Direct Procurement for Customers: Technical Review

A KPMG report for Ofwat

KPMG LLP

1 December 2017

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Executive summary

‘Direct Procurement for Customers’ (DPC) is a new set of arrangements being introduced into the water sector that will enable third parties to potentially design, build, operate, and finance new large scale projects. Ofwat considers that such an approach will help ensure the efficient delivery of large scale projects, and promote innovation by allowing new players to bring new ideas and approaches to the delivery of key projects and therefore deliver benefits to customers.

KPMG were commissioned to support Ofwat in the development of this new framework, specifically to provide a framework that could be used to support choices around the types of projects most suitable for DPC on ‘technical’ grounds, related principally to a series of key generic technical project risks (see section 2). We have not commented on the merits or otherwise of the DPC model or provided any advice on other issues, for example on commercial issues and this necessarily makes our report a partial picture of the issues and risks associated with DPC.

We have drawn on our knowledge of water sector projects, as well as the outputs from two workshops (one with Ofwat, one with water companies, investors and potential bidders), the responses to Ofwat’s methodology consultation, and Ofwat’s recent data request.

What is new and different about DPC?

Whilst there are a range of different models in place across companies in the sector currently, it is very common within those arrangements for water companies to tender out the construction (and parts of the design phase) of projects as well as some aspects of operations. Therefore, whilst the scale of eligible DPC projects could make them large, more complex and therefore atypical compared to the rest of companies capital programmes many of the technical risks involved in the successful delivery of DPC projects are likely to be presented and similarly allocated in the current status-quo arrangements.

The DPC framework does introduce separate ownership and financing of new assets. This raises technical questions around how the incumbent and the Competitively Appointed Provider (CAP) should best interact to deliver high quality, low cost and holistic essential services whilst effectively managing the transaction costs principally arising from the new contracting arrangements.

However, overall DPC could be seen as an evolution from companies’ already well developed contracting or alliancing arrangements throughout their current supply chains. Indeed, Scottish Water and Northern Ireland Water already have PFI-style contracts in place with third parties.

What technically makes a project appropriate for DPC?

A key conclusion from this work is that it would be possible to put contracting arrangements in place for any project so that it could be treated as a DPC project. We have not identified any particular characteristic that would definitively suggest that it would clearly be inappropriate for companies to bring projects forward for delivery under the DPC model. Indeed we note that this conclusion was similar to that reached from a similar exercise undertaken in the design of the Competitively Appointed Transmission Owner (CATO) model by Ofgem.[1]

Based on our work we have developed a simple framework of technical criteria to consider in assessing whether a project is likely to be appropriate for the DPC model, i.e. whether the DPC model is likely to deliver benefits for customers. These could be used as part of that broader cost benefit approach to drive decisions around the allocation of projects to DPC or otherwise. For example for smaller schemes that align more closely to the £100m totex minimum threshold these criteria could be used to decide if the scheme would be suitable for a DPC approach. This is set out below.

[1] Jacobs (2015) 'Technical Input for Extending Competition in Transmission'

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.

What are the technical risks from DPC & who should own them?

Section 2 of the report sets out a series of generic technical risks that we would expect to exist in the delivery of DPC projects in water. These are set out against a typical project lifecycle model and also assessed against different tender model alternatives. We also undertook an allocation of the risks under the current arrangements versus the DPC model to set out who would bear those risks. From the description and analysis of risks the following observations can be made:

— Some of the risks are likely to increase (in likelihood or impact terms) with either larger projects or less common asset types, such as planning consents and commissioning overrun risks. From the initial list of projects received from companies these less common asset types might include reservoirs and desalination plants.

— Many of the technical risks are unaffected by the choice of the DPC model over the status quo in terms of their allocation and likelihood or impact. However, there are also some residual technical risks that either do not exist under the status quo arrangement or are likely to be materially different under a DPC model, these include the risk of a procurement failure or the risks associated with commissioning and asset transfer or handback. There are also some residual risks that cannot easily be transferred to the CAP from the appointee and priced by the market particularly service performance risks relating to statutory obligations.

— The DPC tender models will allow for more risk technical transfer to the CAP from both the appointee and customers which we would then expect to be priced. Earlier tender models generally allow more opportunity for some aspects of technical risks to be transferred but again will see those risks being priced in bids.

— Split tender models may create a disconnect between design, build and operation potentially weakening the link to whole-life costing solutions.

— Many of the risk allocations do not change under the DPC model versus the status quo arrangements. This is particularly true for the early design elements and associated risks which are not transferred even under the earliest tender models.

— Many of the construction/implementation and operation/maintenance risks that previously sat on the appointee could be simply transferred to the CAP.

— There may be some opportunities to transfer risk from customers to the CAP through the competitive bidding process e.g. some demand or volume risk or some input cost risk from biddable indexation.

1 Introduction

Water companies currently use a variety of arrangements to provide services, including self-provision and procuring services from third parties. Ofwat considers that by encouraging companies to consider a broader set of arrangements to deliver services, specifically the financing of large-scale projects and potentially the operation of new high-value assets, additional benefits for customers could be realised.

