Anglian Water

11C. ANGLIAN WATER DIRECT PROCUREMENT FOR CUSTOMERS: DPC ELIGIBILITY ASSESSMENT

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Direct procurement for Customers

DPC Eligibility Assessment

August 2018

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1. Executive Summary

Executive summary

Introduction and overview

- Anglian Water Services (AWS) is considering the opportunity Direct Procurement for Customers (DPC) may be able to play in the context of its investment plan for AMP7 and beyond and where DPC could help to realise additional customer value for money compared with the conventional Price Review (PR) framework.
- KPMG has been engaged to support Anglian Water Services in considering this opportunity and whether projects within AWS' investment plan are likely to be suitable for delivery under a DPC model.
- This document is the final private report setting out the assessment framework, asset evaluation and analysis and key findings, a summary of which is provided as part of this Executive Summary.

AWS Investment plan

- The large enhancement projects within AWS' investment plan are driven by its revised Draft Water Resource Management Plan (WRMP) to be published in early September 2018. Investments are largely targeted at improving resilience and meeting emerging supply/demand deficits in its water supply region given the water scarcity issues that AWS is facing as a result of growth, sustainability reductions in abstraction levels and climate change impacts.
- Given the relatively early stage of development that some of these project are at, development costs are expected to be incurred in the next AMP and therefore even those projects that are expected to be delivered in AMP 8 and AMP9 have been considered where there is greater certainty based on WRMP scheme selection.
- The scheme costs included in the report are based on AWS cost projections included in the final PR19 Business Plan.

Eligibility framework and methodology

- In order to assess projects for DPC suitability, an eligibility framework has been developed that considers a number of project characteristics and is closely aligned with key criteria Ofwat has set out in its Final PR19 Methodology document published in December 2017.
- Specifically, the framework focuses on the size of the project relative to Ofwat's £100m whole life totex cost threshold, technical eligibility (i.e. level of discreteness and separability of the project) and customer value for money delivered under the factual, DPC model, against the counterfactual, conventional price control (PR19) framework.
- The frameworks are underpinned with a number of key assumptions and in some cases there are limitations associated with the assessments and which are highlighted in relevant sections.

Executive summary

Asset evaluation

Size test

- The £100m whole life totex threshold was applied to all major projects within AWS' investment plan. The project's expenditure was considered over the typical period of a PFI concession (25 years plus construction) on an undiscounted basis as opposed to the full asset life given the concession period expenditure is the value in scope for competition under the DPC model.
- The analysis suggests that the projects likely to exceed the £100m threshold are South Lincolnshire Reservoir, Smart metering programme, North Fenland Transfer and Treatment and Elsham Transfer and Treatment schemes.

Technical assessment

- Each of the assets exceeding the size threshold have been evaluated against the qualitative technical 'discreteness' framework to determine technical eligibility for DPC.
- The project characteristics were captured in a project template completed by AWS subject matter experts (SMEs) in order to inform a preliminary assessment of the assets by KPMG.
- This preliminary assessment was then reviewed and updated as part of a workshop with AWS' SMEs where further details and specific asset characteristics were considered to inform a more comprehensive analysis of the projects against the technical framework.
- The assessment was based on specific characteristics of the assets under consideration and cannot be regarded as general views that apply to similar type of assets that may have other specific characteristics.
- The results of the technical assessment showed that some assets can be seen as more suitable for DPC than others. The South Lincolnshire Reservoir was assessed as most technically suitable achieving a score of 14 points, followed by North Fenland Transfer and Treatment with a score of 12 points. Elsham Transfer and Treatment and the smart metering programme scored significantly lower on the technical assessment and were considered overall as less suitable for DPC'.
- Only projects meeting the size test and which were considered more suitable from a technical perspective (i.e. scoring 12+ as part of the technical assessment) were subject to a full value for money assessment as part of the quantitative analysis.
- As a result of the technical assessment the list of project considered for DPC was filtered down to two, the South Lincolnshire Reservoir and the North Fenland Transfer and Treatment scheme.

Executive summary

Asset evaluation

Value for money

Quantitative analysis

South Lincolnshire reservoir

- The base case customer value for money analysis suggests that customer value for money could be realised through delivery of South Lincolnshire Reservoir under a DPC model.
- This is largely driven by financing benefits and potential capital and operating efficiencies which are only partially offset by an accelerated depreciation profile and additional costs associated with DPC delivery to both the DPC and AWS.
- Sensitivity modelling revealed that under all scenarios, DPC delivers greater value to customers, with savings to customers ranging between 4% and 13% in NPV terms over asset life compared to counterfactual.

North Fenland transfer

- The base case customer value for money analysis suggests that customers would not benefit from delivery of the North Fenland Transfer and Treatment scheme under a DPC model.
- The relatively small size of the scheme reduces the potential for financing benefits and the reduced scope for capital and operating efficiencies, given the small, non-complex and relatively simplistic operating requirements of the asset, are more than offset by the additional costs and accelerated depreciation profile under a DPC arrangement.
- Sensitivity modelling included in the appendix does not suggest increase efficiencies and lower financing costs would materially improve this position.

Value for money

Qualitative analysis

- As the VfM analysis showed greater value to customers under a DPC delivery model for the South Lincolnshire Reservoir it was assessed against the qualitative value for money framework to identify whether it would be likely to realise value for money for customers when compared to the counterfactual (i.e. delivery under the conventional Price Review framework).
- The reservoir scored ‘Medium to high’ in terms of potential to deliver value for money for customers. Key rationale included the likely market appetite which was assessed as ‘High’ based on the size and potential pipeline of similar schemes over coming AMPs and general demand for UK infrastructure assets and limited availability of such projects. However, it scored less favourably on the potential for innovation given the relatively low complexity of the asset. In addition, its scale suggests there may be some opportunity to realise further efficiencies.

2. Introduction and context

DPC process and governance across the project

The DPC eligibility assessment was based on a framework developed by KPMG and has involved extensive engagement with the Executive Management Team at Anglian Water and interactions across the project with subject matter experts and key stakeholders as illustrated below.

Portfolio Group Steering Committee

(Including: Head of Direct Procurement (Chair), Asset Management Director, Regulatory Director, Capital Delivery Director, Resilience Director, Head of Investment Planning, WRMP team, Head of Finance, Head of property, Head of Programme Management, Project Team)

Individual meetings and interviews

Regular Steering Group meetings November 2017 to March 2018

Project team

Head of Direct Procurement, KPMG

Weekly progress reporting and project meetings for core team across project duration

Key subject matter experts and stakeholder groups

WRMP team

Investment Planning Group

Finance team

Regulation and PR19 project team

Water and wastewater Operations team / IMDS Metering and Developer Services Alliance

Interviews, discussions, workshops and review sessions with key subject matter experts across the project duration

Internal assurance and audit by CH2MHILL (Assurance provider) and Deloitte (Auditor)

1. Introduction to DPC

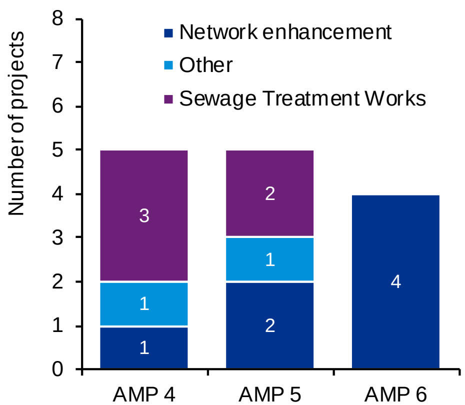
Introduction to DPC

Direct Procurement for Consumers

As part of PR19 proposals, Ofwat set out its expectation for appointed companies to use Direct Procurement for Customers (DPC) to directly procure relatively discrete projects with a whole-life total expenditure (TOTEX) value in excess of £100m from third parties.

Looking back over the last 15 years at the three previous price reviews, 4-5 projects would have had a capex value in excess of £100m at each review. The average project size per regulatory control period is c.£275m but there is significant variance amongst the projects.

Number and type of potential DPC project in each AMP (4-6) (based on those of £100m+ capex)



Ofwat's previous analysis considered that between 2-4% of the value chain could be covered by DPC at future reviews and that £400-£800million of net benefits might be gained from this model (drawing heavily from the OFTO experience). However the counterfactual comparison here is highly challenging, particularly in an environment where the WACC is expected to be sub 2.5% (RPI real) and where companies have highly developed capital delivery models and a track record of significant cost outperformance.

PR19 Final Methodology: Key considerations

Ofwat's PR19 Methodology, published in December 2017, has provided further details on the DPC model. The Methodology places the onus on companies to develop a robust framework for assessing the suitability of projects for DPC and the approach to procurement and contracting with a third party DPC provider.

Specifically, Ofwat has set out a number of key principles including:

- **A threshold of c.£100m whole-life totex although smaller schemes could be considered if companies believe they could provide value to customers.**
- **No licence for CAP providers and licence modifications to incorporate allowed revenues (i.e. no separate price control).**
- **Excludes schemes under the bio-resources price control given plans to create new markets in this part of the value chain.**
- **Prohibition on incumbents or group companies bidding for assets within their own region.**

Examples of projects that would qualify for the direct procurement scheme from previous AMPs include:

AMP6 – Birmingham resilience main scheme

Severn Trent's network enhancement as part of the Network Plus. Capex equal to £265 million in 12/13 prices.

AMP5 – Brighton and Hove STW

Southern Water's sewage treatment works as part of the Network Plus. Capex equal to £226 million in 12/13 prices.

AMP4 – Shell Green Incinerator

United Utilities' bio-solids project. Capex equal to £120 million in 12/13 prices.

Introduction to DPC - scope and incentives

Other regimes in energy (OFTOs/CATOs) and existing PPP/PFI assets provide important precedents against which to consider Direct Procurement within the water sector, particularly the scope (flexible approach to opex) of the contract and the incentives.

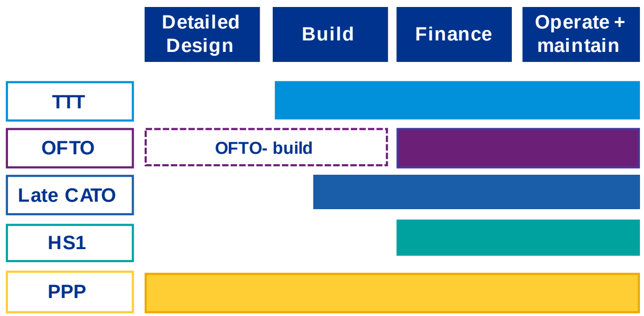
Deciding on potential structures to adopt for DPC is a challenge given the immature nature of the market and untested regulatory framework- how will it work.

Ofwat have set out some parameters but there are still significant gaps for companies to fill in even just as part of the CBA. Companies' DPC model will need to consider issues like:

- **Which risks are being allocated where in the proposed model and how does that compare to the current risk allocation?**
- **Are you going 'early' or 'late' tender?**
- **How are the contracting arrangements going to work at a high-level, specifically with reference to the payment mechanism?**

Companies are also required to develop a practical work-plan/timelines for projects considered eligible for DPC.

Scope of project activities in other infrastructure procurement models- what will scope of DPC be?



Revenue adjustment mechanisms from water PPP/PFI schemes- what about contracts?

Water treatment plant

Payments commence post construction

Payments based on:

- Capacity charge based on availability of water treatment asset
- Partially volume based on output from treatment works

Performance deductions based on reduced capacity, quality and management reporting

Share of any refinancing gains

Capacity charges are partially index linked and volumetric charge fully index linked

Payment mechanisms are highly specified

Comparison of price control arrangements- what approach should be taken for DPC contracts?

Regime	Duration	Opex	Re-openers?	Indexation?	Incentives?
TTT	Fixed during construction with first price review in c.2029	Post construction revenues subject to periodic review	Limited – government support package for high-impact/low-likelihood risks, and true-up for difference between forecast and outturn during construction	Yes – as well as revenues, there is a financing cost mechanism that protects against large changes in the market cost of debt	Yes – incentive for delivery
OFTO	20 year revenue stream (TRS)	Covered by TRS	Limited – adjustments for changes in specific cost elements, or as a result of additional capex required during the operational phase	Partial – proposals for which elements of the revenue allowance are indexed are included in the bids	Yes – availability incentive
CATO	25 year revenue and depreciation	Covered by 25 year revenue stream	Limited – adjustment to revenues allowed as the result of unforeseen events, considered on a case-by-case basis	Partial – proposals for which elements of the revenue allowance are indexed are included in the bids	Yes – incentives for timely project delivery, operational performance, asset management, environmental performance and enabling connections (where relevant).

2. Ofwat Final Methodology

Interim support for Direct Procurement for Customers (DPC)

Ofwat Final Methodology

Aspect	Area	Key points from Final Methodology
Procurement principles	**Incumbent eligibility to bid**	• Incumbent is prohibited to bid in any form in own area • As part of its unregulated business incumbent can participate in other water companies' tenders
	Skilled resources	• Emphasis on access of skilled resources required for the procurement and contract management
	Deliverability	• Companies will need to engage with and test the market in the early stages of the process • Companies need to make sure there is enough certainty about projects when they run tenders • Deliverability is a key aspect to be considered in the bid evaluation – Companies need to satisfy themselves that the CAP has the resources necessary to deliver the project
DPC contract principles (generally minor changes to Draft Methodology)	**Contract duration**	• 15-25 years depending on the asset type • To be defined through market engagement
	Statutory obligation	• Companies remain ultimately responsible for ensuring their statutory and licence obligations are fulfilled • While companies can contract out the execution of these obligations, they cannot contract out the responsibility for compliance
Cost assessment	**Procurement and contract mgmt. costs**	• Companies are allowed to recover their costs related to procuring the DPC and contract management over the contract period
Licence condition	**Licence changes**	• Prohibition on the appointee awarding and holding a DPC contract to an associated company • Companies can recover CAP revenue from customers • Requirement to use reasonable endeavours to run a tender process • Requirement to provide Ofwat with information throughout the tender process, and in relation to the management and termination of the contract • Certain specified aspects of the companies' contract with the CAP will be included in the companies' licence, such as opex changes or refinancing gain-sharing
Contingency arrangements	**Failed procurement**	• Ofwat set out potential options to proceed which include (i) re-scoping and re-tendering, (ii) tendering after construction by appointee, (ii) delivering by appointee under PR19 framework. • Each case will be assessed individually

Ofwat Final Methodology

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

- 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

Asset suitability for DPC as included in Ofwat final methodology

Assets suggested as more suitable for DPC	Assets suggested as less suitable for DPC
▪ Water treatment works ▪ Wastewater treatment works ▪ Network enhancements	▪ Reservoir ▪ Desalination plant ▪ Transfer Scheme ▪ Reuse schemes

Ofwat Final Methodology: "Discreteness" test

Ofwat provides some further guidance on project size and 'discreteness' to consider in our assessment

Figure 1 : Potential framework for identifying DPC projects

Criteria		Projects somewhat more suitable for DPC	Projects somewhat less suitable for DPC
1. Project size		— Very large schemes with capex values in excess of £100m.	— Smaller schemes with totex values close to or below £100m
2. Project 'discreteness'	Stakeholder interactions and statutory obligations	— Limited or marginal impact on the appointees' ability to meet its statutory obligations (e.g. non-potable or raw water sources).	— Asset materially contributes towards appointee meeting statutory obligations.
	Interactions with the network	— Assets where there are limited economies of scale and scope with the rest of the appointees network system OR where those economies of scale or scope could be maintained through contracts. — Simple or limited, well understood and manageable interactions with the appointees' network. — Separate non-contiguous networks or assets within the appointee's area. — Assets where capacity is shared by multiple appointees. — More 'passive' assets (e.g. network enhancement pipes) that are not actively managed as part of the overall system.	— Assets where there are material economies of scale and scope with the rest of the appointees network system OR where economies of scale or scope cannot be maintained through contracts. — Significant, complex and frequent interactions with the appointees' network. — Assets that are actively managed as part of the overall system operation of the network.
	Contributions to supply/ capacity and ability to specify outputs	— Assets where capacity is regularly needed and contracting requirements can be more easily defined and priced. — Schemes where outputs can be clearly defined and are not subject to substantial change from other factors or difficult to predict in the future (e.g. around asset condition at handback).	— Assets where capacity is rarely needed (e.g. resilience schemes) and contracting requirements difficult to specify. — Assets where capacity requirements are not well understood/highly uncertain. — Schemes where outputs cannot be clearly defined.
	Asset and operational failures	— Assets where operational failure risk is well understood and mitigations well established for similar assets. — Well developed market or technical supply chains with strong experience of similar project delivery.	— Assets where operational failure risk is not well understood with limited track record of effective mitigations. — Weak market or technical supply chains with limited experience of similar project delivery. — Assets where there are no alternative back-up supplies.

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

	Line description	Item reference	Units	DPs	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
						PR19				
	Price base				2017-18 FYA (CPIH deflated)	2017-18 FYA (CPIH deflated)				
A	Project 1									
1	Development costs	APP21P101	£m	3						
2	Procurement costs	APP21P102	£m	3						
3	Contract management costs	APP21P103	£m	3						
4	End-of-contract asset value	APP21P104	£m	3						
5	Total appointee costs	APP21P105	£m	3	0.000	0.000	0.000	0.000	0.000	0.000
6	Expected CAP revenue stream	APP21P106	£m	3						
7	Expected CAP capex	APP21P107	£m	3						
8	Expected CAP opex	APP21P108	£m	3						
B	Project 2									
1	Development costs	APP21P201	£m	3						
2	Procurement costs	APP21P202	£m	3						
3	Contract management costs	APP21P203	£m	3						
4	End-of-contract asset value	APP21P204	£m	3						
5	Total appointee costs	APP21P205	£m	3	0.000	0.000	0.000	0.000	0.000	0.000
6	Expected CAP revenue stream	APP21P206	£m	3						
7	Expected CAP capex	APP21P207	£m	3						
8	Expected CAP opex	APP21P208	£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.

3. AWS Investment Plan

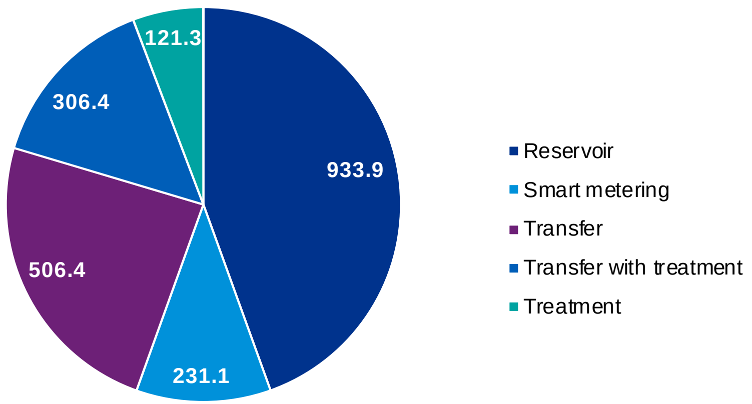
Overview of AWS scheme types

For the four asset types under consideration, size, complexity of design, and discreteness must all be considered in order to understand how DPC could be applied in a way that maximises value for customers.

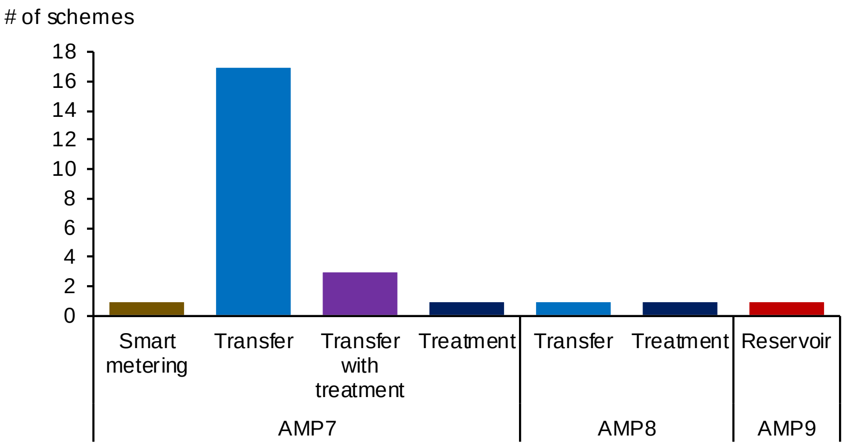
Scheme Type	Description	Number	Delivery date of first asset	Included in WRMP19 preferred plan
Reservoir	• Reservoirs are structures that hold large quantities of water, acting as a storage facility for the water company – they represent a supply side solution. • A water company can draw on the water held in a reservoir in periods of high demand, providing flexibility and resilience across a network.	1	AMP9	No, being considered in adaptive planning process ahead of WRMP24
Transfer	• Transfer schemes transport water through underground pipes either between WRZ's or inter-regionally, from one water company to another often from areas with excess supply to areas with deficits. • Transfer schemes are supply side solutions that support resilience through increasing system connectivity.	21	AMP7 onwards	Yes
Water treatment	• Water treatment plants process non-potable and raw water into potable water, that is fit for drinking. Water treatment plants are often located between raw water abstraction points (e.g. a river) and the customer supply network. • Water treatment plants are necessary for removing certain chemicals and impurities found in raw water to make it fit for human consumption.	2	AMP7 onwards	Yes
Smart Metering	• Smart meters report customers water usage at short regular intervals, allowing for more accurate bills to be provided. Smart meters also act as an incentive for customers to reduce consumption, acting a demand side solution to water companies. • Due to the relative infancy of the smart meter market, a number of different technology options are available to utility companies.	1 (Region wide roll-out)	AMP7 onwards	Yes

Locked down investment programme: Breakdown by asset type

25 year Totex projection by scheme type (includes enabling costs)



Scheme number and type by AMP period



- Total investment over contract life (25 years) of selected schemes is c.£2.1bn over AMP7-AMP9.
- Re-use schemes and treatment work associated with a reservoir recommissioning (Foxcote) have been classified as treatment works for the purpose of the assessment.
- The reservoir, with a total value of £934m, represents the largest single investment, followed by the smart metering programme with a value over of £231.1m and two transfer with treatment plants with combined value of £306.4m.

- All assets are water supply as opposed to wastewater schemes.
- The largest investment is expected during AMP9 at an over asset life value of c£1.95bn.
- While in terms of number, the majority of projects (22 in total) is expected to be online in AMP7, in terms of value this represents 47% of the total investment (ca £1.9bn).

4. Framework to assess DPC eligibility

Approach

This section represents the framework developed to assess scheme eligibility for DPC, which consists of four steps as outlined below. Each step represents an individual stage of the assessment and the process follows a cascading approach filtering down and identifying the most suitable projects for DPC. Only projects that pass the hurdle rate in the previous stages are taken forward in the assessment

A. VALUE LAYERS

- Framework from a customer value perspective
- Potential customer value layers: Financing costs, Cost Efficiency, Cost Savings, Innovation, Timing of Bill impact, Deliverability and Lead Time
- Wider strategic considerations for AWS that may have implications for DPC

B. ASSESSMENT FRAMEWORK

1 'Size' filter test

- Framework to assess schemes' size based on AWS projected costs for individual schemes
- Overview of key assumptions with rationale and commentary

2 'Discreteness' filter test

- Discreteness framework and tests including criteria such as physical asset location, interfaces, processes
- Overview of assessing the results for individual schemes and preliminary discreteness evaluation

3 Quantitative assessment

- Overview of the approach
- Assumptions under the factual and counter factual
- Assumptions informed by qualitative assessment
- Output of the assessment

4 Qualitative assessment

- Overview of qualitative framework and mapping to value layers
- Description of detailed criteria and indicators

KPMG

A. Value layers

Our framework from a customer value perspective

The overarching framework places customer value for money as the key consideration in selecting DPC eligible schemes for the PR19 submission.

- **In the framework the change in customer value under a DPC model ('factual') is assessed compared to a delivery by AWS under the current regulatory framework ('counter factual').**
- **From an economic perspective five potential layers have been identified that can drive value to customers under the factual (DPC) vs the counter factual (AWS) delivery model.**
- **Under the economic framework the potential values to customers are compared with the likely additional costs under the factual (DPC) vs the counter factual (AWS) delivery model.**

POTENTIAL CUSTOMER VALUE LAYERS

- (A) Financing costs
- (B) Cost efficiencies
- (C) Innovation opportunities
- (D) Timing of bill impact to customers
- (E) Deliverability and lead time

Some value layers may carry important risk implications for the project delivery

APPROACH

- Five layers have been identified than can potentially drive value to customers under a DPC delivery model.
- These five layers capture all value that can be derived from DPC.
- These layers are assessed in both a qualitative and quantitative assessment under a combined CBA test.
- These layers can be both positive or negative where no value is created under DPC.
- These layers incorporate the impact of any diseconomies of scale driven by network integrity.
- Each layer has a risk aspect attached to it which is also considered in the assessment.

Potential customer value layers

POTENTIAL CUSTOMER VALUE LAYERS	SOURCE OF VALUE
(A) Financing costs	• Higher or lower financing costs compared with PR framework resulting from differences in cost of capital in different market segments and market appetite • Impact of bid cost vs industry's allowed return, leverage, project financing
(B) Cost efficiencies	• Cost efficiencies that might be expected from market competition, improved productivity, innovative approaches that result in reduced costs • Costs occurring from one-off and ongoing management of new contractual interfaces vs existing arrangements
(C) Innovation opportunities	• The degree to which alternative options from the market can provide innovation in meeting the requirement, design innovation of the solution; innovation in constructability and operational innovation to deliver additional benefits to customers
(D) Timing of bill impact to customers	• Deferment of expenditure into customer bills based on profile of expenditure and revenues only being permitted at point asset is in use versus current PR framework
(E) Deliverability and lead time	• Risks or opportunities associated with early or late delivery of asset • Impact of delivery timetable on regulatory commitments (statutory obligations/ ODIs etc.)

B. Framework

Ofwat's DPC methodology framework and implications

Ofwat has set out guidance (for consultation) on what constitutes an eligible DPC project. The key areas to consider are set out below.

AREA	OFWAT CRITERIA	CONSIDERATIONS AND IMPLICATIONS
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 bioresources as Ofwat is planning to develop this market with different proposals.

Size	£ 100m totex	• Eligible projects are expected to cost over £100 million based on whole-life totex.
		• Totex calculation involves two key considerations:
		  • (i) period of time over the costs are considered where options include 5 years in line with BP, 25 years used for PFI type projects and 40 years used for CBA assessments.
		  • (i) cost types included in totex, i.e. development costs, initial capex, renewal capex, opex and financing costs.

Type	'Discrete'	• Projects highly integrated in appointees' networks may not be eligible for DPC. • Focus on interfaces, projects with several complex interfaces with existing assets may not be eligible for DPC. • Operational complexity of the asset and other dependencies with existing assets may also impact discreteness. • The value at risk related to the asset's integrated nature into the wider network does not seem to be considered.

Value for money to customers	High-value for customers and 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.

- **The DPC eligibility framework adopted in this report is based on Ofwat's high level criteria and provides interpretation and specification to ensure practical applicability of the approach.**
- **Ofwat's proposed framework uses 'size' and 'discreteness' as proxies for a wider VfM which is adopted in this assessment as a pre-filter for the detailed VfM assessment.**

3 levels of the assessment

Initial screening and scheme prioritisation

LEVEL 1
'Value'

Size filter: Is the scheme above the £100m whole life totex threshold?

NO → Scheme costs likely too small to deliver customer value for money → **Not eligible for DPC**

YES ↓

LEVEL 2
'Discreteness'

Discreteness filter: Based on a high level assessment of the schemes' discreteness can DPC delivery provide value for money to customers?

NO → Core to business operations and network management → **Not eligible for DPC**

YES ↓

LEVEL 3
'Vfm'

Value for money: Based on a detailed CBA consisting of a qualitative and quantitative assessment does a DPC delivery provide value for money to customers?

NO → Scheme does not provide customer value for money → **Not eligible for DPC**

YES ↓

Scope to deliver customer value for money / Eligible for DPC

Overall framework to determine asset selection for DPC

Below we set out the approach to assess the five potential layers that can drive value to customers under the factual (DPC) vs the counter factual (AWS) delivery model. A two step approach has been applied, an initial screening based on a 'size & discreteness' test followed by a detailed value for money test based on a qualitative and quantitative CBA model.

Initial screening

Level 1 Size filter test

- We will use Ofwat's proposed approach to proximate schemes' potential to deliver customer value for money.
- 'Size is used as a proxy for the scope for potential benefit and consider a size threshold of £100m whole life totex

Level 2 Discreteness filter test

- Discreteness' considers the asset's role as part of AWS' core operations and the extent to which it is integrated as part of network management
- The initial screening will inform the prioritisation of schemes that are most likely to offer net benefit for customers under a DPC delivery model

Level 3 Value for money test based on a CBA model

POTENTIAL CUSTOMER VALUE LAYERS	3a) Qualitative assessment	3b) Quantitative assessment
(A) Financing costs	Market appetite & Bankability Risks	Financing costs
(B) Cost efficiencies	Cost of interoperability Risk and cost of failure Regulatory interfaces	Cost savings due to efficiency Procurement, contract mgmt. costs Bid costs and interface costs
(C) Innovation opportunities	Technology maturity Scale of project Process complexity	*Assessed under the qualitative framework*
(D) Timing of bill impact to customers	*Assessed under the quantitative framework*	Start of the revenue stream Expenditure profile
(E) Deliverability and lead time	Duration of construction Timing of asset	*Assessed under the qualitative framework*
	Scoring	***PV of costs to customers***

Level 1: ‘Size’ tests under an initial screening

5 attributes have been established against which to consider proposed schemes in order to evaluate their respective ‘size’ and therefore determine whether they could be suitable for delivery under a DPC model

Scheme attributes used for scheme definition

This attribute assessment has been adopted to categorise projects in order to examine their potential for delivery under a DPC model.

Asset type	Single homogeneous asset?
Site	Single site?
Timing	Similar delivery timescales?
Individual size	> £100m capex?
Greenfield or existing asset upgrade	Greenfield?

Suitable for DPC and attractive to infrastructure investors?

Valuation method

Key assumptions used in the calculations

Size of assets has been calculated based on two key assumptions: (i) period over which costs were considered and (ii) types of costs included

Period

Business plan (5 years)	**25 years**	**40 years**
• Current AMP business plan life	• Typical concession period for PFI assets of this nature	• Closer to likely asset life

Cost types

Development costs	**Development costs**	**Development costs**	**Development costs**
Initial Capex	**Initial capex**	**Initial capex**	**Initial capex**
	Renewal capex*	**Renewal capex***	**Renewal capex**
		Opex*	**Opex***
			Financing costs

Suggested preference

Discounted costs

Undiscounted costs

Level 2: 'Discreteness' tests under an initial screening

6 criteria have been established against which to consider proposed schemes in order to evaluate how 'discrete' they are and therefore how suitable they may for delivery under a DPC model.

Increasing level of discreteness →

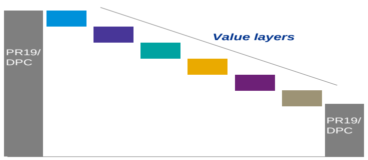
	Criteria	*Key Considerations*		*Low*	*Medium*	*High*
1	Physical asset location	*Level of integration and position of asset within overall network*	▪ Position and location on the network ▪ New or existing asset upgrade ▪ Separate function on standalone basis ▪ Stakeholders interactions	Highly integrated non-separable	Minimal integration with existing site	Standalone separate asset
				Are assets separable?		
2	Interfaces	*Number, type and complexity of key interfaces*	▪ Types of interfaces ▪ Number of interfaces ▪ Many to one or one to many interface relationships	Multiple complex interfaces with one to many relationships	Multiple interfaces	Limited non physical interfaces Limited
				Are there multiple complex interfaces?		
3	Process	*Integration of asset with day to day operations*	▪ Operational staffing and skillset ▪ Manpower levels 24/7 ▪ Frequency and need for co-ordination with wider network ▪ Economies of scale	Inefficient on standalone basis /requires high degree of co-ordination with wider network	Operate efficiently on standalone basis/requires co-ordination with wider network	Operate efficiently on standalone basis with limited need for wider network interaction
				Can operations be run efficiently on a standalone basis?		
4	Impact on service delivery	*Importance of asset to AWS operations and service delivery*	▪ Role in delivering statutory obligations ▪ Impact on customers ▪ Risk to adjacent asset performance ▪ Stakeholder monitoring (e.g. DWI/EA)	High Impact directly on end customer and AWS obligations	Impacts directly on AWS end customers and obligations	Limited indirect impact on AWS operations and outputs
				What is the impact of asset failure?		
5	Flexibility	*Level of scalability and adaptability of the project*	▪ Likelihood of changes in asset's usage ▪ Scalability and adaptability of the operation ▪ Alternative usages of the asset ▪ Predictability of output	No flexibility in operation and no alternative usages of the asset	Operation is scalable and adaptable to changing needs	Predictable asset's usage
				Can the asset be adapted for future changes?		
6	Control	*Level of interaction with the wider network's operation*	▪ Type of asset, i.e. resilience scheme or required for the day to day operation ▪ Frequency of interaction with the wider network	Frequent interaction with the wider network on a day to day basis	Limited interaction needed for the operation of the wider network	Resilience asset with limited interaction with the wider network
				How much control needs AWS over the asset?		

Level 3: Qualitative and quantitative assessment – overall CBA test

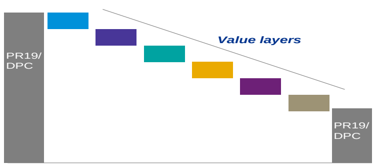
After applying the 'value & discreteness' test we will assess the schemes' potential to deliver customer value for money in a quantitative and qualitative assessment under a CBA to establish which schemes should be presented as eligible for DPC in AWS's BP submission.

Qualitative and quantitative assessment combined in an overall CBA test

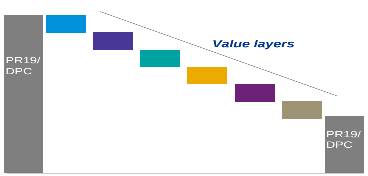
Quantitative assessment



Scheme A



Scheme B



Scheme n

NPV of costs to customers

Qualitative assessment

Potential customer value layers	Criteria	Scheme 1	Scheme 2	Scheme 3
a) Financing costs	Market appetite & Bankability	L / M / H		
	Risks			
b) Cost efficiencies	Cost of interoperability			
	Risk and cost of failure			
	Core business to AWS			
c) Costs due to project scope maturity when tendered	Certainty of costs			
d) Innovation opportunities	Innovation			
e) Timing of bill impact to customers	*Assessed under the quantitative framework*			
f) Deliverability and lead time	Lead time			
Overall Qualitative Score				

Scoring

Projects that show greater value to customers under a DPC delivery model versus the counter factual in the quantitative assessment will be progressed to a qualitative analysis.

Level 3: 'Value for money' test - Quantitative assessment

1 Consider customer value layers as part of overall framework to inform relative VfM comparison

POTENTIAL CUSTOMER VALUE LAYERS	Quantitative assessment
a) Lower financing costs	Financing costs
b) Additional cost efficiencies	Cost savings due to efficiency Procurement and contract mgmt. costs Bid costs and interface costs
d) Innovation benefits	*Assessed under the qualitative framework*
e) Timing of bill impact to customers	Start of revenue stream Expenditure profile
f) Deliverability	Assessed under the qualitative framework

2 Develop model and key assumptions underpinning quantitative assessment

Informed by qualitative analysis assessment of schemes

Common assumptions

Scheme specific assumptions

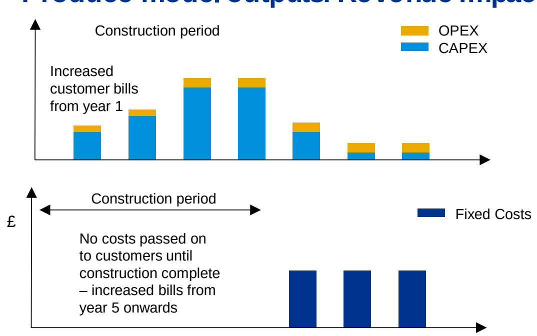
DPC framework model

(Factual)

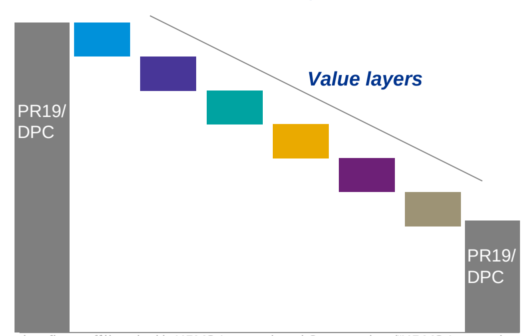
PR19 framework model

(Counter factual)

3 Produce model outputs: Revenue impacts



4 Produce value analysis against layers of customer value identified



Review output and understand sensitivity of scheme assumptions

Level 3: 'Value for money' test - Qualitative assessment

Projects that shows positive value to customers under a DPC delivery model when compares to the counter factual are assessed in a qualitative assessment based on a set of criteria established along the five potential layers that can deliver value to customer under a DPC delivery model.

Potential customer value layers	Criteria	Scheme 1	Scheme 2	Scheme 3
A) Financing costs	Market appetite & Bankability	L / M / H		
	Risks			
B) Cost efficiencies	Cost of interoperability			
	Risk and cost of failure			
	Core business to AWS			
C) Innovation opportunities	Innovation			
D) Timing of bill impact to customers	*Assessed under the quantitative framework*			
E) Deliverability and lead time	Lead time			
Overall Qualitative Score				

1. 'Size' test

Level 1: 'Size' test - Overview of potential options

In some cases schemes represent a combination of projects/programmes or individual assets that meet a specific outcome. In order to assess suitability for DPC, the definition used for a scheme is set out below and which seeks to capture projects that are likely to be more suitable for DPC. The attributes of some schemes make them significantly more complex and are less likely to be suitable for delivery under a DPC model. In line with Ofwat guidance, schemes/projects within the bio-resources control have not been considered.

Increasing complexity →

Scheme attributes		
Asset type	Single homogeneous asset	Different asset types (above ground, below ground, water & wastewater etc.)
Site	Single site	Multiple asset types
Timing	Similar delivery timescales	Different delivery timescales
Individual size	> £100m capex	< £100m capex
Greenfield or existing asset upgrade	Greenfield	Upgrade to existing asset
	More likely to be suitable for DPC and attractive to infrastructure investors	***Less likely to be suitable for DPC and more complex***

Scheme definition adopted

This definition has been adopted to categorise projects in order to examine their potential for delivery under a DPC model.

KPMG

Level 1: 'Size' test - Suggested methodology

Options — *Suggested preference* (green)

Period

Business plan (5 years)	25 years (suggested preference)	40 years
• Current AMP business plan life	• Typical concession period for PFI assets of this nature	• Closer to likely asset life

Rationale and commentary

- After the initial concession period (25 years) assets will revert to AWS and therefore value for money post 25 years does is the same under DPC and AWS models.
- 5 years is too short a period and risks short-term value being prioritised against longer-term benefits which may be greater.
- It is likely that future operating costs provide less opportunity for benefits than initial upfront capital costs and would be significant over 40 years with potential to include schemes where value is low.

Options — *Suggested preference* (green)

Cost types

1

			(suggested preference)
Development costs	Development costs	Development costs	Development costs
Initial Capex	Initial capex	Initial capex	Initial capex
	Renewal capex*	Renewal capex*	Renewal capex
		Opex*	Opex*
			Financing costs

*over the period specified

2

- Discounted costs
- Undiscounted costs (suggested preference)

Rationale and commentary

- Ofwat has defined the costs to be considered as 'wholesale totex' which we have interpreted as all expenditure under the project including development costs but excluding financing costs.
- Including finance costs within the scope of costs considered would significantly increase the number of schemes falling under DPC.

2. 'Discreteness' test

Level 2: 'Discreteness' tests under an initial screening

6 criteria have been established against which to consider proposed schemes in order to evaluate how 'discrete' they are and therefore how suitable they may for delivery under a DPC model.

Increasing level of discreteness →

	Criteria	*Key Considerations*		*Low*	*Medium*	*High*
1	Physical asset location	*Level of integration and position of asset within overall network*	▪ Position and location on the network ▪ New or existing asset upgrade ▪ Separate function on standalone basis ▪ Stakeholders interactions	Highly integrated non-separable	Minimal integration with existing site	Standalone separate asset
					Are assets separable?	
2	Interfaces	*Number, type and complexity of key interfaces*	▪ Types of interfaces ▪ Number of interfaces ▪ Many to one or one to many interface relationships	Multiple complex interfaces with one to many relationships	Multiple interfaces	Limited non physical interfaces Limited
					Are there multiple complex interfaces?	
3	Process	*Integration of asset with day to day operations*	▪ Operational staffing and skillset ▪ Manpower levels 24/7 ▪ Frequency and need for co-ordination with wider network ▪ Economies of scale	Inefficient on standalone basis /requires high degree of co-ordination with wider network	Operate efficiently on standalone basis/requires co-ordination with wider network	Operate efficiently on standalone basis with limited need for wider network interaction
					Can operations be run efficiently on a standalone basis?	
4	Impact on service delivery	*Importance of asset to AWS operations and service delivery*	▪ Role in delivering statutory obligations ▪ Impact on customers ▪ Risk to adjacent asset performance ▪ Stakeholder monitoring (e.g. DWI/EA)	High Impact directly on end customer and AWS obligations	Impacts directly on AWS end customers and obligations	Limited indirect impact on AWS operations and outputs
					What is the impact of asset failure?	
5	Flexibility	*Level of scalability and adaptability of the project*	▪ Likelihood of changes in asset's usage ▪ Scalability and adaptability of the operation ▪ Alternative usages of the asset ▪ Predictability of output	No flexibility in operation and no alternative usages of the asset	Operation is scalable and adaptable to changing needs	Predictable asset's usage
					Can the asset be adapted for future changes?	
6	Control	*Level of interaction with the wider network's operation*	▪ Type of asset, i.e. resilience scheme or required for the day to day operation ▪ Frequency of interaction with the wider network	Frequent interaction with the wider network on a day to day basis	Limited interaction needed for the operation of the wider network	Resilience asset with limited interaction with the wider network
					How much control needs AWS over the asset?	

