised output of the model, as per typical project finance practice, to the maximum allowed by Debt Service Cover Ratio (DSCR) of 1.25.
- The maximum level of gearing which was achievable for the expenditure profile and input assumptions under the base case for DPC scenario of GTW is 76%.
- At an optimised level of gearing (76%), delivery of GTW under a PR19 framework was £4.5m lower cost to customers than DPC using a NPV basis to 2020.
- Welsh Water requested that the VfM analysis also considered a gearing sensitivity for DPC delivery in line with Ofwat's recent statement on the impact of high gearing on financial stability at the notional level i.e. 60%.
- When gearing is held at 60% for the DPC scenario, GTW is a £9.6m greater cost to customers under DPC delivery in comparison with the PR19 framework[1].

Gearing	Difference between PR19 and DPC	Commentary
76%	£4.5m	High levels of gearing produce significant benefit to customers under DPC delivery
60%	£9.6m	Gearing in line with Ofwat's notional assumption further erodes the benefits of delivery under DPC

[1]**Note:** Cost of equity and cost of debt are held as constant inputs and not adjusted to reflect changes in gearing levels. Some changes in the cost of equity and/or the cost of debt associated with different gearing could be expected and which may show some improvement in the DPC position compared with PR19 at lower levels of gearing

"We have observed however that highly geared structures are potentially less flexible and more vulnerable to cost shocks than companies whose gearing levels are closer to our notional assumption. This means that companies with high levels of gearing have potentially lower levels of financial resilience, as the impact of cost shocks or poor performance is magnified to a smaller equity base.'

Putting the Sector back in balance, Ofwat, April 2018



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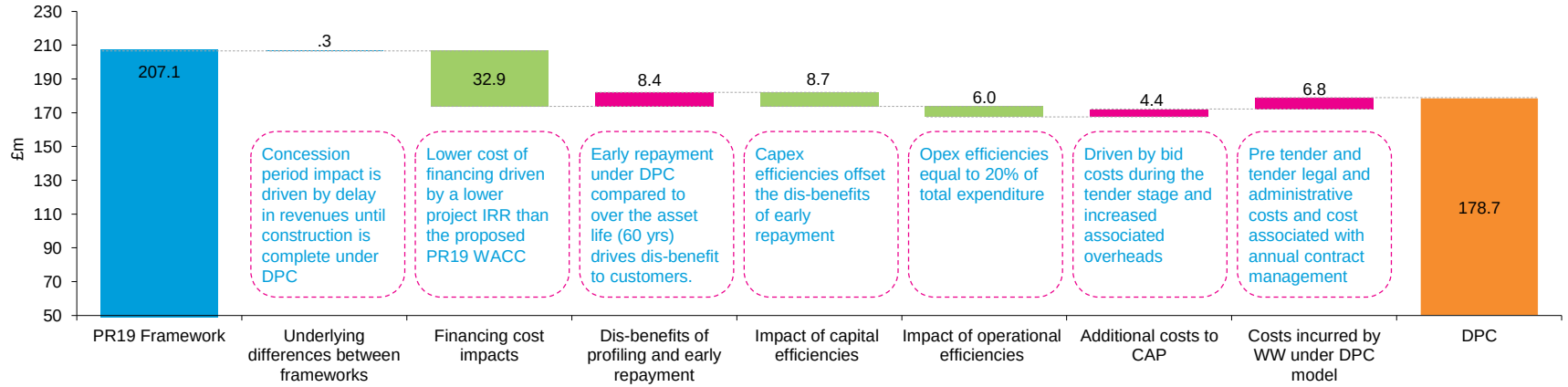
Merthyr Treatment Works: Results

- This chart presents the VfM analysis results as the 2022 NPV difference in customer value for money for the base case assumptions for MTW between delivery under a PR19 framework and a DPC model.
- In the base case, the PR19 model is a greater cost to customers. The NPV difference between the DPC and PR19 delivery models at a base case is £28.4m.
- The key value driver is the lower cost of financing under a DPC model compared with PR19. The early repayment and additional costs offset the capital and operational efficiencies realised by the CAP under the base case assumptions.

Movements in PR19 v DPC



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Merthyr Water Treatment Works: Sensitivity Analysis

This section presents a summary of the sensitivity testing of the three key input assumptions that drive customer value for money under the DPC model versus delivery under a PR19 model. MTW is likely to realise customer value for money under most sensitivities.

Sensitivities		Low end of range	Base case	High end of range
Financing	Cost of debt – construction	3.5%	3.7%	3.9%
	Cost of debt – operation	2.8%	2.85%	2.9%
	Cost of equity	9%	10%	12%
Depreciation	Depreciation period	Depreciated over asset life (60 years)	60% of the asset is depreciated over the contract	100% of the asset is depreciated over the contract
DPC cost efficiency	Opex and capex efficiencies	Capex 0% Opex 0%	Capex 6% Opex 10%	Capex 12% Opex 20%

This table presents the key input assumptions for financing, depreciation and cost efficiency under the base case and the high and low ranges based on comparable precedents and market observations.

The below table presents the results of the sensitivity analysis. Each of the three key input assumptions is tested against the high and low end of the ranges individually. The final two rows of the table demonstrate the most and least beneficial that delivery under the DPC model could be within the ranges of the key input assumptions.

Inputs			Outputs	
Financing costs	Depreciation period	Assumed expenditure efficiencies	Difference between PR19 and DPC	Commentary
High	High	Low	(£13.2m)	**Conservative scenario:** High financing costs, low levels of efficiency, and shorter depreciation period
Base case	Base case	Base line	£28.4m	**Base case:** Mid-range financing costs and efficiencies and 40% of the residual asset remains at the end of the concession period 1
Low	Low	High	£54.3m	**Aggressive scenario:** Low financing costs, high levels of efficiency and depreciation over the full asset life

Key

DPC — *Lower cost to customers under DPC*

PR19 — *Lower cost to customers under PR19*

1. 40% residual value is the approximate midpoint between 100% depreciation over the contract period (25 year concession period plus 3 years construction period) and the asset life (60 years)

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Gearing Sensitivity

In addition to the value for money analysis presented, Welsh Water also wanted to understand the impact on the value for money analysis if the gearing under the DPC model was reduced to 60% in line with Ofwat's recent statements in the 'Putting the Sector back in balance Consultation' published in April 2018.

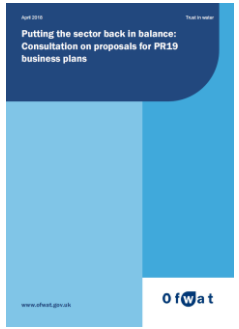
Results

- Gearing under the DPC scenario base case is an optimised output of the model, as per typical project finance practice, to the maximum allowed by Debt Service Cover Ratio (DSCR) of 1.25.
- The maximum level of gearing which was achievable for the expenditure profile and input assumptions under the base case for DPC scenario of MTW is 89%.
- The DPC model when geared at 89% demonstrated a £28.4m lower cost to customers on a NPV basis to 2022 in comparison to the PR19 framework when geared.
- Welsh Water requested that the VfM analysis also considered a gearing sensitivity for DPC delivery in line with Ofwat's recent statement on the impact of high gearing on financial stability i.e. 60%
- When gearing is held at 60% for the DPC model, MTW is a £19.4m greater cost to customers under DPC delivery[1].

Gearing	Difference between PR19 and DPC	Commentary
89%	£28.4m	High levels of gearing produce significant benefit to customers under DPC delivery
60%	£19.4m	Gearing in line with Ofwat's notional assumption erode the benefits of delivery under DPC

"We have observed however that highly geared structures are potentially less flexible and more vulnerable to cost shocks than companies whose gearing levels are closer to our notional assumption. This means that companies with high levels of gearing have potentially lower levels of financial resilience, as the impact of cost shocks or poor performance is magnified to a smaller equity base.'