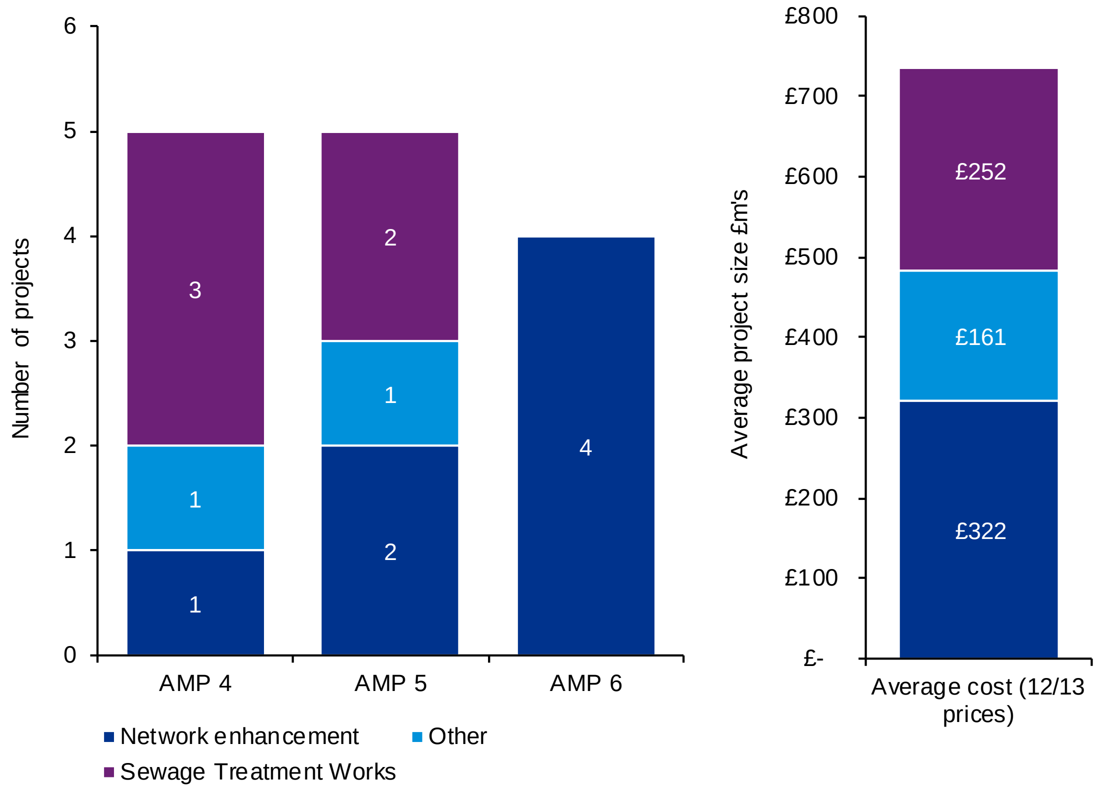
1.1 What is Direct Procurement for Customers?

The term 'Direct Procurement for Customers' (DPC) describes these broader arrangements through which a water company procures services on behalf of customers. Crucially, under a direct procurement arrangement, the Competitively Appointed Provider (CAP) would become the owner of the new asset and would compete to provide finance as well as construction and, where appropriate, operation of the new asset. This provides market evidence on the cost of finance, construction and potentially operation.

Ofwat is in the process of developing its price setting methodology for the 2019 price review (PR19). In July 2017, Ofwat consulted on its proposed methodology for that review. This included a proposed DPC framework, in which Ofwat set out its expectation that companies should consider DPC for relatively discrete, large-scale enhancement projects expected to cost over £100 million based on whole-life totex (total expenditure).

Ofwat's analysis suggests that across previous price control periods there have on average been four and five projects with a capex value greater than £100m.

Figure 2: Number, type and capex size of large projects in each AMP (4-6) with a capex value in excess of £100m (12/13 prices)



In its methodology consultation[2] Ofwat broadly set out a preferred approach to taking forward DPC, the expected elements of the changes needed to appointed companies' licences to accommodate DPC as well as a set of:

— Draft contract principles- covering issues such as the preferred length of the contract, when customers would begin to pay for the assets, financial costs, residual value, etc.; and
— Draft procurement principles- covering issues such as who can bid, tender specification and bid evaluation.

[2] See: https://www.ofwat.gov.uk/consultation/delivering-water2020-consulting-on-our-methodology-for-the-2019-price-review/ and 'Appendix 10 – Direct Procurement for Customers'

1.2 The purpose of this work

Following the methodology consultation, KPMG was commissioned by Ofwat to identify and review the technical characteristics[3] and risks that affect project suitability for DPC. Specifically, Ofwat wanted to understand what types of projects would be most suitable or indeed unsuitable for DPC on technical grounds and to develop a framework for assessing projects that could be applied by both Ofwat and companies for filtering projects as either appropriate for DPC or not.