Key and scoring

Low (L)	= 1
Medium (M)	= 2
High (H)	= 3
More suitable	12+
Less suitable	<12

Level 2: 'Discreteness' tests under an initial screening

In undertaking the assessment, a number of assumptions have been made which could be considered as limitations to the results. It is important to bear these in mind when considering the results, and an overview of some of those assumptions and limitations are provided below.

1) Qualitative nature of the assessment

- The results of the assessment have been informed by a number of discussions a workshop with key subject matter experts, which includes individuals with detailed knowledge of the proposed schemes, and who were able to provide valuable insights into the technical assessment.
- The assessment has been made on a qualitative basis and is, by its nature, based on subjective views and judgement. In order to overcome the subjectivity, a balance of views was used to inform the evaluation, and points of difference were discussed and refined based on further challenge and validation.
- The assessment is based on specific characteristics of the assets under consideration and cannot be generalised and extrapolated across schemes of similar type that may have other specific characteristics.
- Given the immature nature of some of the schemes, the assessment is based on early views and may be further refined as greater detail emerges in time.
- The assessment incorporates the considerations set out in Ofwat's technical guidance as published along side its PR19 Final Methodology, and has been interpreted an adapted for this evaluation.

2) Assumptions

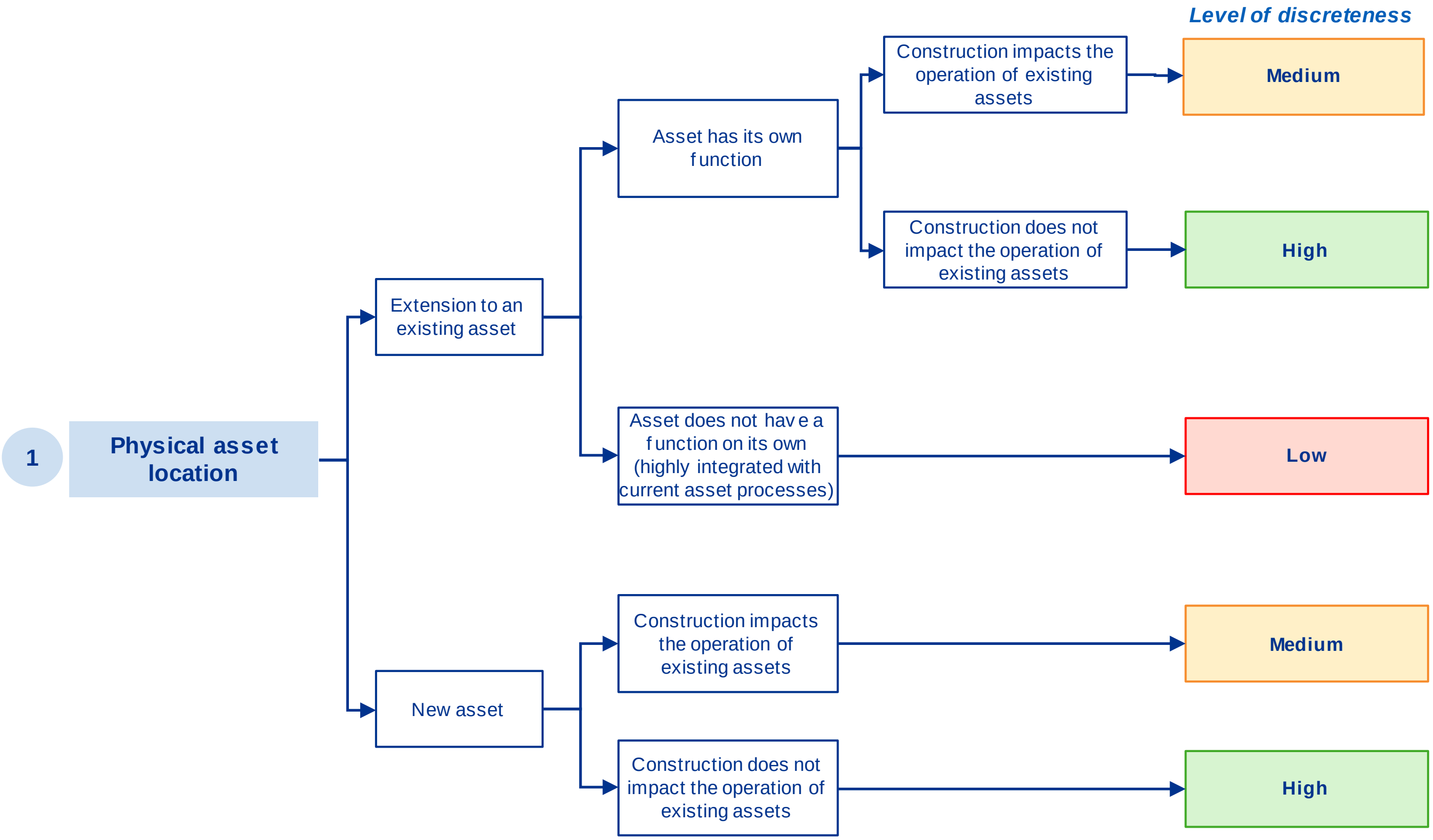
In performing the assessment we have made a number of key assumptions, as set out below;

- The introduction of a 3rd party would impact on AWS' ability to manage and control its network, to a greater or lesser extent linked to the level of asset discreteness, and the fact that AWS will retain the risk for the delivery of its statutory obligations.
- The level of discreteness and separability of the asset is a proxy for the increased costs and risks that may be introduced under a DPC model.
- We have identified a number of criteria that cover the key drivers of discreteness.
- We have not assessed the impact on AWS' existing operation, and assume that it would not be impacted by delivery by a 3rd party provider.
- A private contract would exist between the DPC provider and AWS, incorporating terms that would be required to effectively manage the performance of the asset within the context of the wider network.
- We assume DBFO model, given the critical relationship between construction and operation and the impact that is separating responsibility for these activities could have in the medium term.

3) Decision tree methodology - informative only

- In carrying out the technical assessment, a set of 'decision trees' have been used to help guide and inform the analysis. It is important to note that these have been used as a guide only and other considerations may have been taken into account where relevant and not captured entirely by the guide. In some cases, the assessment has been augmented based on the specific characteristics of assets and where the decision tress do not completely reflect these attributes in the assessment.

Discreteness - Physical asset location

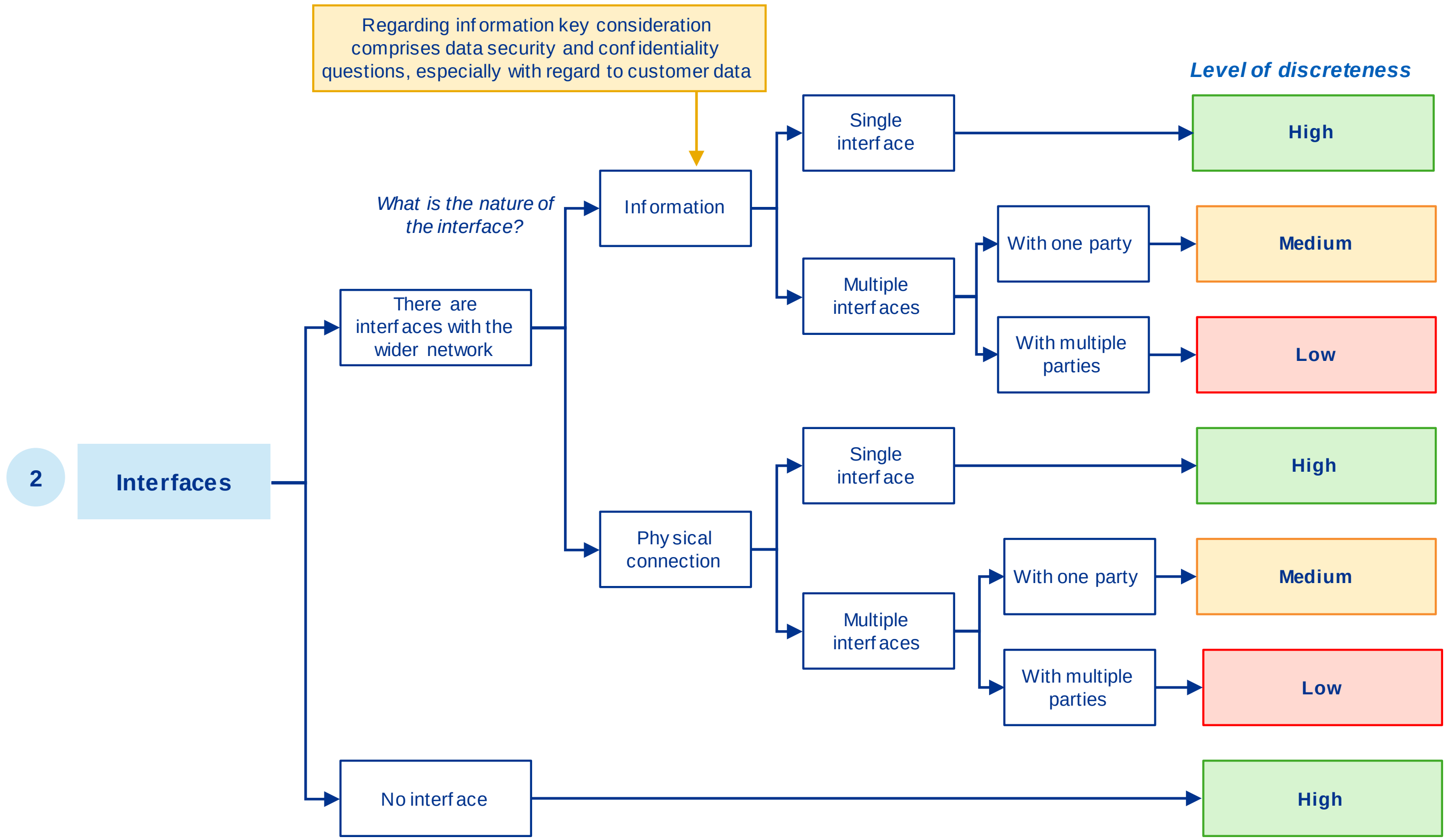


Considerations

- Where construction impacts the operation of existing assets there will be an increased need of coordination between AWS and the DPC provider during construction period.
- Depending on it's physical location the asset may impact AWS' existing assets and capital works.
- Where asset is an extension to an existing asset of AWS some form of asset transfer may be needed to ensure the scheme's discreteness for a 3rd party project delivery (e.g. land leasing, asset sale, etc.).
- The likelihood that an asset transfer would be required is the highest in cases where the scheme is an extension to an existing asset and will not have a function on its own.

Interim support for Direct Procurement for Customers (DPC)

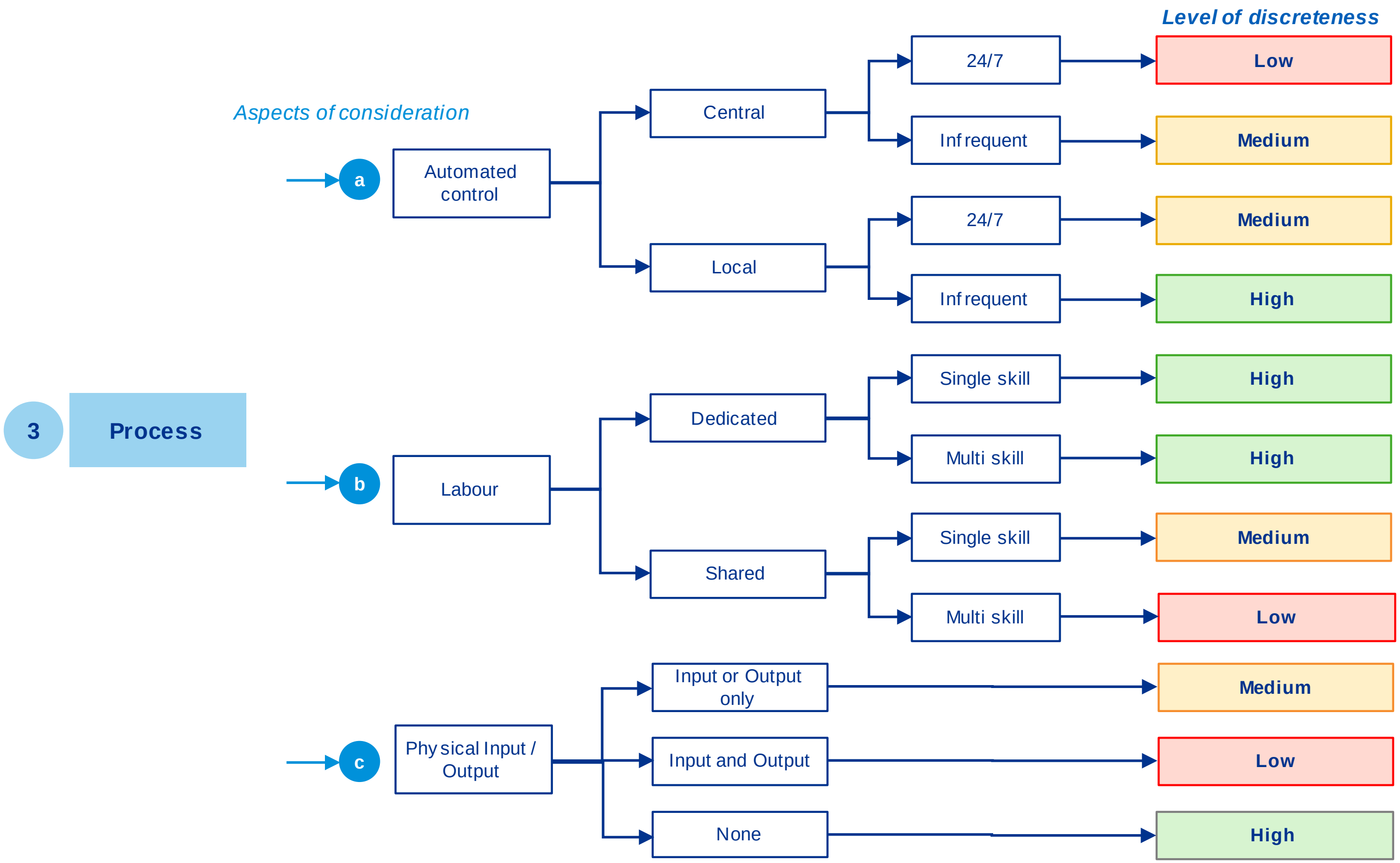
Discreteness - Interfaces



Considerations

- Where asset has physical interfaces with AWS' existing assets additional control elements will be required to ensure scheme's separability from the wider network.
- Information interface with the wider network could potentially necessitate changes, upgrades to existing IT programs or the acquisition of new IT solutions.
- Type and number of interfaces can also increase the complexity of the design of the asset.
- Interfaces can have implications for the day to day operation of the asset.
- The larger the number of interfaces the more complex will become the relationship between AWS and DPC and so the contract between them.

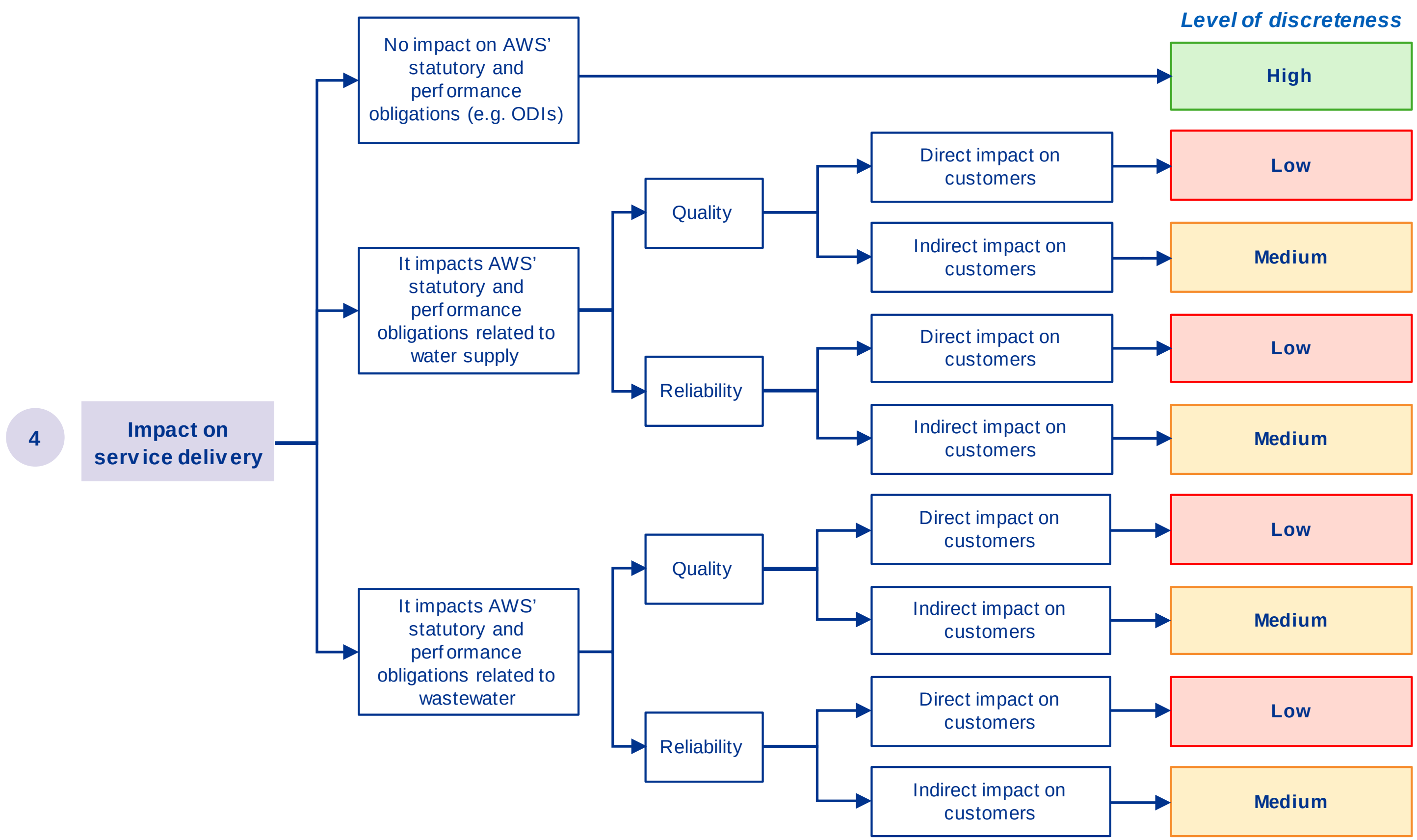
Discreteness - Processes



Considerations

- Where similar assets of AWS are operated with shared resources within the wider business discreteness of operation can be considered limited on a standalone basis.
- In the case of shared resources DPC would lead to a loss of portfolio benefit as resources could not be optimised across a wider portfolio.
- The more complex skills are required for the asset's operation the lower is the scheme's discreteness.
- Where processes are run on an automated basis operation of the asset can be seen as highly discrete.
- Where there is an input-output interdependency between the DPC and AWS the contractual arrangements become more complex to manage limiting the asset's suitability for DPC.

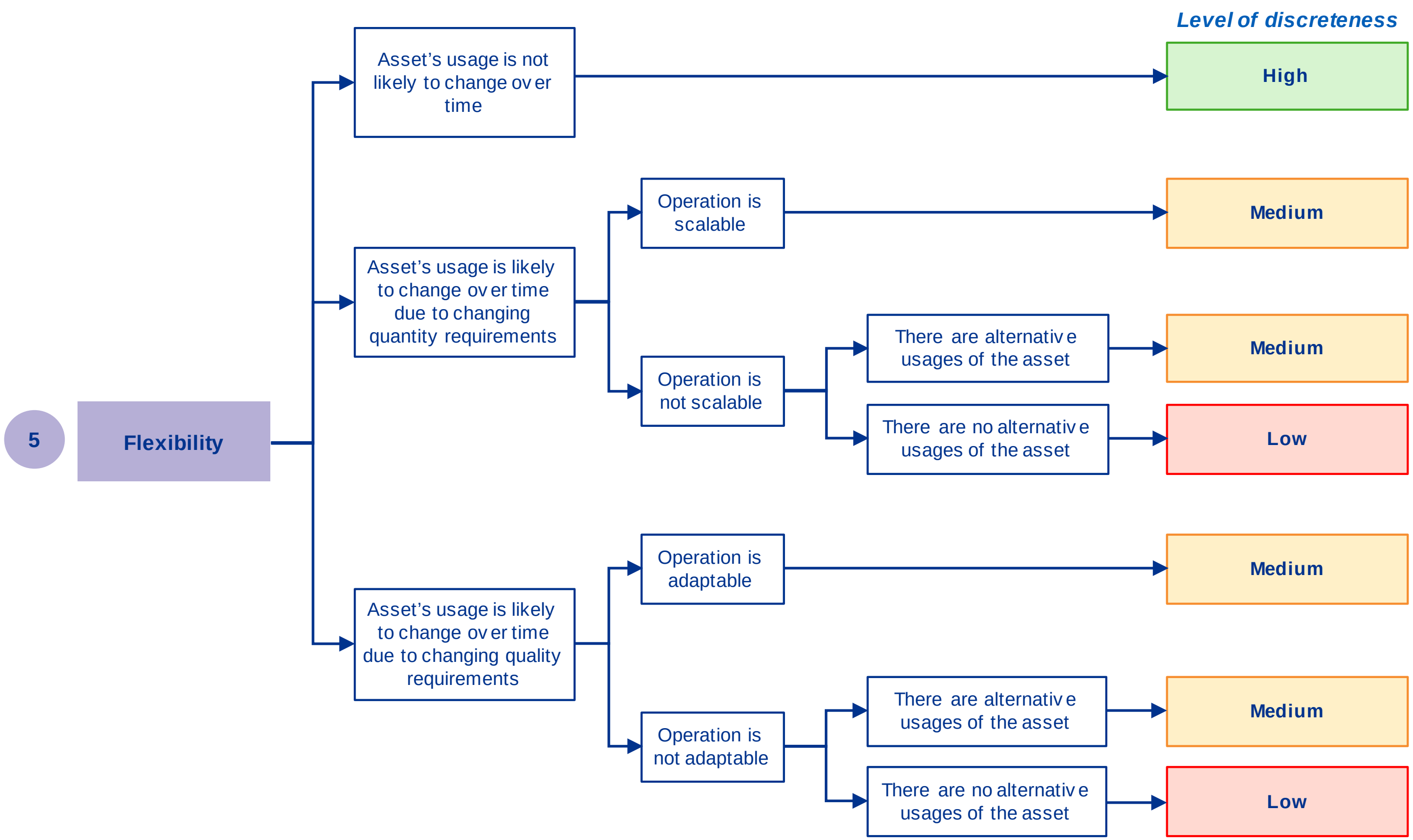
Discreteness - Impact on service delivery



Considerations

- Assets in the water value chain carry in general higher risk both in terms of quality and reliability aspect of delivery.
- Main risk related to quality of supply includes contamination.
- In case DPC supplies water directly to customers the risk to AWS to fulfil their statutory and legal obligations is higher as they have no opportunity to intervene before contaminated water reached customer in a downside scenario.
- Main risk related to reliability of supply includes unavailability and interruption of service. The longer the period over which the problem can be fixed the greater the value at risk.
- The breach of statutory obligations can lead to potential fines from EA and DWI.

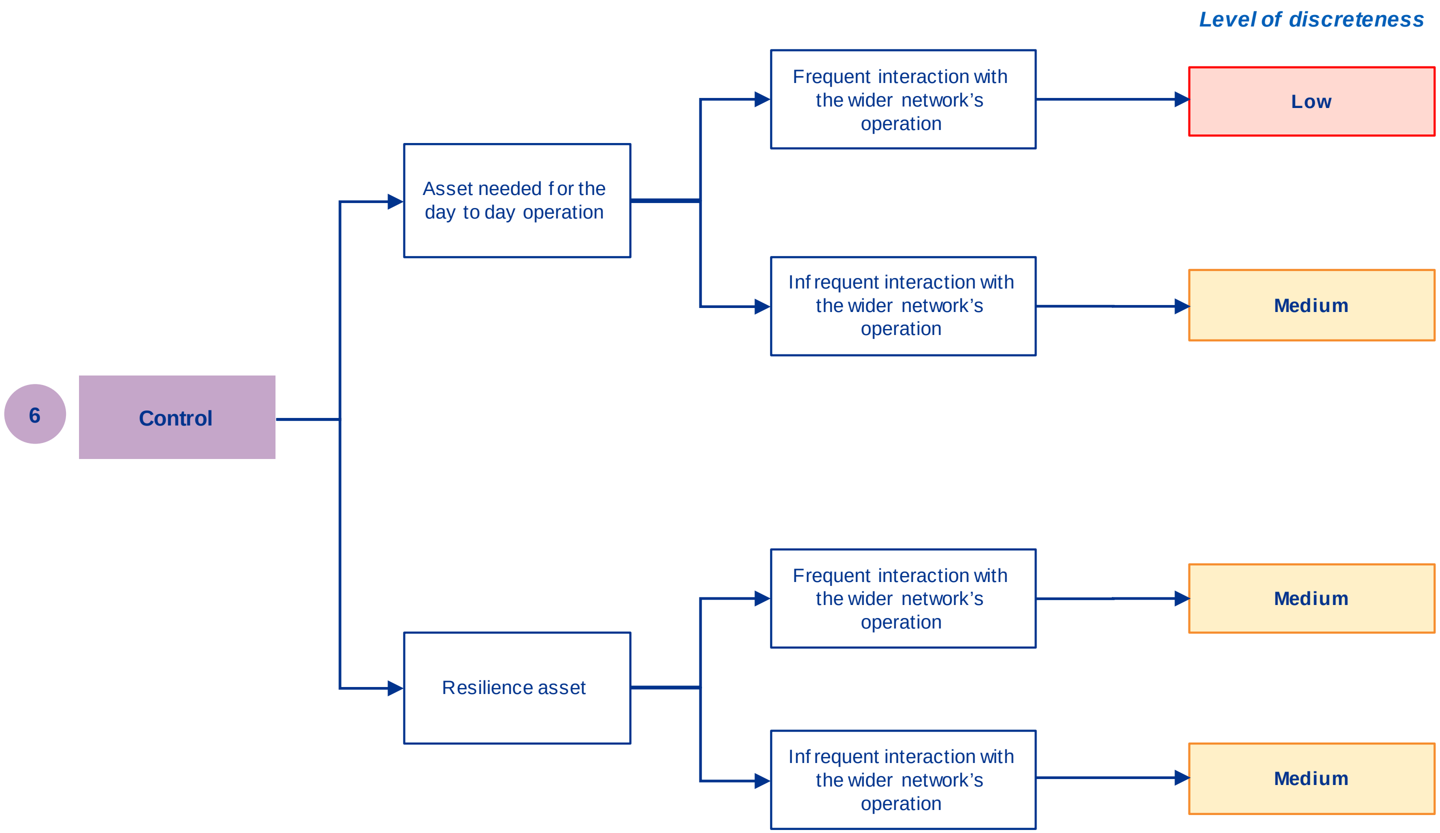
Discreteness - Flexibility of the asset



Considerations

- If asset becomes not fit for purpose it can lead to
  - Underutilised assets
  - Stranded assets
  - New investment requirements
- Assets can be considered highly discrete where it is not likely that their usage would change over time or where their operation is scalable and adaptable to changing quantity and quality requirements and thus are likely to offer value under a DPC delivery model.
- Assets are regarded as non discrete where their usage cannot be adjusted to changing output requirements and thus it is likely that a DPC delivery model would increase the future risks to the asset.

Discreteness - Control



Considerations

- As the water network is managed on a system basis, AWS will need to have some form of control over the assets considered for DPC. AWS may need to interfere on a regular basis or in the case of an emergency.
- Assets which are needed for the day to day operation of the wider network are considered less discrete than resilience assets only used under specific circumstances.
- The interaction required with AWS' wider network has important implications for the scheme's discreteness. The more frequent the interaction required the less discrete is the asset.

Summary of Technical Assessment

This slide sets out a summary of the technical assessment undertaken on each of AWS' assets that were progressed from the 'size' test based on the assumption a 3rd party would design, build, finance and operate the selected assets.

Considerations

- The technical assessment is guided and informed by the 'decision trees' as set out on the previous slides. It is important to note that these are used as a guide only and other considerations may be taken into account where relevant and not captured entirely by the guide.
- Where both interfaces and process imply low level of discreteness, only the 'design & build' phases could potentially deliver customer value under a DPC, but not the 'operation'.
- The introduction of a 3rd party would impact on AWS' ability to manage and control its network, to a greater or lesser extent linked to the level of asset discreteness, and the fact that AWS will retain the risk for the delivery of its statutory obligations.
- In the assessment a DBFO model has been considered, given the critical relationship between construction and operation and the impact that is separating responsibility for these activities could have in the medium term.

		Asset A	*Asset B*	*Asset C*
1	Physical asset location	M	H	H
2	Interfaces	M	M	M
3	Process	L	L M	H
4	Impact on service delivery	L	L M	M
5	Flexibility	L	L M	M H
6	Control	L	L	M
	Overall assessment	L/M	L/M	M/H

3. Quantitative assessment

Model mechanics

Model overview and schematic

The value for money quantitative analysis compares the delivery of schemes under the factual DPC delivery route and the counterfactual (AWS PR19 delivery route), a schematic of the model is provided below.

Model inputs

Inputs common to all schemes

Scheme specific inputs

Fixed inputs in the model, underpinning DPC and PR19 frameworks and resulting profiles

- Depreciation
- Indexation
- Time horizon
- PV discount rate
- Cost to customer commencement

Scheme specific inputs as provided by AWS for each scheme and including;

- Opex
- Capex
- Construction period
- Asset life

Scheme specific inputs are common under both DPC and PR19 frameworks

Scheme specific value layer model assumptions

A) Lower financing costs

B) Timing of bill impact to customers

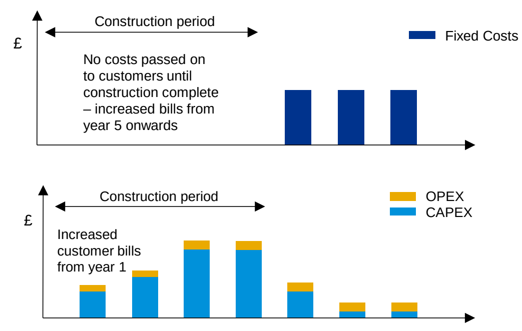
D) Additional cost efficiencies

E) Deliverability - assessed under the qualitative framework

F) Innovation benefits: assessed under the qualitative framework

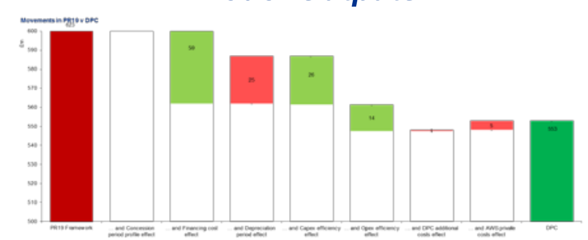
- Key variable input assumptions for each value layer vary based on scheme specific factors
- Timing of bill profile to customers is not based on a specific input variable assumption but is a result of the way in which the DPC framework treats costs versus that in PR19
- Deliverability and Innovation benefits are assessed under the qualitative framework only

Model Mechanics



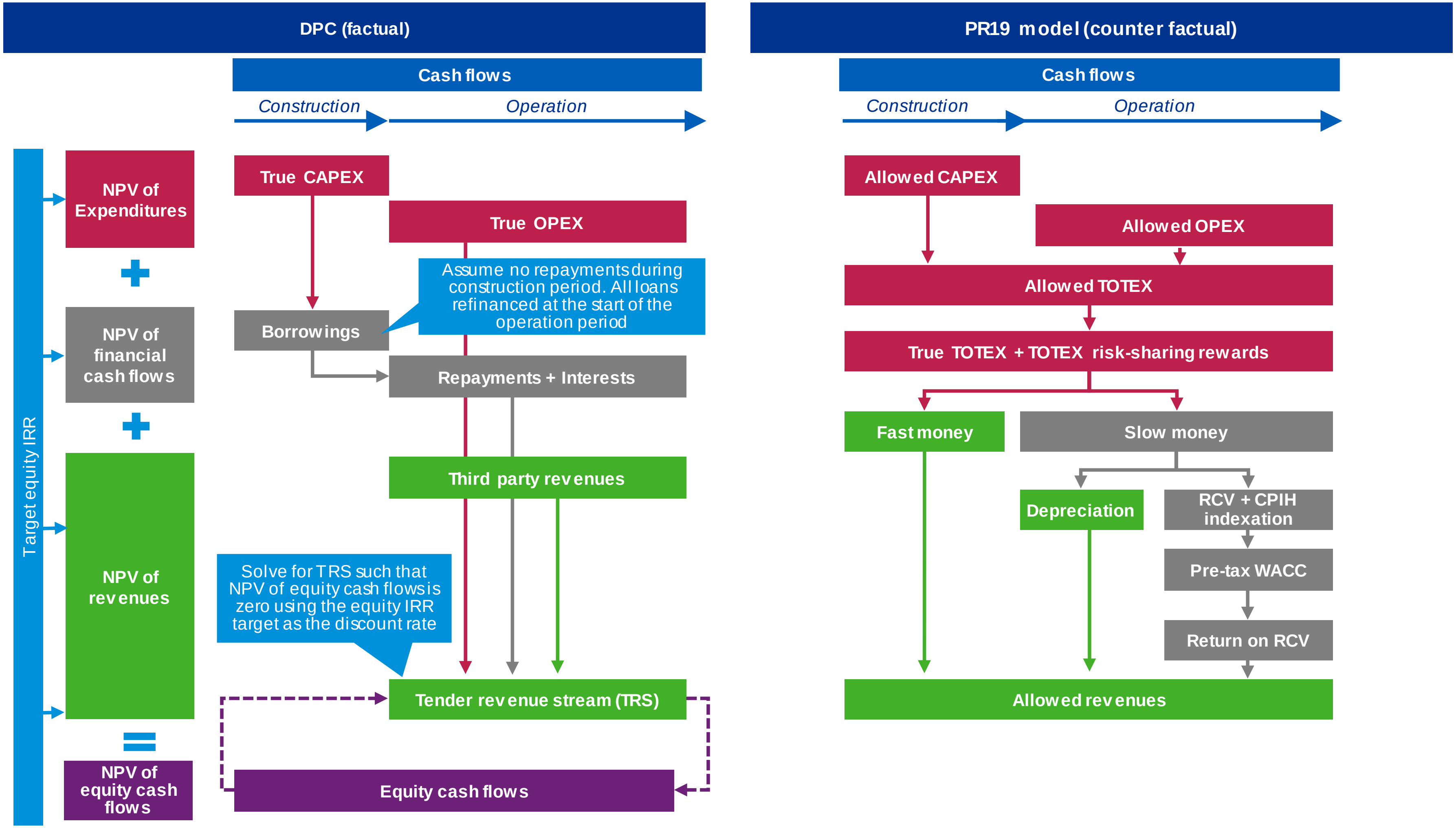
Comparison of present value of costs to customers arising from factual and counterfactual delivery options for specific schemes

Model Outputs



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

VFM model - Calculating revenue allowances



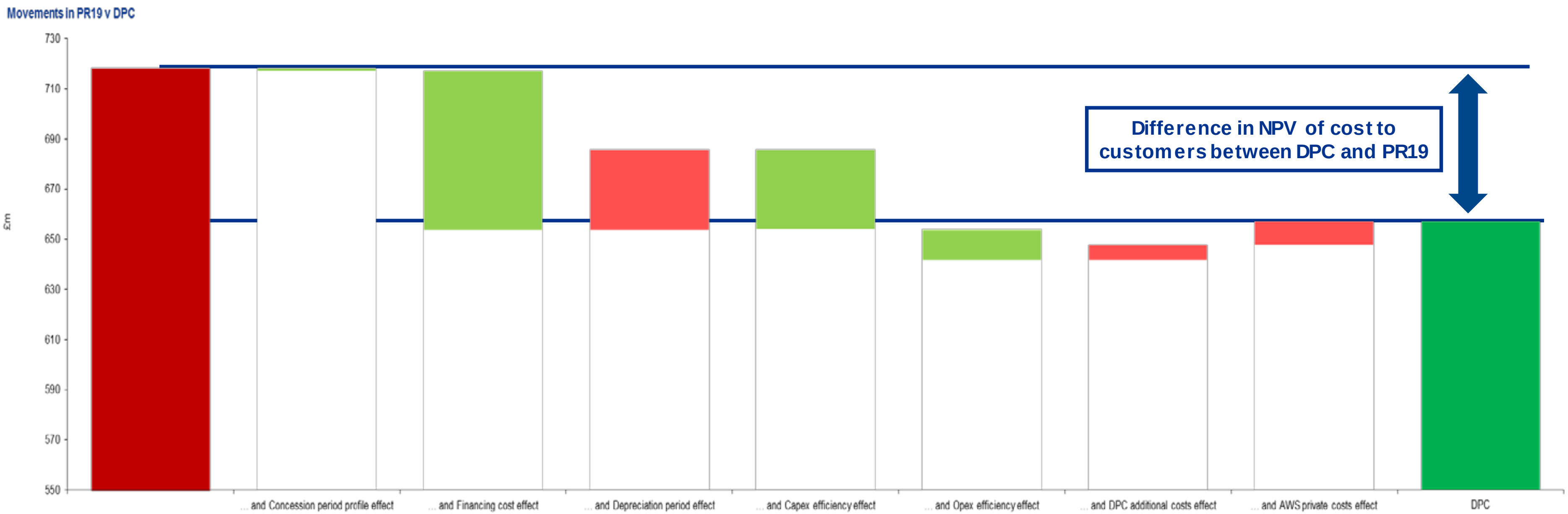
Framework assumptions that underpin the value for money model

Modelling framework – Key assumptions

- Expenditure profile for capital and operating costs are based on Investment planning expenditure forecasts for WRMP and PR19 provided by Anglian Water[1].
- Model assumes PR19 framework will follow Ofwat Final Methodology, including cost of capital assumptions
- The revenue allowance under the PR19 framework is based on Ofwat's building block approach
- DPC' revenues are assumed to be fixed tendered revenue stream over the concession period as submitted by bidders and is based on a target IRR of DPC investors
- Comparisons of costs between the factual and counter factual are based on the social discount rate as set out in HMT Green Book (3.5% real / 5.85% nominal)
- Variable model inputs (assumptions) are based on observed market precedents and prevailing market conditions and a number of judgements developed and discussed in collaboration with AWS.
- The model considers value for money to customers as the difference in costs incurred under both factual and counter factual scenarios, i.e. both delivery models are assumed to result in equal wider benefits to customers (e.g. environmental impacts, reliability, quality, etc.).
- Current modelling has focussed on a late tender model where scheme enabling costs are identical under both factual and counter factual cases. This could be adjusted to derive the value associated with alternative tender models, e.g. very late, early
- Current assumption is that depreciation period will be scheme specific. The asset will be depreciated over its economic asset live under the PR19 model, while under DPC model an accelerated depreciation profile will be assumed, leaving an asset value between 0% and 50% after the 25 year concession period

[1] Note: Project expenditure profiles form C55 asset planning and costs modelling outputs

Value layers - Illustrative output



STEPS TO DERIVE VALUE IMPACT OF EACH LAYER

1. Assuming revenue under DPC start at the end of construction
2. Plus introducing project financing under DPC (EIRR, cost of debt and gearing assumptions)
3. Plus assuming accelerated depreciation profile under DPC
4. Plus introducing capex efficiency under DPC
5. Plus introducing opex efficiency under DPC
6. Plus adding additional costs incurred by the DPC (bid costs, etc.)
7. Plus adding procurement and contract mgmt. costs incurred by AWS

- The potential customer value layers consist of one or more subcomponents which explain the difference in overall costs to customers under a DPC versus the counter factual. A quantification of potential customer layers of value will be heavily dependent on assumptions.
- Theses layers can be both positive or negative depending on the scheme characteristics, i.e. factual (DPC) can have benefits or disbenefits compared to the counter factual (AWS).