Putting the Sector back in balance, Ofwat, April 2018



[1]**Note:** Cost of equity and cost of debt are held as constant inputs and not adjusted to reflect changes in gearing levels. Some changes in the cost of equity and/or the cost of debt associated with different gearing could be expected and which may show some improvement in the DPC position compared with PR19 at lower levels of gearing.

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7. Assessment Summary

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Assessment Summary

The below table sets out the summary results of the assessment for both projects

The analysis suggests:

— Whilst GTW could be technically more suitable for DPC, it is less suitable on value for money given its size and low level of capital expenditure, which also means it is borderline on most measures of the size test.

— MTW is more suitable to provide value for customers (assuming gearing can exceed 60%) and exceeds the size threshold but the discreteness assessment and in particular the highly integrated and strategic nature of the asset may suggest it is less suitable on technical grounds.

Summary results

Assessments	Gwili Gwendraeth	Merthyr (SEWCUS)
Size test	Borderline on most measures and relatively low capex at only £50m.	Exceeds £100m threshold on all measures and significant initial capital investment. Lowest result is £256m.
Technical assessment	More separable and less integrated with wider network. Only one criteria considered 'less suitable for DPC'.	Highly integrated and strategically important asset but could be managed through a contract. Three out of the four criteria were considered 'less suitable for DPC'.
Value for money	Base case and sensitivities suggest VfM case is challenging.	Likely to provide value for money based on current input assumptions and most sensitivities unless gearing needs to be in line with notional level.

Considerations

Some interpretation has been made of whole-life totex definition but only an issue for GTW/MTW position clear.

Subjective, qualitative assessment suggests that MTW is not suitable for DPC but GTW is less of a concern.

GTW would need to assume very aggressive assumptions to show customer VfM, MTW shows VfM under most scenarios.

Key

More suitable for DPC

Less suitable for DPC

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8. Appendix

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1. Ofwat Methodology

Ofwat Final Methodology: Technical Assessment

Ofwat has set out technical guidance on what criteria companies should consider in identifying projects that may eligible as set out below and provides examples schemes that it considers more (green) of less likely (orange) for DPC

In the accompanying DPC technical guidance, a number of criteria are set out to assess project suitability and as set out below.

- There are limited economies of scale and scope with the rest of the appointees' network system or where economies of scale or scope could be maintained through contracts;
- There are simple or limited, well understood and manageable physical and operational interactions with the appointees' network;
- Assets have capacity that is shared by multiple appointed companies; and assets are more 'passive' and are not actively managed as part of the overall system;
- Manageable interactions with stakeholders;
- The ability to specify outputs relating to contribution to supply and/or capacity;
- The impact of asset and operational failures

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Ofwat Final Methodology: Data Tables

In the Final Methodology Ofwat requests companies to submit more detailed cost estimates than previously expected. The table below sets out the data companies will need to provide Ofwat for projects that they consider suitable for Direct Procurement for Customers. Pre-constructions have been broken down into development and procurement costs, while companies need to provide projections for opex, capex and end-of contract asset value under the CAP revenue stream.

App21 - Direct procurement for customers — Company name

Line description		Units	DPs	2020-21	2021-22	2022-23	2023-24	2024-25
Price base				2017-18 FYA (CPIH deflated)				
A	Project 1							
1	Development costs	£m	3					
2	Procurement costs	£m	3					
3	Contract management costs	£m	3					
4	End-of-contract asset value	£m	3					
5	Total appointee costs	£m	3	0.000	0.000	0.000	0.000	0.000
6	Expected CAP revenue stream	£m	3					
7	Expected CAP capex	£m	3					
8	Expected CAP opex	£m	3					
B	Project 2							
1	Development costs	£m	3					
2	Procurement costs	£m	3					
3	Contract management costs	£m	3					
4	End-of-contract asset value	£m	3					
5	Total appointee costs	£m	3	0.000	0.000	0.000	0.000	0.000
6	Expected CAP revenue stream	£m	3					
7	Expected CAP capex	£m	3					
8	Expected CAP opex	£m	3					

Pre-construction Costs

Costs relating to pre-construction (includes, for example: optioneering, front end design, surveys, engineering studies, acquisitions of land rights/legal costs, cost associated with planning applications). Does not include procurement or tender costs.

Additional Development Costs

Additional costs relating to DPC project development - includes any known procurement costs, or other costs involved in developing a DPC model to be able to launch a procurement process.

Expected contractor's revenue stream

Indicative expected revenue stream to be paid to the contractor/ successful bidder. This would include, for example, project capex and financing costs. This is indicative only and used to understand potential customer bill impacts.

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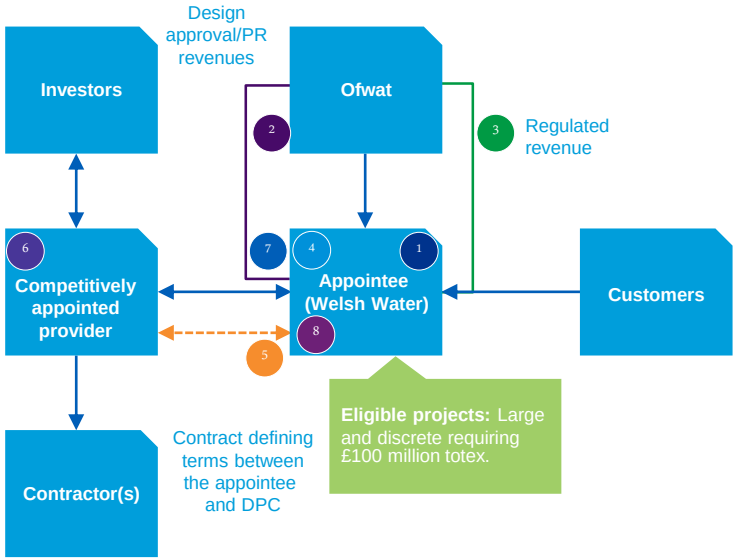
Ofwat Final Methodology: Contractual Structure

Contracting model'

1. The appointee identifies discrete enhancement schemes that it will need to build in the regulatory period 2020-25 or beyond. Eligible projects are required to meet the threshold of whole life project totex equal to £100m. The appointee then specifies the need and completes at least the outline design phase. The expected scope of work for the competitively appointed provider (CAP) is determined at this stage.
2. The costs of the project will be determined by the outcome of the tender and will be recovered from customers via the appointees existing price control as pass through costs.
4. The appointed business runs a ring-fenced procurement process based on clearly set out guidelines provided by Ofwat. The appointee will be banned from bidding for the project.
5. The CAP has a legally binding contract for a set period of time with the appointee. The structure of the contract is similar to a typical PPP/PFI contractual arrangement, which is not regulated by Ofwat. Furthermore, the CAP provider will not be subject to a license. The contract will only cover arrangements in respect to specific areas to build, finance and operate the asset set out prior to the bidding process.
6. Ownership of the asset would sit with the CAP for at least the duration of the financing period, however the CAP will be contracted to provide the services back to the appointee.
7. The Appointee recovers the allowed revenues from customers and controls the cash flow passed to the CAP. There is significantly less visibility in the cash flow pass through than in the 'utility model'.
8. Service risk sits with the CAP and it is reporting on the delivery of the settlement directly to the appointee. Service levels are set between the CAP and the Appointee under the contract arrangements.