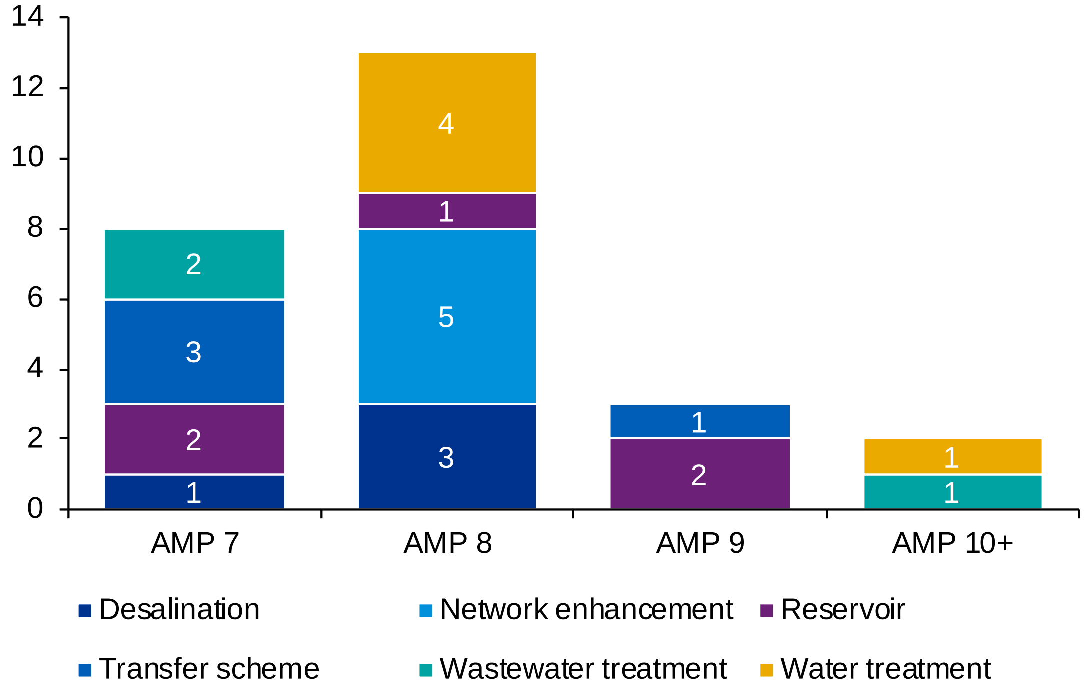
1.3 Our approach

In seeking to meet this objective we have undertaken a desktop review of comparable frameworks and project life-cycle models as well as the common generic technical risks that affect projects across those different frameworks and models. We have also reviewed the responses to Ofwat's methodology consultation and to a data request that Ofwat issued to companies seeking early information on the potential DPC projects that they could include within their business plans.

Stakeholder responses to the consultation made very little comment on the 'technical' aspects of DPC. The information provided gave details of 32 different potential DPC schemes[4], including resilience schemes, reservoirs, reuse works, desalination works, wastewater treatment works, and water transfer schemes. We note that the information provided was preliminary and we consider that the data request is likely to have over-stated the number of schemes reasonably being considered as companies, for example, filter down their Water Resource Management Planning options.

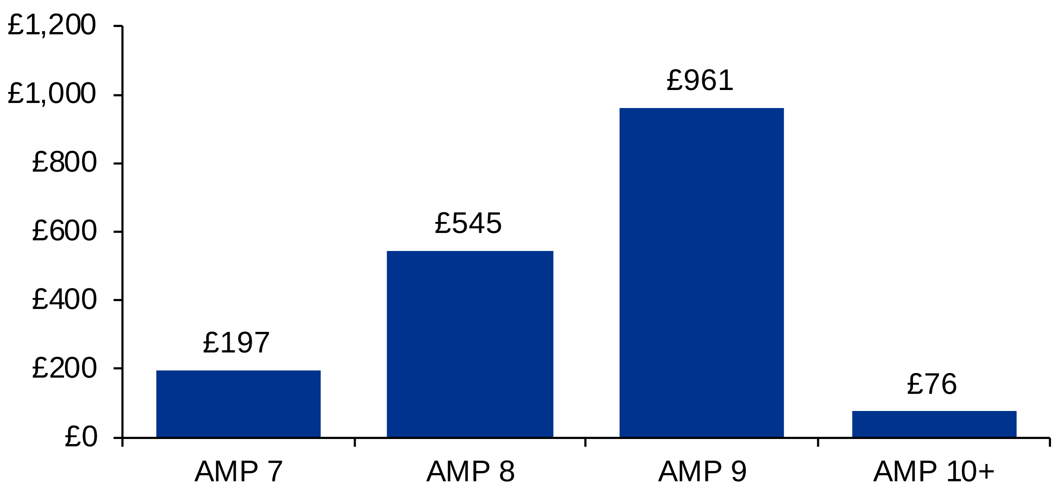
[3] By technical characteristics, we mean physical or process-based attributes that constitute a project. These are distinct from (but may themselves inform) the associated commercial arrangements.
[4] There were 37 schemes listed but five schemes were either alternatives to schemes listed or were given a probability of 0% by companies that they would form part of companies PR19 Business Plans

Figure 3: Number and types of scheme listed by companies and estimated AMP for tendering



Source: Ofwat data request and KPMG analysis

Figure 4: Average project capex value (£m's) by AMP to be tendered



Source: Ofwat data request and KPMG analysis

We facilitated workshops both within Ofwat and with industry stakeholders to discuss the nature of risks affecting water sector projects, as well as how these could be allocated and potentially mitigated.