Explanation of value layers as captured in the model

Value layer	Drivers	Description & calculation	Inputs and assumptions
Timing of bill impact to customers	1 Start of revenue stream	• Equity investors under DPC provide equity to the project throughout the construction period on which they expect to earn a return at the target equity IRR. • However, TRS under the DPC only begins when the asset is commissioned. Equity investors carry forward unearned equity return from the construction period into the operation period. • Hence, the TRS during the operation period must be higher to allow the equity investors to recover expected returns during the construction period. • Because the social discount rate is lower than the equity IRR, the delay in revenue recovery under DPC increases the NPV of customer bills.	Overall fixed input: Timing of cost profile to customers
Financing costs	2 WACC	• The value is driven by the difference assumed in the WACC under PR19 and DPC cost of financing. • WACC (project IRR) under DPC is established based on the (i) revenue requirement derived by the gearing, cost of debt and equity IRR, and the (ii) cost profile under DPC • This value layer has been estimated by introducing DPC WACC in the model (factual) to derive the impact.	Scheme specific assumption: Cost of equity and debt under DPC assumed based on asset characteristics
Timing of bill impact to customers	3 Depreciation	• This value is driven by the depreciation profile of the asset assumed under DPC versus PR19. • Under PR19 the asset is depreciated straight line over its economic asset life, while under DPC an accelerated depreciation profile is assumed (30-100% of the asset is assumed to be depreciated during the concession period of 25 years). • This value has been estimated by accelerating PR19 depreciation under the DPC model.	Scheme specific input: depreciation / run-off under DPC

Value layers are quantified by cascading assumptions (i.e. all assumptions made for previous layers also apply to the next layer, so the specific impact can be isolated)

Explanation of value layers as captured in the model (Cont'd)

Value layer	Drivers	Description & calculation	Inputs and assumptions
Cost efficiencies (and DPC incremental costs)	4 Efficiency savings capex 5 Efficiency savings opex	• This value is driven by the difference in efficiency savings realised by DPC vs AWS • Efficiency under DPC is defined as any additional efficiency realised above and beyond those delivered under a PR19 framework.	Scheme specific assumptions: opex, capex efficiency saving and sharing factor
	6 Additional costs to DPC	• There are a number of additional costs which will be incurred under the DPC which would not occur under the counter factual. One of them are bid costs of DPC/ Incremental costs are also driven by the existence of additional interfaces, potential for loss of synergies in construction and operation of the asset (e.g. increased cost of sampling, insurance, labour) and imperfect asset stewardship in relation to the ret of the network. • These additional costs have been defined as a fix percentage of the capex expenditure on top of the baseline cost assumptions which translate into higher revenue requirement for the DPC. • It has been estimated by applying the incremental cost increases (% of capex) under DPC to the PR19 framework.	Scheme specific assumptions: additional costs to DPC
	7 Procurement and contract mgmt. costs	• Procurement and contract management costs are additional costs to AWS which would not be incurred under the counter factual and thus represent a negative value to customers. • It has been estimated by adding procurement contract management costs of AWS to the DPC model.	Scheme specific assumptions: procurement costs, contract mgmt. costs (AWS private costs)

Value layers are quantified by cascading assumptions (i.e. all assumptions made for previous layers also apply to the next layer, so the specific impact can be isolated)

KPMG

Model inputs and assumptions

Model Inputs & Assumptions Overview

Area	Dimension	Model		Comments and rationale
		Factual: DPC delivers scheme	Counterfactual: AWS deliver scheme	
1. INPUTS COMMON TO ALL SCHEMES				
Cost to customers profile	**Value**	This includes the tender revenue stream of DPC (derived as the balancing item to reach target equity IRR), additional costs to AWS and deprecation and return on residual asset value post concession during the economic life of the asset	Based on allowed revenue under PR19 framework over the economic life of the asset (with allowances for opex during concession based on marginal PAYG rate of the asset)	Value is driven by the inherent differences between a DPC delivery model and a delivery under the PR19 framework based on building block approach
	Timing	When asset is commissioned	When expenditure incur	DPC framework only allows revenues when asset is commissioned where recovery under PR19 starts when costs are incurred
Period of PV calculation		15 – 25 years + construction period	15 – 25 years + construction period	In line with typical PPP contract duration. See 8 Appendix – VfM model assumptions
Discount rate for PV of costs to customers		Social discount rate of 3.5% real with a decreasing profile over time	Social discount rate of 3.5% real with a decreasing profile over time	Based on HM Treasury Green Book Supplementary Guidance: discounting (3.5% 0-30 years, 3.0% 31-75 years, 2.5% 76-125 years)
Revenue indexation		CPIH	CPIH	Based on Ofwat Final Methodology new assets are indexed by CPIH and the same revenue indexation is assumed under DPC
Depreciation	**Method**	Straight line	Straight line	In line with typical accounting practice
2. SCHEME SPECIFIC INPUTS				
Model horizon		Economic asset life (min 30 years)	Economic asset life (min 30 years)	• Expenditure profile for capital and operating costs are based on Investment planning expenditure forecasts for WRMP and PR19 provided by Anglian Water[1] • They are scheme specific and are inputted for each scheme separately • These inputs remain the same in both the factual and counter factual cases • Model spans over the economic life of the asset, but at least over 30 years allowing for construction plus 25 years of operation • Capitalisation of costs is be based on the marginal PAYG rate rather than the natural AWS' natural rate
Expenditure profile in real terms over the PV calculation period	Initial capex	Capex during construction	Capex during construction	
	Opex	Annual opex during operation	Annual opex during operation	
	Renewal capex	Renewal capex during operation	Renewal capex during operation	
	Profile of capitalisation	As costs incur	Marginal PAYG rate of the project	
Timing	Construction period	# of years	# of years	
	Useful economic life	# of years	# of years	
Depreciation	Run-off rate	50% - 100% over concession period	100% over economic asset life	
3. SCHEME SPECIFIC ASSUMPTIONS				
See next slide		The model is informed by a number of scheme specific assumptions as set out in the following slides.		
4. OUTPUTS				
NPV of cost to customers		Based on the inputs and assumptions the model calculates the net present value (NPV) of cost to customers under DPC and PR19.		
NPV of factual vs counterfactual by value layers		The difference between the NPV of cost to customers under factual and counter factual is broken down into separate value layers of timing of bill impact to customers, financing costs, depreciation profile, cost efficiencies, lower costs due to scope maturity, deliverability and innovation benefits. The impact of each of these value layers (increase or decrease in NPV) is presented in a waterfall graph.		

[1] Note: Project expenditure profiles form C55 asset planning and costs modelling outputs

Scheme specific assumptions: Counter factual

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	AWS delivery	Rationale and justification
	3. SCHEME SPECIFIC ASSUMPTIONS			
Financing costs	**Cost of debt**		WACC nominal pre-tax between 4.89% to 5.37% (inflation: 2%)	The WACC estimate is based on Ofwat's early view on the cost of capital for PR19 in Appendix 12 of the PR19 Final Methodology as published in December 2017. The WACC is 5.37% (nominal) assuming, that it is a new asset, and so CPI (H) indexation will apply to revenues. The lower end of the range is based on returns excluding embedded debt.
Financing costs	**Cost of equity**			
Financing costs	**Gearing**		Notional gearing 60%	The notional gearing estimate is based on Ofwat's PR19 Final Methodology as published in December 2017.
Timing of bill impact to customers	**Profile of cost to customers**		PAYG, straight line depreciation, revenues commencement when expenditures are incurred	Cost profile is based on Ofwat's Final Methodology where revenue allowance is in line with timing of expenditure. Profile of capitalisation is based on marginal PAYG rate of the project to account for the project's impact on AWS' overall business while asset will be depreciated over its economic asset life.
Cost efficiencies	**Additional costs to DPC**		£0	Not applicable as only considered under the DPC delivery model.
Cost efficiencies	**Efficiency savings**	Capex	0%	Efficiency saving in the VfM model is defined as incremental efficiency saving realised under DPC above and beyond what would be achieved under the counter factual.
Cost efficiencies	**Efficiency savings**	Opex		
Cost efficiencies	**Private costs to AWS**	Procurement	£0	Assuming current delivery capability and cost base could absorb new project procurement under PR19.
Cost efficiencies	**Private costs to AWS**	Contract mgmnt.	£0	Assuming current delivery capability and cost base could absorb contract management activities.
Cost efficiencies	**Insurance and compliance costs**		£0	Not applicable as only considered under the DPC delivery model.

Scheme specific assumptions: DPC

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	Factual: DPC	Rationale and justification
	3. SCHEME SPECIFIC ASSUMPTIONS			
Financing costs	**Cost of debt**		Construction forward Libor 6m swap + 220bsp – 240bsp Operation forward Gilt / Libor 6m swap + 120bsp – 140bsp RCV bullet repayment forward Gilt / Libor 6m swap + 120bsp – 140bsp Bank arrangement fee of 200bsp and commitment fee of 35bsp	Construction • Assumes an 'early' tender model where there would be a higher cost of financing associated with the construction period. A DPC scheme is assumed to have a similar risk profile to that of primary PPP/renewable Cfds projects during the construction phase. • We have assumed an amortising bank debt financing with mortgage repayment profile with a tenor equivalent to the construction period. • Bank debt solutions are typically referenced to 6m Libor, however, it is expected that the PPP contractor would also hold an interest rate swap to secure a fixed rate of borrowing. • In order to allow for meaningful comparison with financing costs under PR19 we are assuming the construction debt will be raised in 2020 and selected the two year forward six month LIBOR swap rate as the appropriate proxy. • Recent pricing on a large UK infra deal which has a potentially lower risk profile when compared with DPC as it is sovereign backed, saw a range of Libor + 140 bsp to 230 bsp for the weighted average cost of debt for long term bank loan (29 years) and medium term bank loan (15 years). • Recent experience in the waste to energy market reveals a cost of senior debt between 3% and 7% with a maturity of around 15 years. Due to differences in risk profiles the lower end of this range represents the closest comparator for the upper end of debt financing solutions under DPC. Operation • During the operational phase cost of financing is likely to be lower due to the removal of the construction risk and associated risk premia. • Depending on the project size a bond or a bank facility is assumed with associated cost of debt set using forward Gilt or Libor 6m swap rates plus a margin of 120bsp – 140bsp. • Post construction a bond or bank facility is issued with a bullet repayment profile, with a principal value matching the terminal value of the DPC. asset. For the remainder financing need an amortized bank loan or bond is assumed. • As additional cost a 200bsp bank arrangement fee and a 35bsp commitment fee have been assumed with the latter being an annual fee at the rate of 35% of the applicable senior debt margin has been assumed, charged on the committed undrawn debt facility or on undrawn standby facilities. • Recent experience in OFTOs and secondary PPPs has seen a cost of debt in the range of 1.5%-2.0%. Yield on existing OFTO bonds are around 2.4%. • For underlying analysis see 8 Appendix – VfM model assumptions.
	Cost of equity (IRR nominal, pre-tax)		9% - 12%	• In OFTOs we can also observe a decreasing trend in IRR. The NAO found that 10-11% IRR requirements were seen in early deals (round 1), while subsequent tender rounds have seen in many cases equity returns falling closer to reported secondary market rates of return in PFI projects (around 8-9%). OFTO cost of equity is considered to be at lower end of range given maturity of market and nature of assets. • In waste to energy PPP projects, IRRs tends to be in the range of 13%-18%, which have a significantly greater risk profile than DPC and include demand risk. • The base lending rate for variable debt is the 6 months LIBOR in the relevant currency which has been used in our DPC assumptions. • Based on experience in OFTOs and waste to energy PPP projects between 8% and 12% with an average of 10% has been assumed for nominal pre-tax equity IRR. • Experience from TTT suggests single digit equity IRR. • For underlying analysis see 8 Appendix – VfM model assumptions.

Scheme specific assumptions: DPC (cont.)

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	Factual: DPC	Rationale and justification
	3. SCHEME SPECIFIC ASSUMPTIONS			
Financing costs	Gearing		80% - 90%	• The three tender rounds in OFTOs have seen gearing ranging between 80% and 91% with only one project being geared only up to 50% (Project Lincs). OFTO projects where debt finance consists solely of term loan are geared between 80% and 85% (with the exception of Project Lincs). • Experience shows that waste to energy PPP projects are generally geared between 55% and 80% with gearing levels but lower gearing likely to reflect increased risk profile of these projects which often have volume risk attached. • Typical project finance suggests a gearing between 80-90% could be achieved under DPC in line with primary PPP, OFTO and renewables Cfds market experience. • For underlying analysis see 8 Appendix – VfM model assumptions
Timing of bill impact to customers	Profile of cost to customers		Actual expenditure profile, straight line depreciation, revenues commencement after construction period	• Ofwat's Final Methodology for PR19 outlines the proposed DPC framework. • Ofwat's proposed DPC framework assumes no totex approach but expects to treat opex and capex separately with actual opex and capex profile. • Ofwat expects payments to start to the DPC provider after asset has been commissioned, i.e. revenue to DPC provider commences at the beginning of the operational phase after construction has been completed.

Scheme specific assumptions: DPC (cont.)

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	Factual: DPC	Rationale and justification
	3. SCHEME SPECIFIC ASSUMPTIONS			
Cost efficiencies	Additional costs to DPC		Up to 2% of project value (defined as net capex)	• Bidders are likely to price in their costs incurred in relation to participating in the competitive asset tender in their submission. • In its Final Methodology Ofwat has stated that it considers 2 per cent of the project value to be a reasonable estimate for bidder costs. • Ofwat's assumption was used as an upper end estimate in the assessment and adjusted for bottom-up management experience for assets where it was appropriate. • The model disregards additional costs that may arise where asset is operated on a standalone basis requiring additional overheads and potentially the duplication of local operation structures when compared to the counter factual due to the loss in optimisation and synergies in construction and operation of the asset. Also, additional costs that the DPC would incur in order to comply with legal requirements on its own when delivering the asset are disregarded in the assessment. • Bidder costs could be expected to reduce over time as bidders become more familiar with the asset class.
	Efficiency savings	Capex	0% - 10% of total capex	• Evidence from various reports and studies looking at the outcomes of PPP projects versus public procurement suggests that a range of 0%-10% is a reasonable assumption for the capex efficiency that could be realised under a DPC model depending on the asset type. • For underlying analysis see 8 Appendix – VfM model assumptions
		Opex	0% - 10% of total opex	• In its guidance on DPC published as part of the PR14 Final Methodology Ofwat estimates that DPC has the potential to reduce opex costs by 18% to 25% based on CEPA calculations. • According to Ofgem's assessment OFTOs delivered in average 25% opex savings for customers over the last 3 tender rounds when compared to a delivery model under the RIIO T1 as counter factual. The increase in cost savings from 24% in tender round 1 to 27% in tender round shows the benefit how maturity of the market can drive down costs. • Competition in the OFTO market may be stronger due to homogeneous set of asset, the simplicity of operational asset without construction risk and Ofgem being the 3rd party independent procurement body. Therefore it is unlikely that a DPC regime could deliver a similar level of efficiency, certainly in the short term. • Based on Ofwat's guidance and experience with OFTOs opex efficiency savings have been assumed to range between 0% and 10% of total opex depending on the asset characteristics. • Any efficiency saving factored into the bid is passed on to customers in the form of lower revenue requirement by the DPC assuming bidders are under competitive pressure to do. • For underlying analysis see 8 Appendix – VfM model assumptions

Scheme specific assumptions: DPC (cont.)

Potential customer value layer	Area	Dimension	Factual: DPC	Rationale and justification
	3. SCHEME SPECIFIC ASSUMPTIONS			
Cost efficiencies	**Private costs to AWS**	Procurement	Up to 1% of project value (defined as net capex)	• In its Final Methodology Ofwat has suggested tender costs to equal 1% of the project value. This is broadly in line with experiences in the OFTO procurement. • However, the OFTO procurement process is relatively mature and standardised and therefore procurement costs for DPC could potentially be higher due to lack of standardisation and the diversity of assets. • The EIB found that the costs of procuring PPP projects are on average around 10% of the project value based on a study which included 55 PPP projects in the UK economy. As the study dates from 2005 it can be assumed that costs went down since due to general efficiencies. • Procurement costs includes advisory works (commercial, legal, financial, rating agency), procurement process and evaluation, and insurance as observed on typical project finance transaction. • Ofwat's assumption was used as an upper end estimate in the assessment and adjusted for bottom-up management experience for assets where it was appropriate. • For more details please refer to 8 Appendix – VfM model assumptions
		Contract mgmt.	£150k - £500k per year	• In its Final Methodology Ofwat has suggested contract management costs of £150k per year per project under DPC. • AWS management experience suggests a bottom-up estimate of costs up to £500k per annum. • The model assumes contract management costs in the range of £150k - £500k per year which is broadly in line with experience in typical project finance procurement of infrastructure assets. This covers the cost of a team to oversee management of contract.

Scheme specific assumptions: Overview of Factual vs Counter factual

Potential customer value layer	Area	Dimension	Assumptions under DPC: Factual: DPC delivers scheme	Assumptions under DPC: Counterfactual: AWS deliver scheme [1]
	3. SCHEME SPECIFIC ASSUMPTIONS			
Financing costs	**Cost of debt**		Construction: forward Libor 6m swap + 220bsp – 240bsp Operation: forward Gilt / Libor 6m swap + 120bsp – 140bsp RCV bullet repayment: forward Gilt / Libor 6m swap + 120bsp – 140bsp	4.89% - 5.37% (Inflation: 2% per Ofwat PR19 forecast)
	Cost of equity		Nominal equity IRR 9%-12%	
	Gearing		80% - 90%	Notional gearing 60%
Timing of bill impact to customers	**Profile of cost to customers**	PAYG, depreciation, Revenue start	Actual expenditure profile, straight line depreciation, revenues commencement after construction period	Marginal PAYG, straight line depreciation, revenues commencement when expenditures are incurred
Cost efficiencies	**Additional costs to DPC**		Up to 2% of project value	£0
	Efficiency savings	Capex	0% - 10% of total capex	0%
		Opex	0% - 10% of total opex	
	Private costs to AWS	Procurement	Up to 1% of project value	£0
		Contract mgmt.	£150,000 - £500,000 per year	£0

Scheme specific assumptions - Lower financing costs

Ranges

Low end — *High end*

ASSUMPTION UNDER POTENTIAL CUSTOMER VALUE LAYER	COMPLEX ASSETS	STANDARD ASSETS	SIMPLE ASSETS
	highly integrated in the wider network and plays a significant role in delivering AWS' statutory obligations and thus a failure has a high impact on AWS' performance	with multiple interfaces with the wider network but operates efficiently on a standalone basis with scalable and adaptable operation to changing needs	with limited design and operational complexity, small number of interfaces with the wider network and characterised by limited interaction with the wider network
Cost of debt	• Construction: forward Libor 6m swap + 240bsp • Operation: forward Gilt / Libor 6m swap + 140bsp	• Construction: forward Libor 6m swap + 230bsp • Operation: forward Gilt / Libor 6m swap + 130bsp	• Construction: forward Libor 6m swap + 220bsp • Operation: forward Gilt / Libor 6m swap + 120bsp
Cost of equity (nominal IRR pre tax)	**12%**	**10%**	**9%**
Gearing	**80%**	**85%**	**90%**

Cost of debt

Δ: +10bsp — Higher risk profile driven by greater asset complexity results in increased cost of debt for DPC providers

Δ: -10bsp — Limited risk profile driven by limited asset complexity results in better financing conditions for DPC providers

Cost of equity

Δ: +2% — Increased risk profile translates into a higher return expectations from equity providers

Δ: -1% — Limited risks reduce the return expectations of equity holders

Gearing

Δ: -5% — Complex assets tend to have a greater risk profile which generally leads to lower level of gearing

Δ: +5% — Higher gearing can be achieved in the case of more complex assets due to the reduced risk profile

Scheme specific assumptions - Timing of bill impacts to customers

The differences between the DPC framework and the PR19 framework impact the cost profiles which creates value to customers.

ASSUMPTION UNDER POTENTIAL CUSTOMER VALUE LAYER		**PAYG**	**Depreciation**	**Revenue commencement**
		Ofwat PAYG ratio required to set recovery of slow money and fast money at PR19	Depreciation of the asset over time	The starting point of when costs are passed through to customer bills
Timing of bill impact to customers	FACTUAL	No PAYG rate, expenditure profile is precisely in line with project spend profile	Straight line over the useful life of the asset	When asset is completed and in service
	COUNTER FACTUAL	Project specific PAYG rate	Straight line over the useful life of the asset	When expenditure is incurred

Scheme specific assumptions - Cost efficiencies (capex and opex)

Ranges

Low end — *High end*

Assumption under Potential customer value layer	**Low competition**	**Medium competition**	**Strong competition**
	Assets with unique features not well understood in the market with potentially a high risk profile or a small value lacking interest for bidding by market players	Assets with some precedents and limited design and operational complexity leading to limited competition in the bidding process	Assets are widely understood in the market with a proven track record of similar investments or they are very high value projects and so there is a strong competition in the bidding process
Efficiency saving (total capex)	**0%**	**5%**	**10%**
Efficiency saving (total opex)	**0%**	**5%**	**10%**

Efficiency saving (total capex)

Δ: – 5%

When there is no strong market appetite for the asset it is unlikely that the DPC model would reveal incremental efficiencies on the design and build services beyond what would be procured by AWS from the market under the counter factual

Δ: + 5%

In the event of strong competition it could be expected that DPC provider may add lower overhead costs to the asset's capex leading to increased efficiency savings

Efficiency saving (total opex)

Δ: – 5%

Weak competition resulting in the same level of opex expenditure as forecasted under the counter factual with the DPC not delivering any incremental opex efficiencies over the contract period

Δ: +5%

Strong competition incentivising the DPC provider to realise further efficiencies driving down the true costs through dynamic innovation

4. Qualitative assessment

Interim support for Direct Procurement for Customers (DPC)

'Value for money' test: Qualitative assessment

Assets where DPC shows greater value than PR19 in the quantitative assessment are subject a qualitative assessment based on a set of qualitative criteria to assess the five potential layers that can deliver value to customer under a DPC delivery model.

Potential customer value layers	Criteria	Scheme 1	Scheme 2	Scheme 3
A) Financing costs	Market appetite & Bankability	L / M / H		
	Risks			
B) Cost efficiencies	Cost of interoperability			
	Risk and cost of failure			
	Core business to AWS			
C) Innovation opportunities	Innovation			
D) Timing of bill impact to customers	*Assessed under the quantitative framework*			
E) Deliverability and lead time	Lead time			
Overall Qualitative Score				

Key assumptions and limitations of the assessment

In undertaking the qualitative assessment, a number of assumptions have been made which could be considered as limitations to the results. It is important to bear these in mind when considering the results, and an overview of some of those assumptions and limitations are provided below.

1) Qualitative nature of the assessment

- The analysis is based on a range of criteria which are considered reasonable drivers associated with the value layer to which they relate.
- Given there is no existing DPC market and limited recent precedents for the construction of some assets, the analysis is based on insights and experience of other infrastructure markets across sectors where some similarities are likely to exist.
- The evaluation was informed by specific characteristics of the assets considered as provided by AWS, however, in some cases criteria are more subjective and a level of judgment has been required to help inform the analysis.
- Where project development is in early stages, the assessment is based on initial views and may be further refined as greater detail emerges in time.
- Where there is a long period of time available before the asset is due to be constructed, the assessment faces limitations as a result of the high uncertainty around the technological solutions that may emerge in the future.
- Also, as innovation could come in the form of disruptive forces it is difficult to foresee or predict which limits the assessment.

2) Assumptions

In performing the assessment we have made a number of key assumptions, as set out below;

- The qualitative value for money framework aims to identify whether DPC would likely realise value for money for customers when compared to the counterfactual (i.e. delivery under the conventional Price Review framework).
- A private contract would exist between the DPC provider and AWS with a clear allocation of risks and responsibilities between parties. Key terms would be available to bidders ahead of the tender so that they are able to structure their submission accordingly.
- We have identified a number of criteria that cover the key drivers of value to customers.
- We have not assessed the impact on AWS' existing operation, and assume that it would not be impacted by delivery by a 3rd party provider.
- We assume DBFO model, given the critical relationship between construction and operation and the impact that is separating responsibility for these activities could have in the medium term.

Financing costs - Market appetite & Bankability

Market appetite	**Competitive pressure can lead to lower financing costs via lower equity and debt return expectations. Bankability of the asset can be a key driver of value creation for investors and customers alike by driving down financing costs.** • Market appetite is driven by a number of factors, such as the number of potential bidders, size and idiosyncratic nature of the asset (i.e. pipeline of similar assets). • It is acknowledged that the contractual and regulatory framework and the resulting risk profile faced by a bidder is an important driver of interest for the project in the market. However, for the purpose of this assessment a standard risk allocation has been assumed which can be observed in similar transactions. • Bankability of a project refers to a state where it is sufficiently attractive to raise private finance. • The extent to which and the associated conditions a project can have access to debt financing has important implications for the project's overall financing costs.

Indicators	Impact	Assessment	Scoring		
			Low	Medium	High
Bidding interest for the project	Larger interest for the project from in the market results in a greater competition from market players leading to lower financing costs and thus greater value to customers.	Number of market players who could potentially or likely be interested in participating as bidders in the tender process	1-2	3-4	>4
Size of the asset	Larger schemes generally attract appetite from a wider investor group.	Size of the scheme: £ million of capex	<£100m	£100-500m	>£500
Idiosyncratic nature of the asset	Where there is pipeline of similar projects companies have the potential to leverage the experience and bid costs in other tender rounds which results in greater market appetite and competition for the project.	Number of similar projects planned over the next 5 years	1-2	3-5	>5

Financing costs - Risks

Risk	**The equity return expectations for the DPC provider is derived from the risk profile of the project. As a result of introducing new contractual boundaries there may exist some new risks under a DPC model that are not present under today's regime which will impact the costs and VfM for customers under a DPC model.** • Complex and lengthy construction increases the risk of cost and time overruns resulting in greater risk profile for the DPC • If the service performance of the asset has an impact on AWS' statutory obligations the DPC provider will be exposed to an increased risk of failing to meet output specifications. The larger and more direct the impact the higher the risk to DPC. Increased risk profile of the DPC is likely to translate into higher financing costs (expected equity return and cost of debt)

Indicators	Impact	Assessment	Scoring		
			Low	Medium	High
Construction risk	Time overruns and non-delivery of the asset may impact AWS' ability to deliver in line with their statutory obligations.	Length of construction period	>4 years	2 – 4 years	< 2 years
Operation risk	Failing to meet output specifications may impact AWS' ability to deliver in line with their statutory obligations.	Impact of service performance on AWS's statutory obligations	Direct and significant	Direct and limited	Indirect

Cost efficiencies - Cost of interoperability

Cost of interoperability	Cost of interoperability can be assessed through the asset's physical location and the number of interfaces. Also the asset's flexibility and criticality need to be considered with regard to costs related to interoperability • As in some instances the impact of discreteness is hard to be quantified and thus cannot inform the quantitative analysis of the value for money assessment, it should be carefully considered as part of the qualitative approach. • The lower the costs of interoperability of an asset the more likely it can provide customer value under a DPC delivery. • Key considerations around discreteness include whether the asset is greenfield or brownfield investment, how integrated it is from a design and operational perspective with the wider part of the network.

Indicators	Impact	Assessment	Scoring		
			Low	Medium	High
Physical asset location	Standalone separate assets offer greater value to customers under a DPC delivery model.	• Position and location on the network • New or existing asset upgrade • Separate function on standalone basis	Highly integrated non-separable	Minimal integration with existing site	Standalone separate asset
Interfaces	The more interfaces the asset has with the wider network the greater the cost of interoperability under DPC.	• Types of interfaces (physical/information/data) • Number of interfaces • Many to one or one to many interface relationships	Multiple complex interfaces with one to many relationships	Multiple interfaces	Limited non physical interfaces
Process	The more integrated the asset's operation is into the wider network the smaller the scope for value to customers under DPC due to lost efficiencies of scope.	• Operational staffing and skillset • Manpower levels 24/7 • Frequency and need for co-ordination with wider network	Inefficient on standalone basis /requires high degree of co-ordination with wider network	Operate efficiently on standalone basis/requires co-ordination with wider network	Operate efficiently on standalone basis with limited need for wider network interaction
Criticality	The greater the impact of the asset on AWS' operations the greater the value at risk under DPC.	• Role in delivering statutory obligations • Impact on customers • Risk to adjacent asset performance	High Impact directly on end customer and AWS obligations	Impacts directly on AWS end customers and obligations	Limited indirect impact on AWS operations and outputs
Flexibility	The greater the level of scalability and adaptability of the project the larger the value offered to customers under DPC.	• Likelihood of changes in asset's usage • Scalability and adaptability of the operation • Alternative usages of the asset	No flexibility in operation and no alternative usages of the asset	Operation is scalable and adaptable to changing needs	Predictable asset's usage

Cost efficiencies - Cost of failure

Cost of failure	**Cost of failure is a critical aspect of the value provided under a DPC delivery route. As it is hard to quantify it needs to be carefully considered as part of the qualitative assessment.** • Downside scenarios can include non- or late delivery of the asset at the agreed commissioning date, contamination during construction or operation, unavailability of the asset in the operational phase, and different types of asset failures. • Value at risk relates to DPC's role in delivering AWS' statutory and performance obligations set by DWI, EA and Ofwat • Costs and risks in a downside scenario are driven by the impact on customers

Indicators	Impact	Assessment	Scoring		
			Low	**Medium**	**High**
Costs of a failure	The larger the cost incurred in a downside scenario the larger the risk of a failure and the smaller the value to customers.	There are a number of factors influencing the level of costs, such as number of customers affected, type of the area (rural vs urban) and asset type (below or above ground)	Potential for fines and high contractual penalties/customer claims	Contractual penalties /customer claims only	High contractual penalties only
Impact of catastrophic failure	A catastrophic failure with a regional impact over a long period of time results in a low value to customers.	Impact on service	High High probability and high impact	Medium Medium probability and medium impact	Low Low probability and low impact

Cost efficiencies - Core business to AWS

Core business to AWS	**Where the delivery of the asset represents a core capability of AWS which has a long track record of similar assets it can be assumed that DPC has limited potential to realise additional cost savings beyond AWS' cost assumptions.** • Where AWS have delivered a number of similar schemes one can assume that efficiencies have been identified and built into current cost assumptions leaving limited room for a 3rd party to outperform baseline estimates. • DPC has greater potential to introduce cost savings for schemes where AWS does not have the in-house capability or construction experience to deliver the scheme.

Indicators	Impact	Assessment	Scoring		
			Low	Medium	High
AWS' experience and capability	Limited experience and understanding of similar schemes offers greater potential for DPC to introduce cost savings in the delivery.	Number of similar projects delivered in the past	4+	1-3	0

Innovation benefits

Innovation	**Scope for innovation is a key driver of value for money to customers as it defines the costs, form and quality of the delivery.** • Innovation is also referred to as dynamic efficiency and it occurs when firms introduce new methods of production, propose new products/services to the market. • Innovation focuses on new ideas in terms of choices and product/service quality. • Innovation and thus outperformance can be achieved in different stages of project delivery but scope may be greater at earlier tender points (i.e. pre-design). To that end in our assessment we will address the design & build and operate phases of the project lifecycle separately to understand which delivery model offers the greatest potential for innovation for each asset under consideration. • Below we set out a selection of key metrics to capture the potential of innovation, define the way to measure it and set out a suggested calibration to categorise the innovation potential into low, medium and high boundaries.

Indicators	Impact	Assessment	Scoring		
			Low	**Medium**	**High**
Technology maturity	The technology deployed as part of the construction and operation phase can have different maturity levels. New and emerging technologies have larger potential for innovation than mature solutions.	The level of maturity can be captured by the time the technology has been around and the number of innovation occurring every year.	Mature The technology that has been in use for long enough that most of its initial faults and inherent problems have been removed or reduced	Growth phase Some forms of the technology are readily available but there is no one widespread solution and new versions come to the market continuously	Emerging The technology has not been widely tested and is to some extent under the development phase
Scale of project	The potential of great savings/benefits incentivise innovation, i.e. the large project scale implies larger innovation.	Size of the scheme (£ million): for DB: capex for O: opex	<£100m	£100m-500m	>£500m
Process complexity	Complex processes have the potential for greater innovation.	Complexity of process technology considering the interdependence between processes, the uncertainty associated with the processes and their reversibility	Simple, limited process technology	Process technology with some level of complexity	Complex process technology

Deliverability - Lead time

Lead time	**Where project cannot be delivered on time under a DPC it significantly reduces the value to customers** • AWS has statutory obligations to deliver specific outputs linked to the planned schemes. • A non or late delivery of the asset by the required date may result in a loss of service quality to the customers. • The shorter the time window (lead time) AWS has between now and the timing of the asset the higher the risk of a potential non-delivery under a DPC model. • Long construction time reduces the time available to procure the scheme under a DPC model.

Indicators	Impact	Assessment	Scoring		
			Low	Medium	High
Duration of construction	The longer the construction period the shorter the time available to procure the scheme under a DPC model	Length of construction period in years	>5	3-5	<3
Timing of asset	The shorter the time window between now and when the asset is required for AWS to comply with it's statutory obligations, the higher to risk under a DPC and thus lower the value to customers.	Statutory date for the delivery of the asset set for AWS	Start of AMP7	End of AMP7	later than AMP7

5. Evaluation

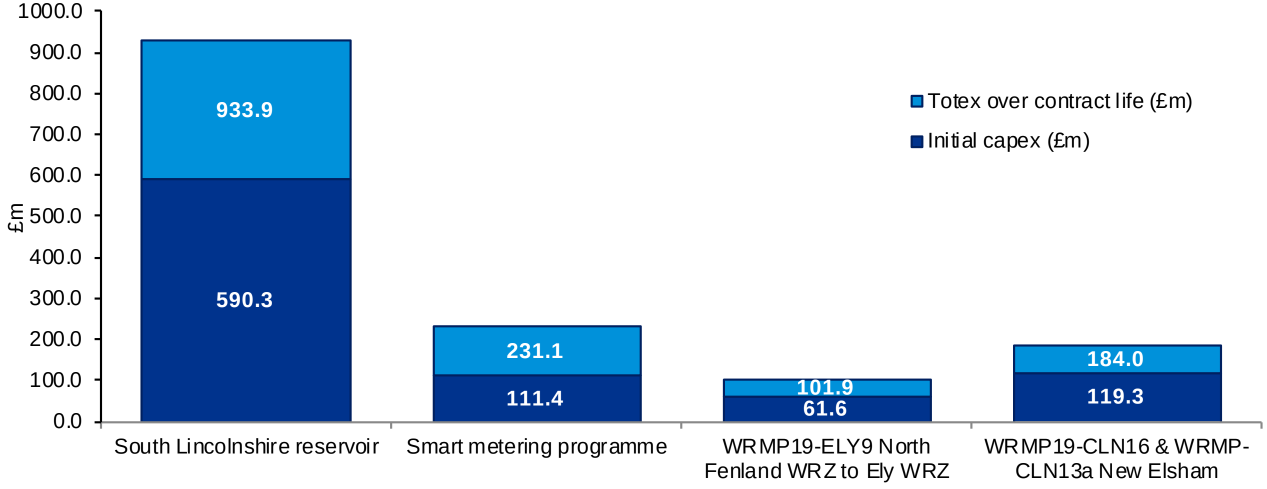
1. Size test

Locked down investment programme: Asset overview

The expenditure profile of all investment programmes for PR19 were assessed on both a discounted and non-discounted basis over two different periods – asset life and contract life. In addition, the initial capex over the construction period was assessed separately. The table below provides a summary of the results for the assets which value exceeds the £100m threshold over the contract period, with each scenario expended upon in the following slides.

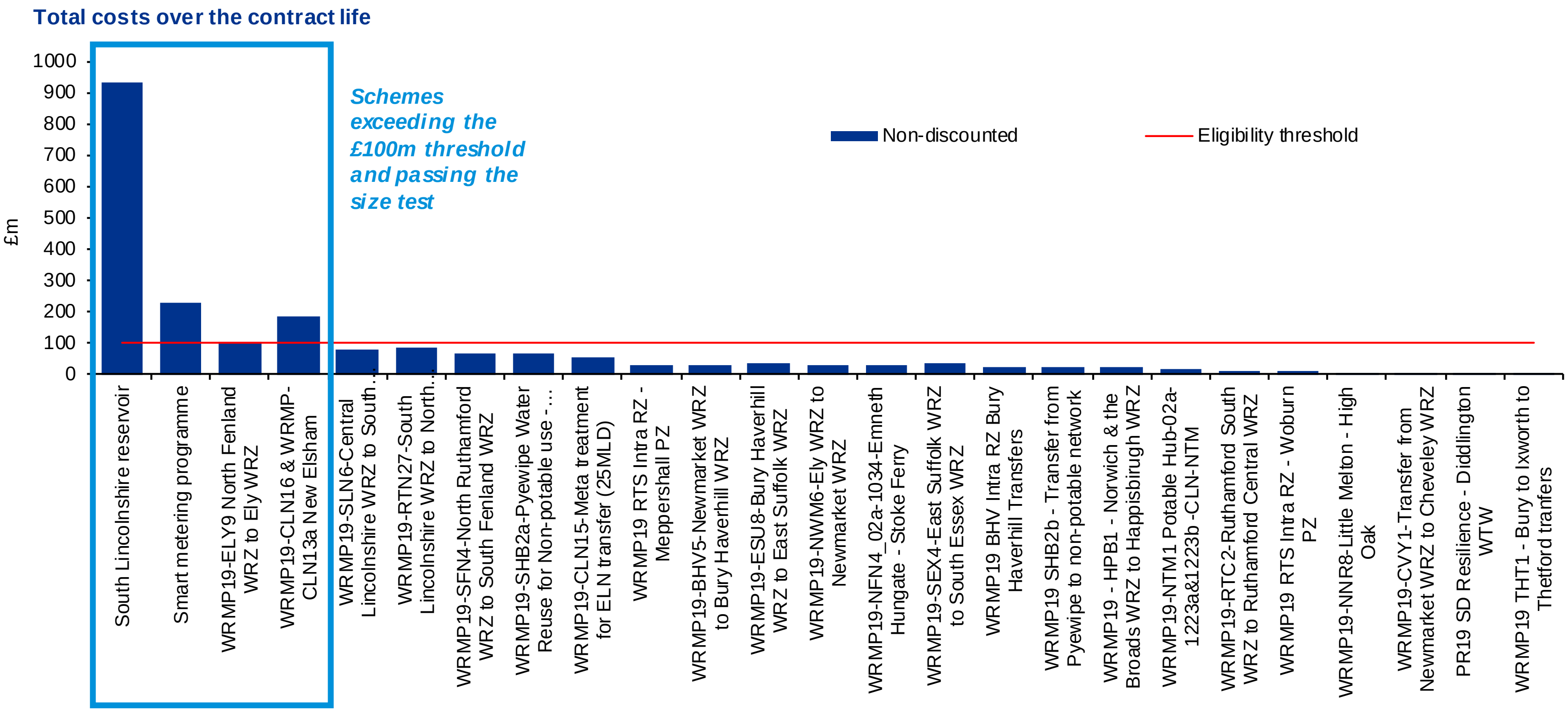
Scheme name	Scheme type	Asset life	Non-discounted		Discounted		Initial capex (£m)
			Totex over asset life (£m)	Totex over contract life (£m)	Totex over asset life (£m)	Totex over contract life (£m)	
South Lincolnshire reservoir	Reservoir	100	1952.3	933.9	875.7	734.1	590.3
Smart metering programme	Smart metering	15	231.1	231.1	193.9	193.9	111.4
WRMP19-ELY9 North Fenland WRZ to Ely WRZ	Transfer with treatment	100	243.1	101.9	98.4	79.8	61.6
WRMP19-CLN16 & WRMP-CLN13a New Elsham	Transfer with treatment	100	273.7	184.0	163.6	144.1	119.3

Non-discounted Totex over contract life



- The result of our size tests shows that based on the investment size a range of different scheme types could be considered for DPC including Reservoir, Smart Metering and Transfer with Treatment.
- Three out of the four assets that exceed the £100m threshold are to be delivered during AMP7, with the exception of South Lincolnshire reservoir, which delivery is planned for AMP9.
- The share of initial capex is relatively high in the overall Totex, which makes the schemes more suitable for DPC.

Total costs over contract life for all PR19 proposed schemes

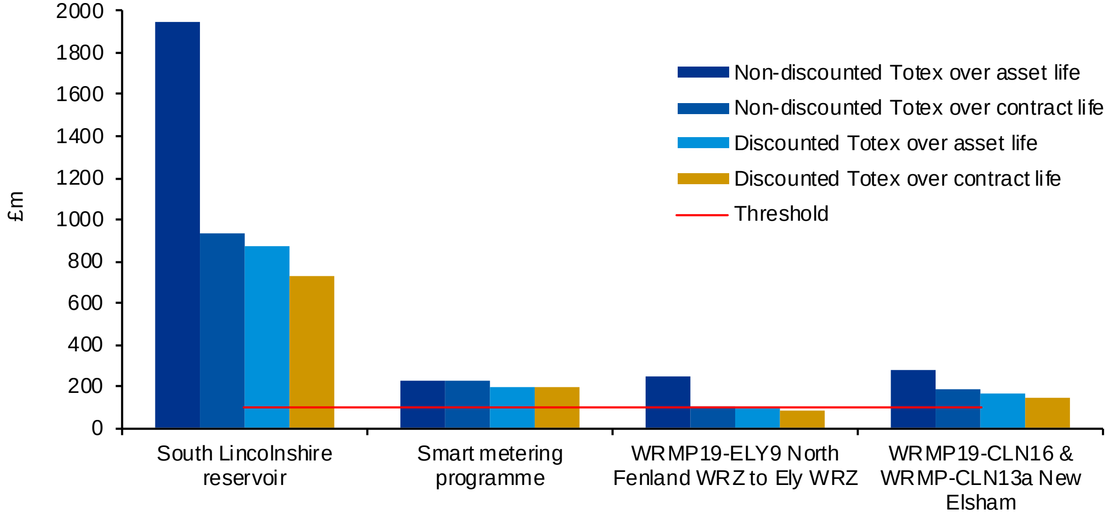


Contract life results

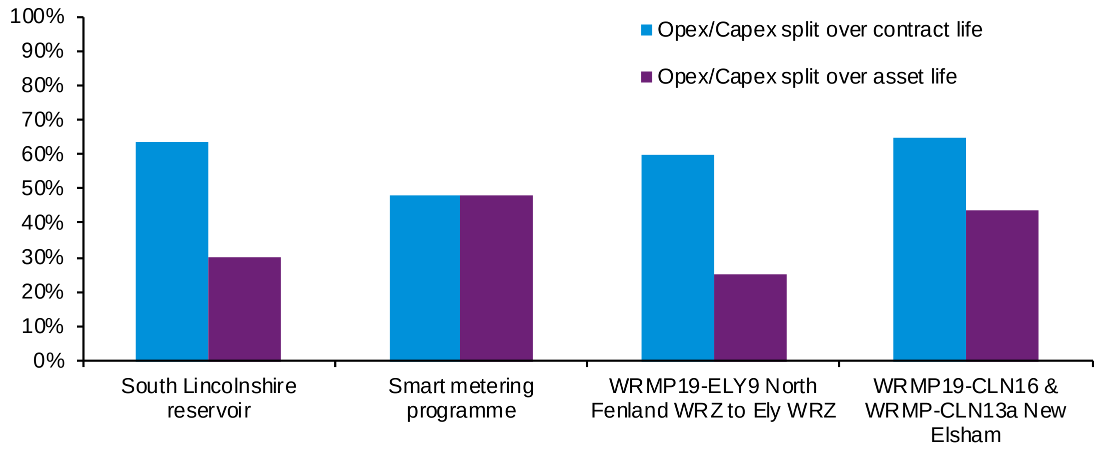
- For the purpose of this analysis, contract life was considered by including the full development and construction period in addition to 25 years of operation.
- Total costs of the projects were assessed on a non-discounted basis.
- As illustrated to the left, four schemes pass the £100m totex threshold on a non-discounted basis. In contrast, only three schemes pass the threshold on a discounted basis – these being the Reservoir, Smart Metering and CLN16&CLN13a Transfer with treatment programme.