Typical PPP/PFI structure

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Procurement Principles – Summary of Key Features

The table below presents the principles and key features, set out in Ofwat's final methodology, which Ofwat expects appointees to follow in relation to the DPC procurement process.

Principle	Key features
Competitively appointed providers: — Contract cannot be awarded to an associated company	— Awarding the contract to an associated company is considered a conflict of interest relating both to the bidding process and to the management of the contract. Appointees can compete for DPC projects of other water companies as part of their unregulated business.
Resourcing and governance: — Clear and transparent governance processes — Access to skilled resources — Processes to respond to bidders' questions and clarifications — Processes to manage intellectual property	— Appointees should be fully aware of the risks involved in running tenders and have structures in place to mitigate them. — Specific skills are required to manage a DPC procurement process effectively. If unavailable, appointees should seek resources externally. — Appointees must be prepared to respond to clarification questions in order to mitigate the risk of bidders basing their submissions on an inadequate understanding. — Innovation is in customers' interests, so appointees should put processes in place to manage bidders' sensitive information and intellectual property.
Process: — Adhere to Utilities Contracts Regulations 2016 — Standardise processes — Outline process timescales — Use market engagement and to establish appetite for DPC — Minimise time between appointing and awarding the contract	— Contracts are likely to require negotiation. It is for the appointee to consider the most appropriate process to use. — Standardising the processes can reduce transaction costs and build investors' interest, as well as providing stakeholders with transparency over the process. — Procurement timetables will set expectations for potential bidders. — The level of interest from the market will affect the degree of competition and likely costs of DPC, which are key inputs for the cost-benefit analysis. — An efficient process before appointment of bidder will minimise the likelihood of reopening any details from the tender.

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Procurement Principles – Summary of Key Features (cont.)

The table below presents the principles and key features, set out in Ofwat's final methodology, which Ofwat expects appointees to follow in relation to the DPC procurement process.

Principle	Key features
Preconstruction works: — Make relevant information available to bidders during the tender process — Preconstruction works need to be transferrable to CAPs when they are awarded the contract	— Any omissions in relevant information will be reflected in the bid. Minimising uncertainties will deliver better customer outcomes. — If preconstruction works are not easily transferrable, it will add complexity and potentially cost to the finalisation of arrangements. Potential risk may be priced into bidders' submissions if there is uncertainty during the tender process.
Tender specification: — Provide draft versions of contracts as part of tender specifications — Allow bidders to comment on draft contracts in preliminary stages	— Not providing bidders with draft contracts could create uncertainty, which may be reflected in the submission. — Allowing bidders to comment may allow for more robust arrangements, better pricing, and allow appointees to clarify contract terms which limits potential negotiation at the preferred bidder stage.
Bid evaluation: — Clear bid evaluation strategies and scoring systems in place — Appointees should satisfy themselves that bidders can meet the key contractual obligations	— Robust approaches to bid evaluation must be developed before tendering to ensure equal, transparent, proportional and non-discriminatory procurement processes. — Evaluation strategies will need to consider a range of factors to ensure the selected bidder can meet relevant standards and is the most economically advantageous tender.

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Ofwat Final Methodology: Contractual Principles

In the final methodology, Ofwat has set out some key contractual principles as set out below and has been considered in the assessment of the schemes

Contract principles	Key features based on Ofwat guidance
Contract duration	— 15-25 years of operation, plus construction period
Revenue and financing costs	— Fixed revenue paid to CAP after construction and when we accepts assets — Assets depreciated over useful lives — Revenue streams not index-linked — Provisions for debt re-financing and change of control in CAP
Risk allocation	— Risks to parties based on their ability to manage these — Provisions for force majeure events
Expiry, termination and step in	— Specify end date, use of asset after termination and compensation payable from termination — Specify circumstances for us to step in — Specify residual asset values and condition of asset at end date, and how this is paid to the CAP
Construction programme and completion	— Construction milestones — Requirements for assets to trigger completion — Provisions for liquidated damages in late delivery
Operation and maintenance	— Performance commitments and incentives — Provisions for variations in opex — Reporting and information requirements
Security	— Provision against late delivery or non-delivery
Compliance with legislation	— Relevant statutory or licence obligations — Provisions to vary allowed revenues because of changes in regulatory requirements

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2. Assessment Methodology

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Step 1

Test 1a. Size Test

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DPC Eligibility Methodology and Key Considerations: Step 1a.

This section presents the methodology employed in the size test, test 1a). Ofwat has suggested a £100m whole-life totex threshold, however the guidance does not contain specific details of how this should be applied. We have therefore provided some additional clarity on this interpretation as part of our considerations to enable the schemes to be evaluated and as set out below.

Considerations	Considerations	Approach and rationale
Scope of costs	Potential costs could include: — Procurement costs — Project development costs e.g. land acquisition — Financing costs — Initial capital expenditure and renewal capital expenditure	— 'Totex' by definition excludes financing costs and therefore we have only considered all capital and operating costs associated with the scheme. — Project development costs are included as it is assumed these are included as part of the whole life scheme costs. — The size test has been run including and excluding bioresources assets embedded within the MTW scheme.
Duration of costs	Periods that expenditure is considered over: — Business plan life (five years) — Asset life — Typical concession period (e.g. 25 years) — Costs have been discounted at the social time preference rate of 3.5% (real)	— For the purpose of analysis we have assumed a 28 year period. This includes a three year construction period and a 25 year O&M concession period. — This aligns with typical concession periods for PFI /PPP contracts and which would include the full scope of costs being considered for competitive procurement. — 25 years is likely to be the upper end of the time range for which financing could be secured against the project and will be the value of the project that the market will assess (for example, the contract period).
Discounted or undiscounted/real or nominal out-turn costs	Whole-life costs could be based on: — Real or nominal costs — Discounted or undiscounted rates	— For the purpose of analysis we have assumed a discount rate of 3.5% in line with the social time preference and giving greater weight to upfront investment versus operational costs. — Cost are all in real terms in a 17/18 price base.

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Step 1

Test 1b. Discreteness Assessment Framework

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DPC Eligibility Methodology and Key Considerations: Step 1a.

This section presents the methodology employed in the size test, test 1a). Ofwat has suggested a £100m whole-life totex threshold, however the guidance does not contain specific details of how this should be applied. We have therefore provided some additional clarity on this interpretation as part of our considerations to enable the schemes to be evaluated and as set out below.

		Considerations	Approach and rationale
1	**Interactions with stakeholders**	— Generally speaking, the greater the level of interaction with different stakeholder groups, the more costly and less discrete a project.	— What is the nature of the stakeholder interactions? — Does the scheme have an impact on our statutory obligations? — Are stakeholder interactions particularly complex?
2	**Interactions with existing network**	— A project that is located in a relatively stand-alone location is likely to be more separable than one that is highly integrated with the existing network.	— How many connections to the wider network are there? — What is the nature of the interactions with the network – passive asset vs. complex asset? — Are there economies of scope/scale from the incumbent delivering the scheme?
3	**Contributions to supply/ capacity**	— In general, it is easier to establish operational contracts for assets whose usage patterns and outputs are predictable and well understood.	— Can the schemes output be easily specified and defined? — Will the scheme be used regularly, or is it a resilience asset? — Is the output expected to vary over time?
4	**Asset and operational failures**	— The better failures are understood, the easier these could be accounted for within the contracting arrangements and priced efficiently.	— How mature is the schemes supply chain? — Have similar schemes been delivered before? — Is robust historic data on failure rates available for similar schemes?