We have considered the responses in the development of the technical risks and used the information contained in the data request as a basis for considering the types of projects that could be brought forward through DPC and how the risks and technical issues may apply.

By testing our desk-based work through workshops we have sought to identify what the technical characteristics are that make a project more or less suitable for DPC by:

— establishing a set of key generic 'technical' risks relating to large water and wastewater infrastructure projects and considering how the allocation and management of these risks could be impacted by the application of different tender models (e.g. 'early', 'late' or 'split' tender models);
— considering how these are allocated and managed now under the current framework and how that might change under a DPC model;
— developing a framework for assessing the suitability of DPC projects based on a set of key technical criteria that could be used by both Ofwat and the industry in developing and assessing candidate DPC projects in light of the existing procurement and contract principles that Ofwat set out in its methodology consultation in July[5]; and
— finally considering the contractual lessons from this work and potential re-openers.

[5] See: https://www.ofwat.gov.uk/consultation/delivering-water2020-consulting-on-our-methodology-for-the-2019-price-review/ and 'Appendix 10 – Direct Procurement for Customers'

2 Defining the technical risks

2.1 The project life-cycle

In seeking to define and allocate the technical risks associated with the development of relevant DPC projects in the water sector it is helpful to first consider the typical project lifecycle of a DPC projects.

This development process can broadly be set out into a number of key steps as outlined in Figure 5. Some of these steps might be carried out in parallel, but are presented here sequentially for simplicity.

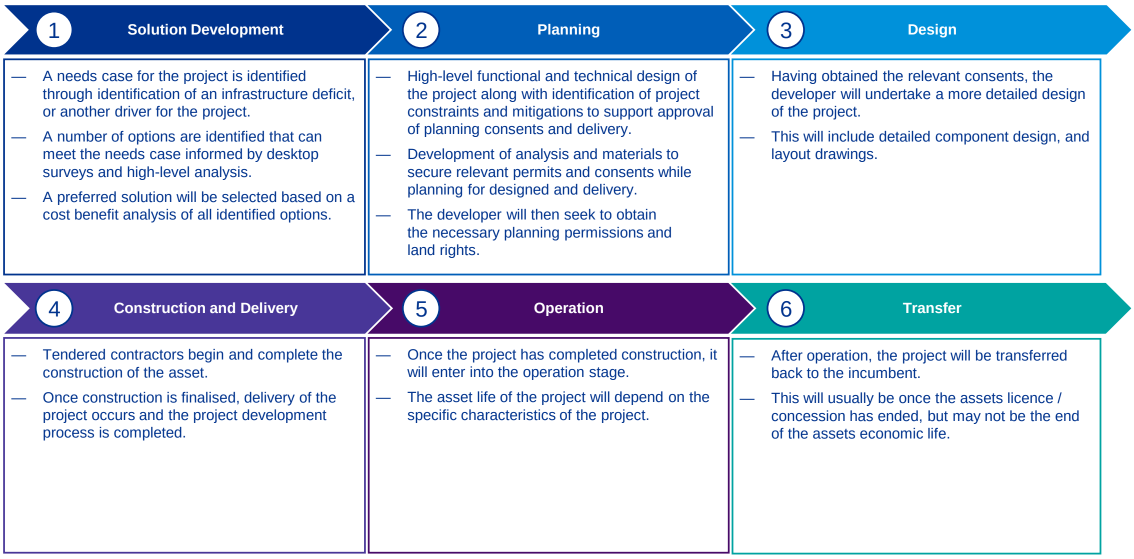


Figure 5: Project life-cycle

2.2 Different tender models

Beyond the project lifecycle process Ofwat has set out a range of potential tender models that could be taken forward, including:

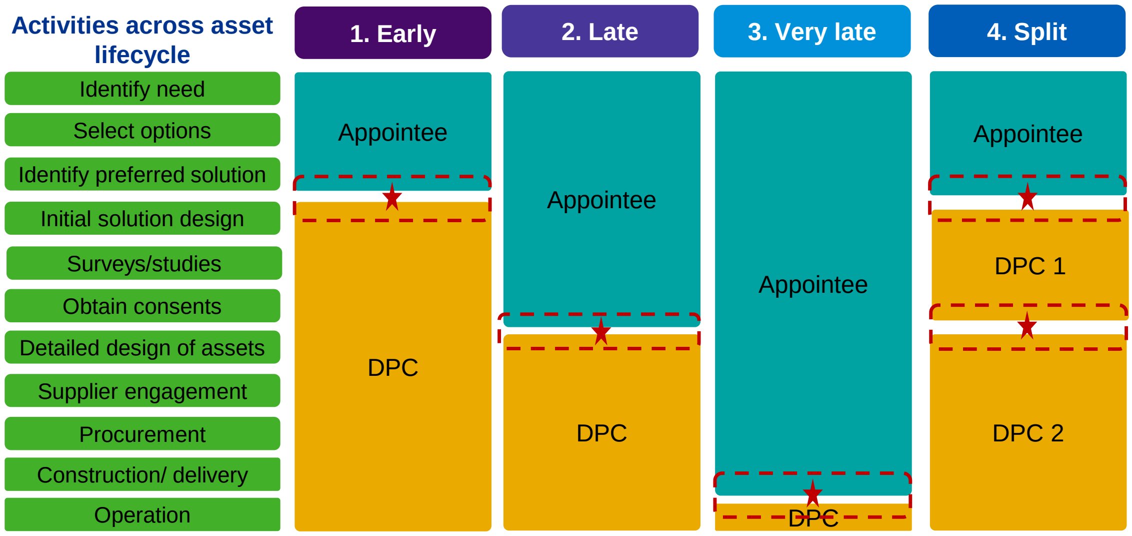
— 'Early'- the solution is tendered at the option appraisal/initial design stage. This is the broadest option with the Competitively Appointed Provider (CAP) undertaking most of the design and all of the build, financing and operation of the asset. This tender option has some similarities with the 'early' Competitively Appointed Transmission Operator (CATO) model.