Total costs over asset life for all PR19 proposed schemes

Total costs over asset and contract life



Non-discounted Opex/capex split

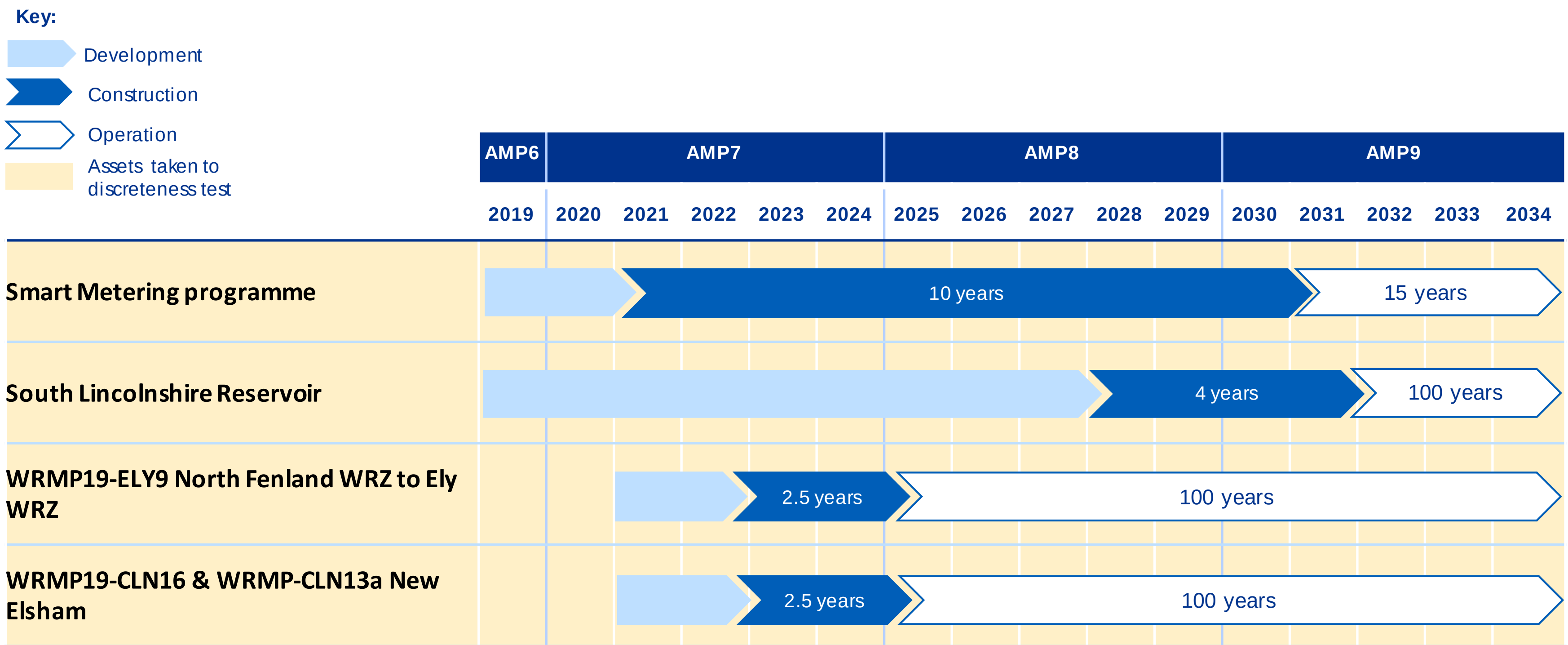


Asset life results

- For the purpose of this analysis, asset life was taken to include the development and construction phase, with the total period being 100 years for reservoir and transfer with treatment schemes; and 15 years for the smart metering programme.
- Total costs of the projects were assessed on both a non-discounted and discounted basis, using the 3.5% green book discount rate.
- As illustrated in the chart to the left, all four schemes passed the £100m totex threshold on a non-discounted basis, while only three schemes pass it on a discounted basis, with North Fenland transfer scheme being within £2m of the threshold.
- The share of capex in the overall project costs over contract life ranges between 48.22% and 64.51% depending on the asset, and between 25.32% and 48.22% over the asset life on a non-discounted basis.

Results of the 'Size' test - Timing

The chart below is a representation of the expenditure profile for each of the investment programmes that meet or are in proximity to the £100m size threshold. Programmes with construction in AMP 8 or AMP 9 are less likely to be suitable for delivery under a DPC model due to more limited certainty in their development, however in order to assess suitability more accurately, all four schemes have been taken through to the discreteness test.



2. Discreteness test

Process for qualitative technical assessment

Set out below is the process that was followed to develop and evaluate the suitability of individual assets from a technical perspective in order to establish how 'discrete' or 'separable' an asset may be and, as such, how suitable it may be for delivery under a Direct Procurement for Customers (DPC) model.

Process

Framework Development	• An initial framework was developed to assess the technical suitability of projects for delivery under a DPC model from the perspective of asset discreteness and how separable assets are from the wider network. • This framework was developed based on interviews with AWS' SME's and input from the Executive as part of Portfolio Group meetings on DPC. In addition, it was reviewed and updated against Ofwat's PR19 Final Methodology to reflect further guidance.
'Project on a page' template	• To capture the relevant asset information for each project a template was developed and populated by AWS' SMEs who had detailed knowledge of the projects. • The information collected through this template provided an overview to the asset, as well as key asset characteristics to help inform the technical assessment (e.g. the nature of interfaces, and potential impact of asset failures).
Workshop with AWS SMEs	• A one-day workshop with key AWS SMEs was held in order to capture further information on the assets and validate the initial assessment against the technical framework and revise and update the assessment where required to reflect specific asset characteristics. • The workshop allowed for a more in depth understanding of the specific asset characteristics and resulted in further updates.
Write up and validation	• The workshop information was captured and used to update the assessment and establish the key findings and results of the analysis. • The draft assessment was provided to the workshop SMEs to ensure that the information collected was accurate and interpreted appropriately. Further feedback and comments were collated and some further updates to the draft assessment were made.
Final results	• The final results were documented and presented to the AWS team for final review. • Results were presented and discussed at the DPC Portfolio Group for final review and sign-off.

Summary of Technical Assessment

This slide sets out a summary of the technical assessment undertaken on each of AWS' four assets that were progressed from the 'size' test. A more in depth assessment against each of the 6 drivers are provided in the following slides. The assessment has been undertaken on the assumption a 3rd party would design, build, finance and operate the selected assets.

		Elsham Transfer	*North Fenland Transfer*	*South Lincs Reservoir*	*Smart Metering Programme*
1	Physical asset location	M	M / H	H	L / M
2	Interfaces	M	M	M	L / M
3	Process	L / M	M	H	M
4	Impact on service delivery	L / M	M	M	H
5	Flexibility	L / M	M	M	L
6	Control	L / M	L / M	M	L / M
	Overall scoring	10	12	14	10.5
	Overall assessment	Less suitable	More suitable	More suitable	Less suitable

Key and scoring

Low (L)	= 1
Medium (M)	= 2
High (H)	= 3
More suitable	12+
Less suitable	<12

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Elsham Transfer (including WTWs)

Elsham Transfer: Asset overview

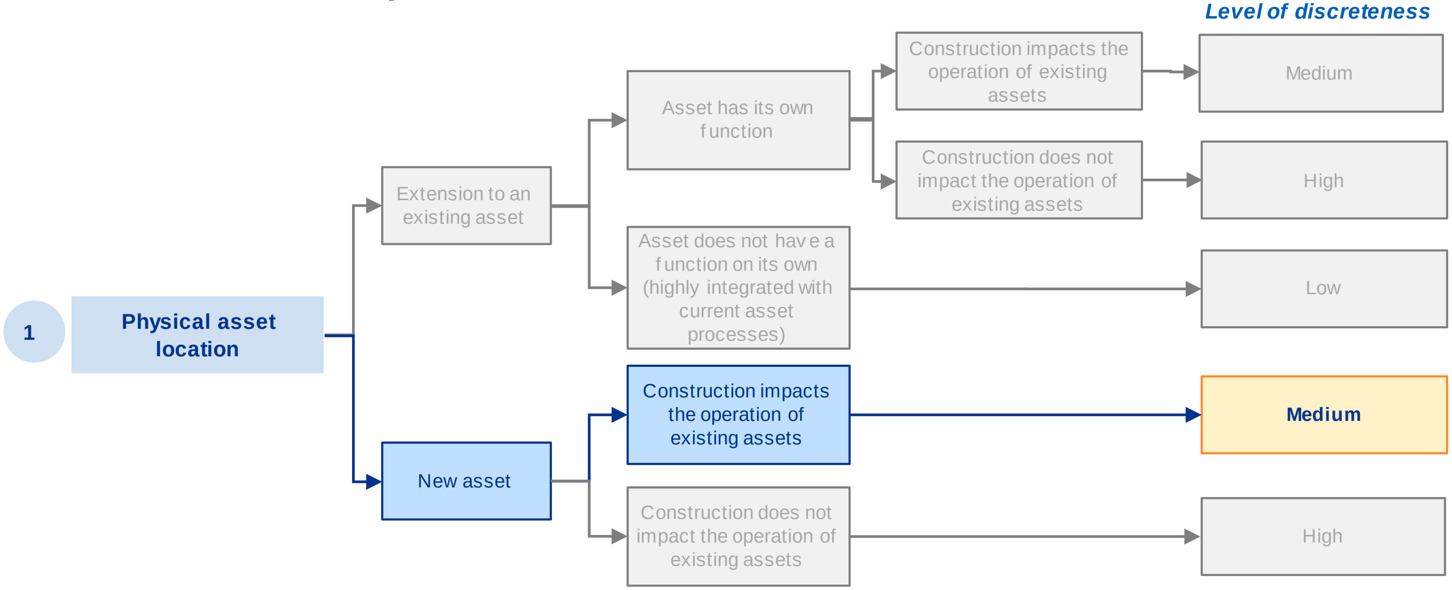
Project overview			
Project name and code	South Humber Bank WRZ to Central Lincs WRZ Transfer (50 Ml/d) and Elsham WTW	**Totex value over 25 yrs (£m)**	£184m
Project description	Transfer of treated water from the proposed new Elsham plant to Lincoln storage and two new treatment works (one raw water to potable WTW and one metaldehyde treatment works) New pipe, total length 55Km, 900 (62Ml/d capacity), 1 x Pumping station, 2 x new storage reservoirs (only required if metaldehyde treatment stays in the option), 37 crossings requiring directional drilling.		
Length of enabling and construction periods (years)	3 year construction period 2 year enabling works period	**Part of wider scheme and/or associated with other assets**	Links to the Lincoln supply system. Could be other connections for single source of supply resilience
Asset life (years)	100 years	**Implication of delays on output**	SOSI, Interruption to Supply ODI, Drought resilience ODI, WFD no det
Regulatory delivery date	2025	**Investment driver of the project**	Sustainability reductions, drought and climate change

Elsham transfer: Assessment against discreteness drivers

This slide sets out a summary of the discreteness assessment for the Elsham Transfer scheme, with an overview of the main considerations for each of the 6 criteria.

	Criteria	Summary	Assessment
1	Physical asset location	• *Multiple assets across different sites increases risk and complexity of delivery. Whilst it is a new asset, not requiring the transfer of assets from AWS to the DPC, the asset would impact on existing AWS operations and requires connection to an existing operational site that serves critical UK infrastructure (Humberbank). This increases the construction risk in terms of potential for delays and cost over-run and requires close management given the potential stakeholder impact.*	M
2	Interfaces	• *Multiple physical and informational interfaces with the wider AWS network. Well understood processes may reduce the impact of costs associated with new contractual boundaries. However, there will need to be regular and close coordination of interfaces where dependences on Pyewipe Treatment Works impact on Elsham transfer and WTW capacity available for deployment to South Lincs WRZ.*	M
3	Process	• *The asset is highly integrated with the wider AWS network and would be controlled in real-time through a 24/7 centralised control centre in order to enable network resilience and balance supply/demand. As such, a 3rd party would have limited control over asset operation which is likely to impact on risk, restricting its ability to manage and operate the assets itself.*	L / M
4	Impact on service delivery	• *Asset failure could have a high impact on AWS' quality and reliability obligations that are related to interruption to supply, leakage, water quality (ODI penalties). As such contractual penalties will need to be addressed through the contract. Managing these risks as part of a standalone asset is likely to result in greater costs from the loss of portfolio effect and which will be crystallised through higher cost to customers.*	L / M
5	Flexibility	• *One of the key risks under a DPC delivery route is related to access and future upgrades to the asset, where connections may be required to increase resilience or improve network optimisation. Under a fixed term contract for the asset, future upgrades and changes may be constrained or could be costly and may require additional cost and potential for delays.*	L / M
6	Control	• *Critical supply and demand asset required for day to day operation, and control is critical in the event of asset failure on the existing connection supply area. In the event of a major operational incident AWS would likely require control over the asset to mitigate supply impacts across the wider network and reduce the impact on customers. This could be more difficult to achieve if operated by a third party.*	L / M
		Total score	**L/M**

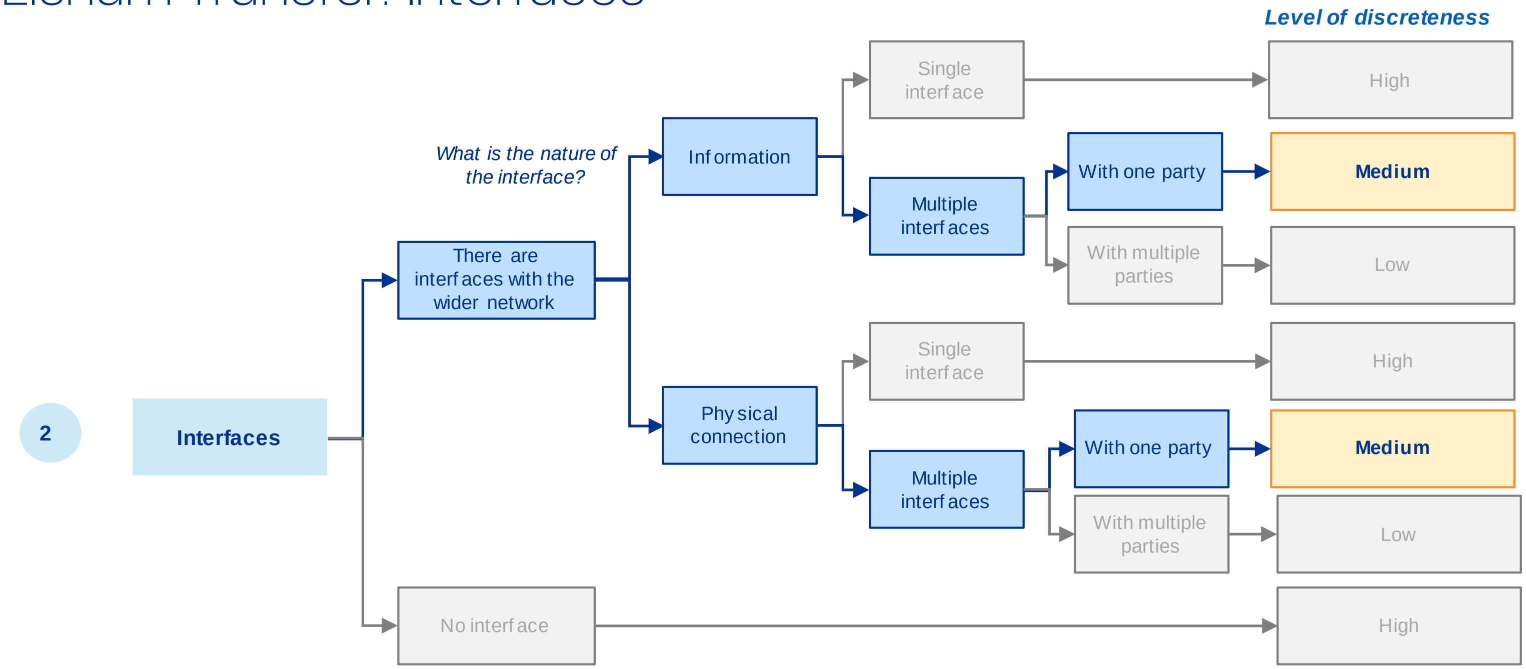
Elsham Transfer: Physical asset location



Physical asset location assessment

- The scheme consists of four different types of assets (including pipes, pumping stations, storage reservoirs and raw water and a metaldehyde treatment works) in different locations which adds complexity to overall project delivery (e.g. different interfaces with Highways Agency and National Rail), and which have different risk profiles. The asset will be constructed on a combination of both an existing brownfield and greenfield site. As the scheme does not involve the transfer of an existing asset, from AWS to the DPC, there is no risk associated with a DPC adopting legacy assets.
- Some of the construction will need to take place on greenfield site which is in close proximity to an archaeological site. Construction will also take place on a brownfield site, which is currently designated as an EKP. The sites classification as an EKP will result in significantly increased construction risk for DPC, which is likely to be translated into higher construction costs.
- The construction of one element of the asset (one of the new service reservoirs) will impact the operation of existing AWS' assets. Also, the asset will need to be connected into the existing upstream and downstream operational assets, whose supplies will need maintaining during the construction period, calling for close coordination between DPC and AWS, which could impact on construction costs and project delivery.
- The planning, development and construction of similar assets of this type is considered a core capability of AWS, and who would want to maintain the risk associated with the management of local stakeholders. There are a number of similar projects being delivered by the @one alliance.
- The potential for innovation is considered limited, and is only likely to arise with respect to pipeline routing and trenching / directional drilling techniques.

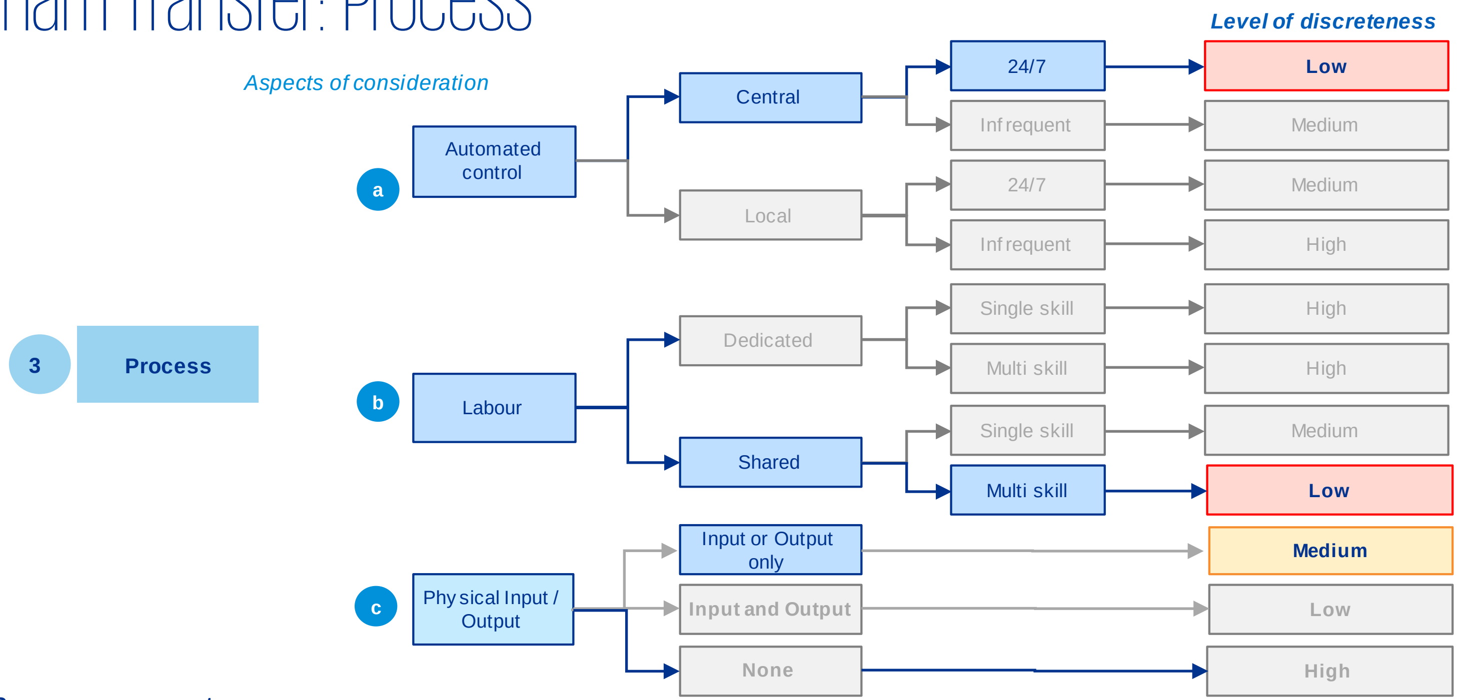
Elsham Transfer: Interfaces



Interfaces assessment

- There are multiple physical interfaces that would need managing and contractual arrangements, potentially incurring additional costs. However, interactions are restricted to AWS only which reduces complexity.
- In addition to both the connections upstream (into the new potable Elsham WTW) and downstream (the Lincoln supply system, Westgate and Bracebridge storage), there will be multiple connections with an existing asset that continues to be critical to operation and provides supply resilience. Coordination between the existing and new asset will be needed on an ongoing basis to enable network optimisation and ensure resilience. A key benefit of the scheme is the increased resilience that the asset provides to the existing AWS network, and is therefore an integral part of AWS' operations.
- Information will be shared with several teams within AWS (operations / networks / water quality teams). These multiple informational interfaces would likely require ongoing, day-to-day management by both parties and could therefore result in increased costs to customers.
- It is important to note that in its Final Methodology, Ofwat states that pipes are a "highly integrated component of a network" making them less suitable for DPC in that perspective.

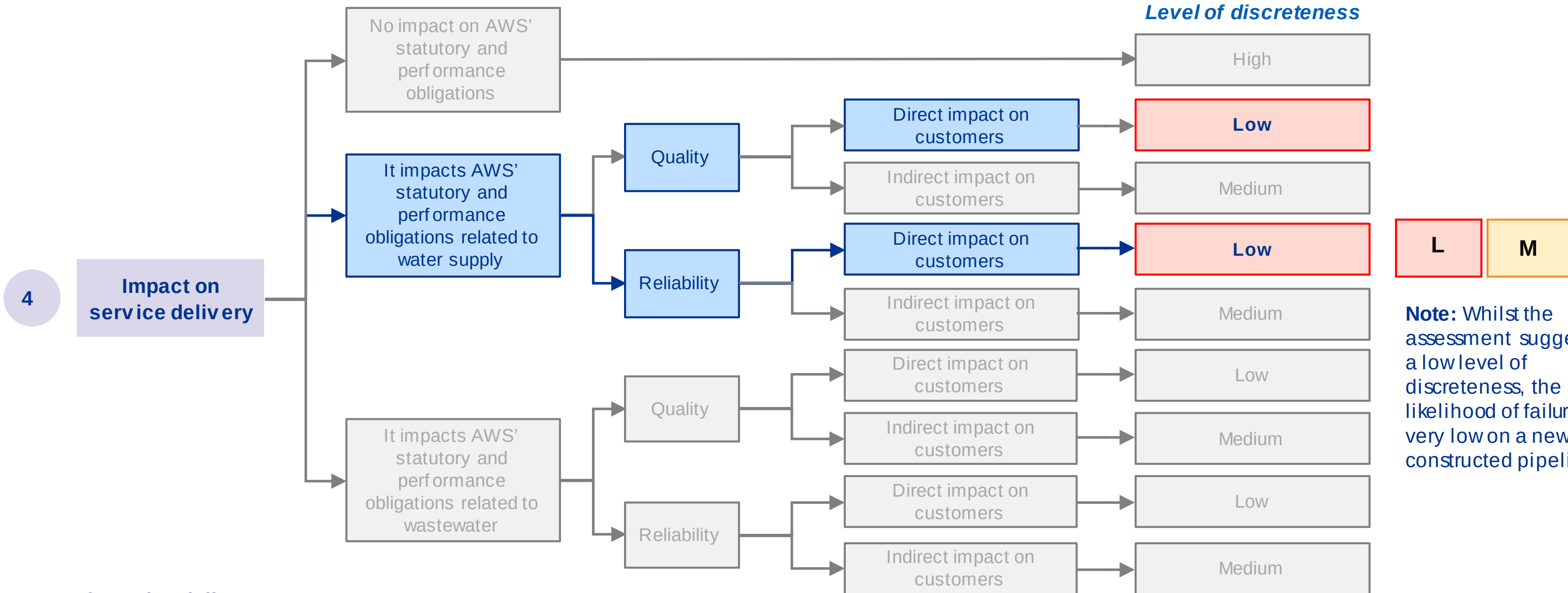
Elsham Transfer: Process



Process assessment

- The asset will be fully automated and controlled centrally by AWS with the help of telemetry. Flows on the asset will be balanced automatically at a network level as part of day to day network optimisation. This would significantly impact on a 3rd parties ability to control the operation of the asset, potentially increasing its risk. In addition, if AWS was constrained in terms of network operations, this could have wider impacts across the network.
- The operation of the asset also impacts on the Lincoln Supply System [AWS to confirm] and so regular coordination across the wider water network and the Elsham WTW will be required to manage flows effectively.
- Asset utilisation would be driven by demand in the Lincoln Supply System (Central Lincs WRZ). As the output of the asset will be driven by factors outside the DPC's control, revenue payments based on usage will be difficult to implement, and could lead to increased cost for customers if linked to availability only, however we know that operational costs are low and this may not be material.
- Labour is mainly required for maintenance purposes which is expected to consist principally of preventive maintenance work including pressure checks, flow monitoring, etc. As the maintenance of similar assets is managed with AWS' shared resources across the wider business, there would be potentially a loss of economies of scope and scale and a DPC may result in higher costs, as labour could not be optimised across a wider portfolio of assets.
- Given AWS' size, it is perhaps less likely that a 3rd party would have the same purchasing power for key operational inputs. However, operational costs are relatively low and therefore there may be less impact resulting from a loss of scale economies.
- The pipeline is a passive asset, simply transporting water from one location to the other. At the same time, as the asset will include two treatment facilities (one for raw water and one for metaldehyde) processes are characterised by a increased level of complexity reducing the level of discreteness of the asset.

Elsham Transfer: Impact on service delivery

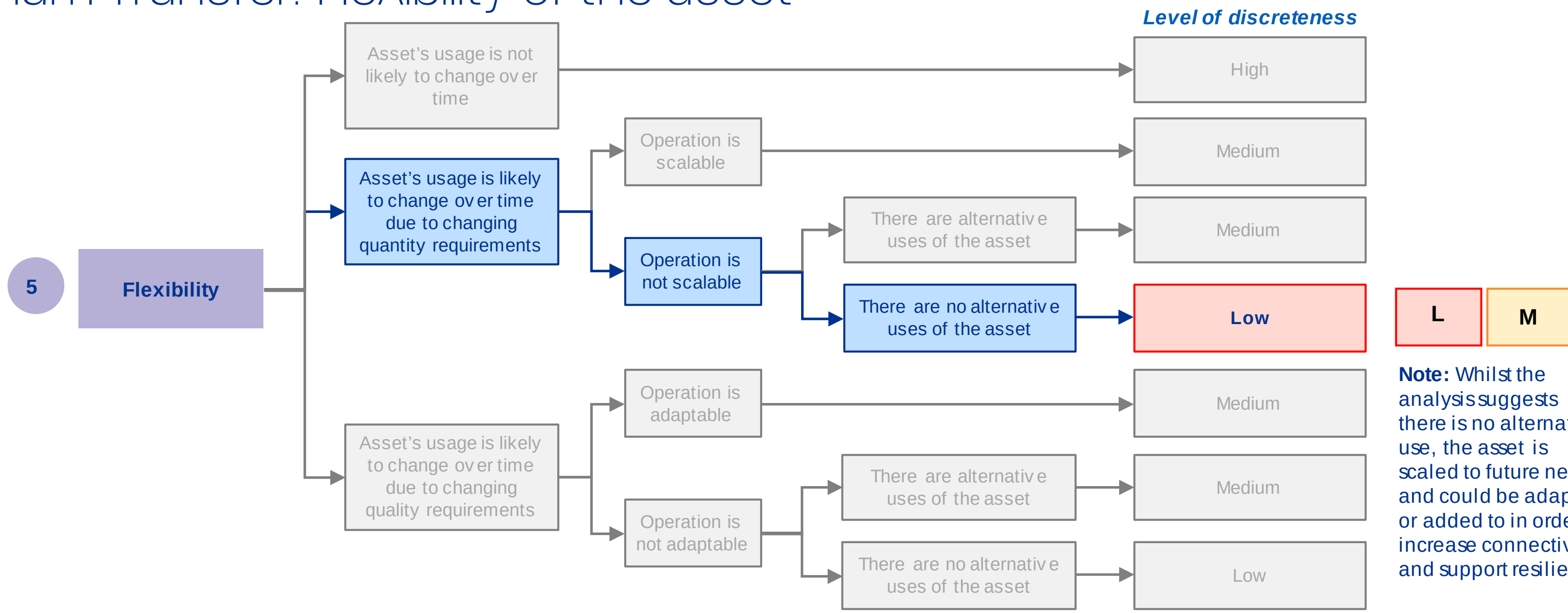


Note: Whilst the assessment suggests a low level of discreteness, the likelihood of failure is very low on a newly constructed pipeline

Impact of service delivery assessment

- The asset will have a high impact on AWS' quality and reliability obligations that are related to interruption to supply, leakage (ODI penalties) and metaldehyde levels. Managing risk associated with a single asset results in greater costs from the loss of portfolio effect, which will be crystallised in costs to customers.
- The impact of asset failure could results in AWS breaching its licence conditions which is a significant risk to AWS and threatens ongoing business operations and could result in high reputational damage. This would be both difficult and costly for AWS to transfer to the DPC, particularly with respect to reputation.
- As the asset is part of the water value chain, and its operation directly affects AWS' customers, a DPC model carries an increased risk from a service delivery perspective. AWS has a short time window of 24-72hrs to respond to asset failure before unavailability starts to impact the wider network and AWS' customers. Time delays resulting from hand-offs between AWS and a 3rd party could impact on failure response times.
- Interruption of supply caused by asset failure can lead to compensation claims from retailers/ end customers, potentially impacting AWS' C-MEX measures. It is also likely that AWS would suffer reputational damage as a result of an interruption of supply. This would be costly to transfer fully to a DPC provider who may have limited experience in the cause and impact of failure costs.
- Whilst asset failure is potentially unlikely, and AWS would manage the risk across its network, a 3rd party provider may be more inclined to price this risk more aggressively within the contract, and overestimate the potential impact. Given asset usage will be dictated by the wider network, establishing responsibility for the cause of failure may be challenging.
- There is limited alternative back-up supply available, and in the event of asset failure, supply/demand balance can be maintained over the short term. The long term impact on supply/demand could be more damaging, creating more risk for AWS in meeting its obligations.
- In summary, asset failure can be categorised as relatively low likelihood but would result in a significant event with direct impact on customers. As such, the asset may be less suitable for delivery under DPC.

Elsham Transfer: Flexibility of the asset

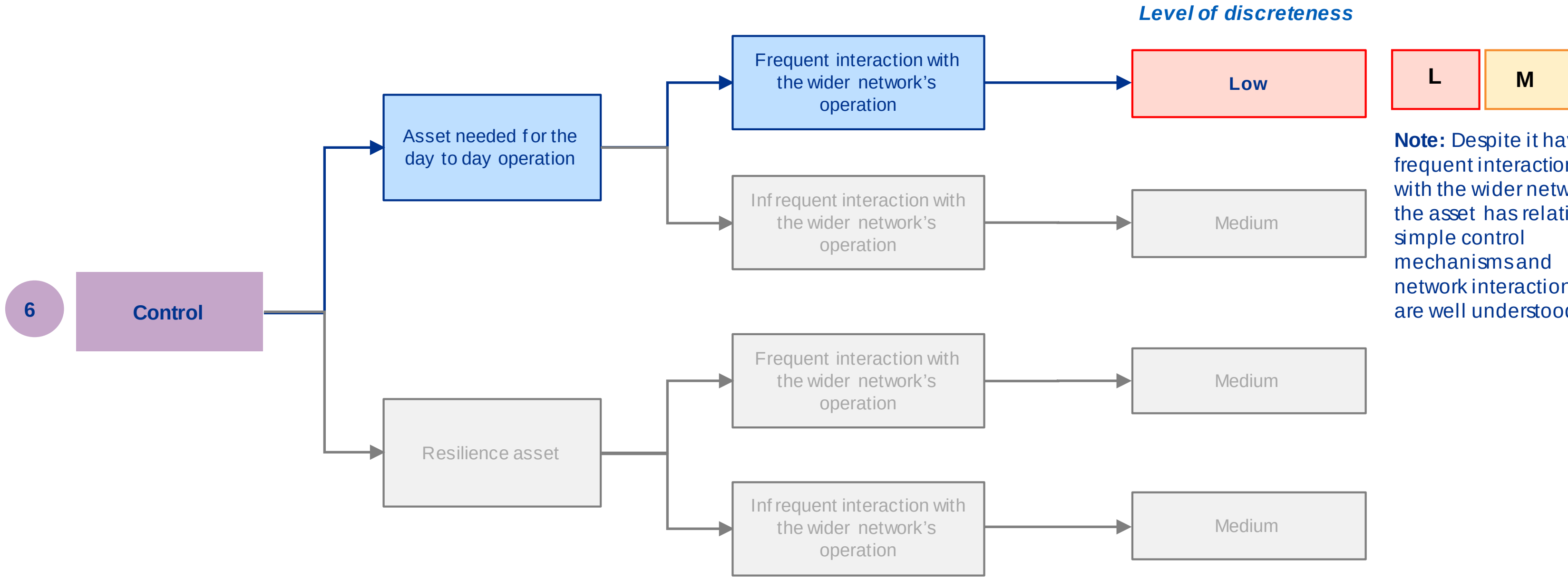


Note: Whilst the analysis suggests there is no alternative use, the asset is scaled to future needs and could be adapted or added to in order to increase connectivity and support resilience

Flexibility assessment

- One of the key risks under a DPC delivery route is related to access and future upgrades to the asset, where connections may be required to increase resilience or improve network optimisation. Under a DPC model, AWS may be constrained in the delivery of such schemes, or it may increase the time and costs associated with new schemes. Elsham is located near to an area where network growth could result in a need for enhancements.
- Output is volatile, driven by seasonal demand and organisational network wide resilience requirements. Based on current forecasts and past experiences variability of output is expected to be in the range of +/-40%, therefore establishing 3rd party service requirements in a contractual agreement could be challenging given the low level of predictability of output.
- Operation of the asset is not scalable, and there are no alternative usages of the asset available leading to limited discreteness from a flexibility perspective.
- The asset's utilisation would increase if operating in drought resilience mode, and will increase over time in response to future SR reductions and climate change impacts. As requirements towards the asset might change in the future, most likely driven by changes in demand, contractual terms will need to be structured in a way that allows for flexibility in future usage (in case future trading or connection potential is lost due to rigid contract terms, there is a risk that future investments cannot be optimised in the most cost efficient way leading to higher costs to bill payers).
- The decision regarding the need to include metaldehyde treatment is pending potential changes to legislation and which creates a level of uncertainty over the scope requirements for the scheme and which will impact the value and scheme complexity. It is unlikely this will be resolved in time to give clarity to bidders.

Elsham Transfer: Control



Note: Despite it having frequent interaction with the wider network, the asset has relatively simple control mechanisms and network interactions are well understood

Control assessment

- The asset will be part of a complex integrated system that requires real time control to optimally balance flows on the network, and therefore 3rd party operation create complexity in terms of asset operation which could result in reduced benefits of the scheme.
- The asset will help to supply the Lincoln Supply System (Central Lincs WRZ) where demand and supply will be managed on a daily basis at a coordinated network level, requiring frequent interaction between DPC and multiple teams within AWS, potentially adding costs associated with a new contractual requirement.
- In the event of a major incident AWS may require direct control over the asset to isolate supplies and carry out necessary repair and maintenance work. Introducing an interface may result in delays to response times and lead to more severe impacts, where AWS needs to gain permission and access over the asset.
- In summary, operational control of the asset is considered critical to AWS and a contractual interface would increase costs and complexity associated with required coordination.

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North Fenland Transfer

North Fenland Transfer: Asset overview

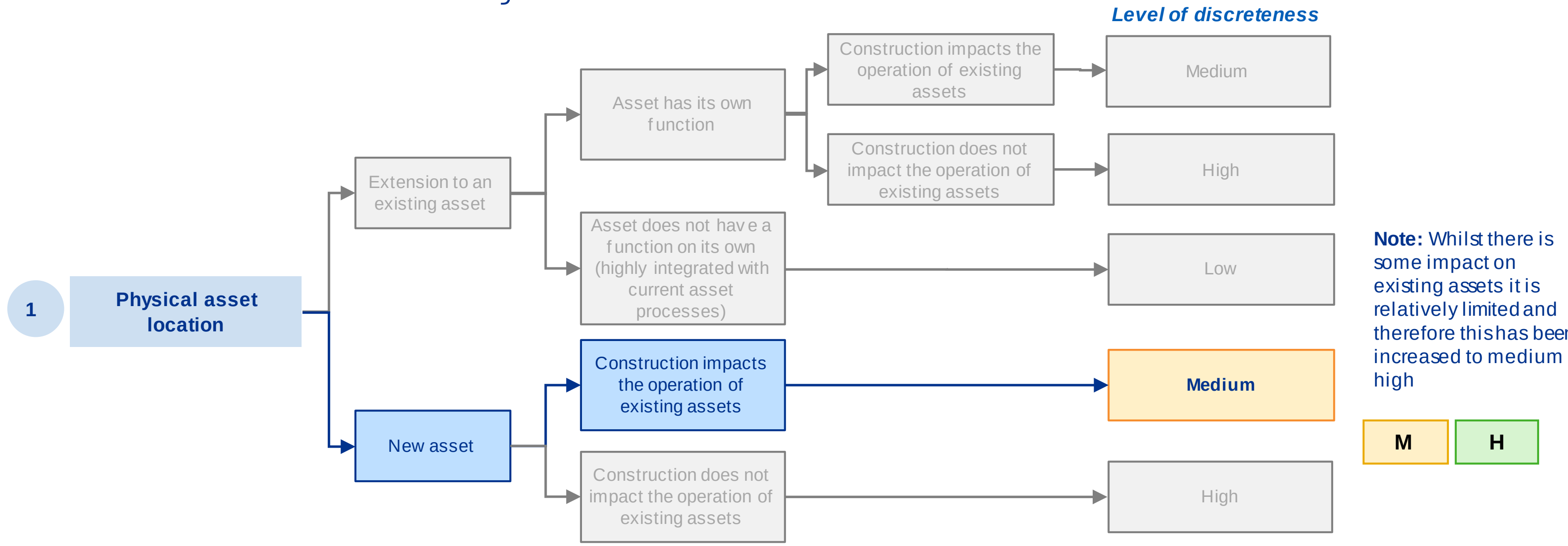
Project overview			
Project name and code	ELY9 North Fenland WRZ to Ely WRZ	**Totex value over 25 yrs (£m)**	£102m
Project description	Transfer of treated water from the North Fenland water resources zone to Ely water resources zone. New pipe, total length 34Km, with 20Ml/d capacity, 1 x metaldehyde treatment work, 7 crossings requiring directional drilling		
Length of enabling and construction periods (years)	3 year construction period 2 year enabling works period	**Part of wider scheme and/or associated with other assets**	Links two discrete water resources zones and introduces new water supply into Ely WRZ
Asset life (years)	100 years	**Implication of delays on output**	SOSI, Interruption to Supply ODI, Drought resilience ODI, WFD no det
Regulatory delivery date	2025	**Investment driver of the project**	Sustainability reductions, drought and climate change

North Fenland transfer: Assessment against discreteness drivers

This slide sets out a summary of the discreteness assessment for the North Fenland to Ely Transfer and Treatment scheme, with an overview of the main considerations for each of the 6 criteria.