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 1: Interactions with Stakeholders

Where there are a large number of complex interactions with a range of different stakeholders, a project will generally be more costly, and therefore less appropriate for DPC. For more complex stakeholder relationships, it is expected that the incumbent is better placed to manage these given its experience, and local in-area expertise. The assessment is a qualitatively comparative method in contrast to other projects being considered for delivery under a DPC model and past projects. The methodology provides a broad insight into the overall discreteness of the asset in comparison with other industry examples.

Indicator	Description	Assessment method
What is the nature of the stakeholder interactions?	— A wide number of stakeholders are involved in the development and operation of water schemes, from Ofwat and the NRW, to DWI and Defra. Depending on the nature of the asset, the extent and complexity of the stakeholder interactions will differ. The fewer the number of stakeholders involved in a scheme, the more discrete that project is considered to be.	*Less discrete* — *More discrete* **Large number of stakeholders involved in scheme** — **Limited number of stakeholders involved in the scheme**
Does the scheme have an impact on our statutory obligations?	— Certain types of schemes are more likely to impact on a companies statutory obligations, for example a water treatment works and water quality standards. Licencing, rather than contracting, arrangements are often more suitable where there are compliance risks, and therefore where a scheme has a significant impact of statutory obligations it is considered less discrete and less appropriate for DPC.	*Less discrete* — *More discrete* **Significant impact on statutory obligations** — **No impact on statutory obligations**
Are stakeholder interactions particularly complex?	— Where stakeholder interactions are complex, the incumbent water company is likely to be better placed in managing those relationships. This risk can to some extent be offset through the implementation of a late tender model, but generally speaking, a project is more appropriate for delivery under a DPC framework when stakeholder interactions are comparatively simple.	*Less discrete* — *More discrete* **Complex and regular interaction with stakeholders required** — **Simple and/or infrequent interactions with stakeholders**

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 2: Interactions with Existing Network

A project that is located as a relatively stand-alone asset, with limited physical and informational interfaces/connections with the existing network is likely to be more separable than a scheme that is highly integrated with the network. On the other hand an asset that has a single interface with the network is likely to be more easily separated from the network both during construction and management during operation.

Indicator	Description	Assessment method
How many connections to the wider network are there?	— Projects that are highly integrated, with a number of connections to the existing network are likely to be less appropriate for delivery under DPC. Assets that are physically separate from the existing network, with fewer and more simple connections are considered more separable and therefore more appropriate for delivery under the DPC model.	*Less discrete* — *More discrete* **Large number of connections with wider network** — **Limited number of connections with existing network**
What is the nature of the interactions with the network – passive asset vs. complex asset?	— Assets that will play central roles in the strategic management of the network with higher levels of influence are more complex and discrete. Assets that play a more passive role in the management of the network requiring limited levels of control and communication with the network are more appropriate for DPC delivery.	*Less discrete* — *More discrete* **Complex asset requiring regular and ongoing control** — **Passive asset that requires limited control**
Are there economies of scope/scale from the incumbent delivering the scheme?	— Projects which would benefit from the economies of scope and scale from the incumbent are considered less discrete. Projects delivered widely by incumbents with established supply chains, skills, resource and relationships are unlikely to deliver benefits under a DPC model. Projects which do not offer economies of scale and scope with network can be considered discrete as these cannot be undermined by DPC delivery.	*Less discrete* — *More discrete* **Incumbent able to leverage EoS from delivering scheme** — **No EoS available from incumbent which could be damaged by DPC delivery**

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 3: Contributions to Supply/Capacity

DPC schemes with clearly defined, specified and well understood inputs and outputs can be captured by simpler contractual arrangements. It may be more complicated and there may be less investor appetite for an asset that is used infrequently. The financial arrangements for an asset required that is not demanded on or for a project that has less tangible inputs and outputs.

Indicator	Description	Assessment method
Can the schemes output be easily and accurately measured?	— All water and wastewater service demand and abstraction supply fluctuate to some extent. However, assets with inputs and outputs which are well understood and with a high degree of certainty about the assumptions used to forecast are more straight forward to draft contractual terms based on measurable outputs. Assets that either have higher levels of uncertainty regarding either the inputs or outputs require more complex legal drafting, price in risk, erode customer value for money and reduce investor appetite.	*Less discrete* — *More discrete* **Lack of clarity around output and how to measure it** **Output well understood with a high degree of confidence about the assumptions used to forecast**
Can the schemes output be easily defined/specified?	— Where outputs are less easy to define and inherently less tangible this may be difficult to draft into the contractual arrangements. Defining the level of output required by the CAP and ensuring a fair level of compliance with that output considering factors outside the CAPs control may create inefficient pricing and erode the potential value for money for customers.	*Less discrete* — *More discrete* **Intangible, less easily defined and quantifiable output** **Tangible, measurable and easily defined output**
Is the output expected to vary over time?	— An asset that is rarely used but may be required to operate at full capacity without much notice may be more complicated to draft contractual terms for. A rarely used asset would like require capacity payments and regular assurance testing to ensure capability of asset to deliver at short notice. Volatile and uncertain operating costs will likely impact payment and performance terms between the incumbent and CAP. This may impact the CAPs financeability.	*Less discrete* — *More discrete* **Volatile output with uncertainty over future usage** **Stable and predicable output expected over time**

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 4: Asset and Operational Failures

The better understood the probability and impact of asset and operational failure, the more easily these can be accounted for in the contractual arrangements and priced efficiently. Failure during all stages of the life of the asset from construction, operations and transfer are all relevant. Factors influencing the understanding of the probability and impact include the robustness of historical data, delivery of similar schemes and maturity of the supply chain.

Indicator	Description	Assessment method
How mature is the schemes supply chain?	— The availability of asset components, materials, expertise and knowledge will affect the suppliers ability to respond to failures. An immature supply chain increases the impact a failure could have to customers. Required parts and expertise may not be accessed for longer periods of time and/or greater cost.	**Supply chain yet to be established** — *Less discrete* — *More discrete* — **Well established supply chain with significant experience**
Have similar schemes been delivered before?	— The delivery of similar schemes in the sector increases likelihood a CAP will be able to respond to asset failure effectively. A lack of clear understanding of the operational risks such as price escalation or one-off costs could impact the financeability of the CAP. Asset experience reduces the uncertainty, improves the pricing efficiency and reduces the potential impact of failure.	**Few similar schemes delivered previously** — *Less discrete* — *More discrete* — **Proven track record delivering similar schemes in the sector**
Is robust historic data on failure rates available for similar schemes?	— Robust historical benchmarking data on similar assets will allow risk of failure to be more accurately priced into the contracts. This allows for more efficient pricing and greater value for money for customers. Low levels of evidence or understanding reduces the discreteness and the appropriateness of the scheme for delivery under a DPC model.	**Little evidence or understanding of failure rates on similar schemes** — *Less discrete* — *More discrete* — **Failure rates well understood with robust supporting evidence**

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Step 2

Quantitative Assessment of Customer Value for Money

Cost Benefit Analysis Model - Overview

To better undertake the value for money assessment and Cost Benefit Analysis (CBA) model was constructed with input from external advisors. The model contains a number of input assumptions and compares two scenarios a DPC framework scenario (factual) and a PR19 framework (counterfactual) to produce a series of different revenue impacts and a bridge to show the resulting NPV's of the two scenarios against certain value layers.

1 **Consider key assumptions to inform relative VfM comparison**

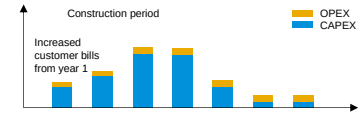
- Profile of capex vs opex
- Financing costs
- Depreciation and residual value
- Start of the revenue stream
- Efficiency savings
- Inefficiencies due to additional separation
- Innovation potential, 3rd party revenues
- Procurement and project management costs
- Deliverability

2 **Develop model and key assumptions underpinning quantitative assessment**

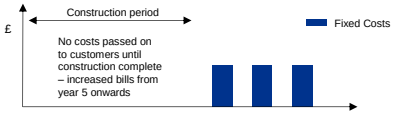
- Common assumptions
- Scheme specific assumptions
- **DPC framework model** *(Factual)*
- **PR19 framework model** *(Counter factual)*

Review key assumptions for specific scheme with us.