— 'Late'- the project is tendered after the initial design is complete and the project has been taken through planning. This option would enable the CAP to provide only the detailed design, all of the build financing and operation of the asset. This tender option has some similarities with the 'late' CATO model.

— 'Very late'- the project is tendered after construction is complete. This option would enable the CAP to provide only the financing and operation of the asset. This tender option has some similarities with the Offshore Transmission Operator (OFTO) model.

— 'Split'- the project is tendered in two stages, an initial stage covers design and planning and a later stage covers build, financing and operation of the asset.

Figure 6: Alternative Ofwat tender models



Source: Ofwat, July 2017, Delivering Water 2020: consultation on PR19 methodology Appendix 10: Direct procurement for customers

In considering the allocation of risk it is important to understand how that allocation could change under different tender models.

Company responses to the Ofwat information request suggest that the majority of projects were proposed for the late model type as illustrated in Figure 7

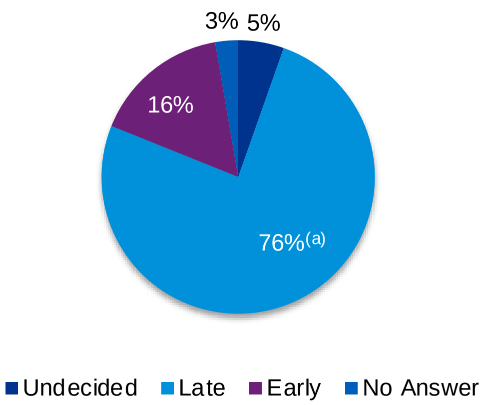


Figure 7 Summary of DPC Model Type Responses

Note: (a) Includes nine responses indicating late model but restricted to design and build stages of life cycle

2.3 The allocation of risk within the project life-cycle

Technical risks are present at each stage of the project life-cycle with varying impacts and materiality to the DPC process and the parties managing those risks. These variances are influenced by a number of factors including the project type, geographic complexity, environmental constraints etc. Table 1 outlines what we consider to the key potential technical risks at each stage of the life-cycle along with a general, relative assessment of the probability and consequence for these risks. We note that the severity and likelihood of these risks will be different for particular projects and tender models. We have sought to describe for each risk whether the allocation of risk may change depending on the type of project or tender model adopted.