	Criteria	Summary	Assessment	
1	Physical asset location	*The scheme includes a booster station, metaldehyde treatment and a transfer pipeline which is a point to point connection between two discrete water resource zones (Ely and North fenland) and which is the most significant component of the scheme. Whilst the pipeline will cross utility services and transport connections (e.g. road/rail) and the planning process may be lengthy it is not expected to be contentious given local geography).*	M	H
2	Interfaces	*There are a limited number of physical interfaces with the existing network, reducing the complexity of the scheme and costs associated with contractual interfaces. Inputs from ground and surface water sources will have implications for water quality and will require close monitoring which could increase costs and result in additional stakeholder interactions (e.g. DWI).*	M	
3	Process	*While the asset is highly integrated with the wider AWS network and would be centrally controlled 24/7, given the passive nature of the point-to-point connection, the underlying risks can be efficiently managed by appropriate contractual agreements. Unlike Elsham, North Fenland does not include raw water treatment and hence the complexity of processes is moderate.*	M	
4	Impact on service delivery	*As a link between two WRZs, the asset has relatively low impact on customers during asset failures. However, extreme cases with long periods of supply disruptions could have an impact on AWS' quality and reliability obligations, giving rise to ODI penalties. Managing these risks as part of a standalone asset is likely to result in greater costs from the loss of portfolio effect and which could be crystallised through higher cost to customers.*	M	
5	Flexibility	*The asset is sized to meet future requirements and there are not expected to be cross-connections linking the pipeline to other WRZs given the asset location (unlike Elsham). Pending legislation changes relating to metaldehyde treatment may cause uncertainty over the scheme scope of the scheme in the short-medium term reducing flexibility.*	M	
6	Control	*Critical supply and demand asset required for day to day operation, and control is critical in the event of asset failure on the existing connection supply area. In the event of a major operational incident AWS would likely require control over the asset to mitigate supply impacts across the wider network and reduce the impact on customers. This could be more difficult to achieve if operated by a third party.*	L	M
		Total score	M	

North Fenland Transfer: Physical asset location



Physical asset location assessment

- The scheme consists of two different types of assets, which adds complexity to overall project delivery and which have different risk profiles. The treatment asset will be constructed on existing AWS sites and the transfer will involve a few crossings (river and railways) considered to be standard for similar construction work. As the scheme does not involve the transfer of an existing asset, from AWS to the DPC, there is no risk associated with a DPC adopting legacy assets.
- The asset will introduce water containing metaldehyde into an area where the water does not current contain metaldehyde. Therefore, in order to comply with relevant drinking water quality regulations, treatment is required and which creates additional risks.
- The construction will impact the operation of existing AWS' assets. Also, the asset will connect two discrete water resources zones and thus will need to be connected into the existing upstream and downstream operational assets, whose supplies will need maintaining during the construction period, calling for close coordination between DPC and AWS, which could impact on construction costs and project delivery.
- The planning, development and construction of similar assets of this type is considered a core capability of AWS, and who would want to maintain the risk associated with the management of local stakeholders. There are a number of similar projects being delivered by the @one alliance.
- The potential for innovation is considered limited, and is only likely to arise with respect to pipeline routing and trenching / directional drilling techniques.

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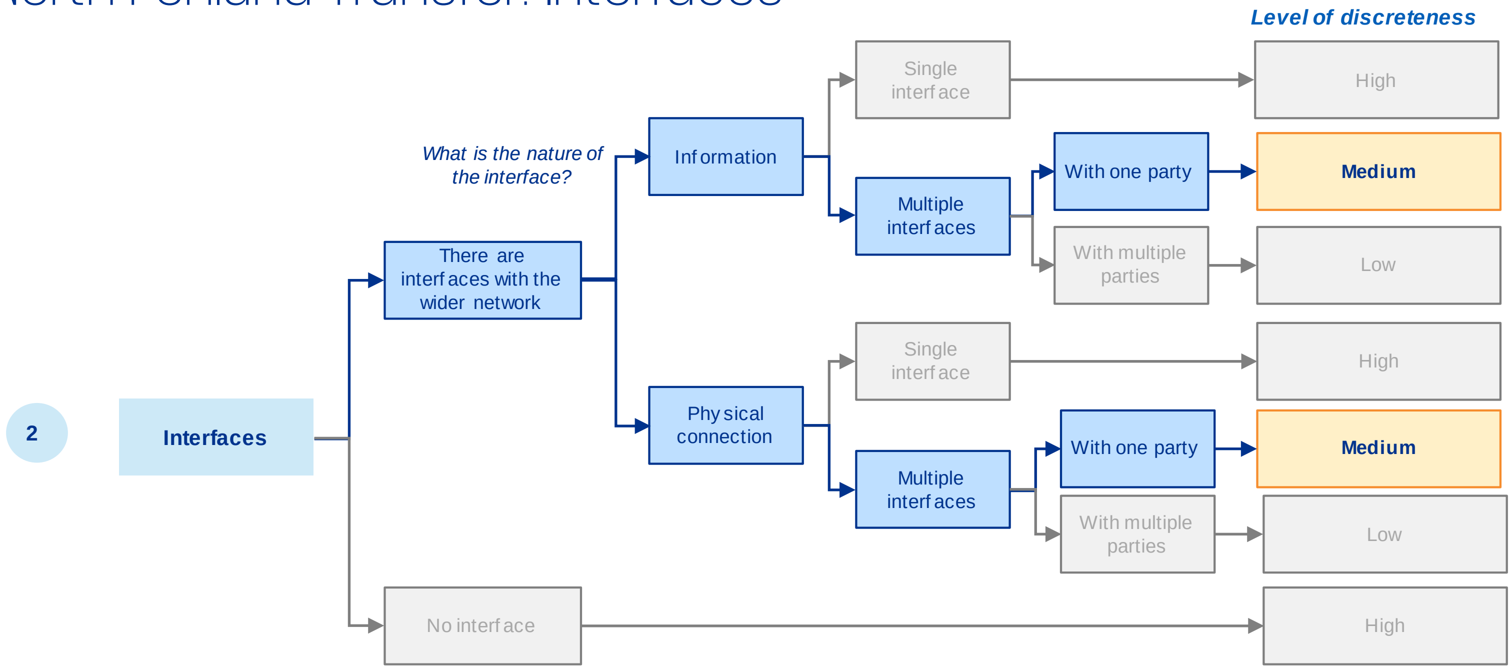
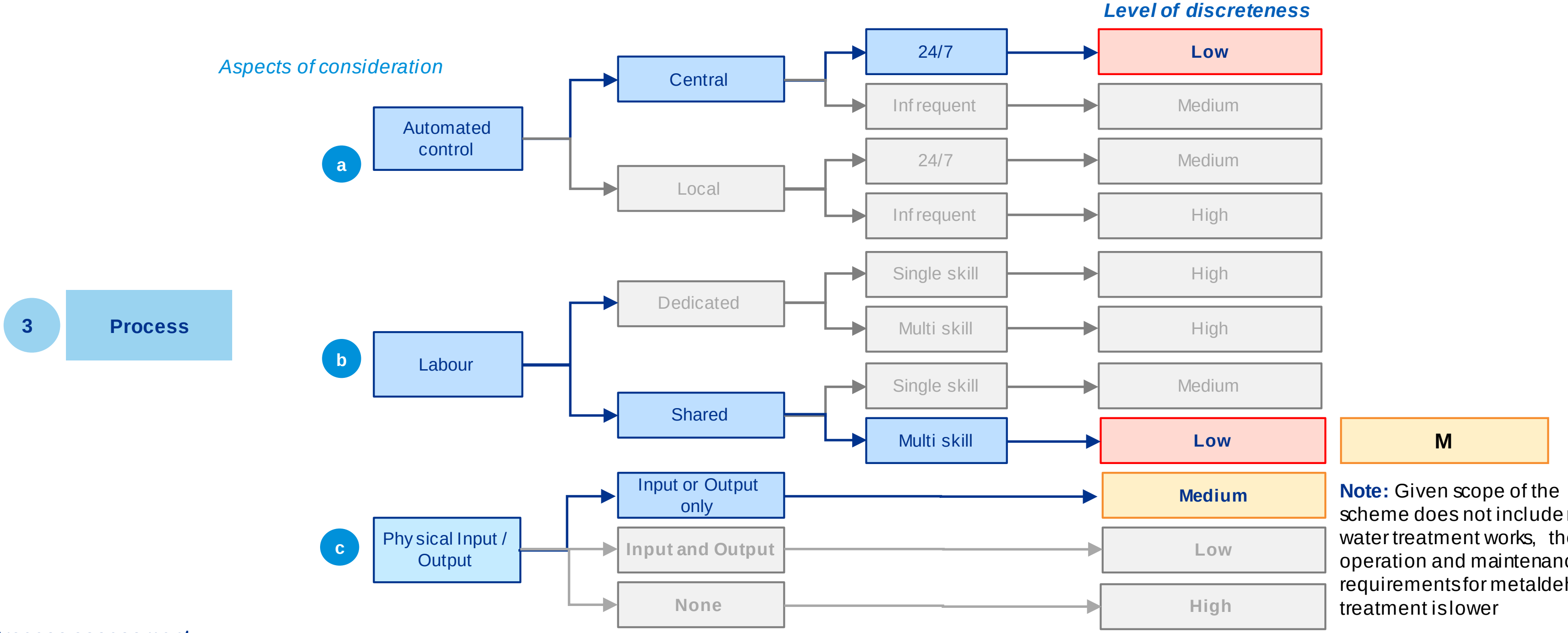
North Fenland Transfer: Interfaces



Interfaces assessment

- There are multiple physical interfaces that would need managing and contractual arrangements, potentially incurring additional costs. However, interactions are restricted to AWS only which reduces complexity.
- The asset is a point-to-point connection between two water resources zone, linking North Fenland WRZ and Ely WRZ and thus coordination between the existing and new asset will be needed on an ongoing basis to enable network optimisation. A key benefit of the scheme is the new supply the asset introduces into the existing network in Ely WRZ, and is therefore an integral part of AWS' operations.
- The asset will take water from two different sources, and mix surface water and ground water introducing additional complexity to the interfaces.
- Information will be shared with several teams within AWS (operations / networks / water quality teams). These multiple informational interfaces would likely require ongoing, day-to-day management by both parties and could therefore result in increased costs to customers.
- It is important to note that in its Final Methodology, Ofwat states that pipes are a "highly integrated component of a network" making them less suitable for DPC in that perspective.

North Fenland Transfer: Process

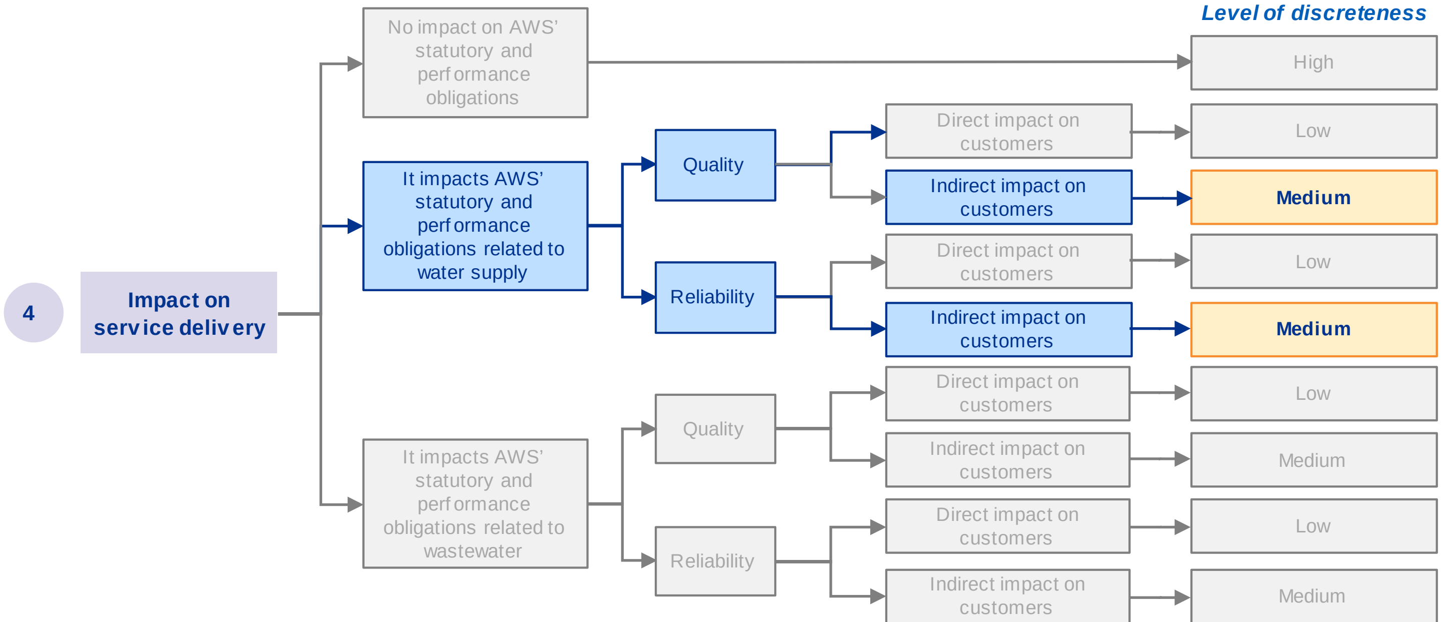


Note: Given scope of the scheme does not include raw water treatment works, the operation and maintenance requirements for metaldehyde treatment is lower

Process assessment

- The asset will be fully automated and controlled centrally by AWS with the help of telemetry. Flows on the asset will be balanced automatically at a network level as part of day to day network optimisation. This would significantly impact on a 3rd parties ability to control the operation of the asset, potentially increasing its risk. In addition, if AWS was constrained in terms of network operations, this could have wider impacts across the network.
- The operation of the asset impacts two currently discrete water resources zones and so regular coordination on a wider network level will be required to manage flows effectively.
- Asset utilisation would be driven by demand in the Ely WRZ. As the output of the asset will be driven by factors outside the DPC's control, revenue payments based on usage will be difficult to implement, and could lead to increased cost for customers if linked to availability only, however we know that operational costs are low and this may not be material.
- Labour is mainly required for maintenance purposes which is expected to consist principally of preventive maintenance work including pressure checks, flow monitoring, etc. As the maintenance of similar assets is managed with AWS' shared resources across the wider business, there would be potentially a loss of economies of scope and scale and a DPC may result in higher costs, as labour might not be optimised across a wider portfolio of assets. But given AWS extensive experience in operating similar projects, the impact could be less material by having appropriate contractual agreements with the DPC.
- Given AWS' size, it is perhaps less likely that a 3rd party would have the same purchasing power for key operational inputs. However, given the nature of operational costs there may be less impact resulting from a loss of scale economies.
- The pipeline is a passive asset, simply transporting water from one location to the other. However, the asset will take water from two different sources, and requires metaldehyde treatment which creates increased complexity and risk and reduces the level of discreteness of the asset.

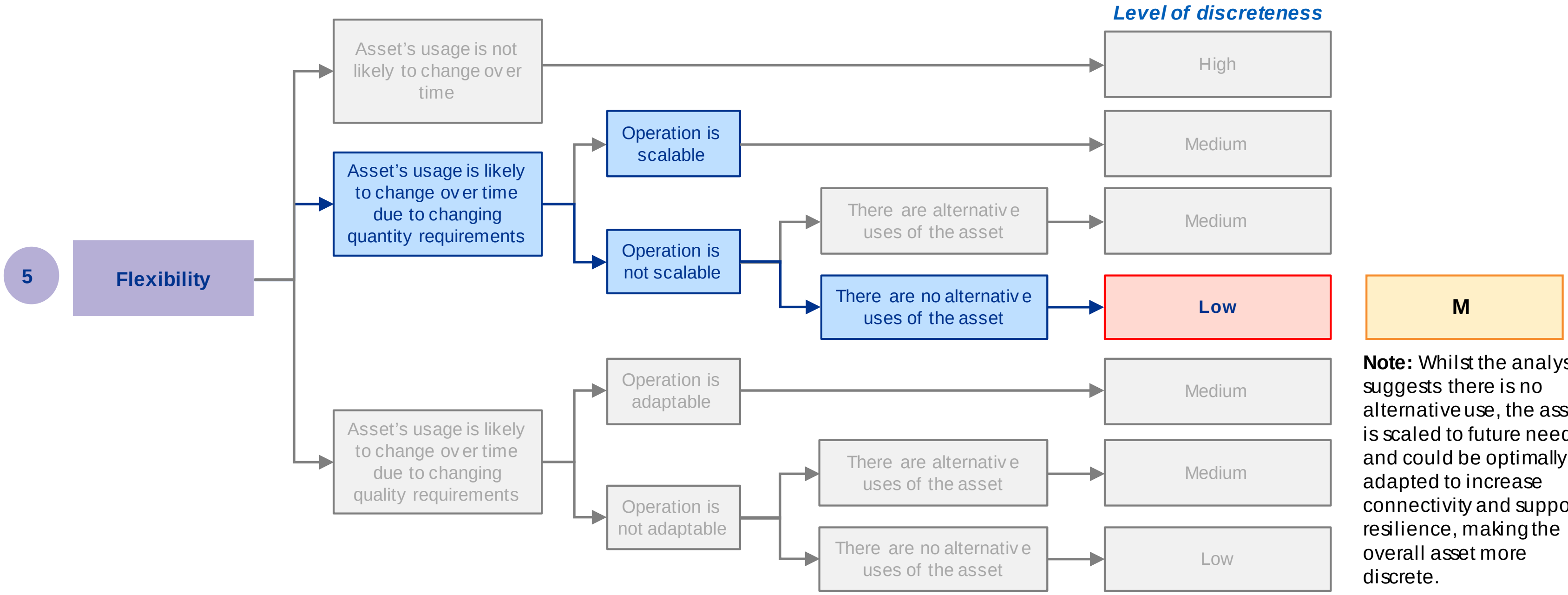
North Fenland Transfer: Impact on service delivery



Impact of service delivery assessment

- The asset will have a medium impact on AWS' quality and reliability obligations that are related to interruption to supply, leakage (ODI penalties). Managing risk associated with a single asset could potentially lead to greater costs from the loss of portfolio effect, which will be crystallised in costs to customers.
- The impact of asset failure could result in AWS breaching its licence conditions which is a significant risk to AWS and threatens ongoing business operations and could result in high reputational damage. This would be both difficult and costly for AWS to transfer to the DPC, particularly with respect to reputation.
- Although the asset is part of the water value chain, and its operation affects AWS' customers and such a DPC model carries an increased risk from a service delivery perspective, as the transfer does not supply customers directly the impact of an asset failure is limited. Being a point-to-point connection between two WRZs demand can be met by bringing in alternative supply sources in the event of unavailability of the asset before it starts to impact the wider network and AWS' customers.
- Where asset failure leads to an interruption of supply on AWS' network this can result in compensation claims from retailers/ end customers, potentially impacting AWS' C-MEX measures. It is also likely that AWS would suffer reputational damage as a result of an interruption of supply. This would be costly to transfer fully to a DPC provider who may have limited experience in the cause and impact of failure costs.
- Noted that although back-up supply is available, in the event of asset failure, supply/demand balance can only reasonably be expected to maintain over the short term. The long term impact on supply/demand could be more damaging, creating more risk for AWS in meeting its obligations.
- Also, whilst asset failure is potentially unlikely, and AWS would manage the risk across its network, a 3rd party provider may be more inclined to price this risk more aggressively within the contract, and overestimate the potential impact. Given asset usage will be dictated by the wider network, establishing responsibility for the cause of failure may be challenging.
- In summary, asset failure can be categorised as relatively low likelihood and would have moderately material impact on customers. As such, the asset may be less suitable for delivery under DPC.

North Fenland Transfer: Flexibility of the asset

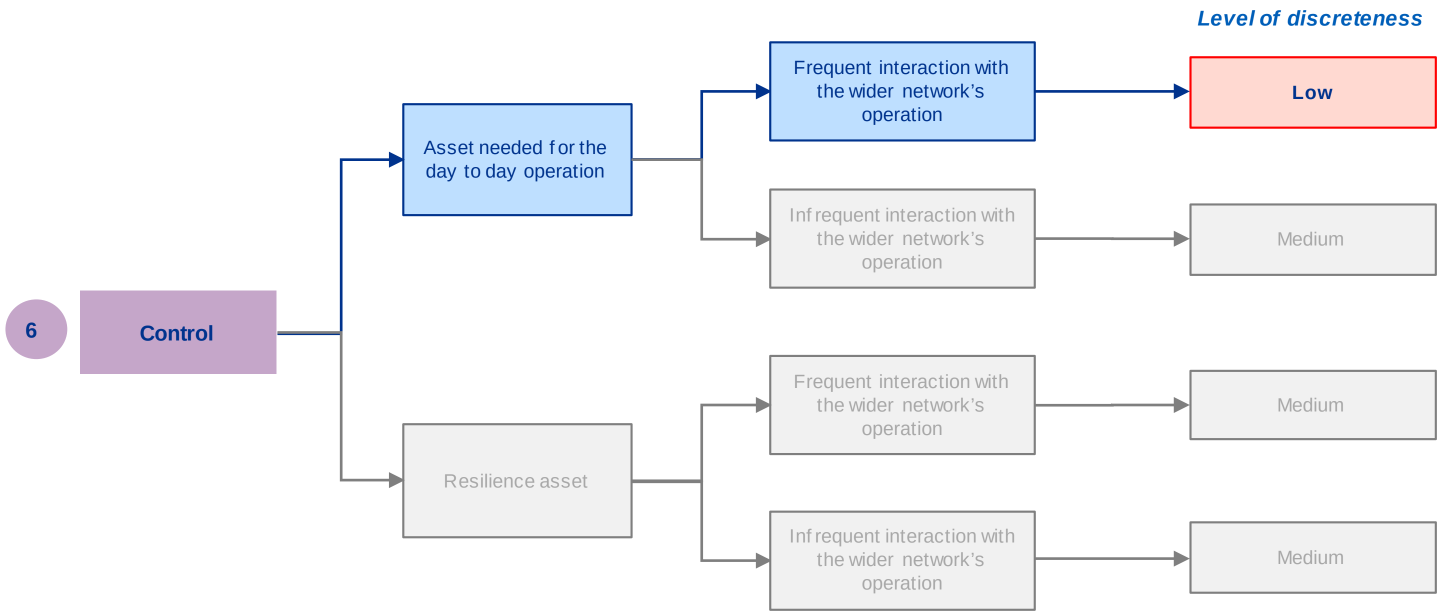


Note: Whilst the analysis suggests there is no alternative use, the asset is scaled to future needs and could be optimally adapted to increase connectivity and support resilience, making the overall asset more discrete.

Flexibility assessment

- One of the key risks under a DPC delivery route is related to access and future upgrades to the asset, where connections may be required to increase resilience or improve network optimisation. Under a DPC model, AWS may be constrained in the delivery of such schemes, or it may increase the time and costs associated with new schemes.
- Output is volatile, driven by seasonal demand and organisational networkwide resilience requirements. Based on current forecasts and past experiences variability of output is expected to be in the range of +/-40%, therefore establishing 3rd party service requirements in a contractual agreement could be challenging given the low level of predictability of output.
- While operation of the asset is not scalable, and there are no alternative usages of the asset available, the asset is scaled to future needs and could be optimally adapted to increase connectivity and support resilience, making the overall asset more discrete from a flexibility perspective.
- There is less interconnection expected to be required in the future to improve resilience across other parts of the network compared with the Elsham transfer scheme.

North Fenland Transfer: Control



L M

Note: Despite it having frequent interaction with the wider network, the asset has relatively simple control mechanisms and network interactions are well understood

Control assessment

- The asset will be part of a complex integrated system that requires real time control to optimally balance flows on the network, and therefore 3rd party operation create complexity in terms of asset operation which could result in reduced benefits of the scheme.
- The asset will help to supply the Ely WRZ where demand and supply will be managed on a daily basis at a coordinated network level, requiring frequent interaction between DPC and multiple teams within AWS, potentially adding costs associated with a new contractual requirement.
- In the event of a major incident AWS may require direct control over the asset to isolate supplies and carry out necessary repair and maintenance work. Introducing an interface may result in delays to response times and lead to more severe impacts, where AWS needs to gain permission and access over the asset.
- In summary, operational control of the asset is considered critical to AWS and a contractual interface would increase costs and complexity associated with required coordination.

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South Lincolnshire Reservoir

South Lincolnshire Reservoir: Asset overview

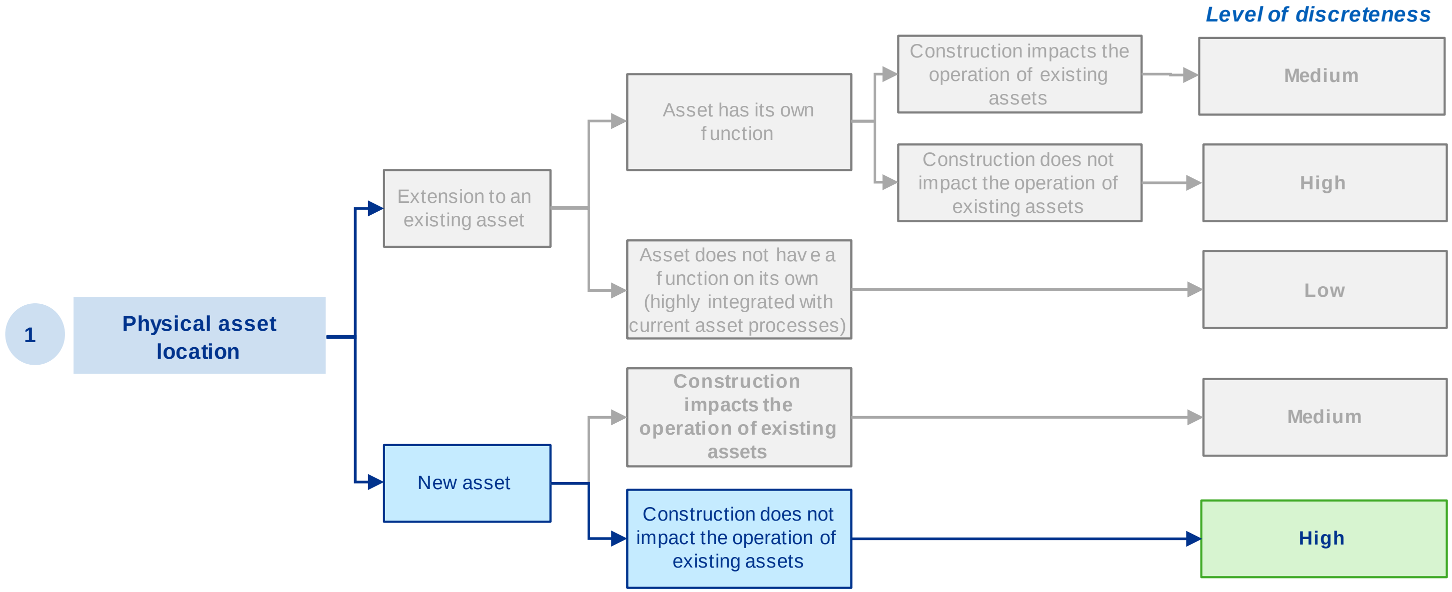
Project overview			
Project name	South Lincolnshire Reservoir	**Totex value over 25 yrs**	£933.9m
Project description	A number of assets associated w ith the scheme including a river intake, raw w ater pumping station, raw w ater transfer, fully embanked 4km^2 reservoir structure, draw off tow er, and raw w ater delivery to dow nstream netw ork.		
Length of enabling and construction periods (years)	Approx 8-10 years including 4 year construction period, plus 2 year fill period (2 years)	**Part of wider scheme and/or associated with other assets**	This w ill feed into dow nstream raw w ater transfer to Ruthamford North WRZ and associated new WTW process. The need for the asset w ill be determined at WRMP24
Asset life (years)	100 years	**Implication of delays on output**	SOSI, Interruption to Supply ODI, Drought resilience ODI, WFD no det
Regulatory delivery date	2035 but dependent on the outcome of future WRMPs, as not currently confirmed as needed in WRMP19	**Investment driver of the project**	Sustainability reductions and exports to third parties

South Lincolnshire Reservoir: Assessment against discreteness drivers

This slide sets out a summary of the discreteness assessment for the South Lincolnshire Reservoir scheme, with an overview of the main considerations for each of the 6 criteria.

	Criteria	*Summary*	*Assessment*
1	Physical asset location	• *The scheme includes multiple assets that will be constructed on a standalone greenfield site (pipeline and reservoir). This scheme would have limited impact on existing operations during construction. It is assumed AWS would purchase the land and secure planning prior to tender and reducing risks for the DPC.*	H
2	Interfaces	• *There are a number of physical and informational interfaces associated with the construction and operation of this scheme, notably between the DPC and AWS and the EA. While these interfaces could introduce additional costs for AWS and DPC, they can be effectively managed using well-established contractual agreements.*	M
3	Process	• *The reservoir scheme will require limited Integration with AWS' day to day operations and would likely be operated by a dedicated team, responsible for the reservoir and associated treatment works. Automated on site processes reduce the need for complex coordination with the wider network, however there is a remote risk of losing some efficiency from not being able to draw on wider AWS capability.*	H
4	Impact on service delivery	• *Risk of failure at the reservoir is considered small with the large capacity of the reservoir meaning any upstream faults will have a minimal direct impact on AWS' service delivery. Downstream faults could result in supply interruptions/quality issues which would impact AWS' customers directly, potentially impacting C-MEX measures/ODIs and which AWS would need to reflect in a contractual arrangement with the DPC.*	M
5	Flexibility	• *The asset has a high predictability of usage with low volatility in output, enhancing the potential for the asset to be delivered under a DPC model. Population growth may increase demand in later AMPs however, the limiting constraint is likely to be raw water source which is unchanged under DPC or in house delivery. Some potential loss of flexibility may occur through introduction of additional boundary.*	M
6	Control	• *Operation of the reservoir will require more limited interaction with AWS' wider network assuming required reservoir refill protocols are being fulfilled. Although AWS will not require direct control of the assets to manage the wider network, some co-ordination will need to be established through contractual arrangements to ensure the DPC provider is not creating any additional risk with respect to AWS' statutory obligations.*	M
		Total score	**M/H**

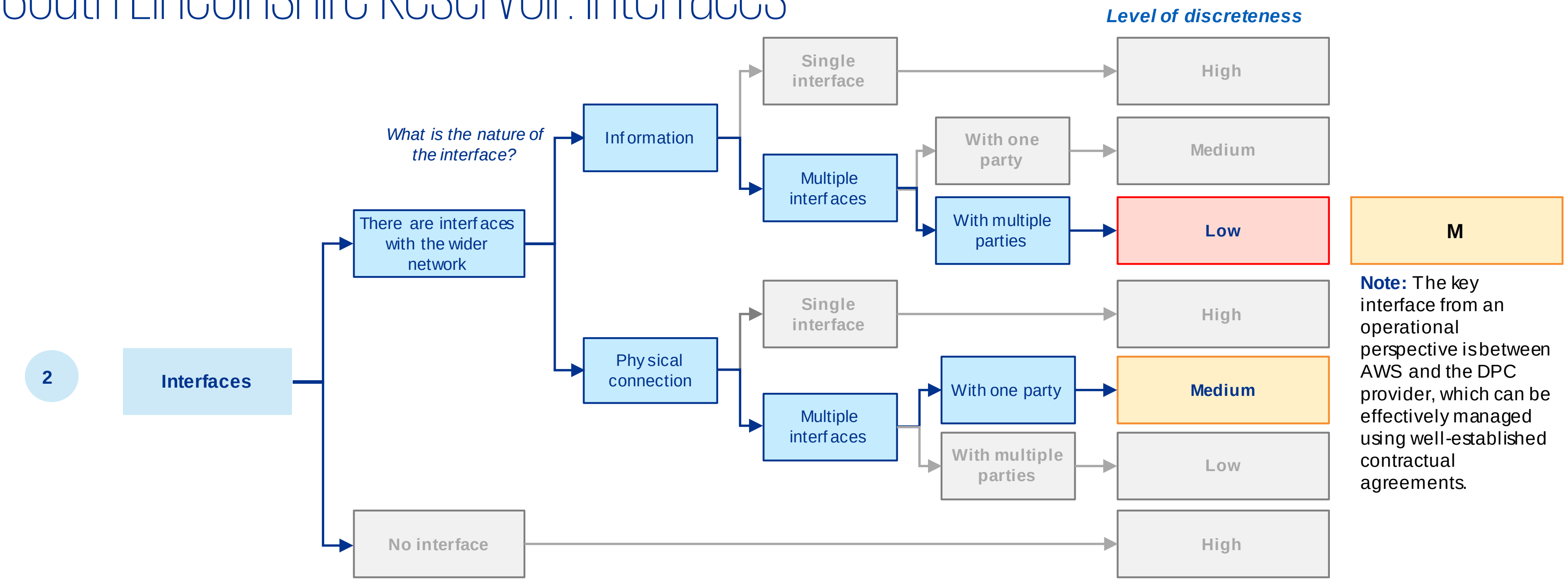
South Lincolnshire Reservoir: Physical asset location



Physical asset location assessment

- The proposed South Lincs Reservoir Scheme comprises a number of new, and related, assets that will be constructed on a greenfield site, which is likely to be classified as grade 2 arable land. During construction, limited coordination will be required between the DPC and AWS, reducing any complexity and associated costs of integration with existing AWS assets.
- There are not currently any existing AWS asset located in the vicinity of any of the assets proposed with this scheme and can be constructed on a stand alone basis without the complexities of constructing the assets on or near existing AWS assets. There are however a number of 3rd party assets located close to 3rd party including utility assets, onshore windfarms and underground power cables. It is expected that any risks associated with these 3rd party assets will be mitigated through the planning and consenting process and would therefore not significantly impact the risk profile of the DPC.
- While AWS have significant experience in delivering large diameter infra assets and related pumping stations, it has not delivered a similar project in the past, and one this scale has not been built in the UK in a number of decades. Having said this, there is relatively low complexity and construction risk involved in the development and construction of an embanked reservoir of this nature and, the engineering capability is available in the market however lack of recent precedents does create some challenges.
- AWS will want to ensure compliance with the obligations set out in the Reservoir Act in relation to reservoir construction and operation and this could increase costs for a DPC contractor which it may be less familiar with.
- Given the standalone nature of the asset and the limited need for coordination between the DPC provider and AWS during the construction period, the South Lincs Reservoir Scheme is considered to be highly discrete from a physical asset location perspective.

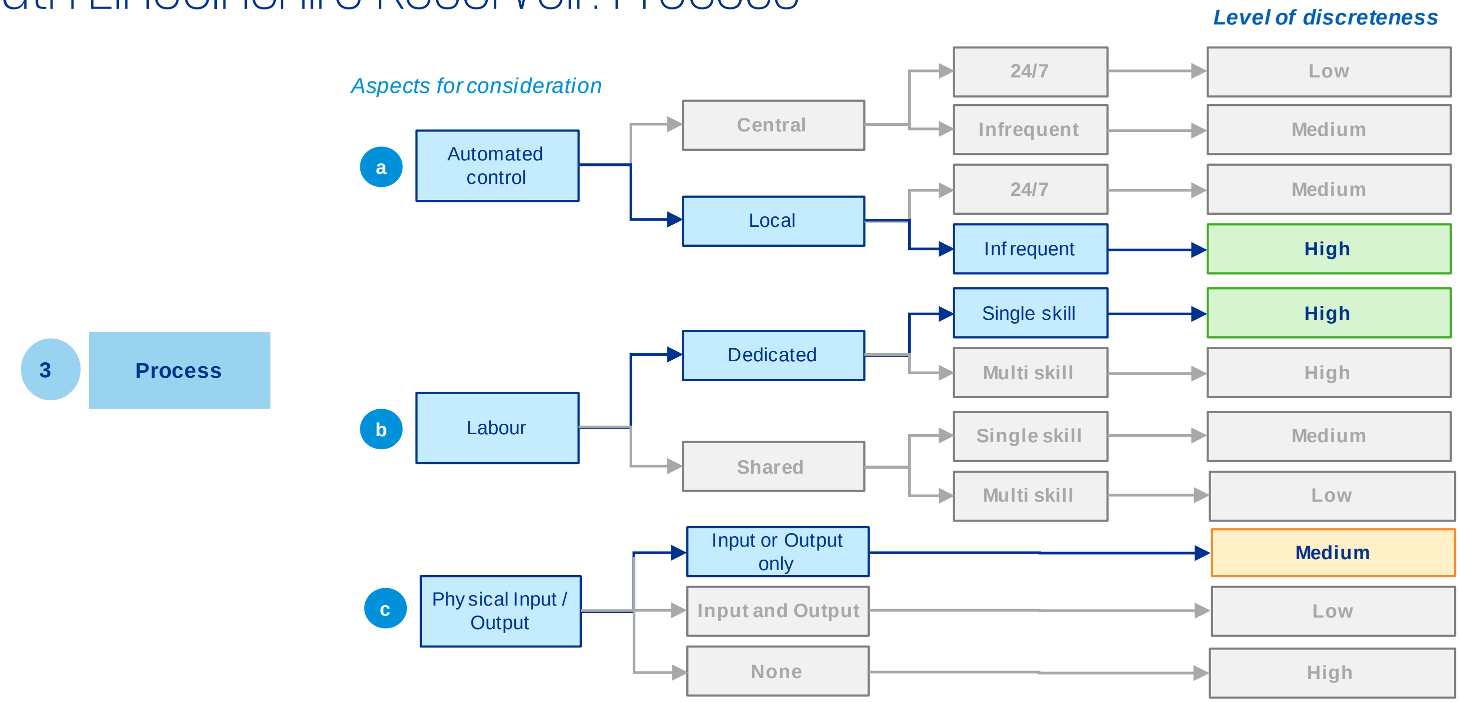
South Lincolnshire Reservoir: Interfaces



Interfaces assessment

- The South Lincs Reservoir Scheme will have two physical interfaces, one upstream and one downstream. The upstream physical interface will be at the point where the raw water for the reservoir will be extracted from the river. The water from the reservoir will be transported to the proposed water treatment works, that makes up part of the wider scheme, to AWS' wider downstream network. This constitutes the second physical interface.
- Coordination between the reservoir scheme and AWS' network asset will be needed on an ongoing basis to balance supply into the network with demand. This is likely to introduce a small amount of complexity to the assets ongoing operation, however this is not expected to be significant and the interface is well understood and will require minimal monitoring.
- Furthermore, the scheme will have 2-way informational interfaces with the AWS water operations and water resource teams, as well as the Environment Agency. These interfaces will relate to availability of river flows and reporting of abstraction and reservoir levels and are expected to be simple to manage. The interfaces between the DPC and AWS would need to be managed through a contractual agreement, which could increase costs for both parties as opposed to if AWS was to deliver the scheme and given AWS will retain the abstraction licence obligations from the EA.
- We consider that the simple nature and limited number of physical and informational interfaces between the scheme and other parties will not result in a significant increase to costs for customers and, on balance, can be considered to have a medium level of discreteness from an interface perspective.

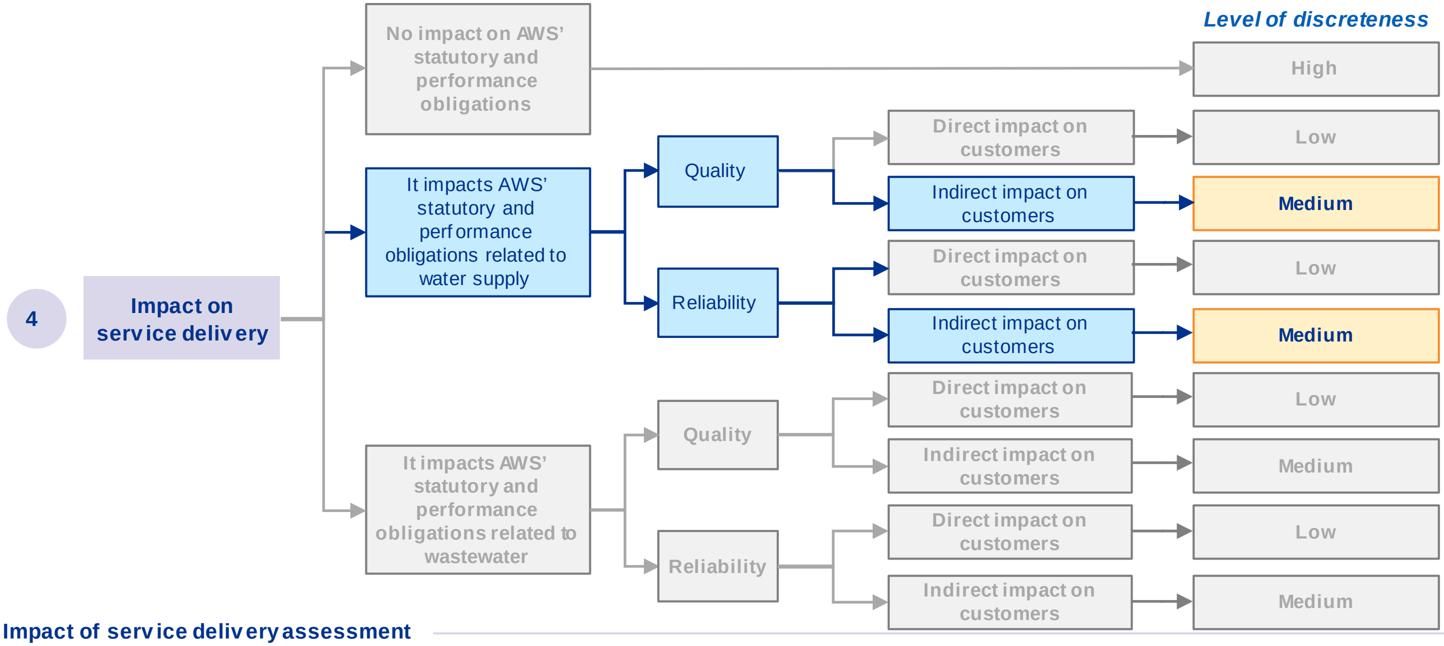
South Lincolnshire Reservoir: Process



Process assessment

- ***Automated control*** – It is expected that operation of the reservoir asset will be able to be run locally and that the asset will be require relatively infrequent co-ordination with the wider network apart from the upstream treatment works which it is connected to directly. The treatment works would call for demand from the reservoir to maintain raw water storage levels at the treatment works, and this process would be fully automated and operated via telemetry, reducing complexities associated with operational management.
- ***Labour*** – Unlike other AWS assets, where a central team is shared across a specific region, the reservoir scheme will require a dedicated local team for its operation. It is expected that this team would operate the scheme 8 hours a day, 5 days a week, and the skills required would be relatively simple from an operational perspective. Having a dedicated team mitigates the risk of labour not being optimised across a wider portfolio of assets, as would likely occur should a shared team be used to operate the scheme. The DPC is unlikely to suffer from any loss of economies of scope and scale in this respect, and operation on a standalone basis is unlikely to lead to increased costs.
- ***Physical Input / Output*** – The discreteness of the physical input /output connection is classed as medium. The input to the reservoir will be from the adjacent river and which would also be the case where AWS was responsible for the asset, and therefore only the output from the process creates an additional hand-off under DPC. However, AWS will remain responsible for compliance with the abstraction licence at the river and will therefore want to ensure the DPC provider does not exceed abstraction allowances. This will involve some additional monitoring.