3 **Produce model outputs: Revenue impacts**

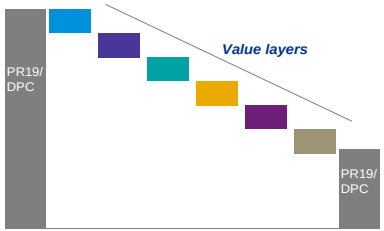


PR19



DPC

4 **Produce value analysis against layers of customer value identified**



Review output and understand sensitivity of scheme assumptions

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Cost Benefit Analysis Model Mechanics

CBA Inputs

Inputs common to all schemes

- Indexation
- Time horizon
- PV discount rate
- Cost to customer availability

Scheme specific inputs

- Cost input (our internal view of efficiency)
- Construction period
- Asset life
- Cost profile (PAYG)

Scheme specific assumptions

- Financing costs
- Cost savings due to (i) scope maturity, (ii) efficiencies, (iii) innovation
- Additional costs, for example, due to procurement, contract management, loss of synergies, risk of delay.

CBA Calculations

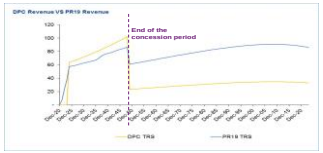
Costs to customers

1. **Revenue from the residual asset value**
   Revenue earned on the residual value under the PR19 framework post contract period over the remaining asset life
2. **Revenue over the contract period**
   TRS to the DPC provider under the factual and PR19 revenue allowance under the counter-factual
3. **Additional costs to us**
   Procurement and contract management costs
4. **Cost of delay in asset delivery**
5. **Innovation benefits to customers**

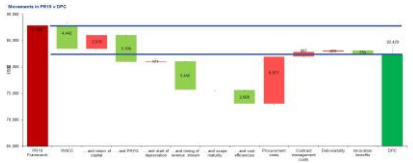
CBA Outputs

NPV of cost to customer

- Under DPC and PR19 model



NPV of factual vs counterfactual by value drivers



The model provides a breakdown of the value difference between DPC and PR19 delivery routes for specific schemes

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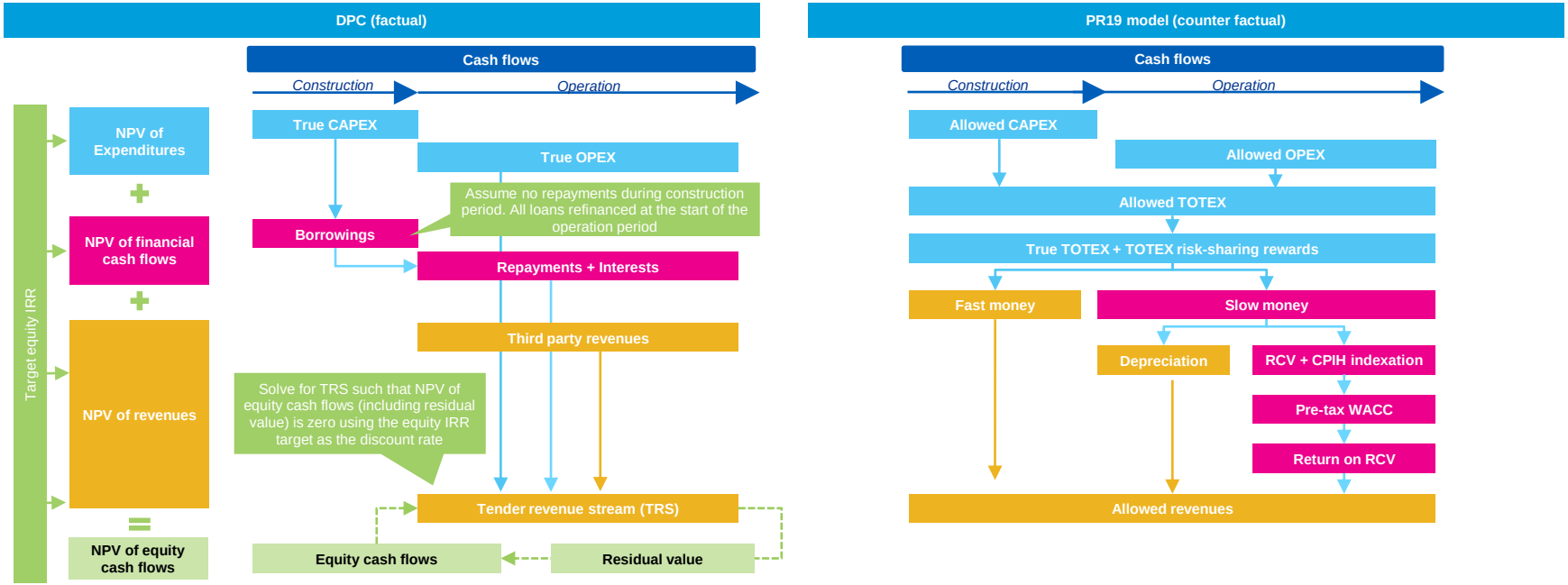
Cost Benefit Analysis Calculations: Revenue over the Contract Period

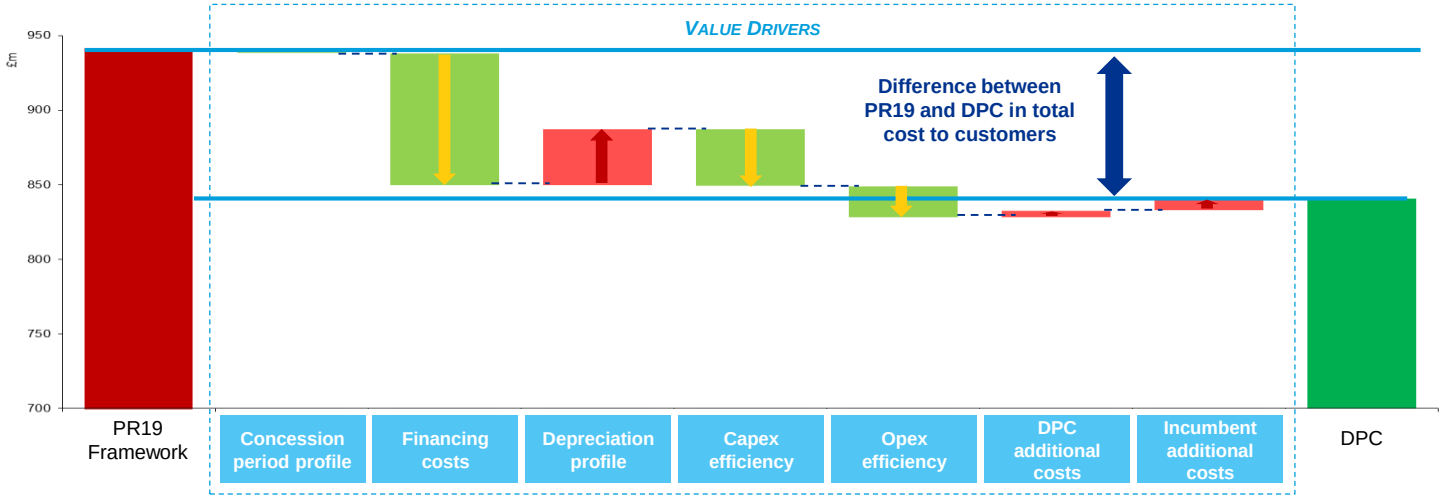


Cost Benefit Analysis Model Outputs – Value Drivers

The extent of customer value for money will be determined by a number of value drivers that explain the difference in overall costs to customers under a DPC versus the counter factual.