Table 1: Technical risks/issues for potential DPC projects in project life-cycle

Technical risks/issues	Description	Risk allocation	Likelihood/impact
1. Solution Development			
Lack of data/data quality issues	Infrastructure requirements may be driven by a deficit due to demand or compliance with quality standards. Data is required to model and understand these needs as accurately as possible to ensure the optimum solution is selected. A lack of appropriate data could drive inefficient, costly, excessive and over engineered solutions or indeed drive uncertainty around the effectiveness of new and innovative solutions.	This risk is likely to be present with the appointed company regardless of DPC or the tender model developed.	A lack of data or data quality issues may be of greater likelihood where projects are proposed that use new or particularly innovative technologies where there is not a strong historic evidence base.
Future uncertainty	Infrastructure projects typically have long asset lives and solutions are driven by projections around future demands based on longer term planning horizons which feature high levels of uncertainty due to challenges in predicting climate change, population growth and future scenarios. Inherent uncertainty within long term planning processes may drive excessive or unsuitable solutions with inappropriate levels of capacity.	This risk is likely to be present with the appointee regardless of DPC or the tender model developed.	Future uncertainty risk may be of higher likelihood and impact for projects which have particularly long asset lives or where the required capacity is linked to a long term need, such as new reservoirs.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Constraints on design	There are a range of constraints in developing and selecting a solution of optimum value. This includes items such as size, location, access, environmental, impact on stakeholders and third parties etc. If constraints are not identified early on, a solution may be progressed which encounters a constraint later in the life cycle generating excessive cost. All possible constraints associated with the range of solutions should be identified as early as possible.	This risk is likely to be present regardless of DPC but early or split tender models may provide more opportunities to address constraints on design and pass some of this risk to the CAP.	Constraints on design are likely to be very project and site specific.
2. Planning			
Land purchase and site risk	The rights and access to land needed for construction is a key element of the planning process as well as nature and condition of the proposed construction site. Failure to acquire title to land targeted for construction. Unforeseen or unsuitable geophysical and hydrological conditions, presence of archaeological factors may impact costs, cause delays in access or use of site.	This risk is likely to be present regardless of DPC but early or split tender models may provide more opportunities to address constraints on design and pass some of this risk to the CAP.	Land purchase and site risk are likely to be very project and site specific.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Environmental and social risks	A range of environmental conditions may impact the use of a proposed site while environmental impact can result from delivery and operation of the asset during the life cycle. This can include environmental factors such as contaminated land, status as a SSSI site, protected species etc. Risks of contaminating land or nearby watercourses and species, noise pollution are also risks of delivery and operation. Special requirements to alleviate these risks may be costly or render proposed site unsuitable for construction.	This risk is likely to be present regardless of DPC but early or split tender models may provide more opportunities to address constraints on design and pass some of this risk to the CAP.	Environmental and social risks are likely to be very project and site specific.
Planning / Consent permission	The risk of not obtaining the necessary planning or consent permission. Also any delay in obtaining permission carries risk for the overall timetable for the project. A delay in receiving planning permission may have broader cost implications for the project as well as the loss of potential savings.	This risk is likely to be present regardless of DPC but early or split tender models may provide more opportunities to address constraints on design and pass some of this risk to the CAP.	Environmental and social risks are likely to be very project and site specific but larger projects may be required to undergo different planning processes, such as through Development Consent Orders.
Third party impact	Third party stakeholders may be impacted by proposed works. Special considerations may be required for accommodation of third parties such as alternate access etc. which may impact costs. There is equally opportunity to align with stakeholders for improved access and cost sharing if works are needed in the same location. E.g. sharing of costs for permitting, access and excavation for network enhancement of water and gas in the same location.	This risk is likely to be present regardless of DPC but early or split tender models may provide more opportunities to address constraints on design and pass some of this risk to the CAP.	Third party impact risks are likely to be very project and site specific.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
3. Design			
Design process	Failure to translate the requirements of the need and desired outcome into the design. Design details take too long resulting in delays to the programme. Additional cost or delay to meet detailed planning or judicial review requirements.	This risk is likely to be present regardless of DPC and alliance-like contracts may help to mitigate this risk.	Design process risks may have a higher likelihood for projects that are related to less commonly developed asset types or where there is limited recent track record e.g. reservoirs and desalination plants.
Design for construction	Design does not take account of construction problems which may lead to additional design and construction costs. E.g. site space to accommodate specialist machinery etc.	This risk is likely to be present regardless of DPC but early tender models may provide the best opportunity to mitigate the risk and create the right incentives on the CAP.	Design for construction risks are likely to be very project and site specific and risks may change with different tender models (e.g. early, late, etc.). Split tender models may increase the likelihood of this risk.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Design for maintenance	Design phase presents a key opportunity to design features which can minimise future operating costs. This includes Building Information Management (BIM), remote monitoring technology, self-diagnostic capabilities, self-healing materials, efficient power supplies, effective data capture and storage etc. Failure to maximise this opportunity to through poor design could result in higher operational costs. E.g. failure to design ease of access creating difficulty in future access requiring costly outages for maintenance.	This risk is likely to be present regardless of DPC but early tender models may provide the best opportunity to mitigate the risk and create the right incentives on the CAP.	Design for maintenance risks are likely to be very project and site specific and risks may change with different tender models (e.g. early, late, etc.). Split tender models may increase the likelihood of this risk.
Resource availability and expertise	Large infrastructure schemes may require significant volumes of resources, some of which are specialist in nature. There is a risk that failure to secure the appropriate resource could generate costly delays or compromise the quality of construction.	Many companies have existing framework and alliancing arrangements which may help to mitigate this risk compared to the DPC model. Different tender models are unlikely to have an impact on this risk.	Resource availability and expertise risks are likely to be very project specific but may be of higher likelihood or impact where projects are larger or the asset types less common ultimately limiting the depth of the supply of resources and expertise.
Change in design required due to external influences	There is a risk that changes in design could be required due to unforeseen circumstances found during construction such as below ground obstructions, undocumented contamination etc.	Early or split tender models may allow this risk to be passed to the CAP.	Changes in design risks are likely to be very project or site specific.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Materials and Plant	Special consideration should be given to innovative materials which can increase asset life, are cost effective and can lower maintenance costs. Equally there is the risk that specialist materials may not be available e.g. media or membrane technology for treatment works. Access to and availability of specialist plant should also be considered to avoid the risk of delays or specialist sourcing.	Unlikely to be significantly impacted by different tender models.	Materials and plan risks may be of greater likelihood for less common asset types.
Innovative solutions	Innovative solutions, e.g. prefabricated solutions that are constructed offsite, delivered and assembled onsite can bring significant efficiencies. However there is the risk that unique constraints of the innovation (e.g. site or product) could make these unsuitable for example connection with existing infrastructure, unknown below ground obstructions or water quality.	Unlikely to be significantly impacted by different tender models.	Prefabricated solution risks are likely to be very project or site specific.
4. Delivery			
Time and cost overrun risk	Time overrun against estimates and cost overrun against estimates, incorrect cost and time estimates.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Time and cost overrun risk is likely to be very project or site specific.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Resource availability of contractors	Magnitude or uniqueness of scheme (and other similar programmes) may lead to a shortage of project management skills/contractors in the market/area.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Larger or more complex/less common assets may require greater or more specialised contractor availability.
Unforeseen ground or existing building conditions	Cost variations discovered during works.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Unforeseen ground condition risks are likely to be project or site specific.
Third party claims	Any costs associated with third party claims due to loss of amenity and ground subsidence on adjacent properties.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Third party claim risks are likely to be project or site specific.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Subcontractor default / bankruptcy	Additional costs incurred as a result of subcontractor default and the necessity to appoint a replacement. It may also cause delay in the project.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Subcontractor default / bankruptcy may be more likely for larger projects or those involving less common asset construction.
Poor project management	Poor project management leading to additional costs, e.g. if contractors are not well co-ordinated, one could be delayed because the work of another is incomplete.	DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	Poor project management risks are likely to be project or site specific.
Commissioning overruns	Commissioning needs to demonstrate that the asset is substantially complete and meets the minimum performance levels. Water distribution projects require detailed commissioning and testing regimes to ensure that the facility meets the output, water quality, efficiency and environmental requirements. These tests are prone to delays and could impact hand offs and costs in DPC process.	The DPC model may increase commissioning risk if the CAP uses a consortium model with multiple parties.	Commissioning overrun risks may be more likely on larger and more complex projects or assets that are less common.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Availability of facilities	There is a risk that some or all of the facility will not be available for the use to which is intended which may involve additional costs for the project.	This risk is likely to exist regardless of DPC. DPC model may allow some of this risk to be passed from customers/appointee to the CAP under either the 'Early', 'Split' or 'Late' tender models.	This risk will be higher where it is more complex to specify the purpose/final use of the asset.
Legislative / regulatory change	A change in specific legislation / regulations, leading to a change in the requirements and variations in costs.	This risk is likely to exist regardless of DPC	This risk is likely to be very project and site specific.
5. Operation			
Service performance risk	The risk that the asset is unable to achieve the output specification metrics (water quality, availability, etc.) These service performance requirements will include the CAP meeting the statutory requirements and obligations of the appointee.	The DPC model may allow some of this risk to be passed to the CAP.	This risk is likely to be very project and site specific.
Resource or input risk	The risk that the supply of inputs or resources required for the operation of the project is interrupted or the cost increases.	The DPC model may allow some of this risk to be passed to the CAP, for example through biddable indexation.	The inflation link under the current model effectively allows much of this risk to be passed to customers.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Demand risk	The demand for the product or service of a project from consumers/users.	The DPC model may allow some of the demand or volume risk to be passed to the CAP under the payment mechanism.	Companies are currently shielded from demand risk through revenue true-ups (subject to new market proposals).
Maintenance risk	The risk of maintaining the asset to the appropriate standards and specifications for the life of the project.	The DPC model may encourage a more risk averse approach to be taken to the maintenance risk, especially where this had links to the payment mechanisms in the contract. This could potentially increase cost compared to the current model but may allow some of that risk to be passed to the CAP.	This risk will depend on the contracting arrangements.