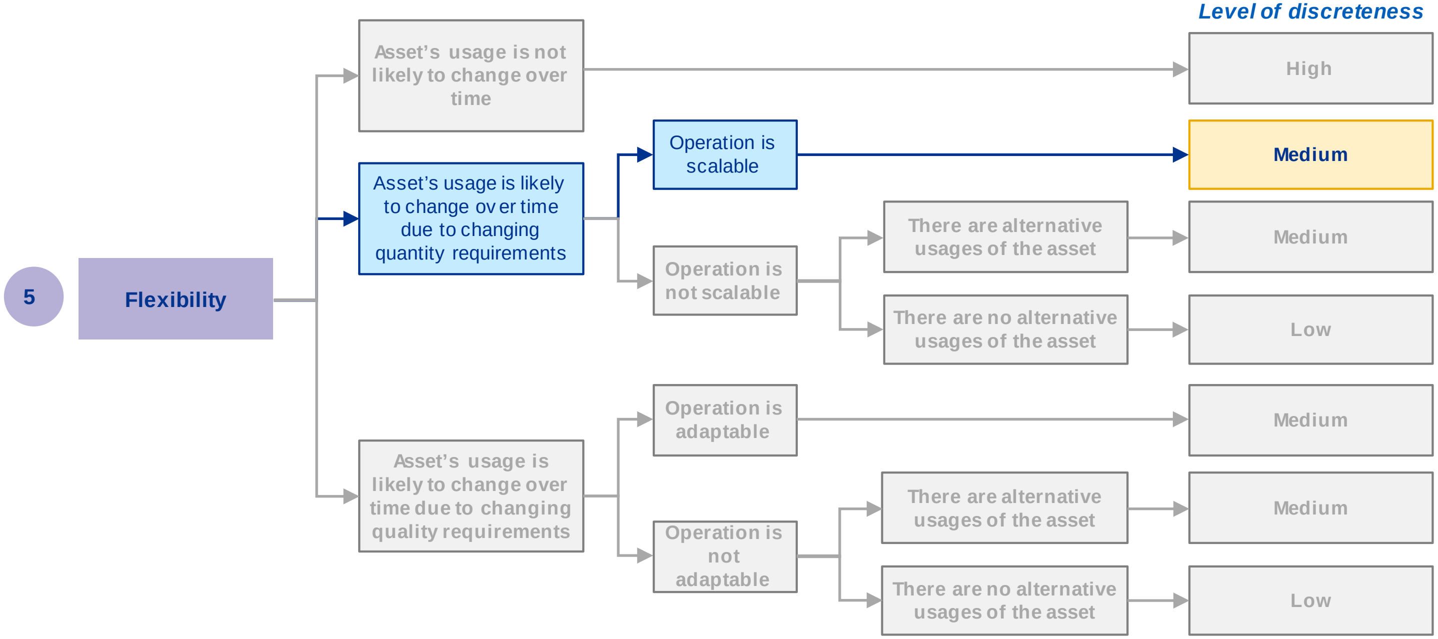
South Lincolnshire Reservoir: Impact on service delivery



Impact of service delivery assessment

- Failure of the South Lincs Reservoir Scheme is only likely to occur at the raw water intakes or transfer mains and not the main reservoir structure itself. With material volumes of water in storage (400,000 Ml) a short/medium term failure of the upstream assets is not likely to be critical as it is anticipated that the reservoir will continue to be able to supply the downstream network while repairs are carried out, decreasing the risk to AWS of a DPC delivering the scheme.
- A failure of the downstream pumping station could be more problematic, putting the water supply to the new WTW at risk. This could have supply interruption implications for AWS customers that could potentially result in reputational damage and compensation claims, impacting C-MEX measures and potentially incurring ODI penalties. AWS would need to effectively transfer the risks associated with asset failure to the DPC, through potentially complex contracts.
- Water quality from the reservoir could impact on customers (e.g. as a result of deterioration in surface water quality from metaldehyde) however additional stages in the supply process before the customer network is likely to reduce the impact although close monitoring of water quality compliance will be required given the licence obligation remains with AWS. As the impact on service delivery is considered to be well understood and manageable, the incremental risk of a DPC delivering the scheme is reduced which improves the scheme's suitability for DPC.
- Given where the South Lincs Reservoir Scheme is located upstream of the water network and with AWS assets in between it is considered that the impact on service delivery arising from a failure of the asset is considered to be more manageable and therefore a medium level of discreteness has been assigned for this scheme in relation to the impact on service delivery.

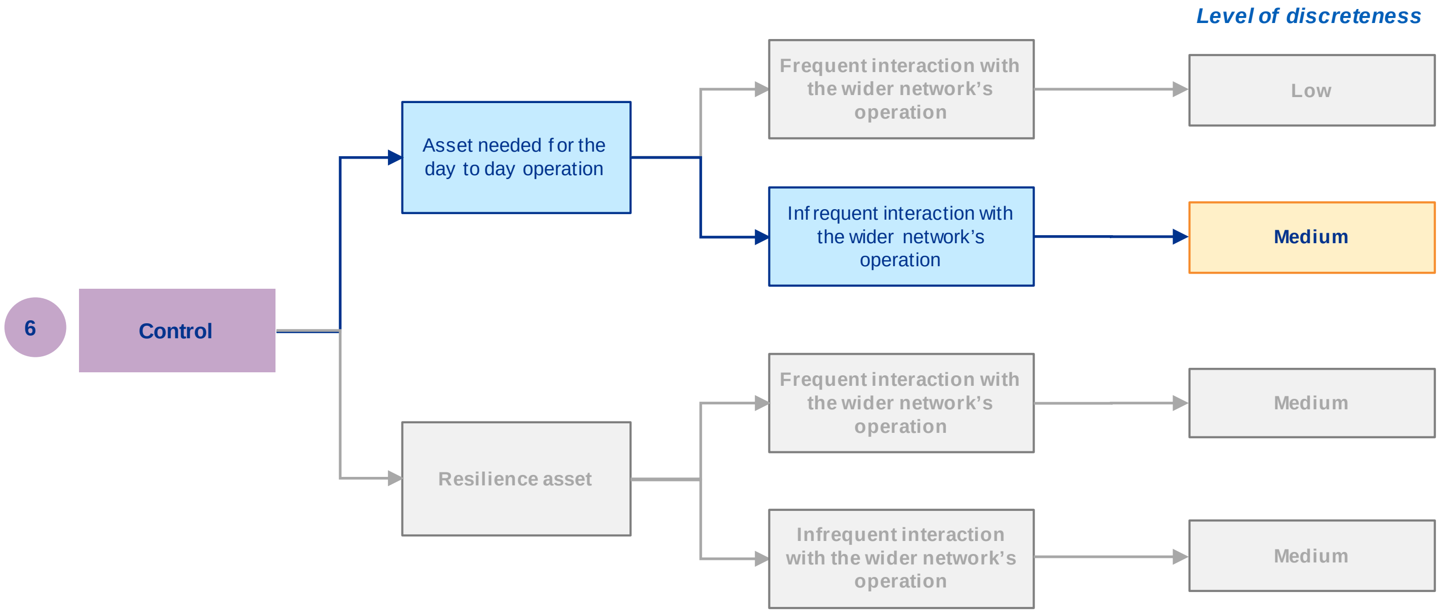
South Lincolnshire Reservoir: Flexibility of the asset



Flexibility assessment

- Within a certain range, there is high predictability of the schemes output, and the associated short term volatility in output is low. This means the assets specifications are likely to remain fit for purpose over the duration of the asset life, reducing the need for modifications and upgrades. This enhances the potential for a DPC delivery model as the likelihood of asset stranding is significantly reduced.
- Having said this, demand could increase in future AMPs. The reservoirs capacity is therefore expected to be scalable over time, with reservoir expansion works being possible at the current site. Any material variation to the output of the reservoir would need to be managed through a contractual agreement between the DPC and AWS which could increase costs and limit future flexibility.
- Given that the scheme is potentially scalable and adaptable to changes in output requirements, these assets can be considered to be more discrete and hare less likely to be affected where a fixed long term contract is entered into under a DPC model.

South Lincolnshire Reservoir: Control



Control assessment

- The reservoir scheme is expected to be operated on a day to day basis, depending on the demand from AWS' wider network. In periods of high demand, output from the reservoir may be increased, while output may be decreased in periods of low demand. There will need to be interactions and coordination between the scheme and AWS' water resource function to determine the level of output required to meet AWS' demand but given the available storage this is considered to be more manageable where a third party is involved.
- Interaction between AWS and the DPC is anticipated to be infrequent, and largely conducted on an automated basis given the relative simple nature of the of assets output.
- It is unlikely that AWS will ever need to have direct control over, or 'interfere' with, the DPC assets. Appropriate procedures and protocols will however need to be established to ensure that the communication between AWS and the DPC is secure, robust and reliable and the DPC follow re-fill protocols.
- The South Lincs Reservoir Scheme will be run on a day to day basis to help AWS meet the fluctuating demand from is end customers. Despite this, AWS will not require direct control of the assets and contractual arrangements could be established to set out the relationship between AWS and DPC, so that AWS can continue to meet the demand across its network.

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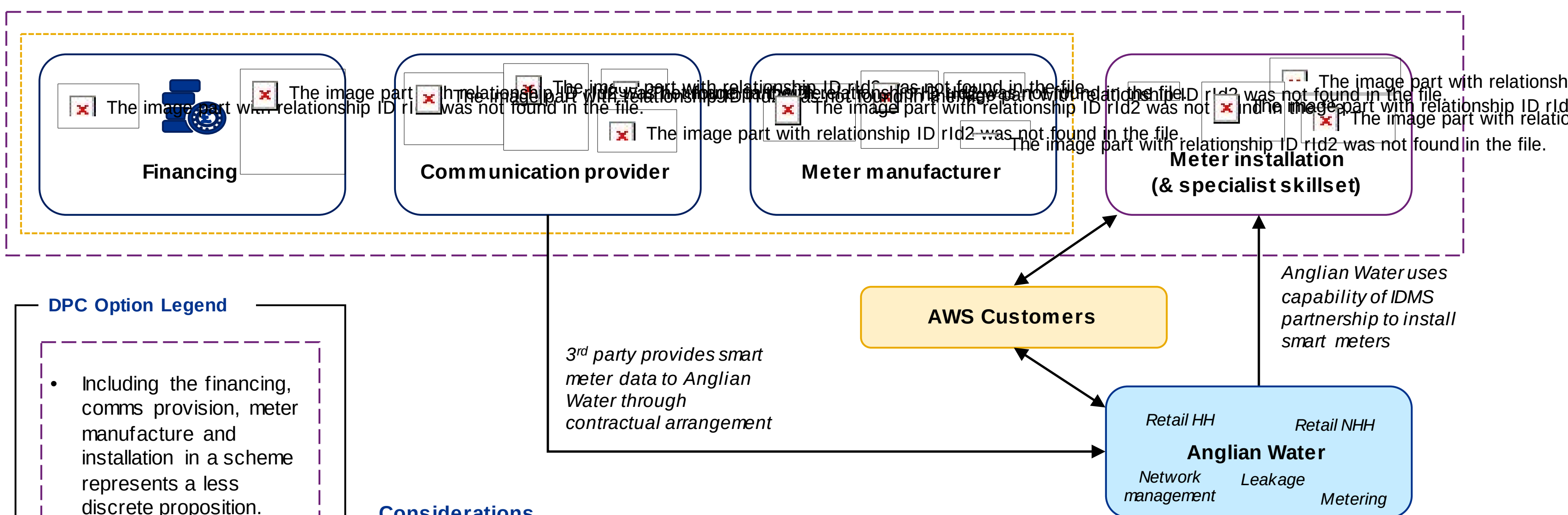
Smart Metering Programme

Smart Metering: Overview

The schematic below sets out these different services at a very high level and explores how the level of discreteness might be impacted through different variations of service bundling that could be included within the scope of a SMART metering roll out .

Smart meter value chain



DPC Option Legend

- Including the financing, comms provision, meter manufacture and installation in a scheme represents a less discrete proposition.

- Packaging the financing, comms provision and meter manufacture into a scheme, with AWS retaining responsibility for meter installation represents a more discrete proposition.

Considerations

- The different scope of smart metering services that AWS select will likely impact on the separability and discreteness of the programme.
- If AWS continued to manage the roll-out through IMDS, then packaging of the other services may be more discrete and will reduce the number of interfaces. However this could impact on service delivery through introducing a hand-off (e.g. is it an issue with the meter installer, the actual meter or the communication of the meter with the network).
- It is assumed AWS will package the full suite of services and procure in one contract, as per the purple dashed box option in the graphic above.
- Financing of SMART metering may be more challenging than for typical infrastructure assets thereby reducing customer value for money.

Smart Metering: Overview

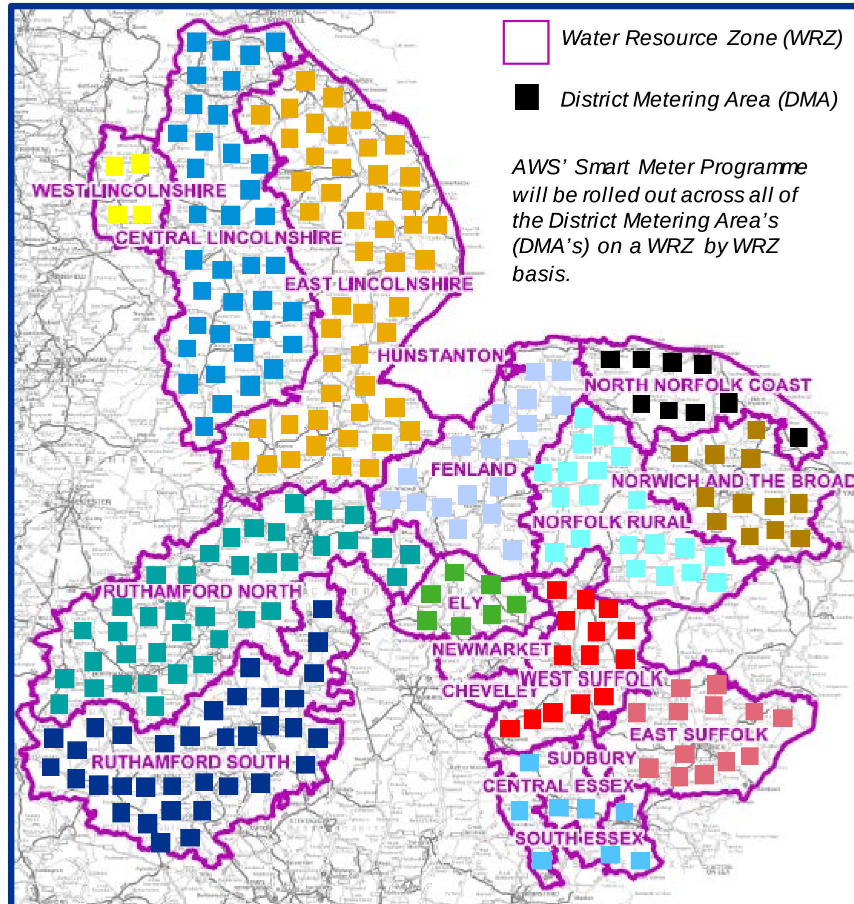
We have set out below some of the key characteristics of the smart meter market in the UK, demonstrating the difference between the water and energy sectors and which may impact on the potential for a DPC smart metering programme.

	Energy Sector	*Water Sector*	*Implications*
Where is the meter located?	Meter located both on the interior and exterior of properties	Water meter usually located on the exterior of the property, often underground in a boundary box	Easier access through water meters positioned outside of property where energy requires access to customer property
Who has the obligation for providing a meter?	Energy supplier is obliged to provide a meter to its customers	Water company holds the responsibility for supplying the meter	Energy suppliers have obligation but don't have same strength of balance sheet as water cos. Higher cost of financing allows entrants to compete more effectively
What is the technology?	Advanced smart metering with 2 way communication between supplier and customers	Smart meters less advanced than in energy with more limited roll-out of 'smart meters'	Technology risks associated with emerging new metering technologies and potential lower cost options becoming established
National roll-out?	Government back smart meter roll-out scheme with 2020 the anticipated target date for implementation	No national roll-out, roll-out based on water company initiatives	Limited standardisation may reduce attractiveness of market for suppliers and requires mix and match approach to delivery, reducing efficiencies
Size of the market	Each property has a gas and electricity meter means large market size in energy	Variable meter penetration between water companies means more limited market size	Similar to energy but not all companies will invest in smart metering resulting in smaller market and slower timetable for roll-out
Is there an established market?	Established metering market in the energy sector with significant Metering Asset Providers (MAPs) presence	Market is less established in water	Current structure and disaggregation of metering within value chain in energy creates a more established market compared with water
Estimated required returns?	c.10%	PR14 WACC – 3.60% (real)	Higher returns in smart metring delivery within energy sector reflect risks that MAPs are exposed to in the early stages of the smart-meter rollout

Smart Metering programme: Asset overview

Project overview			
Project name and code	Smart Meter Programme	**Totex value over 25 yrs**	£231.1
Project description	Implementation of smart meter programme across 1,900 [DMA?s] in AWS region. Anticipated penetration of c.2 million smart meters. Technology and final solution are still to be determined.		
Length of enabling and construction periods (years)	Programme to span over 12 years, with ongoing construction throughout that period.	**Part of wider scheme and/or associated with other assets**	Extension to existing metering programme
Asset life (years)	15 year asset life	**Implication of delays on output**	Potential reduction in demand-side benefits
Regulatory delivery date	Roll out commences in 2020 and is expected to take 12 years	**Investment driver of the project**	Demand reduction

Smart Meter programme – Stylised schematic

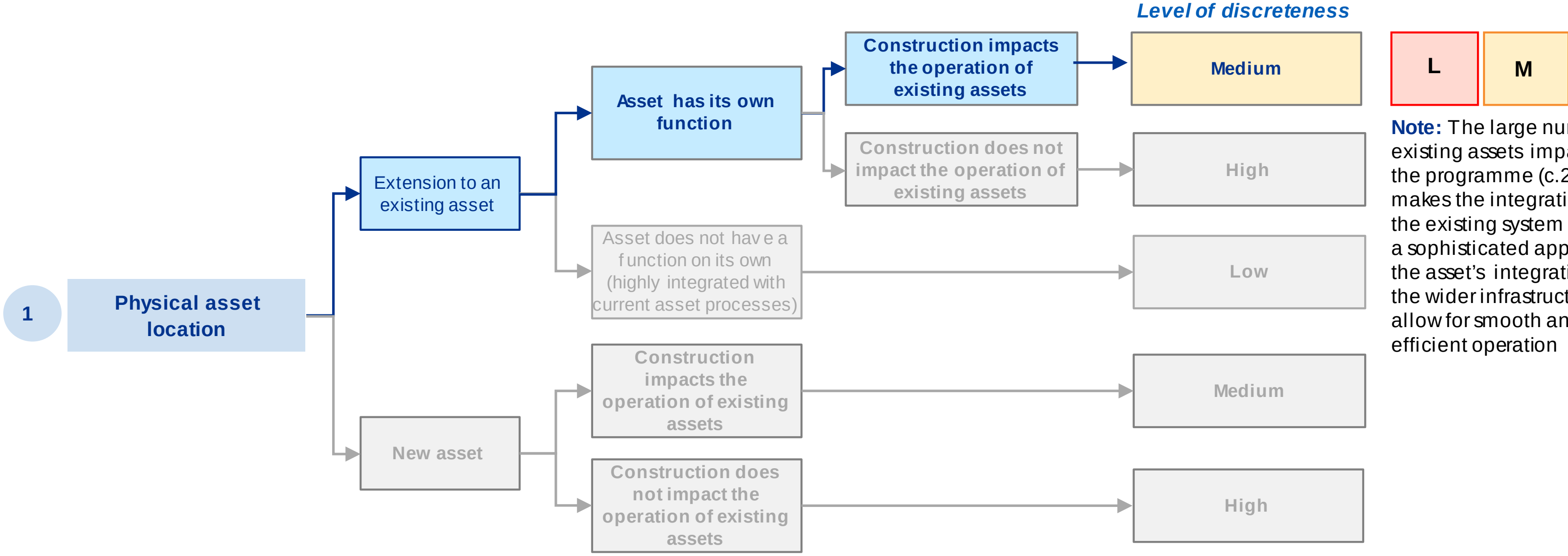


Smart metering programme: Assessment against discreteness drivers

This slide sets out a summary of the discreteness assessment for the Smart Metering scheme, with an overview of the main considerations for each of the 6 criteria.

	Criteria	Summary	Assessment
1	Physical asset location	• The smart metering programme will require c.2 million smart meter assets to be installed onto AWS' existing network over a 10-12 year period which cerates a risk with respect to asset data and ownership. Installation involves existing AWS assets and will require significant customer communication and stakeholder liaison to manage streetworks planning and wider engagement with local communities as part of roll-out.	L / M
2	Interfaces	• There are both physical and informational interfaces associated with this scheme. The physical interface with AWS' supply pipes are passive once installed, however the informational interfaces between the meter installations, the data communication provider and AWS'/NHH retailer billing, network and leakage functions will require active management and potentially increasing complexity and interface costs.	L / M
3	Process	• AWS has an established alliance for meter installation which includes third party contractors capable of installing smart meters. Establishing an alternative delivery route for SMART metering roll out could increase costs However existing arrangements suggest a third party provider could be used.	M
4	Impact on service delivery	• There are no statutory or performance obligations associated with the delivery and ongoing operation of the smart meter programme. Consequently, the impact on service delivery resulting from asset failure is considered to be limited albeit will impact on C-Mex performance and could impact billing.	H
5	Flexibility	• Emerging Smart metering technologies are likely over the duration of this scheme and there is a risk that the technology implemented becomes obsolete and redundant where a long term contract is selected for meter ownership. In addition and over time AWS may want to use a fixed network for alternative communicates with the network ('internet of things') and which could be more costly and complex to affect through a DPC arrangement.	L
6	Control	• There is potentially a high level of customer engagement required in the roll-out of Smart metering and which could impact AWS' customer experience and reputation. Metering is critical to the efficient running of the customer account and billing functions in AWS and for other retailers and whilst assets are quite passive, AWS may want to retain greater control over deployment and customer engagement.	L / M
		Total score	M

Smart Metering programme: Physical asset location

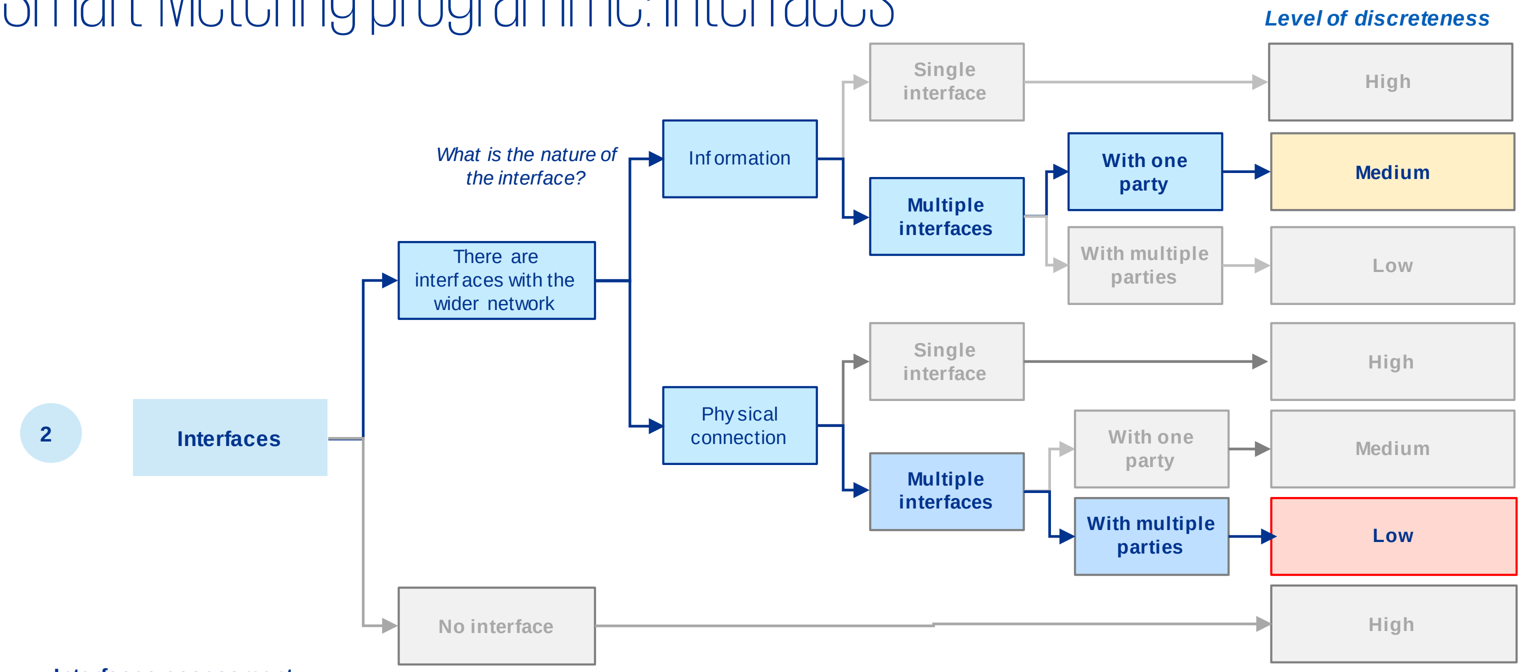


Note: The large number of existing assets impacted by the programme (c.2 million) makes the integration into the existing system requires a sophisticated approach for the asset's integration into the wider infrastructure to allow for smooth and efficient operation

Physical asset location assessment

- Implementation of AWS' smart meter programme is planned to be undertaken as part of a 12 year phased roll-out. Over this period, c.2 million smart meters will be installed across AWS' network. The roll-out will require extensive stakeholder and client management which AWS may wish to retain in-house even under DPC delivery, increasing the complexity through a need to establish clear responsibilities and accountabilities in the contract.
- The scheme will replace AWS' existing portfolio of 'dumb meters' with smart meters, and will be installed onto AWS' existing network within the boundary boxes located outside properties. Unlike single stand-alone assets or schemes, the smart meter programme will impact c.2 million existing AWS assets given AWS' high penetration of meters to date, and would require a large degree of coordination between the DPC installing the meters and AWS during the installation period. This will introduce costs that wouldn't be incurred were AWS to deliver the assets under its own delivery route.
- Furthermore, smart meters do not function as a stand alone asset and are reliant on their interaction with the existing network to provide their function.
- Given the interaction with, and impact on, AWS' existing network, the scheme is considered to be highly integrated with AWS' current and ongoing operations and is therefore not discrete from a physical asset location perspective.

Smart Metering programme: Interfaces

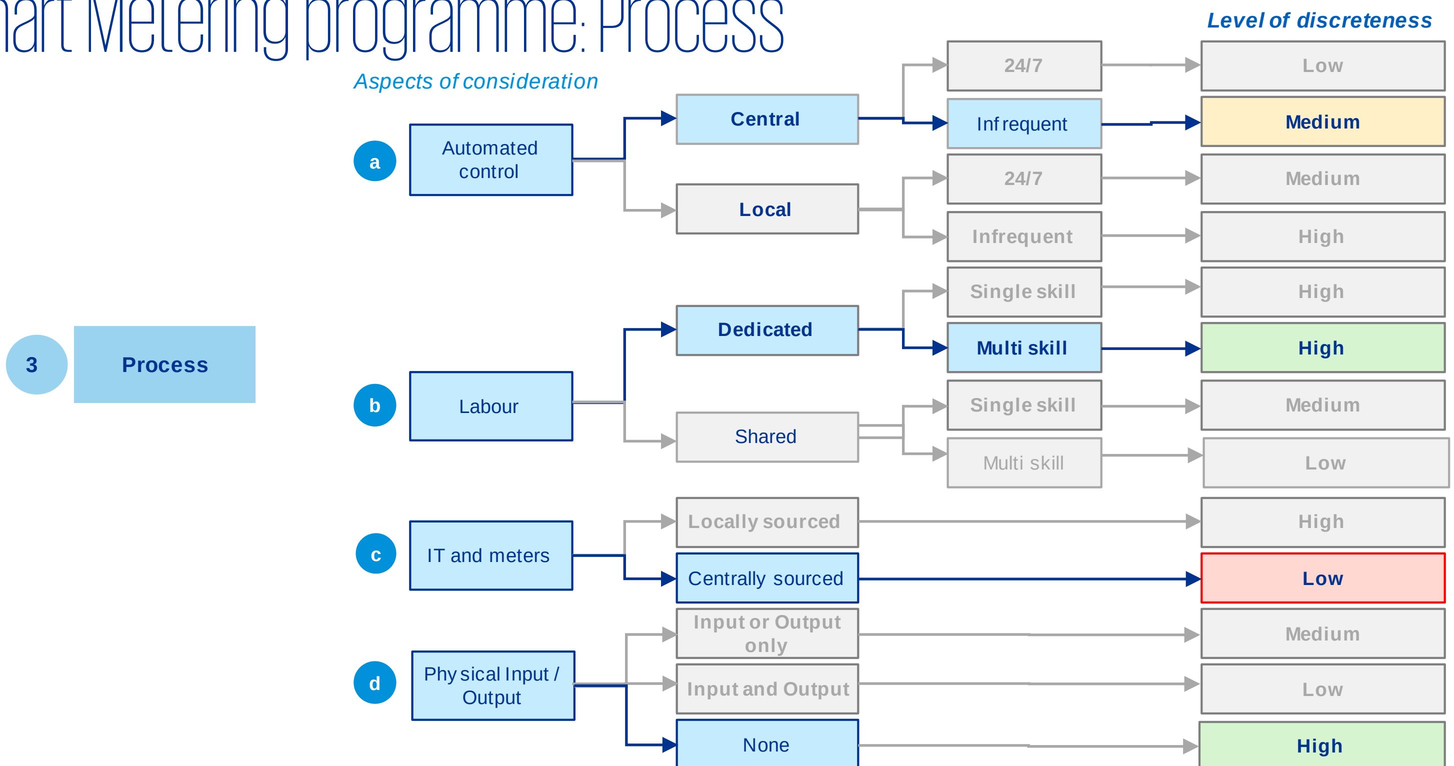


Interfaces assessment

- The smart meter programme has both physical and informational interfaces – the physical connection comprises multiple interfaces with multiple parties (customer and AWS), whilst the information connections are multiple interfaces where the collected data is processed through a localised platform developed by DPC, with AWS as a recipient. For residents, there are c.2 million smart meters with an individual, single physical interface with the AWS network at the point where the smart meter connects to the supply pipe outside each property. Corporations with a range of facilities might require smart meters with multiple interfaces for additional functionalities such as wireless communications and point-to-point monitoring to track usage of specific parts of the facilities. Once installed, smart meters will passively monitor water flow without any need for ongoing coordination with the physical assets However as part of the installation process there is a significant co-ordination and customer interface issue which impacts on the customer relationship and service performance. As such the interface has been considered as Medium due to the importance of the customer interface.
- There will also be complex informational interfaces between the DPC, data communication provider and the AWS billing/ operations department. It will be important that these interfaces work effectively as the need for accurate and reliable data will be paramount. These interfaces could increase the complexity of the design of the assets and potentially necessitate changes and upgrades to existing IT programs or the acquisition of new IT solutions which would be costly to AWS and the DPC.
- A key risk with regard to a 3rd party delivery arises from the nature of information collected and distributed under the smart metering programme. We are assuming that AWS will keep the customer relation and the data collected by the DPC will be shared with customers by AWS reducing the risks and concerns around confidentiality and data handling which still will need to be carefully managed through robust contractual terms between AWS and DPC.
- In summary, SMART metering could be considered as low/medium. Whilst the information interface can be effectively managed through commercial arrangements, and the physical interface is relatively straight forward and passive, the installation requires significant coordination and could impact on the end customer.

Interim support for Direct Procurement for Customers (DPC)

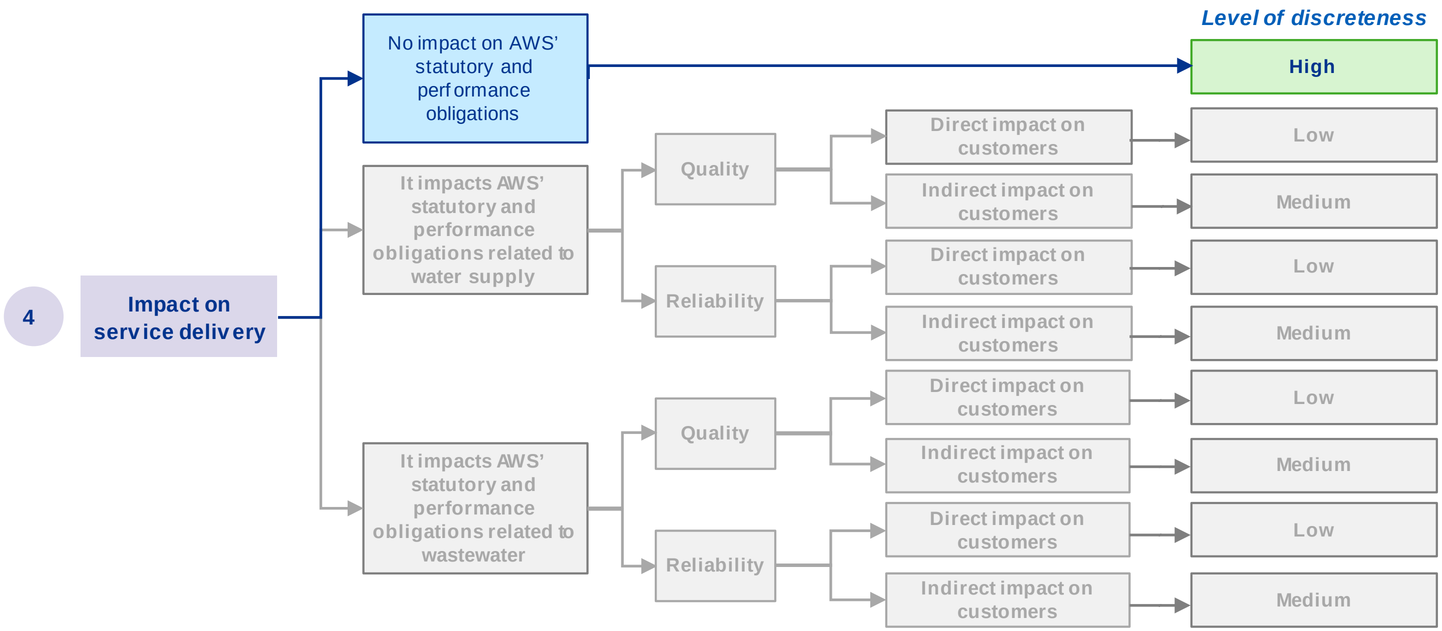
Smart Metering programme: Process



Process assessment

- AWS has establish an alliance (IMDS) for metering delivery and which has the capability to install smart meters and which would need to be changed under a DPC model and which could be costly. Metering processes and information is important across a number of functions within AWS and impacts on both network and leakage management and customer billing processes and is therefore highly integrated into business processes. While several inputs are impacted at a different level by a 3rd party delivery, overall we consider the asset's discreteness from a process perspective to score medium.
- ***Automated control*** – Smart meter assets operate passively, automatically and continuously transmitting usage data between the meter and communication provider at regular intervals. The data would also be transmitted to AWS automatically, however it would be necessary to have a number of IT staff who would be responsible for the ongoing maintenance and upkeep of the cloud based communication software.
- ***Labour*** – While a specific set of skills are needed for the installation and maintenance of smart meters, it is likely that the workforce would share responsibility for operating other assets in the AWS portfolio. Were the scheme to be operated by a DPC there would be a loss of portfolio benefit as resources could not be optimised across a wider portfolio.
- ***IT and meters*** – Due to the nature of this scheme, the need for raw materials and energy will be limited but communications IT and meters are a key input and AWS is likely to have strong purchasing power given the scale of its programme.
- **Physical Input / Output** – There is a physical interface between the meter and pipe, however this is not deemed to be a physical input / output since there is no flow of water. There is, however, an information process – this is captured in the 'Interface' element of the discreteness assessment.

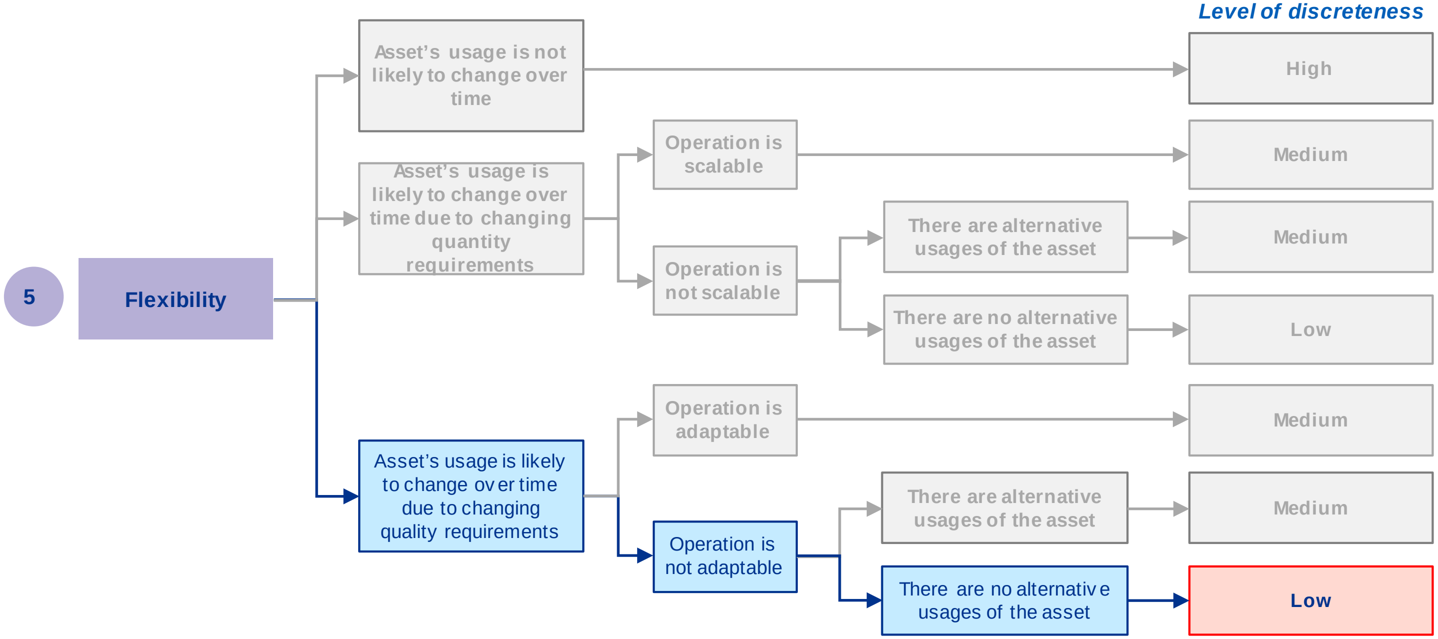
Smart Metering programme: Impact on service delivery



Impact of service delivery assessment

- Failure of an individual smart meter will only impact one individual customer, with the impact on overall service delivery being relatively low. Were the central, cloud based IT or communication system to fail however the impact on customers would be more widespread. Having said that, The effect would be limited to a loss of usage data and is unlikely that any statutory or regulatory obligations would be breached by a failure of assets. The risk of AWS contracting out the delivery of the Smart Meter Programme to a DPC is therefore considered relatively low.
- Were the scheme to be delivered under DPC, the impact of failure on AWS would be a loss in data for the duration of the fault. This would impact AWS' ability to accurately measure and bill its customers in the short term, however the duration of smart meter faults are anticipated to be limited with negligible long term impacts.
- Meters will play an important role in leakage detection and helping AWS deliver on its associated performance targets. The contract between AWS and DPC will need to provide for situations where asset failure leads to decreased leakage performance for AWS.
- On balance, the smart metering programme is discrete from an impact on service delivery perspective. This is driven by the fact that there are no statutory obligations associated with smart meter failure, and the impact on customers from a failure is expected to be minimal.