- Theses layers can be both positive or negative depending on the schemes characteristics, i.e. factual (DPC) can have benefits or disbenefits compared to the counter factual. A quantification of potential customer layers of value will be heavily dependent on assumptions used in the model.
- The chart below sets out the various value drivers that will be assessed under the quantitative CBA analysis, and a stylised example of how the value layers will be presented in the results.

Movements in PR19 v DPC



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3. Assessment Results and assumptions

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1a. Technical Assessment

GTW

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 1: Interactions with Stakeholders

This section presents the technical assessment of GTW for the four criteria and indicators. Covering relevant project characteristics, the assessment and the assessment rationale.

Indicator	Project characteristics	Assessment	Assessment rationale
What is the nature of the stakeholder interactions?	— NRW to set new compliance limits for the seven current WwTW in 2021. — New relationships to be established with Carmarthen Bay representatives and NRW operational staff. — Brownfield site is close to residential properties but has yet to be purchased, however other local sites are available. We have compulsory purchase powers but are reluctant to use these.	*Less discrete* — *More discrete*	— Risk created by uncertainty over the compliance date, which may impact project timeline. — Numerous local groups to engage with, which will increase operational costs for CAP. — Alternative sites and purchase powers minimises risk.
Does the scheme have an impact on our statutory obligations?	— More stringent discharge compliance limits have been set for Carmarthen Bay (phosphorous, biochemical oxygen demand (BOD), microbial standards, habitats licence), increasing risk of non-compliance. — GTW has a potential impact on discharge permit obligations but scale is unlikely to impact performance commitments. — Late delivery of scheme due to delay in construction would result in continued use of Gwili and Gwendraeth rivers, triggering non-compliance with the National Environment Programme (NEP) and uncapped fines from NRW.	*Less discrete* — *More discrete*	— Lower pollution limits have been imposed for the bay, which makes the risk of non-compliance greater. We will seek to pass fines for pollution due to any CAP operational failure through to the CAP. — Late delivery penalties will be allocated to the CAP, however the pricing of this risk will be challenging.
Are stakeholder interactions particularly complex?	— Relationship with NRW when wastewater treatment was previously outsourced was difficult. — NRW may issue more stringent discharge limits over time to reflect changing understanding of environmental impact/changing environmental regulations.	*Less discrete* — *More discrete*	— Incumbent is better placed to manage complexity of agency interactions to facilitate sampling, analysis, compliance and corrective action. — Additional capex and opex during contract may be required to meet changes to discharge consents. — Consent amendments would be addressed as reopeners or in extreme circumstances, step-in rights. Risk of this may affect investor appetite.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 2: Interactions with Existing Network

Indicator	Project characteristics	Assessment	Assessment rationale
How many connections to the wider network are there?	— GTW will interface with each of the existing catchments for the seven WwTW it is replacing. — Each catchment will have a pumping station operated by the CAP. — Incumbent will undertake operational work within the catchments for example, combined sewer overflows which often have screening which require monitoring and maintenance.		— Single incumbent operating seven catchments has a higher number of connections, but less complex contractual arrangements. — Single outflow does not interact with network. — Scheme is largely separable from the wider network due to the relatively low number and strategic importance of interactions.
What is the nature of the interactions with the network – passive asset vs. complex asset?	— Asset requires active management but there are passive interfaces between the catchment. — Network operated by CAP and GTW require minimal operational coordination during normal operations. — An active operational interface between the incumbent and CAP is required to manage throughput during storm events. — New connections to the network would require active management and coordination between CAP and incumbent.		— Minimal operational interface requires low contractual complexity. — Operational procedures to manage throughput to GTW can be captured under contractual obligations. — New connections into the network would require active management and coordination with incumbent.
Are there economies of scope/scale from the incumbent delivering the scheme?	— Current network has two FTEs with a central control centre at Lwyrn. Maintenance and operational staff work across our 834 current WwTW. — We delivered Cardiff WwTW in 2000 to serve population of 90,000. Previous delivery offers some economies of scope and scale for incumbent but this is limited. — South Wales sludge strategy includes three large anaerobic digestion treatment centres. GTW will thicken sludge to be driven to advanced digestion plant.		— Our local economies of scale/scope to reduce costs for labour, flexible resourcing and shared expertise would be lost through DPC delivery. — Bioresources economies of scope may be lost under DPC regime. — CAP may have more flexibility with respect to operational, management and processes, which could lead to efficiencies where the contract is not constrained by requirements to meet existing arrangements such as, staffing levels and union requirements.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 3: Contributions to Supply/Capacity

Indicator	Project characteristics	Assessment	Assessment rationale
Can the schemes output be easily and accurately measured?	— Consent limits are based on widely accepted quality testing processes. — NRW take monthly samples of water quality to monitor compliance for a large number of processes.		— Ourselves and NRW monitoring the outputs will ensure output can be clearly set out in contractual arrangements without required additional complexity. — Defined standards in discharge consents can be clearly expressed in contractual arrangements with well understood compliance monitoring.
Can the schemes output be easily defined/ specified?	— Permit for concentrations and dry weather flow permit prescribe allowed output. — Flow variation and control can be specified within the contractual arrangements. — Bioresource outputs are not clearly specified.		— Clearly defined and specified output will ensure clarity of scope in tender and procurement stage – minimising tender costs for bidders. — Bioresource output is not specified and could be an additional revenue stream for CAP but may create an additional interface.
Is the output expected to vary over time?	— Economic and demographic growth is forecasted but the basis for scheme needs a time horizon to 2036 with high degree of certainty. — Currently serves 20,000 PE and is estimated to be 40,000 by 2036. If additional capacity is required a CAP is unlikely to be adverse to additional expenditure. — NRW may issue more stringent discharge limits over time to reflect changing understanding of environmental impact/changing environmental regulations.		— High levels of certainty in capacity forecast reduces potential variability. — Contractual arrangements would have to allocate the risk of changing consent limits, reopeners, or (in the case that the CAP delivers an asset which does not comply with new discharge limits) step-in rights. — Variations over time may be more challenging to effect through third party contracts and may come at a cost. — CAP will not be adverse to additional expenditure due to increased revenue stream, but contractual management of a reopener is likely to be complex.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 4: Asset and Operational Failures

Indicator	Project characteristics	Assessment	Assessment rationale
How mature is the schemes supply chain?	— Conventional WwTW technology being proposed at site has a well understood and mature supply chain. — High availability of asset components, materials, expertise and knowledge — Limited precedents of third party operators in UK water sector outside of the incumbent companies.	*Less discrete* — *More discrete*	— Mature supply chain reduces potential impact of unexpected failure during construction or operation. — Proposed process technology is conventional and mature. If more innovative and alternative processes were selected as the project develops, there may be a less capable supply chain established.
Have similar schemes been delivered before?	— We delivered a WwTW which became operational in 2000. It serves a population of 900,000 compared to GTW which serves 40,000. — We own and operate 834 WwTW. Current operational experience and expertise of addressing asset and operational failures. — Delivery of conventional WwTW across the sector and the associated risks are very well understood.	*Less discrete* — *More discrete*	— Wide supply chain experience in delivering similar schemes across the sector potentially reduces the risk associated with loss of our experience.
Is robust historic data on failure rates available for similar schemes?	— Similar scheme asset and operational failures is widely available under reporting mechanisms such as ODIs, Performance Commitments, APRs, regular monitoring of discharge consent compliance. — Carmarthen Bay is a sensitive area with potential impacts on shellfish waters and bathing waters. — GTW is downstream of catchments and is therefore impacted by any deterioration which leads to higher flows.	*Less discrete* — *More discrete*	— Well understood asset performance means probability of failure to be more accurately priced into the contracts. — Impact on Carmarthen Bay can be inferred but lack of local precedent creates uncertainty when pricing risk impact. — Deterioration of catchment networks creates a risk that GTW may be required to treat higher flows and which creates a risk for the CAP.