Technical risks/issues	Description	Risk allocation	Likelihood/impact
External and third party impact	The condition and performance of other assets upstream or downstream have the potential to impact on the operation of DPC asset. E.g. burst main downstream cause reservoir to drain and water quality issue generated. Equally DPC candidate asset may be required to operate differently in emergency event of downstream or upstream affected asset e.g. isolation etc. External parameters such as changes in water quality at source or changes in composition of could also impact operation of DPC assets.	DPC may increase this risk overall by creating coordination issues and transaction costs.	Assets with either stronger economies of scale and scope with the rest of the network or where the default risk is greater are likely to have an increased likelihood of this risk.
6. Transfer			
Asset condition and performance at hand-back	Uncertainty about the future performance of the asset and its maintenance need; Re-delivery of poor condition or out-of-specification assets; Receiving inadequate compensation for non-performance; Inability to obtain the benefit of supply/manufacturer warranties. Asset records including information on the asset and quality/completeness of the data.	The DPC model may materially alter this risk, where it creates a different owner operator of an asset for a significant period of time before requiring the transfer of that asset back to the appointee.	

Technical risks/issues	Description	Risk allocation	Likelihood/impact
Tender model specific risks			
Procurement failure	There is a risk that the procurement process for the CAP tender fails resulting in delays to the project delivery and availability of the capacity of the asset as well as additional costs.	This risk is not likely to be present absent the DPC model as the current arrangements do not involve the competitive tendering of infrastructure assets in the same way. However existing arrangements may also result in failed procurements and disputes are common.	The likelihood of procurement failure may be very project and site specific.

From the description and analysis of risks the following observations can be made:

— Some of the risks are likely to increase with either larger projects or less common asset types, these risks may include:
  - Design process risks;
  - Planning consents;
  - Resource and supply chain availability related risks; and
  - Commissioning overrun risks.