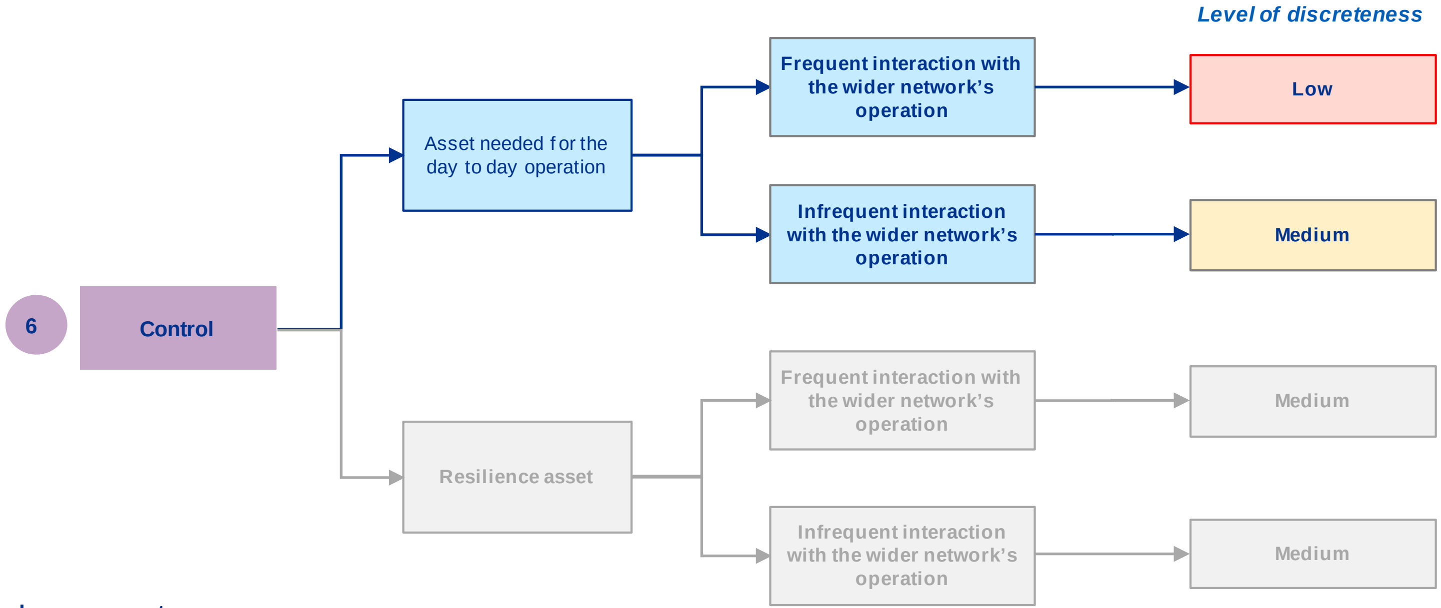
Smart Metering programme: Flexibility of the asset



Flexibility assessment

- The smart meter market is still in its relative infancy with a number of potential technology options available to water companies and utilities more generally. A market leader and favoured technology is yet to be determined and there is scope new entrants and technologies in the coming years. It is therefore likely that the smart meter technology that is implemented under this scheme will be inferior to the technology that is favoured in 10 years time.
- Based on current technologies, the operation of smart meters is not generally seen to be adaptable and there is a risk that assets could become redundant in the case that newer technologies are favoured over the old. Were this the case, AWS may be required to replace the smart meter stock with more up to date technologies, increasing renewal capex requirements substantially. It is important to note however that this would not be impacted by whether the smart meter programme was delivered by AWS or a DPC.
- The smart meter programme is regarded as relatively non discrete as once the meter has been installed, its capability can only be changed by replacing the entire asset. Depending on the length of the contract the DPC model could increase the future risks to the asset.

Smart Metering programme: Control



Control assessment

- Smart meter assets will be required for AWS' day to day operation on an ongoing and regular basis. They will not necessarily be needed for the operation of the wider network, i.e. the supply of water to customers, however they will be relied upon frequently, and are integral to the efficient running of the customer account and billing functions in AWS.
- Given the importance and sensitivity of the data collected under the smart meter programme, cybersecurity concerns could result in increased risk profile for AWS under a DPC model. A customer data breach could result in high reputational damage for AWS and transferring the risk to the DPC would be both difficult and costly, particularly with respect to reputation.
- The smart metering programme is unique in that the outputs required by AWS relate to the data and information that the meters provide, rather than a specific physical output that is associated with a number of the other schemes considered under this assessment. It is unlikely that AWS would need direct control over the assets themselves, but rather ongoing and reliable access to the data provided by the assets.
- As the assets are required for the day to day operation of AWS' business, and the interaction is required on an ongoing and regular basis, the smart meter programme is not considered discrete from a control perspective.
- Whilst AWS would need to understand metering information for leakage/customer billing and network management purposes, the interaction is largely passive and based on information only. More control is required over the installation process, where more frequent interaction is needed as part of the roll-out process. Therefore, it is assessed as medium.

Key risks across the project life-cycle

For each of the schemes assessed, there are a number of potential risks at each stage of the DBFO project life cycle. The key risks and considerations for each of the assets considered, at each stage of the project lifecycle, are presented below and are likely to impact on the assets suitability for DPC.

	Design	*Build*	*Finance*	*Operate*	*Suitability for DPC – Taken forward to VfM*
Elsham Transfer	▪ Potential for representations against development. ▪ Could be run through DCO process if permissions not granted. ▪ DWI interest in metaldehyde treatment given limited precedent. ▪ Greater interface design complexity given multiple asset types	▪ Scheme includes a number of components, adding to the complexity of the scheme and increasing risk of projects overruns. ▪ Existing underground services. ▪ Interface with existing AWS assets.	▪ Limited UK precedents for reuse technology is likely to create uncertainty over maturity of technology and potential risks. ▪ Supply to Humberbank industrial region and implications of failure at a national level.	▪ Operational complexity as asset will need to connect into existing operational infrastructure while maintaining existing supplies.	✘
North Fenland Transfer	▪ Potential for representations against development. ▪ Could be run through DCO process if permissions not granted. ▪ DWI interest in metaldehyde treatment given limited precedent. ▪ Mixing of ground and surface water sources and impact on water quality.	▪ Limited interfaces with existing operation ▪ Existing underground services ▪ Small number of components reduces complexity	▪ Limited UK precedents for reuse technology is likely to create uncertainty over maturity of technology and potential risks.	▪ Relatively passive asset, although highly integrated with network management and control systems ▪ Reduced interconnectivity allows for greater control and ability to isolate in case of failure	✓
South Lincs Reservoir	▪ Representations against development expected but DCO process provides some protection.	▪ No recent experience constructing reservoir assets. ▪ Potential for high cost of construction overruns and delays.	▪ Size of project likely to result in high terminal value that creates uncertainty for investors. ▪ No UK precedents in recent years.	▪ Relatively simple asset operation. ▪ Initial refill period could coincide with regional drought, delaying ability to refill and put asset into supply. ▪ Intake quality.	✓
Smart Metering Programme	▪ Range of technology options results in risk of not 'picking the winner'. ▪ Risk that designs may change during programme as new technologies are adopted.	▪ Important to 'get it right first time'. ▪ High risk of asset failure associated with the installation phase.	▪ Capital spend profile less predicable and spread across 10 long period. ▪ Limited water SMART metering precedents but read across from energy may help provide confidence. ▪ Implications of household competition and creation of a separate MAP as in energy for long term contract.	▪ Risk that in event of asset failure, it is difficult to determine who is responsible for that failure where multiple parties are involved.	✘

Our overall qualitative discreteness and risk analysis suggests that North Fenland and South Lincolnshire Reservoir are the two schemes than can be considered discrete enough from a technical perspective to provide benefits to customers under a DPC model and are thus taken forward to a detailed VfM assessments.

3. Quantitative assessment

Findings - General observations

We have carefully modelled a comparison of (1) the DPC model (factual), and (2) the 'status quo' on balance sheet PR19 model (counter factual) applied to a reservoir from the value for money for customers perspective

All results have been with the Executive Management Team at Anglian Water. Cost data is based on Investment planning expenditure forecasts for WRMP and PR19 provided by Anglian Water[1].

Key assumptions and drivers	Key value dynamics and 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, if greater than zero, is assumed to transfer to the RCV at the end of the concession period (AWG buys out the asset). • The PR19 route assumes Ofwat's cost of capital with the new cost of debt only. We vary the cost of capital assumptions under the DPC model to isolate potential financing benefits and test different assumptions. • All financing assumptions have been discussed with the Anglian Corporate Finance experts. • The projects are assumed to have a 100 years asset life under the PR19 model. • We vary the assumptions about the terminal value at the end of the concession period under the DPC model to test and isolate the effects of revenue profiling. • PAYG rates are project specific. • We test the impact of different assumptions about potential cost efficiencies under the factual model.	• 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 benefit customers under the DPC model, unless DPC is subject to limitations on gearing. • PR19 model benefits from the postponement of revenues from customers into the future. • Benefits of profiling under the DPC model largely depend on its ability to finance a large terminal value (and hence reduce revenues during the concession period). • A low terminal value and hence high revenues during the concession period eliminates a share of financing benefits under the DPC. • DPC model assumes additional cost efficiencies, but also implies additional costs to the costumers. • 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.

[1] Note: Project expenditure profiles form C55 asset planning and costs modelling outputs

Findings - Scheme specific results

The result from our model shows that only South Lincolnshire Reservoir can deliver better value for money to customers under DPC model.

	South Lincolnshire Reservoir	North Fenland Transfer
Findings	• Our Base Case results suggest that DPC provides greater value for money to customers than the counterfactual PR19 delivery model. • Key drivers of the results include financing benefits and efficiencies which are partly offset by the accelerated depreciation profile and additional costs of both DPC and AWS associated with the scheme. • As a large scheme with a significant upfront capital investment SLR allows investors to benefit from competitive financing terms under a project finance model which can be than passed on to customers via lower tender revenue streams. • Given the size and nature of the asset a fairly strong competition can be expected in the market delivering additional efficiency savings for customers beyond what is forecasted under the counter factual. • Since results are heavily dependent on the assumptions, sensitivity of results have been tested for key inputs, such EIRR, depreciation and efficiencies in both low case and high case scenarios. Under all scenarios, DPC delivers greater value to customers, with savings to customers ranging between 4% and 13% in NPV terms over the asset life compared with counterfactual.	• Our Base Case results suggest that PR19 provides greater value for money to customers than a DPC delivery model. • Key drivers of the results include limited financing benefits and efficiencies which are entirely offset by the accelerated depreciation profile and additional costs of both DPC and AWS associated with the scheme. • The scheme's size and cost profile suggest limited financing benefits could be realised under a project finance model. • In the light of the smaller project procurement and contract management costs, as well as bid costs are likely to play a greater role in the overall results. • The technical characteristics of the asset, combined with its size imply that limited efficiencies may be achievable under a DPC model. • Since results are heavily dependent on the assumptions, sensitivity of results have been tested for key inputs, such EIRR, depreciation and efficiencies in both low case and high case scenarios. Under all scenarios, DPC delivers greater value to customers, with savings to customers ranging between 1% and 10%.
Suitability for DPC?	✔ *Asset to be taken forward to the qualitative assessment*	✘ *Asset considered to be not suitable for DPC*

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South Lincolnshire Reservoir

Reservoir Base Case: Model assumptions (1/2)

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	DPC delivery	Rationale and justification
	SCHEME SPECIFIC ASSUMPTIONS			

Financing costs	Cost of debt		Construction: 3.64%
			Operations: 2.88%
			RCV bond: 2.68%
				• Facilities: Dual financing so that investor can take advantage of decreased risk profile and thus lower financing costs during the operational phase
				  • Construction: bank debt with a tenor equivalent to the construction period: 2 year forward of a 6M LIBOR swap with a tenor of 4 years plus + 240bps
				  • Operation: amortising bond finance through operations: 6 year forward Gilt with a tenor of 14 years + 125 bps, RCV bullet repayment bond: 6 year forward Gilt with a tenor of 25 years plus + 130bsp.
				• Large discrete infrastructure asset with significant capex requirement in excess of £600m and limited risk profile which is likely to drive interest from a number of market players across the sector, resulting in competitive financing terms. As a relatively simple asset with limited design and operational complexity, small number of interfaces with the wider network has a limited risk profile which is likely to help DPC provider to achieve low financing costs.

	Cost of equity		10%	• Expected equity IRR from recent project finance precedents. • Whilst failure of the asset could result in impacts on customers and threaten AWS' ability to meet its statutory obligations, the risk mitigants are well understood and should be manageable, and therefore in line with other recent project finance precedents. Although construction risk will be born by DPC provider, due to the limited design complexity, the premium expected by equity holders are likely to be limited.
	Gearing		89.9%	• Gearing level determined using the model to solve for a target DSCR level. • Typical project finance gearing to reach target DSCR of 1.25x.
Timing of bill impact to customers	Profile of cost to customers		Straight line to leave 30% asset value after 25 year concession period	• To allow reasonable time period for recovery of a portion of initial investment (25 years).

Reservoir Base Case: Model assumptions (2/2)

Potential customer value layer	Area	Dimension	DPC delivery	Rationale and justification
	SCHEME SPECIFIC ASSUMPTIONS			
Cost efficiencies	**Additional costs to DPC**		0.5% on Net nominal Capex (ca.£4.5m)	• Additional costs are expected to come in the form of bid costs associated with advisors. • Bid costs are expected to be in line with market precedents of other schemes of a similar scale and size. These costs are well understood and can be forecast with a reasonable degree of certainty. • Estimate has been informed by AWS bottom-up management experience.
	Efficiency savings	Opex	10% on total opex	• Large scheme has potential for greater operating cost efficiencies and likely less impact from loss of scope and scale economies. • Given the large scale and size of the project, as well as limited design and operational complexity it is likely that there will be a strong competition in the market which will incentivise providers to realise further efficiencies driving down the true costs through dynamic innovation.
		Capex	5% on total capex	• Large scheme has potential for greater operating cost efficiencies and likely less impact from loss of scope and scale economies. • The scale and size of the project is significant and therefore the opportunity to identify innovative opportunities may be higher, especially at the construction stage. Also, strong interest from the market is likely to incentivise DPC providers to include lower overhead costs in the asset's capex leading to increased efficiency savings.
	Private costs to AWS	Procurement	0.5% on Net nominal Capex (ca. £3m)	• Costs associated with advisor support (e.g. legal and commercial) and procurement activity by AWS (for 12 - 24 months period). • Costs exclude bidder costs which are captured separately under the 'Additional costs to DPC and also excludes Ofwat's additional costs suggested at £500k per project in the Final Methodology. • Estimate has been informed by AWS bottom-up management experience in procurement.
		Contract mgmnt.	£0.42m	• AWS team responsible for contract management and administration assumed to be incremental to as is capability • Estimate has been informed by AWS bottom up management experience (note Ofwat suggests £150k per annum).

Reservoir Base Case: Project Overview and model outputs

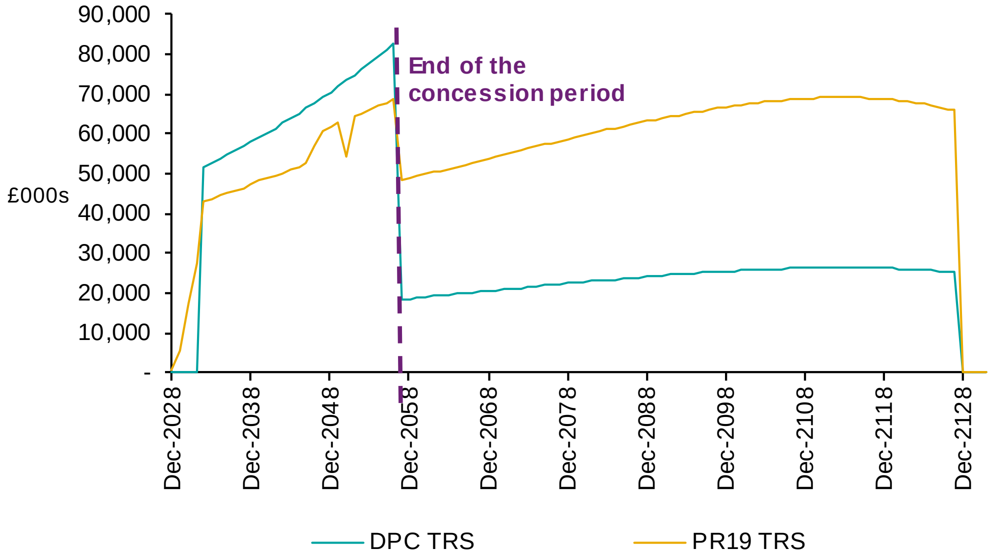
Project Overview[1]	
Initial capex	£590m
Renewal capex	£108m
Opex	£249m
Asset life[2]	100 years

Key model outputs (£m)[2]

	Factual DPC	Counterfactual PR19
Revenue stream during concession	668.64	594.72
Additional costs to AWS	12.32	
Differential terminal value		165.76
PV of cost to customers	**680.96**	**760.48**
Project IRR	**4.69%**	**4.82%**

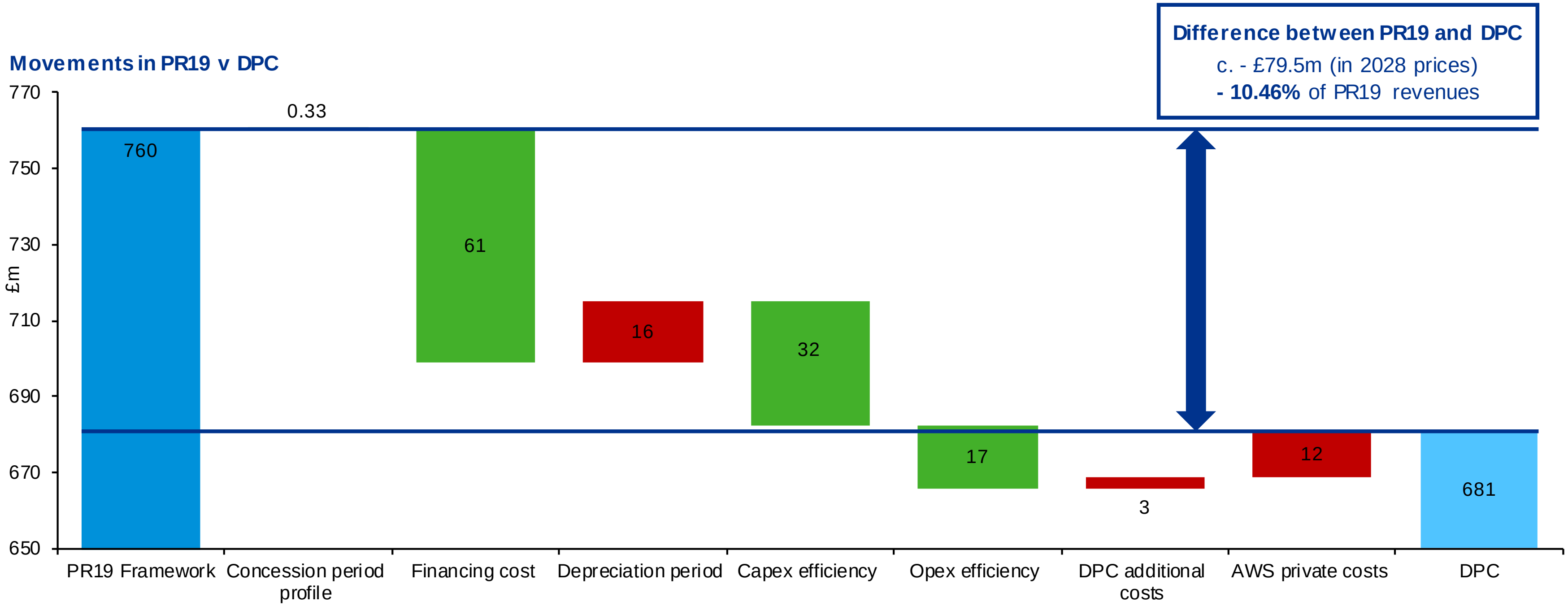
[1] Sum of costs incurred during construction plus 25 years operation in 2017/18 prices without any efficiency
[2] Total useful economic life also includes the construction period of 4 years
[3] NPV in 2028 prices (time of contract award)

DPC Revenue VS PR19 Revenue



- As 70% of the asset is depreciated over the concession period the terminal value at the end of year 29 in DPC is significantly lower than in PR19.
- The terminal value in DPC will be transferred to AWS and carried forward and depreciated over the remaining asset life under the PR19 framework. The revenue resulting from the terminal value consists of a return on RCV and depreciation.
- As the social discount rate used to calculate the present value of cost to customers is higher than both DPC and PR19 project IRR, any postponement (e.g. via the terminal value) creates value for customers.

Reservoir Base Case: Model output by value layers



- Concession period profile effect is driven by the different shape of revenues in DPC and PR19 and as the social discount rate is higher than both PR19 and DPC project WACC a 4 year postponement of revenues creates a small value under the DPC model.
- Cheaper project financing than the allowed PR19 cost of capital creates significant value to customers under a DPC delivery.
- An accelerated depreciation profile (depreciating 70% of the asset over the concession period in DPC versus a depreciation of the asset over its economic life in PR19) diminishes the value of DPC to customers to some extent.
- Both opex and capex efficiencies can deliver significant benefits for customers in PV terms.
- Additional costs to both DPC and AWS reduce the overall value for money to customers under a DPC delivery.

DPC Value for Money – Scenario results

Reservoir - Scenario results

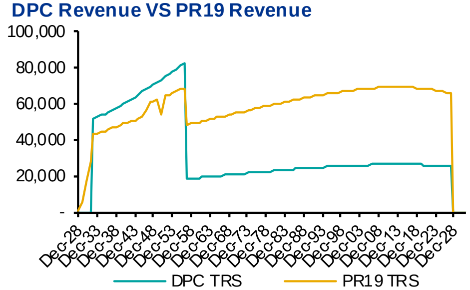
Analysis suggests that DPC delivers significantly greater value for money to customers than PR19 under all scenarios.

Legend:
- DPC more beneficial for customers than PR19
- Difference between PR19 and DPC is smaller than under Base Case (with DPC remaining still more beneficial than counterfactual)

Low Case

Assuming:
- EIRR increased to 12%
- Decreased efficiency levels
- 100% of the asset value depreciated during the contract period

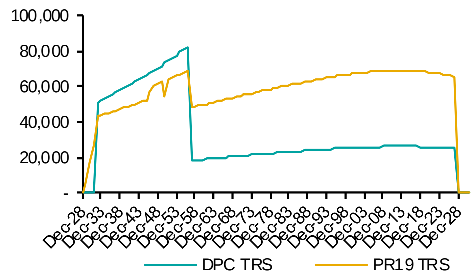
DPC Revenue VS PR19 Revenue



Base Case

Assuming:
- EIRR equal to 10%
- 10% opex and 5% capex efficiencies
- 70% of the asset value depreciated during the contract period

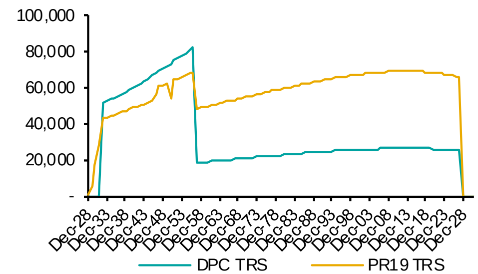
DPC Revenue VS PR19 Revenue



High Case

Assuming:
- EIRR decreased to 9%
- Increased efficiency levels
- 50% of the asset value depreciated during the contract period

DPC Revenue VS PR19 Revenue



Sensitivities	*Assumption* (Low Case)	*Difference between PR19 and DPC** (Low Case)	**Total difference between the DPC and PR19 models***	*Assumption* (High Case)	*Difference between PR19 and DPC** (High Case)
EIRR	EIRR = 12%	*- £32.3m* [- 4%]		EIRR = 9%	*- £101.1m* [- 13%]
Efficiency:					
Capex	*Capex = 2.5%*	*- £63.2m [-8%]*	**- £79.5m [- 10%]**	Capex = 7.5%	- £95.9m [- 13%]
Opex	*Opex = 5%*	*- 71.1m [- 9%]*		Opex = 15%	- £87.9m [- 12%]
Depreciation	100%	*- £113.2m* [- 13%]		50%	*- £92.5m* [- 13%]

*NPV in 2028 prices (time of contract award) b

KPMG

North Fenland Transfer

North Fenland Base Case: Model assumptions (1/2)

POTENTIAL CUSTOMER VALUE LAYER	Area	Dimension	DPC delivery	Rationale and justification
	SCHEME SPECIFIC ASSUMPTIONS			

Financing costs	Cost of debt		Construction: 3.59%
			Operations: 2.84%
			RCV bond: 2.91%
				• Facilities: Dual financing so that investor can take advantage of decreased risk profile and thus lower financing costs during the operational phase
				  • Construction: bank debt with a tenor equivalent to the construction period: 2 year forward of a 6M LIBOR swap with a tenor of 3 years plus + 240bps
				  • Operation: amortising bank finance through operations: 5 year forward Libor swap with a tenor of 8 years + 125 bps, RCV bullet repayment bank loan:5 year forward Libor swap with a tenor of 15 years plus + 130bsp.
				• As a relatively simple asset with limited design and operational complexity, small number of interfaces with the wider network has a limited risk profile which is likely to help DPC provider to achieve low financing costs.

	Cost of equity		10%	• Expected equity IRR from recent project finance precedents. • Whilst failure of the asset could result in impacts on customers and threaten AWS' ability to meet its statutory obligations, the risk mitigants are well understood and should be manageable, and therefore in line with other recent project finance precedents. Although construction risk will be born by DPC provider, due to the limited design complexity, the premium expected by equity holders are likely to be limited.
	Gearing		88%	• Gearing level determined using the model to solve for a target DSCR level. • Typical project finance gearing to reach target DSCR of 1.25x.
Timing of bill impact to customers	Profile of cost to customers		Straight line to leave 30% asset value after 15 year concession period	• To allow reasonable time period for recovery of a portion of initial investment (15 years).

Interim support for Direct Procurement for Customers (DPC)

North Fenland Base Case: Model assumptions (2/2)

Potential customer value layer	Area	Dimension	DPC delivery	Rationale and justification
	SCHEME SPECIFIC ASSUMPTIONS			
Cost efficiencies	**Additional costs to DPC**		2% on Net nominal Capex (ca.£1.4m)	• Additional costs are expected to come in the form of bid costs associated with advisors. • Bid costs are expected to be in line with market precedents of other schemes of a similar scale and size. These costs are well understood and can be forecast with a reasonable degree of certainty. • Estimate is based on Ofwat's suggestions as published in its Final Methodology.
	Efficiency savings	Opex	5% on total opex	• Large scheme has potential for greater operating cost efficiencies and likely less impact from loss of scope and scale economies. • Given the large scale and size of the project, as well as limited design and operational complexity it is likely that there will be a strong competition in the market which will incentivise providers to realise further efficiencies driving down the true costs through dynamic innovation.
		Capex	2.5% on total capex	• Large scheme has potential for greater operating cost efficiencies and likely less impact from loss of scope and scale economies. • The scale and size of the project is significant and therefore the opportunity to identify innovative opportunities may be higher, especially at the construction stage. Also, strong interest from the market is likely to incentivise DPC providers to include lower overhead costs in the asset's capex leading to increased efficiency savings.
	Private costs to AWS	Procurement	1% on Net nominal Capex (ca.£0.8m)	• Costs associated with advisor support (e.g. legal and commercial) and procurement activity by AWS (for 12 - 24 months period). • Costs exclude bidder costs which are captured separately under the 'Additional costs to DPC and also excludes Ofwat's additional costs suggested at £500k per project in the Final Methodology. • Estimate is based on Ofwat's suggestions as published in its Final Methodology.
		Contract mgmnt.	£0.15m	• AWS team responsible for contract management and administration assumed to be incremental to as is capability • Assumption is based on Ofwat's suggestion of £150k per annum.

North Fenland Base Case: Project Overview and model outputs

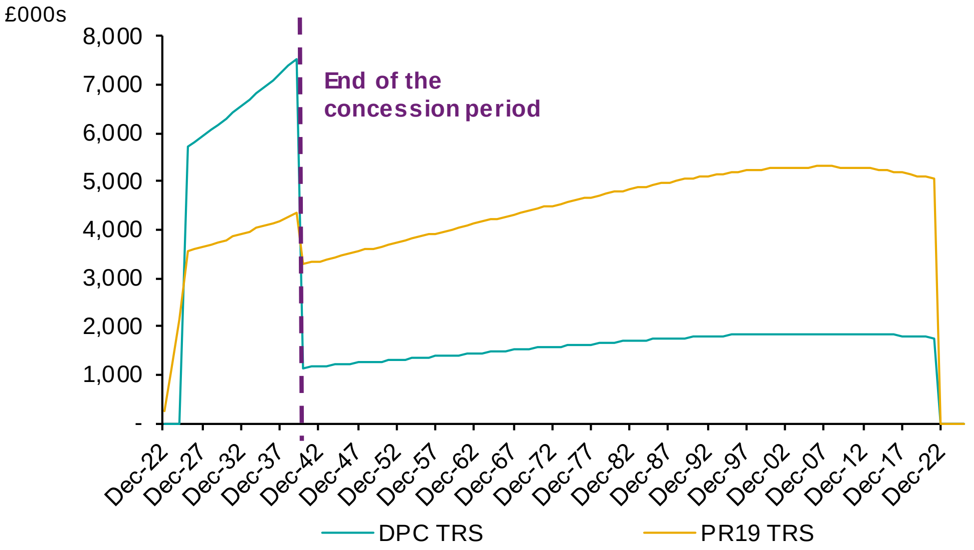
Project Overview[1]	
Initial capex	£61m
Renewal capex	£0.93m
Opex	£10m
Asset life[2]	100 years

Key model outputs (£m)[2]

	Factual DPC	Counterfactual PR19
Revenue stream during concession	54.84	35.84
Additional costs to AWS	3.59	
Differential terminal value		20.17
PV of cost to customers	**58.43**	**56.01**
Project IRR	**4.7%**	**4.8%**

[1] Sum of costs incurred during construction plus 15 years operation in 2017/18 prices without any efficiency
[2] Total useful economic life also includes the construction period of 3 years
[3] NPV in 2022 prices (time of contract award)

DPC Revenue VS PR19 Revenue

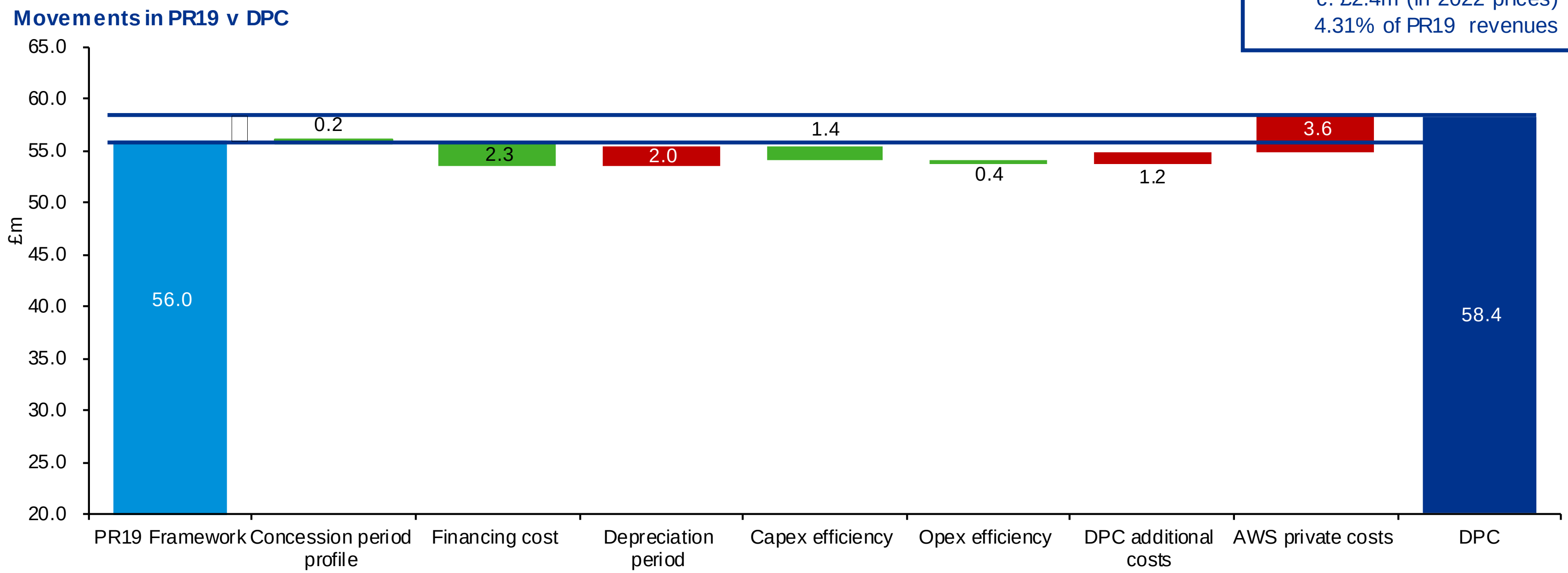


- As 70% of the asset is depreciated over the concession period the terminal value at the end of year 29 in DPC is significantly lower than in PR19.
- The terminal value in DPC will be transferred to AWS and carried forward and depreciated over the remaining asset life under the PR19 framework. The revenue resulting from the terminal value consists of a return on RCV and depreciation.
- As the social discount rate used to calculate the present value of cost to customers is higher than both DPC and PR19 project IRR, any postponement (e.g. via the terminal value) creates value for customers.

DPC Value for Money – Scenario results

North Fenland Base Case: Model output by value layers

Difference between PR19 and DPC
c. £2.4m (in 2022 prices)
4.31% of PR19 revenues



- Concession period profile effect is driven by the different shape of revenues in DPC and PR19 and as the social discount rate is higher than both PR19 and DPC project WACC a 4 year postponement of revenues creates a small value under the DPC model.
- Given the size and cost profile of the asset project financing delivers limited financing benefits for customers when compared to the counter factual.
- An accelerated depreciation profile (depreciating 70% of the asset over the concession period in DPC versus a depreciation of asset over its economic life in PR19) almost fully offset the financing benefits under the DPC model.
- Both opex and capex efficiencies can deliver additional benefits for customers in PV terms.
- Additional costs to both DPC and AWS overall reduce significantly the total value for money to customers under a DPC delivery.

North Fenland - Scenario results

Analysis suggests that PR19 delivers greater value for money to customers than DPC under all scenarios.

PR19 more beneficial for customers than DPC

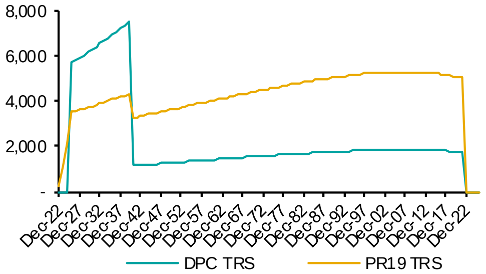
Difference between PR19 and DPC is smaller than under Base Case (with DPC remaining still more beneficial than counterfactual)

Low Case

Assuming:

- EIRR increased to 12%
- Decreased efficiency levels
- 100% of the asset value depreciated during the contract period

DPC Revenue VS PR19 Revenue

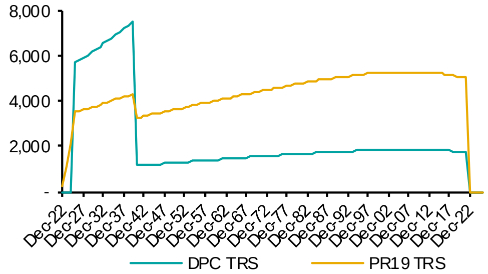


Base Case

Assuming:

- EIRR equal to 10%
- 5% opex and 2.5% capex efficiencies
- 70% of the asset value depreciated during the contract period

DPC Revenue VS PR19 Revenue

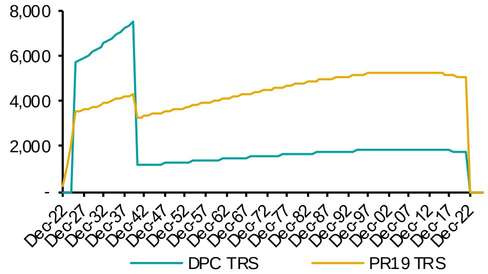


High Case

Assuming:

- EIRR decreased to 9%
- Increased efficiency levels
- 50% of the asset value depreciated during the contract period

DPC Revenue VS PR19 Revenue



Sensitivities	*Assumption*	*Difference between PR19 and DPC**	**Total difference between the DPC and PR19 models***	*Assumption*	*Difference between PR19 and DPC**
EIRR	EIRR = 12%	*£4.5m* [8%]		EIRR = 9%	*£1.7m* [3%]
Efficiency:					
Capex	Capex = 0%	*£3.9m* [7%]	**+ £2.4m [4%]**	Capex = 5%	*£0.9m* [2%]
Opex	Opex = 0%	*£2.8m* [5%]		Opex = 7.5%	*£2.2m* [4%]
Depreciation	100%	*£7m* [10%]		50%	*£0.6m* [1%]

*NPV in 2022 prices (time of contract award)

4. Qualitative assessment

Qualitative VFM Assessment

To accompany the quantitative value for money analysis a qualitative analysis was also completed for the South Lincolnshire Reservoir Scheme to help inform the quantitative assumptions in the VFM model and to inform the likely potential that the scheme will realise customer value for money under a DPC delivery route.

Potential customer value layers	Criteria
A) Financing costs	Market appetite & Bankability
	Risks
B) Cost efficiencies	Cost of interoperability
	Risk and cost of failure
	Core business to AWS
C) Innovation opportunities	Innovation
D) Timing of bill impact to customers	*Assessed under the quantitative framework*
E) Deliverability and lead time	Lead time
Overall Qualitative Score	

- The qualitative assessment considers specific scheme attributes that are likely to impact on customer VfM across the different value layers.
- Under each value layer a set of criteria have been established that are likely to be important in the value realised by customers if the scheme where to be delivered under a DPC model.
- For each criteria a subset of indicators has been identified which can be used as a guide to help establish whether the project is likely to deliver low, medium or high value for money.
- The information provided by AWS on the South Lincolnshire Reservoir Scheme was used to complete the evaluation of each scheme against the qualitative framework.
- The result of the analysis will accompany the quantitative VfM assessment to ensure a balanced approach to the analysis which may capture attributes that may be harder to quantify.

Example

Specific criteria used to consider the impact of each value layer

Indicators of low, medium and high scores

Customer value layer

Rationale for assessed scoring

Description of criteria

Assessment of specific asset

Financing costs	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Market appetite	Bidding interest for the project	Number of market players who could potentially or likely be interested in participating as bidders in the tender process.	1-2	2-4	4+	Large discrete infrastructure asset with significant capex requirement is likely to drive interest from a number of investor groups.
	Size of the asset	Size of the scheme: £ million of capex	<100	100-500	>500>20	Capex requirement of £1.3bn. [Need to confirm with AWS.]
	Idiosyncratic nature of the asset	Number of similar projects planned over the next 5 years	1-2	3-5	5+	
Risk	Construction risk	Length of construction period	0 – 2 years	2 – 4 years	4 years +	
	Operation risk	Impact of service performance on AWS's statutory obligations	Direct and significant	Direct and limited	Indirect	

Summary of Qualitative Assessment: Reservoir

This slide sets out a summary of the qualitative assessment undertaken on the South Lincolnshire Reservoir Scheme that was progressed from the 'size' and 'discreteness' tests. A more in depth assessment against each of the value layers are provided in the following slides. The assessment has been undertaken on the assumption a 3rd party would design, build, finance and operate the selected assets.

Customer value layers	Criteria	Summary	Assessment
A) Financing costs	Market appetite & Bankability	Number of capable market players, and project size and potential pipeline suggests there could be high level of market appetite especially given limited opportunities available in UK infra market. Proven demand (TTT/OFTO) and low interest rate environment.	H
	Risks	Limited UK precedents in recent years of reservoir build but contained standalone asset located away from urban areas and low risk of catastrophic failure and well understood operational issues impacting on quality and availability.	M
B) Cost efficiencies	Cost of interoperability	Interoperability issues considered to be limited. Therefore lower incremental costs that could offset potential efficiencies are likely to be small and provides opportunity for efficiency.	M-H
	Risk and cost of failure	Low probability of catastrophic failure and impact relatively well contained rural area. Storage reduce availability risk and quality issues well understood.	H
	Core business to AWS	Non core for Aws and no recent experience of projects of this size or type. @One alliance delivery route not appropriate for delivery of this project and therefore new delivery route required regardless of DPC.	H
C) Innovation opportunities	Innovation	Limited complexity and potential for innovation construction or through size of land bank for alternative uses (e.g. energy generation, leisure).	M
D) Timing of bill impact to customers		*Assessed under the quantitative framework only*	
E) Deliverability and lead time	Lead time	A long lead time ahead of expected asset construction and duration of construction should help mitigate deliverability and risks of over run.	H
Overall Qualitative Score		The scheme is considered to offer medium to high potential to realise value for money for customers, however this will depend on the scope of the final scheme (i.e. including WTW)	M-H

Financing costs

Financing costs	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Market appetite	**Bidding interest for the project**	Number of market players who could potentially or likely be interested in participating as bidders in the tender process.	1-2	3-4	>4	Large discrete infrastructure asset with significant capex requirement in excess of £600m and which is likely to drive interest from a number of market players across the sector. High bidder demand anticipated due to the fact that there are currently a limited number of similar projects available to private investors, so opportunity to invest is more limited. The DPC framework provides investors with long term visibility and certainty over future costs. Unlike under the standard price control framework, where water companies are exposed to price control reviews every 5 years (where the WACC is subject to change), regulatory intervention in the DPC framework is expected to be low across the entire 25 year concession period.
	Size of the asset	Size of the scheme: £ million of capex	£100m	£100-500m	>£500m	Relatively high value project for the sector at c.£600m, with significant capex element, of which there may only be a small number of equivalent sized schemes in the next 1 or 2 AMP periods. Given the limited number of similar size assets expected in the upcoming AMPs, and with investors looking to deploy capital in large infrastructure assets, bidder interest in the South Lincolnshire Reservoir scheme is expected to be increased.
	Idiosyncratic nature of the asset	Number of similar projects planned over the next 5 years	1-2	3-5	>5	It is expected that a number of reservoirs may emerge as key infrastructure investments by water companies to address WRMP supply demand deficits over the next 2-3 AMP periods. However the current pipeline is relatively limited in terms of firm projects coming to market in the next 5 years.