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1a. Technical Assessment

MTW

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 1: Interactions with Stakeholders

This section presents the technical assessment of MTW for the four criteria and indicators. Covering relevant project characteristics, the assessment and the assessment rationale.

Indicator	Project characteristics	Assessment	Assessment rationale
What is the nature of the stakeholder interactions?	— Construction will require engagement with customer representative groups, planning and environmental departments local landowners, Brecon Beacons National Park Authority. — Level of interaction required with incumbent is high due to interdependencies of SEWCUS network. — SEWCUS network serves the Welsh capital, almost half the Welsh population and the headquarters of the Welsh Government. — DWI have served two notices in relation to the odour and colour of water delivered.	*Less discrete* — *More discrete*	— Stakeholder engagement during construction is not unusually high for a large infrastructure project. — We will require substantive obligations within the contractual arrangements to cover reputational and financial risk of failure to supply or a drinking water quality incident. — DWI interactions may be complicated as water quality could be impacted by CAP and our operational or asset failure.
Does the scheme have an impact on our statutory obligations?	— Scheme has very high potential impact on statutory obligations in terms of quality and quantity. — 12 to 24 hours of no supply from MTW would irreversibly affect the an annual ODI in terms of ERI and CRI. — Late delivery of the project is unlikely to impact our ability to perform our statutory obligations as the current process can be continued. — Connection into SEWCUS network means a pollution incident could impact up to 1.4 million customers. — We currently set higher standards than DWI require due to customer feedback.	*Less discrete* — *More discrete*	— We will require substantial KPI financial payments to cover financial and reputational risk of failure of supply and subsequent impacts on our statutory obligations. — As the licence holder, we will want certainty in the contractual arrangements that the CAP will comply with water quality statutory obligations and has adequate schemes in place to offset financial and reputational effects.
Are stakeholder interactions particularly complex?	— We have not yet engaged government on project or potential for DPC delivery. — Network update within scope of project will only relate to connection to mains but phase 2/3 would begin to stretch down towards Cardiff. — Preferred site has topographical characteristics which are preferable for gravity filters. Not acquiring the preferred site will have detrimental effect on the cost of the scheme and timeline.	*Less discrete* — *More discrete*	— Scale and proximity to capital of the scheme is likely to make it susceptible to scrutiny from stakeholders which may impact investor appetite. — SEWCUS pipeline projects will require reopeners which may be viewed as riskier by potential investors. — Site unavailability may have a significant impact on project design and scope.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 2: Interactions with Existing Network

Indicator	Project characteristics	Assessment	Assessment rationale
How many connections to the wider network are there?	— Three inputs into the network from the three existing WTW fed from existing dams which will require continued maintenance and the construction of one pumping station. — Two further WTW are planned to be integrated into the asset during the contractual period. — Three output points, two of which into the existing SEWCUS network and one to serve valley town. — Inclusion of a discharge point into river for overflow capacity. — Three WTW will maintain operations until construction is complete with some additional mitigations to address DWI quality concerns. — Additional capacity at two further WTW could be brought into network via MTW to increase resilience.		— Higher number of input (three plus further planning) and output (three plus an outflow) connections to the network than a typical WTW. — There is a need for increased coordination between CAP and incumbent during construction to maintain supply .
What is the nature of the interactions with the network – passive asset vs. complex asset?	— SEWCUS network management will require active interactions, complex operational procedures and real time monitoring, communication and management. — Bi-directional flows between Cardiff and Newport allow for optimisation of fluctuating supply between the northern water sources and eastern strategic link. — Active forecasting of required network demand and supply to optimise additional resilience created by water storage tank capacity at MTW. — Three treatment streams at Merthyr allow capability to shut down a production stream to allow maintenance activities to be undertaken include refurbishment and replacement work.		— Scheme is heavily integrated within our system but physical connections are relatively simplistic. — We will actively manage supply from MTW as part of the SEWCUS network but CAP's interactions will be more passive, responding to supply needs. — Our operating central control will continually engage with the CAP requiring complex contractual arrangements and operational procedures. — Increased compliance monitoring and legal support may erode potential benefit to customers from DPC delivery.
Are there economies of scope/scale from the incumbent delivering the scheme?	— Implementation and operation of SCADA across SEWCUS would provide operational economies of scope and scale for us. — Localised flexible resourcing and expertise currently shared across region would not likely be achievable by CAP.		— Single management of supply and demand of SEWCUS may offer greater total operational efficiencies than delivery by CAP. — CAP may be able to access similar levels of economies of scope and scale for material, power and chemicals. — CAP would not be able to utilise the localised expert resource we have in SEWCUS region. — Additional network capacity would create an additional interface into MTW.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 3: Contributions to Supply/Capacity

Indicator	Project characteristics	Assessment	Assessment rationale
Can the schemes output be easily and accurately measured?	— Variable output will be required to optimise network continuously. — Central system will provide high accuracy information on asset inputs, outputs and stores. — Integration with the rest of the SEWCUS network will allow for remote monitoring of CAPs performance against requirements. — Output water quality monitoring based on statutory obligations will require robust monitoring, reporting and compliance assurance.		— Ourselves and DWI monitoring the output can be clearly set out in contractual arrangements to reflect variable requirement. — Well understood raw water quality and clearly defined output limits are easily transferred into clear tender documentation and contractual arrangements.
Can the schemes output be easily defined/ specified?	— Required volumetric output will be dependent on SEWCUS demand and real time capacity of other WTW in network. — Storage facility utilisation is dependent on supply capacity of the rest of the network. — MTW needs to supply a minimum for population in higher lands who cannot be served by the rest of the SEWCUS network equal to approximately 60 Ml/d. — SEWCUS network collectively must provide guaranteed maximum supply for 1.4m population.		— Primary output is clearly defined within thresholds of quality and quantity. — Served population is well understood and there is high certainty in the forecasted demand and output specified in contractual arrangements.
Is the output expected to vary over time?	— Expected low variance in require output as MTW will be lowest cost of water in network. — High levels of certainty in the demand forecast for the region with significant capacity head room. — Substantial change in rate in water quality deterioration could create additional cost of treatment although this is unlikely.		— Well understood and predictable output reduces operating expenditure risk. — Payment terms can be agreed with high level of certainty between CAP and incumbent. — Certainty over revenue streams is likely to improve attractiveness of the project and help reduce costs of financing. — Willingness of the CAP to accept some demand risk would need to be established and may result in higher costs due to variability.