Financing costs

Financing costs	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Risk	**Construction risk**	Length of construction period	> 4 years	2 – 4 years	<2 years	Reservoirs are large infrastructure assets and whilst they are relatively simple in design complexity, the scale and long construction period is likely to be considered higher risk especially considered that there have been no UK precedents in a number decades.
	Operation risk	Impact of service performance on AWS's statutory obligations	Direct and significant	Direct and limited	Indirect	Failure may lead to availability or water quality issues however processes are well understood and potential risk mitigations such as quality sampling and alternative supply options should reduce impacts and are well established processes.

- High demand for infrastructure assets in the UK is likely to suggest there will be a high market appetite especially in a low interest environment and as evidenced by TT and OFTO competitive processes.
- On balance the assessment suggests that market appetite could be high given the size of the asset and potential pipeline of similar assets as companies seek to include new sources of supply to meet further SOSI challenges. In addition, there are currently a limited number of similar projects available to investors in the market and therefore a project of this nature is expected to drive bidder interest.
- The DPC framework provides investors with long term visibility and certainty over future costs. Reducing regulatory uncertainty and the potential for regulatory intervention means that schemes delivered under the DPC model are considerably more attractive to investors.
- The risks associated with the asset are assessed as medium as the scale and size of the project and limited recent UK precedents is likely to increase the risks. In addition, whilst failure could result in impacts on customers and threaten AWS' ability to meet its statutory obligations the risk mitigants are well understood and should be manageable.
- The potential to realise lower financing costs is considered to be high, providing significant scope for customer value for money if the South Lincolnshire Reservoir Scheme were delivered under a DPC model.

Cost efficiencies

Cost efficiencies	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Cost of interoperability risk	Physical asset location	• Position and location on the network • New or existing asset upgrade • Separate function on standalone basis	Highly integrated non-separable	Minimal integration with existing site	Standalone separate asset	The scheme will be constructed as a number of new assets located on a site where there are no existing AWS assets. The scheme will require little integration with AWS ongoing operation during construction.
	Interfaces	• Types of interfaces (physical/information/data) • Number of interfaces • Many to one or one to many interface relationships	Multiple complex interfaces with one to many relationships	Multiple interfaces	Limited non physical interfaces	Physical and informational interfaces associated with the construction and operation of this scheme, notably between the DPC and AWS and the EA. These interfaces could introduce additional costs for AWS and DPC as they will have to be managed through separate contractual arrangements.
	Process	• Operational staffing and skillset • Manpower levels 24/7 • Frequency and need for co-ordination with wider network	Inefficient on standalone basis /requires high degree of co-ordination with wider network	Operate efficiently on standalone basis/requires co-ordination with wider network	Operate efficiently on standalone basis with limited need for wider network interaction	The reservoir scheme will require limited integration with AWS' day to day operations and would likely be operated by a dedicated team, responsible for the reservoir and associated treatment works. There may be some loss of efficiency from not being able to draw on centrally procured energy for the pumping station.

- The reservoir and associated assets will be constructed on a standalone greenfield site with simple and well understood interfaces connecting to the existing AWS network.
- Some physical and informational interfaces exit between the assets and AWS/EA but relatively well understood and non-complex in nature reducing the likely incremental costs associated with new contractual boundaries.
- The loss of scale economies are considered to be low given that a dedicated team covering the site operation is likely to be required and reduces AWS ' ability to absorb the asset operations within its wider operational teams without the need for additional staffing although some management and overhead duplication may be required under a DPC model.

Cost efficiencies

Cost efficiencies	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Cost of interoperability Risk	**Impact on service delivery**	• Role in delivering statutory obligations • Impact on customers • Risk to adjacent asset performance	High Impact directly on end customer and AWS obligations	Impacts directly on AWS end customers/ obligations	Limited indirect impact on operations and outputs	Risk of failure is considered small. Downstream faults could result in supply interruptions/quality issues which would impact AWS' customers directly, potentially impacting C-MEX measures. AWS would need to reflect in a contractual arrangement with the DPC.
	Flexibility	• Likelihood of changes in asset's usage • Scalability and adaptability of the operation • Alternative usages of the asset	No flexibility in operation and no alternative usages of the asset	Operation is scalable and adaptable to changing needs	Predictable asset's usage	The asset has a high predictability of usage with low volatility in output. Population growth may increase demand in later AMPs however, and consequently, the reservoir will be scalable to meet changing quantity requirements.
	Control	• Type of asset, i.e. resilience scheme or required for day to day operation • Frequency of interaction with the wider network	Frequent interaction with the wider network on a day to day basis	Limited interaction needed for operation of the wider network	Resilience asset with limited interaction with the wider network	Operation of the reservoir will require more limited interaction with AWS' wider network assuming required reservoir refill protocols are being fulfilled. Although AWS will not require direct control of the assets to manage the wider network, some co-ordination will need to be established through contractual arrangements.

- The reservoir us upstream form the customer network and therefore service failure is likely to be contained and not result on direct impacts to customers.
- The output is largely predictable and stable and can meet the future demands that may merge over time associated with requirements for increased output (e.g. growth, climate change). Some loss of flexibility given likely duration of contract over 25 year period which could be costly to change if required.
- Relatively low level of interaction with wider network on a frequent basis.

Cost efficiencies

Cost efficiencies	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Cost of failure	Costs of a failure	Cost incurred in a downside scenario	Low Potential for fines and high contractual penalties/ customer claims	Medium Contractual penalties and customer claims only only	High Contractual penalties only	Small # of customers affected in a rural area by an above ground asset failure. Some impact downstream where availability and quality could be impacted and likely to result in contractual penalties only (e,g, ODIs/Cmex)
	Impact of catastrophic failure	Impact on service associated with catastrophic failure considering impact and likelihood of failure and impact on	High High probability and high impact	Medium Medium probability and medium impact	Low Low probability and low impact	Catastrophic failure of a reservoir asset is considered highly unlikely. However, the impact of a failure would likely result in a supply deficit when demand is high and repairs to the structure could be costly and requires draining of the reservoir which would further increase the impact.
Core business to AWS	AWS' experience and capability	Number of similar projects delivered in the past 5-10 years.	4+	1-3	0	Limited UK precedent and no recent experience of capital scheme of this size within AWS.

- Catastrophic failure of the reservoir structure is highly unlikely. Failure is more likely to occur from poor quality output or loss of supply where the river is low and the reservoir cannot be filled as planned. This may have some impact on end customers but alternative sources could provide back-up supply for a short period of time, There is also a risk of water quality issues but which are generally well understood (e.g. metaldhyde) and monitoring upstream of the reservoir helps in the early identification and mitigation of this.
- AWS has limited experience of a capital schemes of this size and the construction is not considered core capability for AWS. In addition, the @One alliance capital delivery route is not appropriate for delivery of an asset of this type and an alternative delivery route would need to be considered even if DPC delivery was not being considered.
- In summary, The analysis against specific indicators suggests that cost associated with interoperability and new contractual boundaries are unlikely to be significant and reducing the incremental costs that could reduce efficiencies. In addition a scheme of this size is not core capability for AWS or its existing delivery route and therefore a new delivery capability would be required to deliver the project. Risk of failure is considered relatively low and the impact is likely to be contained locally, reducing the potential impact.

Innovation benefits

Innovation benefits	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Innovation	**Technology maturity**	The level of maturity can be captured by the time the technology has been around and the number of innovation occurring every year.	Mature	Growth phase	Emerging	The scheme is not technically complex and there are limited likely to be limited opportunities for innovation albeit some innovation during construction through modular, off-site build could be achieved given the size of the scheme.
	Size of scheme	The larger the scheme in terms of size and scale the greater potential there may be for identifying and securing innovation benefits.	<£100m	£100m-500m	>£500m	The scale and size of the project is significant and therefore the opportunity to identify innovate opportunities may be higher; For example land bank surrounding the reservoir could be utilised for alternatives (e.g leisure, energy generation)
	Process complexity	Complexity of process technology adopted for the scheme.	Simple, limited process technology	Process technology with some level of complexity	Complex process technology	Well understood, low complexity assets suggest limited opportunities for innovation may be available.

- There is some potential for innovation given the size and scale of the asset albeit the associated technology is relatively mature and non-complex in nature.
- Potential for innovation is likely to come from innovation in the construction and the opportunity to use the land bank surrounding the asset for alternative uses such as energy generation or leisure facilities.
- Given the timescales for asset delivery it is harder to predict what technological advances may enhance the innovation opportunities and increase customer value for money.
- Changing market expectations and relationships with customers may lead to new opportunities for innovation through additional services which are currently unknown but could be leveraged in the future.
- The local community and existing backdrop of scarce water resource may create alternative and innovative funding solutions through multisector collaboration which could again deliver incremental value for money.

Deliverability

Deliverability	Indicators	Assessment	Scoring			Rationale
			Low	Medium	High	
Lead time	**Duration of construction**	Length of construction period in years	>5	3-5	<3	The construction period of the South Lincolnshire Reservoir Scheme is expected to take 4 years. A further three years would then be required to fill the reservoir to full capacity. Given the size of the project and long construction period the risk of delay is potentially greater
	Timing of asset construction	Date that construction is expedited to begin.	Start of AMP7	End of AMP7	Later than AMP7	The asset is due to be operational by AMP9 with construction beginning in 2029 and so there is long lead time to ensure readiness and plan in order to mitigate potential delays.

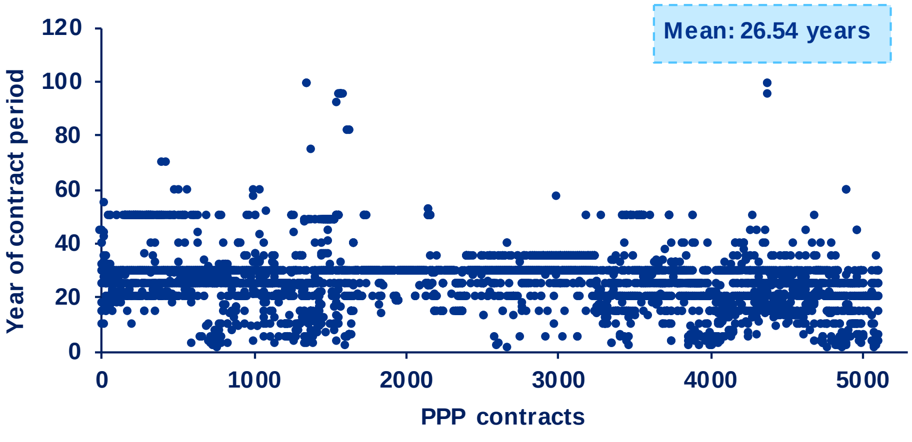
- There is a long period of time available before the asset is due to be constructed and therefore risk of delay is considered to be low and reducing the deliverability risk and associated impact on delivery of customer benefits.
- The construction period is significant at 4 years plus an additional 3 years required to fill the reservoir. Give the long period of construction and potential stakeholder implications the risk of delays is considered to be medium. However, the long lead time between now and start of construction allows for adequate planning and preparation and the opportunity to de-risk the project further and mitigate potential delays and cost over runs that that would impact on customer value for money.

8 Appendix – VfM model assumptions

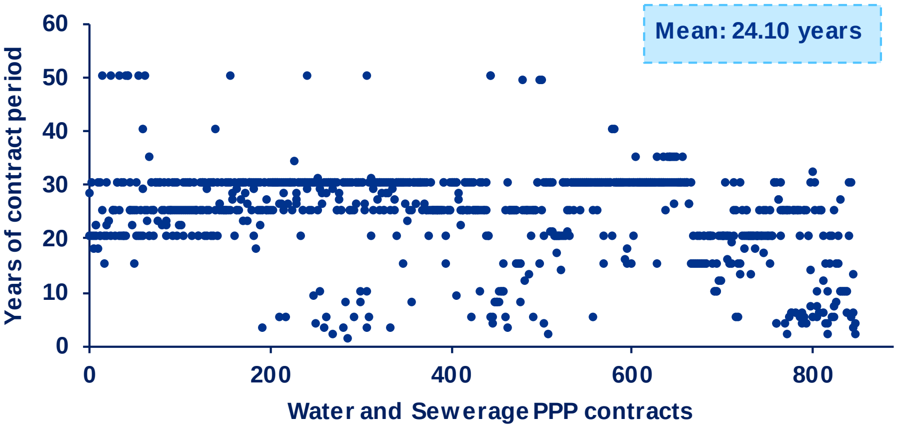
Interim support for Direct Procurement for Customers (DPC)

Contract Period analysis

Contract Period for all PPP contracts



Contract Period for Water and Sewerage PPP contracts



Typical period for a PPP project is 25 years

- The analysis is based on a database of over 5,000 projects from the Global PPP market from 1995 to 2017 collated by the World Bank.
- Across all sectors (e.g. transport, social, energy, water and wastewater etc.) the mean contract period on PPP deals is 26.54 years.
- In the Water and Sewerage sector, the mean contract period is slightly lower at 24.10 (median is 25 years).
- Between 1995 and 2017, the contract period has steadily declined.
- The results of our analyses indicate that it's reasonable to assume a PPP contract period of 25 years.

Source: Data collected for all global PPP contracts from 1995 and 2017, World Bank

DPC financing costs assumptions: Base rates for Reservoir

Our base rates for both construction and operation phases are 2YR and 6YR Forward rates with respective tenor so that DPC and PR19 financing costs are comparable, taken from Reuters Eikon data base on 01/01/2018

Validation Date: 01/01/2018	Spread (%)	Selected base rate (%)	Total (%)
Construction			
2YR FWD Libor 6m 4Y	2.40	1.24	**3.64**
Operation			
Bank loan: 6YR FWD Gilt 14Y	1.25	1.16	**2.41**
RV bond: 6YR FWD Gilt 25Y	1.30	1.38	**2.68**
Reserve accounts: 6YR FWD Libor 6m 14Y	1.25	1.63	**2.88**

- The construction will last for a period of 4 years. Therefore, 2YR FWD 6m Libor with a tenor of 4 years had been selected to be the base rate. The model picked 2YR FWD from validation date 01/01/0218 in the forward curve to match PR19 WACC, which is expected to come into effect on 2020, for DPC and PR19 financing costs to be comparable
- Operation period, subsequently, will start 4 years from construction start date, which results in 6 years forward rates to be chosen
  - Bank loan: 6YR Forward Gilt with a tenor of 14Y had been selected to be the base rate
  - RV bond: 6YR Forward Gilt with a tenor of 25Y had been selected to be the base rate
  - Reserve accounts: 6YR Forward Libor 6m with a tenor of 14Y had been selected to be the base rate

Details
Gilt Forward Rates - GBP
Start Interval: | Tenor: -Short 4Y, xMedium 14Y, -Long 25Y

Std Periods	Start Date	End Date	Rates	End Date	Rates	End Date	Rates
01-Jan-18	01-Jan-18	04-Jan-22	-0.2257	02-Jan-32	1.4271	02-Jan-43	1.704
1W	08-Jan-18	10-Jan-22	-0.2039	08-Jan-32	1.4293	08-Jan-43	1.7046
1M	01-Feb-18	01-Feb-22	-0.1234	02-Feb-32	1.4428	02-Feb-43	1.709
2M	01-Mar-18	01-Mar-22	-0.0231	01-Mar-32	1.4573	02-Mar-43	1.7132
3M	03-Apr-18	04-Apr-22	0.0987	05-Apr-32	1.4744	03-Apr-43	1.7193
4M	01-May-18	03-May-22	0.2011	04-May-32	1.4869	01-May-43	1.7225
5M	01-Jun-18	01-Jun-22	0.3033	01-Jun-32	1.503	01-Jun-43	1.7283
6M	02-Jul-18	04-Jul-22	0.4194	02-Jul-32	1.519	02-Jul-43	1.7335
9M	01-Oct-18	03-Oct-22	0.6418	01-Oct-32	1.5326	01-Oct-43	1.7281
1Y	02-Jan-19	03-Jan-23	0.8639	04-Jan-33	1.5465	04-Jan-44	1.7215
2Y	02-Jan-20	02-Jan-24	3.5564	03-Jan-34	1.6462	03-Jan-45	1.7688
3Y	04-Jan-21	06-Jan-25	0.3706	04-Jan-35	1.9122	04-Jan-46	1.9182
4Y	04-Jan-22	05-Jan-26	1.4045	04-Jan-36	2.2185	04-Jan-47	2.0916
6Y	02-Jan-24	04-Jan-28	-1.1397	04-Jan-38	**1.1602**	04-Jan-49	**1.375**
7Y	02-Jan-25	02-Jan-29	2.8119	04-Jan-39	2.4756	04-Jan-50	2.1742
10Y	04-Jan-28	05-Jan-32	2.1097	06-Jan-42	2.153	06-Jan-53	1.899
15Y	04-Jan-33	05-Jan-37	2.1553	04-Jan-47	1.9416	04-Jan-58	1.6853
20Y	04-Jan-38	06-Jan-42	1.8845	04-Jan-52	1.628	04-Jan-63	1.4837
25Y	02-Jan-43	02-Jan-47	1.6361	02-Jan-57	1.3934	03-Jan-68	1.3537
30Y	02-Jan-48	02-Jan-52	1.1985	03-Jan-62	1.2432	02-Jan-73	1.3165
35Y	02-Jan-53	02-Jan-57	1.2763	04-Jan-67	1.2833	03-Jan-78	1.3841

Details
6m Libor Forward Rates - GBP
Start Interval: | Tenor: -Short 4Y, xMedium 14Y, -Long 28Y

Std Periods	Start Date	End Date	Rates	End Date	Rates	End Date	Rates
01-Jan-18	01-Jan-18	04-Jan-22	0.9558	02-Jan-32	1.3847	02-Jan-46	1.4324
1W	08-Jan-18	10-Jan-22	0.9605	08-Jan-32	1.3854	08-Jan-46	1.4329
1M	01-Feb-18	01-Feb-22	0.9721	02-Feb-32	1.3918	01-Feb-46	1.4353
2M	01-Mar-18	01-Mar-22	0.9888	01-Mar-32	1.3988	01-Mar-46	1.4382
3M	03-Apr-18	04-Apr-22	1.0054	05-Apr-32	1.4065	03-Apr-46	1.4414
4M	01-May-18	03-May-22	1.0196	04-May-32	1.4116	01-May-46	1.443
5M	01-Jun-18	01-Jun-22	1.0353	01-Jun-32	1.4202	01-Jun-46	1.447
6M	02-Jul-18	04-Jul-22	1.0498	02-Jul-32	1.4278	02-Jul-46	1.4496
9M	01-Oct-18	03-Oct-22	1.0935	01-Oct-32	1.4468	01-Oct-46	1.4571
1Y	02-Jan-19	03-Jan-23	1.13	04-Jan-33	1.4638	02-Jan-47	1.4633
2Y	02-Jan-20	02-Jan-24	**1.2433**	03-Jan-34	1.5185	02-Jan-48	1.4796
3Y	04-Jan-21	06-Jan-25	1.3471	04-Jan-35	1.5645	04-Jan-49	1.4899
4Y	04-Jan-22	05-Jan-26	1.4281	04-Jan-36	1.5979	04-Jan-50	1.4932
6Y	02-Jan-24	04-Jan-28	1.5657	04-Jan-38	**1.632**	02-Jan-52	1.4829
7Y	02-Jan-25	02-Jan-29	1.6235	04-Jan-39	1.6345	02-Jan-53	1.4709
10Y	04-Jan-28	05-Jan-32	1.7006	06-Jan-42	1.5973	04-Jan-56	1.4123
15Y	04-Jan-33	05-Jan-37	1.6395	04-Jan-47	1.4619	04-Jan-61	1.278
20Y	04-Jan-38	06-Jan-42	1.4175	04-Jan-52	1.2984	04-Jan-66	1.1508
25Y	02-Jan-43	02-Jan-47	1.3104	02-Jan-57	1.162	02-Jan-71	1.0946
30Y	02-Jan-48	02-Jan-52	1.1498	03-Jan-62	1.0373	02-Jan-76	1.0775
35Y	02-Jan-53	02-Jan-57	1.0092	04-Jan-67	0.9697	02-Jan-81	1.0943

**Source: Reuters Eikon data as of 01/01/2018*

DPC financing costs assumptions : Base rates for North Fenland

Our base rates for both construction and operation phases are 2YR and 5YR Forward 6m Libor rates with respective tenor, so that DPC and PR19 financing costs are comparable, taken from Reuters Eikon data base on 01/01/2018

Validation Date: 01/01/2018	Spread (%)	Selected base rate (%)	Total (%)
Construction			
2YR FWD Libor 6m 3Y	2.40	1.19	**3.59**
Operation			
Bank loan:			
5YR FWD Libor 6m 8Y	1.25	1.59	**2.84**
RV bond:			
5YR FWD Libor 6m 15Y	1.30	1.61	**2.91**

Details
Forward Rates - GBP

Start Interval:	Tenor:		-Short		xMedium		-Long
			3Y		8Y		15Y
Std Periods	Start Date	End Date	Rates	End Date	Rates	End Date	Rates
01-Jan-18	01-Jan-18	04-Jan-21	0.8763	02-Jan-26	1.1867	04-Jan-33	1.4026
1W	08-Jan-18	08-Jan-21	0.88	08-Jan-26	1.1891	10-Jan-33	1.4042
1M	01-Feb-18	01-Feb-21	0.8942	02-Feb-26	1.1982	01-Feb-33	1.4096
2M	01-Mar-18	01-Mar-21	0.9115	02-Mar-26	1.2071	01-Mar-33	1.4163
3M	03-Apr-18	06-Apr-21	0.9299	07-Apr-26	1.2199	04-Apr-33	1.4236
4M	01-May-18	04-May-21	0.9439	01-May-26	1.2291	03-May-33	1.4286
5M	01-Jun-18	01-Jun-21	0.9625	01-Jun-26	1.2404	01-Jun-33	1.4362
6M	02-Jul-18	02-Jul-21	0.982	02-Jul-26	1.2514	04-Jul-33	1.4424
9M	01-Oct-18	01-Oct-21	1.0279	01-Oct-26	1.2814	03-Oct-33	1.4606
1Y	02-Jan-19	04-Jan-22	1.068	04-Jan-27	1.3086	03-Jan-34	1.4765
2Y	02-Jan-20	03-Jan-23	**1.1923**	04-Jan-28	1.3992	02-Jan-35	1.5273
3Y	04-Jan-21	04-Jan-24	1.3048	04-Jan-29	1.4801	04-Jan-36	1.5683
4Y	04-Jan-22	06-Jan-25	1.3959	04-Jan-30	1.5434	05-Jan-37	1.5968
5Y	03-Jan-23	05-Jan-26	1.4644	03-Jan-31	**1.5928**	04-Jan-38	**1.6145**
6Y	02-Jan-24	04-Jan-27	1.5324	02-Jan-32	1.6319	04-Jan-39	1.6228
7Y	02-Jan-25	04-Jan-28	1.5962	04-Jan-33	1.6596	03-Jan-40	1.6227
15Y	04-Jan-33	04-Jan-36	1.6567	04-Jan-41	1.5534	06-Jan-48	1.4488
20Y	04-Jan-38	04-Jan-41	1.4352	04-Jan-46	1.3747	06-Jan-53	1.2843
25Y	02-Jan-43	02-Jan-46	1.3204	03-Jan-51	1.251	02-Jan-58	1.1501
30Y	02-Jan-48	03-Jan-51	1.1655	04-Jan-56	1.0902	02-Jan-63	1.032
35Y	02-Jan-53	04-Jan-56	1.0158	04-Jan-61	0.9842	03-Jan-68	0.9695

**Source: Reuters Eikon data as of 01/01/2018*

- The construction will last for a period of 3 years. Therefore, 2YR FWD 6m Libor with a tenor of 3 years had been selected to be the base rate. The model picked 2YR FWD from validation date 01/01/0218 in the forward curve to match PR19 WACC, which is expected to come into effect on 2020, for DPC and PR19 financing costs to be comparable
- Operation period, subsequently, will start 3 years from construction start date, which results in 5 years forward rates to be chosen
  - Bank loan: 5YR Forward Libor 6m with a tenor of 8Y had been selected to be the base rate
  - RV bond: 5YR Forward Libor 6m with a tenor of 15Y had been selected to be the base rate

DPC financing costs assumptions : Precedents

Financing costs in primary PPPs – Indicative debt financing for from major players in recent PPP and project finance space

Facility	Average ticket size (£m)	Weighted average cost of debt	Notes
Long term bank (29 years)	108	Libor + 150bps to 210bps	Swap credit margins 15bps and 30bps not included
Medium term bank (15 years)	106	Libor + 130bps to 260bps	Swap credit margins 7bps and 22bps not included
Medium term bank (10 years)	106	Libor + 120bps to 250bps	Swap credit margins 5bps and 20bps not included
Fixed rate bond	186	Libor + 160bps to 275bps	Assuming a BBB rating
Fixed rate bond (delayed amortisation)	200	Libor + 175bps to 240bps	Assuming a BBB rating
Indexed-linked bond	150	Libor + 200bps to 275bps	Assuming a BBB rating

Key drivers of financing costs

- Debt/Equity ratio: equity investors typically assume more risk than lenders, as they will expect a return commensurate with the risks they face. Therefore, a lower Debt/Equity ratio leads to higher total financing costs (WACC) for the project.
- Risks of project cost overrun and delays: the higher the risks, often observed in mega-size and high tech projects, the higher the financing costs.
- Public financing availability: When there are subsidies available from the authorities, either through milestone payments or low interest grants, WACC would be lower.
- Macro economic factors: Can effect WACC in either direction. Ex: Quantitative easing puts pressure on interest rates, thus making WACC lower as investors seek for high-yield projects in the private sectors. Whereas rate normalisation (happening in US) would increase WACC as investors have more options to allocate their funds.
- Contract length: The longer the contract, the better chance investors have to get repayments from PPP contractors, hence lower the WACC.

Due to the assumed risk profile under the DPC model the lower end of medium term debt represents the closest comparator for debt financing margins during operation.

DPC financing costs assumptions : Precedents (cont.)

Financing costs in primary PPPs – Waste to energy PPP projects

Project	Levered blended equity IRR (nominal pre tax)	Levered blended equity IRR (nominal post tax)
Range across a number of transactions	13.70%-17.8%	12.0%-16.57%
Average	15.6%	14.2%

Key drivers of the financing costs

- Contract length with waste suppliers: The longer the contract terms, the more waste inputs the plants have to process, hence the more electricity and heat can be produced, which results in a more sustainable revenue stream and better repayment schedule for investors, leading to lower WACC.
- Technology used: The more time-proven and efficient the technology, such as gasification and pyrolysis, the less costly it is to generate electricity/heat and to carry out repairs. This would ultimately ensure a more stable revenue stream in the future, thus fortifying PPP contractors' ability to service their debt obligations and reducing the risk of miss-payments, which lowers the WACC.
- Power Purchase agreement: Better terms and longer timeframe of a PPA translate into higher and more predictable revenue stream for PPP contractors to sell the electricity and heat produced to grid and direct consumers. By helping to achieve better repayment schedules this will result in a shorter loan duration, thus freeing up more cash to distribute back to equity investors quicker. Investors often reward the behaviour with a discount in their required equity return, leading to lower WACC. Further more, better PPAs also means PPP contractors can repay their loan with more certainty, thus lowers the cost of debt. In short, PPAs allow PPP contractors to discount both cost of debt and equity.
- Government support: If government supports low carbon economy, then WACC would tentatively be lower as investors discounts government subsidies in terms of tax and grants.

KPMG analysis

DPC financing costs assumptions : Precedents (cont.)

Publicly available information provided by Ofgem.

Financing costs under the OFTO regime

Project	Tender Round	Transfer Value	Security type	Gearing	Maturity	Margin
Barrow	1	£34m	Term loan	81%	17.5 years	Libor + 220bps
Gunfleet Sands 1&2	1	£50m	Term loan	84%	19 years	Libor + 195 bps
Robin Rigg	1	£66m	Term loan	84%	20 years	Libor + 200 bps
Walney 1	1	£105m	Term loan	85%	19 years	N/A
Walney 2	1	£110m	Term loan + £5m liquidity facility	87%	19 years	Libor + 240 bps
Sheringham Shoal	1	£193m	Term loan + £6m liquidity facility	91%	19 years	Libor + 220 bps
Greater Gabbard	1	£317m	Bond issuance + EIB credit enhancement	87%	19 years	4.137% coupon (gilts + 125 bps)
West of Duddon	2	£300m	Bond issuance	85%	19 years	3.446% coupon (2027 gilts +145bps)
Lincs	2	£308m	Term loan	50%	19 years	Libor + 150bps
Gwynt y Mor	2	£352m	Bond issuance	87%	19 years	2.778% coupon (2025 gilts +110bps)
London Array	2	£459m	Term loan + £3m liquidity facility	N/A	19 years	Libor + 220 bps
Westermost Rough	3	£172m	Term loan	83%	19 years	Undisclosed (index linked)

Trends observed over the 3 tender rounds

- The overall cost of financing has fallen between the tender rounds driven mainly by (i) improved terms of debt providers (EIB finance), (ii) lower borrowing costs, and (iii) lower required equity returns from investors.
- One of the trends in this asset class is to see an increasing interest in offering a larger equity portion. This deleveraged, "thick SPV" structure may better support pension funds and other long term investors who typically accept lower returns.
- Although the effect of cheaper equity is offset by having lower leverage, the overall cost of capital could be lower, particularly since the lower leverage may also allow banks offer to better terms e.g. EIB.
- Margins on debt have been falling reflecting improvements in debt market conditions and the benefits of inflation linked financing arrangements.
- The earlier deals were financed on a c. 98% availability assumption. In practice, projects have delivered a higher level of availability – close to 100%.

A decreasing trend in IRR can be observed over time. The NAO found that 10-11% IRR requirements were seen in early deals (round 1), while subsequent tender rounds have seen in many cases equity returns falling closer to reported secondary market rates of return in PFI projects (around 8-9%).

AWS private costs for procurement process - Cost build up

Key costs AWS is likely to incur associated with tender activity for typical PPP/PFI procurement process based on management experience are set out below.

Key assumptions

- “Late’ tender model including design, build, construction, operations and financing within scope of procured services.
- Assumes typical DBFO PPP type procurement activity including PQQ and RFP stages with approximately 2-3 bidders progressing to more advanced stages of procurement process.
- Currently assume re-tendering of operations contract every 5 years can be absorbed within existing procurement activity included in existing cost base.
- Assumes procurement begins in 2026/27 and lasts for 24 months until 2027/28.
- Excludes bidder costs which could be up to 2% of overall scheme (According to Ofwat estimate) and which are likely to be added to the costs recovered through the DPC revenues.
- Excludes Ofwat costs suggested at £500k per scheme (Ofwat PR19 Methodology, DPC appendix).

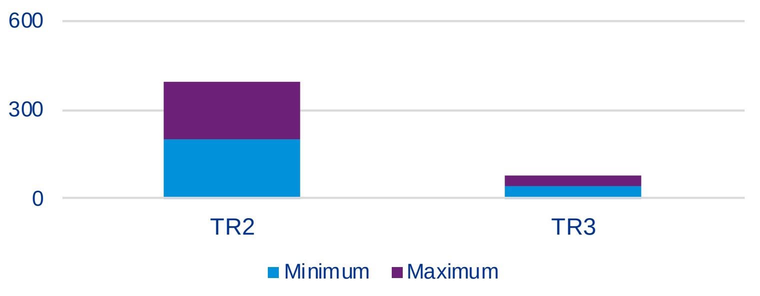
Key costs associated with tender activity for typical PPP/PFI	Estimated costs	Commentary
‘Team of 7 FTE in procurement team for 2 and costing based on existing labour costs for associated grades	£600k	AWS assumption
Legal advisors	£500k	Does not include legal fees for other parties (e.g. bidder , banks, etc)
Commercial and financial advisors	1,000k	Includes model build and review
Ratings agency engagement and project assessment	50k	Only likely to be require son large scheme where debt is raised through the markets.
Insurance advisors	100k	Will depend on complexity and familiarity with similar type project and risk profile.
Debt benchmarking	50k	Specialist advise to ensure debt is correctly priced
Data room hosting	100k	Could potentially use an in house solution if suitable.
Procurement partner Specific input	350k	Mott MacDonald’s estimate for programme partner input ahead of tender process.
Total	**£3,271k**	

DPC cost efficiency assumptions: OFTOs

Cost efficiencies under the OFTO regime – Outcome of the comparison

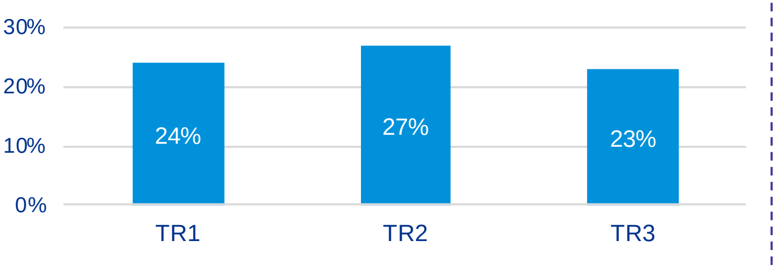
- **The report published by Ofgem looking into the benefits of the OFTO tender rounds suggests that competition has driven down operating costs.** Ofgem's evaluation indicates that the OFTO TR2 and TR3 realised operating costs savings when compared to delivery by the incumbent.
- Operating costs on a percentage of FTV basis were lower in TR2 than TR1 but higher in monetary (£m) terms. Also in TR2 the incumbent's opex was closer to the preferred bidder's costs than in TR1.

Estimated operating cost savings compared with RIIO-T1
(£m NPV in 2014/15 price base)



- The net present value delivered via operating cost saving in TR5 ranges between £201m and £391m, while in TR3 it is between £45m and £79m compared to a delivery under the RIIO T1 framework.
- The higher savings for TR2 than for TR3 are likely to be driven by differences in project sizes.

Estimated operating cost savings compared with RIIO-T1
(% of FTV)



- All three tender rounds allowed for a cost saving of above 20% when compared to a delivery model under the RIIO T1 as counterfactual.
- Increase in saving between TR1 and TR2 show the benefit how a maturity in the market can drive costs down.
- The trend from TR2 to TR3 reflects that the operating cost path in the counterfactual reduced to the preferred bidder level rather than the average bidder level (which was the case in TR1).

- It is important to note that one of the key aspects that have enabled efficient pricing by bidders for operating costs include the significant de-risking provided by the operational nature of the assets and twenty-year availability-based licences.
- OFTOs operating costs include a range of costs associated with operating the OFTO SPV, including O&M costs but also insurance, SPV management and other running costs.

DPC cost efficiency assumptions: Literature Review

This section presents the precedents of capital and operational expenditure efficiencies delivered by competitive schemes compared to delivery by an incumbent. These precedents were used to inform the efficiency assumptions used in the quantitative assessment of the value for money for customers from delivery of the asset under a DPC model compared with delivery under PR19.

OPEX		
Study	Methodology and key comments on efficiency gains	Cost efficiency range of total opex
Evaluation of OFTO tender round 2 and 3 benefits	• Ofgem commissioned CEPA to undertake a study of the benefits of the OFTO tender round 2 and 3 benefits • Comparative study compared operating expenditure of OFTOs against a series of counterfactual scenarios. • Counterfactual scenarios modelled revenue stream of assets using a building block modelling approach based on a licence merchant generation (based on the experience of offshore oil and gas development) and the regulatory regime (expansion of the onshore regulated regime offshore). • The percentage range based on the savings of the OFTOs tender revenue stream against the counterfactual scenarios. • The merchant counterfactual is less applicable to DPC as it takes cost assumptions from a similar industry whereas the regulated counterfactual extends the current regime. • *Figures apply across 20 years of OFTO licence and are projected real costs*	19-23% for the regulated counterfactuals and 22-31% for the merchant counterfactuals
Extending competition into electricity transmission: impact assessment	• 2016 report by Ofgem assessing impact of their decision to extend the use of competitive tendering to onshore electricity transmission assets that are new, separable and high value. • The assessment compares the preferred option to extend competition to onshore electricity transmission under an early and later model against a counterfactual which assumes the continuation of current arrangements for the delivery of the assets. • Analysis uses broadly comparative examples from GB and other countries when assessing potential benefits and cost assumptions. • Ofgem expect competitive tendering to put downward pressure on capital and operational expenditure. • True costs likely to be faced by monopoly companies creates problems of information asymmetry which is particularly problematic because new, high-value projects have not come forward historically. • Ofgem expect bidders to put forward lower costs than incumbents estimating the cost of construction. • Early tender models which include construction internationally came in between 20 – 60% below project cost/incumbent bid. • Late tender bids looked at OFTOs and Thames Tideway where the winning bid WACC of 2.297% was substantially below the original estimate of 3.29%.	Evidence suggest some opex savings within total savings at bid stage between 20 – 60% versus incumbent
CBA of the potential introduction of competitively appointed transmission operators	• National grid commissioned Frontier Economics to undertake CBA of competitive onshore transmission projects. • The report criticises the use of OFTOs as a precedent as it involves the transfer of assets which have already been built and therefore do not hold construction risk. • The report notes that OFTOs largely subcontracts O&M activities with the associated risks passed through to the contractor. • Criticism of the precedent highlights that the procurement or contract management of subcontractors could be replicated and similar cost reductions could be made under achieved by an incumbent transmission operator.	Evidence suggests limited cost efficiency
NAO Report: PF1 and PF2	• NAO briefing on the rationale, costs and benefits of the PFI 1 and 2 and the introduction of PFI 2. • NAO work on PFI hospitals found no evidence of operational efficiency over 10 years. More recent data from NHS London Procurement Partnership shows costs of services are higher under PFI contracts. • Respondents to 2017 survey considered that operational costs were either similar or higher under PFI contracts.	Evidence suggests limited cost efficiency

DPC cost efficiency assumptions: Literature Review (cont.)

CAPEX		
Study	**Methodology and key comments on PPP/PFI efficiency gains**	**Cost efficiency range of total capex**
Performance of PPPs and Traditional Procurement in Australia: Allen Consulting Group	• The Infrastructure Partnerships Australia (IPA) 2007 study considered efficiency of PPP relative to traditional procurement approaches in the provision of public infrastructure. • Study separated project into four periods and examined the project management and construction phases of projects recording costs incurred compared with cost anticipated. • It considered 206 projects (50 PPP and 156 traditional public procurement) undertaken since 2000, larger than \$20m and matched the complexity of PPP to traditional delivery projects. • Traditional procurement is associated with optimism bias which is defined as the differential between capex cost between the project inception and completion of work. A Mott Macdonald study of large public procurement in UK showed that non-standard projects have greater levels of optimism bias. • The study compared reported cost overruns between traditional delivery and PPP delivery. The difference between the cost overrun is the assumed capital expenditure efficiency under PPP delivery. • PPP projects, from contract to completion, had a cost overrun of 1.2% whereas traditional procurement overran by 14.8% • The upper end of the range of efficiency covers the full period from inception to work completion whereas 11.4 runs from contract commitment to work competition. 11.4% capex efficiency covers a more analogous period to DPC than the other 3 periods considered in the study.	11.4 – 30.8%
Performance of PFI construction: NAO	• 2009 study focused on the performance of PFI construction performance against contracted timetable and price. • Evidence comes from two surveys undertaken by NAO in 2008 of public sector construction projects with capex greater than £20m completed between 2003 and 2008 of 151 projects. • 94% of projects reported to deliver on or less than 5% over price and the remaining reported price increased of five per cent and over. One project reported delivery at less than the contracted price. • This analysis does not compare expenditure under a PFI model to traditional procurement but does collaborate the findings of the IPA report that PPP/PFI models deliver on budget whereas traditional procurement has cost overruns.	n/a
Comparison of construction contract prices for traditionally procured roads and public-private partnerships	• 2009 journal article published in the Journal of Industrial Organisation focuses PPP contracts in the EU over the past 15 years • Data on ex ante road construction prices in Europe from project appraisal files of the EIB. • Analysis suggest that a PPP road is 24% more expensive in the contract price that traditionally procured road. • However, this estimate resembles reported ex post cost overruns of traditionally procured roads which means the premium covers construction risk. • This analysis does not include the actual cost spend of PPP projects versus traditional procurement. • However, the study notes that if the private sector partner obtains the residual control they are incentivised to undertake cost-saving investments in that asset whereas the focus on the study focuses on build only contracts.	- 24%
RICS Research. The Future of PFI and PPP	• 2011 report issued by the Royal Institute of chartered Surveyors (RICS) • There is a lack of robust and objective data on PPP contract efficiency in comparison with than conventional procurement. This is compounded by the opaqueness and complexity of PPP contracts. • Comparative assessments fail to take into account 'fixed price, fixed-term, turn key constructions contracts' which are integral to PPP agreements	n/a
NAO Report: PF1 and PF2	• O briefing on the rationale, costs and benefits of the PFI 1 and 2 and the introduction of PFI 2. • Treasury Committee found that some PFI projects charge higher prices for construction to cover unforeseen costs. NAO report on PFI housing reported significant capital cost increases compared to initial estimates. • Department of Education has focused on the impact of private finance procurement on construction costs and has found that the financing route offers little to no effect on construction costs of schools as part of Priority School Building Programme. • Fixed price benefits can be achieved without the use of long-term private finance contract.	Limited evidence for any efficiency