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Less suitable for DPC — *More suitable for DPC*

Discreteness Criteria 4: Asset and Operational Failures

Indicator	Project characteristics	Assessment	Assessment rationale
How mature is the schemes supply chain?	— Our project delivery is either undertaken by the alliance or through competitive tender. MTW is a significantly larger project than typically delivered by the alliance. MTW would most likely go to competitive tender and would require a special ring fence team. — The detailed feasibility study for MTW will consider conventional and unconventional water treatment technology such as microfiltration and ceramic membrane. — DWI is driving additional expenditure across the industry following United Utilities cryptosporidium outbreak. Requirement of no single point of failure will drive investment across the industry with similar schemes.	*Less discrete* — *More discrete*	— Unsuitability of alliance to deliver project suggests that there is a limited supply chain able to service a project of this scale/complexity. — Conventional technology supply chain is mature in the UK and globally. — There is a limited UK supply chain for unconventional technology is membrane filtration is employed. This may exacerbate the impact of a potential failure due to delay in parts delivery, greater costs and long supply interruptions.
Have similar schemes been delivered before?	— We have estimated that there are approximately half a dozen companies who have the capability to deliver MTW with conventional technology. — South West Water and Anglian have unconventional membrane technology delivered at two sites with at least 2 more planned. — Few precedents of operation of WTW with high required levels of active and complex management with an interconnected supply network operated by a different entity. — Recent pollution incidents demonstrated that asset or operational failures impacting water quality can be missed by early identification and contaminate an entire network.	*Less discrete* — *More discrete*	— Limited precedents of recent schemes of this size may reduce the appetite for this project, however precedents do exist of PPP type arrangements for WTW. — Low probability but high impact of water quality incident will likely require suppliers to maintain a minimum level of commercial insurance.
Is robust historic data on failure rates available for similar schemes?	— Operational and asset failure at WTW is well understood and documented under reporting mechanisms such as Performance Commitments, APRs and DWI methodology. — Two of the existing sites have had recent land slips – there is limited land footprint at each site for further construction. Risk of landslip on new site is unknown but in a similar region to other WTW. — Limited asset and operational data for unconventional technology.	*Less discrete* — *More discrete*	— High levels of statistical confidence in failure rates of conventional technology allows for more efficient pricing. — If a more unconventional technology is adopted greater risk over the long term performance of the plant and associated lifecycle costs may present greater risk.

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2. Value for Money Assessment

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Quantitative Value for Money Assessment: Input Ranges

This section presents the key financial input range assumptions of the potential benefits which could be gained under a DPC delivery model. The benefits of financing and capital and operational savings were considered as part of this value for money analysis. These ranges are based on market observations for comparable industries and project finance under equivalent regulatory regimes to the proposed model for DPC.

Key input assumptions	DPC scenario		PR19 scenario	
	Model input ranges	Rationale	Model input ranges	Rationale
Cost of debt	Construction 3.7% -3.9% Operations 2.7 -2.9%	Based on market observations and recent transactions: — Bank debt through construction: 6M LIBOR plus (+ 220bps to 240bps) — Bank debt through operations 6M LIBOR plus (+ 120bps to 140bps)	5.37%	— Wholesale PR19 WACC cost of equity and cost of new debt (nominal on CPI H basis) — WACC constant through model period — Assumes 2% CPI H inflation forecast per Ofwat PR19 methodology
Cost of equity	9 -12%	Expected equity IRR from recent project transaction precedent in different infra sectors and across the market		
Gearing	80-90%	Typical project finance gearing	60%	PR19 notional gearing
Depreciation/ Run-off	To leave 0-50% asset value after 25 year concession period	To allow reasonable time period for recovery of initial investment (25 years).	Straight line over asset life	In line with typical price control practice
PAYG	N/A	Not part of DPC framework but capitalisation in line with expenditure	Asset specific PAYG	In line with marginal PAYG rate on specific asset
Opex efficiency	19 – 23% on total scheme costs	Ofwat expect competitive pressure on capital and operational costs for projects under the DPC framework. Range based on OFTOs, CATOs, NAO PFI assessment and independent analysis of Australian PPP infrastructure contracts.	-1% to +1% per annum	Assumes we could out-perform forecast
Capex efficiency	-10% to +10% on total scheme costs		-10% to +10% on total scheme costs	Assumes we could out-perform forecast

Note: Ofwat also expects new savings to increase over subsequent tender rounds, but as both projects will begin construction in AMP this benefit was not included in the analysis. Ofwat also expects a competitive tendering process to more accurately reflect costs rather than Ofwat estimates. We have assumed, for the VfM analysis, that these benefits are captured in the capital and operational savings observed in comparable precedents.

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Quantitative Value for Money Assessment: Base Case

This section presents the base case input assumptions from the market precedents under comparable regulatory and financial regimes. The base case inputs were generally selected as the median or near median values of the identified ranges. They were used to build the waterfall chart to demonstrate the key drivers of the value for money for customers analysis under DPC delivery compared with under PR19.

Key input assumptions	DPC base case	PR19	Rationale for DPC and PR19 assumptions under base case scenario
Cost of debt	Construction: 3.7% Operations: 2.85%	WACC: 5.37%	— Base case assumes higher limit on financing costs associated with relative size, complexity and risks associated with treatment works assets. — Equity investors for project of this scale are likely to require higher returns than for larger more standardised projects and given it includes construction risk — Assumes debt refinancing post construction at lower rate to reflect lower risk during operational phase — PR19 Ofwat WACC forecast based on PR19 methodology published in December 2017 on CPIH basis — CPI H assumed at 2% in WACC calculation
Cost of equity	10%		
Gearing	*See note*		
Depreciation/Run-off	60% of the asset is depreciated over the contract period.	Straight line over full asset life of 60 years	— Typical PFI/project finance arrangements would have the asset value paid in full over the concession period. — This results in there being no terminal value at the point of contract end and is likely to be attractive to investors albeit it accelerates payment for customers. — Deprecation under PR19 is in line with PR19 framework and depreciation of asset is on straight line basis over asset life of 60 years — The base case assumes 60% of the asset is depreciated over the contract life recognising this is likely to be more acceptable to investors and is close to the mid point between full depreciation and zero depreciation over the contract life but adjusted to reduce investor risk further.
PAYG	N/A	Consistent with opex and capex profile of asset	— Under PR19, the asset specific PAYG rate has been assumed as opposed to the average company PAYG which supports a consistent comparison with the DPC assumptions — PAYG does not feature under a DPC model
Opex efficiency	10%	0%	— Assumes equal opportunity for opex and capex out-performance under both PR19 and DPC delivery routes and under PR19 would equate to potential Ofwat challenge. Increased operational efficiency inline with Ofwat guidance which calculated operational savings in the range of 18-21%
Capex efficiency	6%	0%	
Bidder costs	2% of project value	n/a	— Based on Ofwat methodology update impact assessment (see appendix for further detail)
— Pre-tender — tender — contract management	— £1m — 1% of project value — £150k annually	n/a	

Note: Gearing is an optimised output of the model, as per project finance methodology, limited within the bounds of a Debt Service Cover Ratio (DSCR) of 1.25.

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Project Evaluation: Quantitative Value for Money Assessment

Cost of debt: Financing Assumptions

Construction	Operations
Merthyr treatment works	
Base rate 3 Year Forward LIBOR[1] Tenor 17 years[2] 1.5% **Margin** 220 to 240 bps[3]	**Base rate** 3 Year Forward LIBOR [1] Tenor 17 years [2] 1.5% **Margin** 120 to 140 bps [3]
Gwili Wastewater treatment works	
Base rate 3 Year Forward LIBOR[1] Tenor 15 years[2] 1.5% **Margin** 220 to 240 bps[3]	**Base rate** 3 Year Forward LIBOR [1] Tenor 15 years [2] 1.5% **Margin** 120 to 140 bps [3]

- Bank arrangement fees of 2%
- Commitment fees: Annual fees at the rate of 35% of the applicable senior debt margin, charged on committed undrawn debt facility or on undrawn standby facilities

1. Source: Thomas Reuters Eikon forward yield curve taken at 29 December 2017
2. Source: Weighted Average Life (WAL) of construction and operations period
3. Source: Based on margins of comparable projects