  From the list of projects received these less common asset types might include reservoirs and desalination plants.

— Many of the technical risks are unaffected by the choice of the DPC model. However, there are also some residual technical risks that either do not exist under the status quo arrangement or are likely to be materially different under a DPC model, these include the risk of a procurement failure or the risks associated with commissioning and asset transfer or handback.

— The DPC tender models will allow for more risk transfer to the CAP from both the appointee and customers which we would then expect to be priced. Earlier tender models generally allow more opportunity for some aspects of technical risks to be transferred.

— Split tender models may create a disconnect between design and build and operation potentially weakening the link to whole-life costing solutions.

2.4 Allocation of risk to participants

Figure 8 below illustrates how the key risks in the project life-cycle may currently be allocated between appointees, contractors and consumers. Many of the risks are currently shared between consumers and the appointee/its investors via various cost sharing and other arrangements.

The core principle of allocating risk between the appointee, the CAP and the end customer should be to allocate risk to the party best placed to manage the risk.

The allocations of risk under the DPC model may vary depending on the type of project and DPC model as well as when in the project lifecycle the procurement process occurs. A number of key considerations and observations for allocation of risks to parties to address when designing/running the tendering process were made during the workshop discussions:

- **Maturity of party to manage risk** – in some cases, the maturity of either party to manage the risk may develop over time as DPC arrangements feature increasingly in company plans and the markets, or companies develop and improve capabilities to manage technical risks throughout different stages of the project life-cycle.
- **Capability to operate projects/assets** – it has been assumed in the illustrations that there is capability in the market to operate these types of projects and assets. It may be the case that this capability does not currently exist in the market. If so the appointee is best placed to manage the operational risks associated with these schemes, particularly those with increased interoperability.
- **Complex schemes** – for larger more complex schemes requiring significant planning and consent ahead of delivery, the license powers afforded to an appointee may make them best placed to manage the risks at these stages. They may also have substantial local relationships established over many years of developing large water and wastewater infrastructure assets. However there are examples of other organisations being formed to undertake complex projects with associated stakeholder management challenges (e.g. Thames Tideway).
- **Risks from previous stages in the project life-cycle** – risks from different stages in the project life-cycle may materialise within later stages. These will need to be mapped and accounted for within the contracting arrangements. For example, an incorrect design may later have an operational impact. If the appointee carries out the design, it may be preferable for it to bear the risk of the design not meeting the need.
- **Financeability** – should the risk occur, would it likely cause the bankruptcy of the CAP? While most risks can be covered by insurance, there may be certain instances of uninsurable risk (for example, the bursting of a reservoir near a population centre). In such instances, it may be appropriate to either allocate the risk to the appointee (which is likely to have greater capacity to manage the risk) or exploring regulatory mechanisms (such as re-openers) that could be used (see section 4).

- **Interoperability across contractual boundaries** - governance could be established to manage interoperability and key interfaces could be established so each party understands how and when to engage based on specific circumstances (e.g. preventative maintenance outages).
- **Counterparty risk** - in the case the DPC fails to deliver against the contractual commitments, the appointee will have to manage potential risks associated with contract termination, project rescue and any associated impacts on delays to meeting its regulatory commitments and objectives associated with delays in asset delivery.
- **Asset condition at handback** - at handback, the asset condition and performance and its ability to meet the future needs of the business will rest with the appointee. This risk does not exist under the current framework in a similar way.

Figure 8: Current allocation of technical risks under status quo models

Key Risks in Project Life Cycle	Stakeholder			Comments
	Appointee	Contractor	Consumer	
1. Solution Development				
Data	✓		✓	— Solution development and planning elements generally undertaken by incumbents under current model in line with WRMP and other statutory requirements. — Risks shared between appointee and customers under cost sharing and re-opener arrangements in regulatory framework. — Some contracting models allow for some sharing of risk associated with latter elements of solution development with contractors/supply chain.
Uncertainty	✓		✓	
Constraints	✓	✓	✓	
2. Planning				
Land purchase and site risk	✓		✓	
Environmental and social risk			✓	
Planning / Consent permission	✓		✓	
Third Party Consideration	✓	✓	✓	
3. Design				
Design process	✓	✓	✓	— Assumes outline design undertaken by appointed company — Some design risks may be passed to contractors under current tendering arrangements or shared (e.g. plant, resource availability) — Where design fails to reflect most efficient whole-life costs approach or is subject to change cost sharing would share risk with customers.
Design for construction	✓		✓	
Design for maintenance	✓		✓	
Resource availability and expertise	✓	✓		
Change in design required due to external influences	✓	✓	✓	
Materials and plant		✓		
4. Delivery				
Time and cost overrun risk	✓	✓	✓	— Various alliancing and other contracting models typically seek to share risks between appointee and contractors. — Some construction risks can be passed to contractors entirely.
Resource availability of contractors		✓	✓	
Unforeseen ground or existing building conditions	✓	✓	✓	

Third party claims	✓		✓	— Where major schemes are late or there are significant cost overruns ODIs are typically used to ensure customers do not pay and companies may be subject to penalties which are likely to be reflected in contracting arrangements. — Cost sharing arrangements still pass some risk back to customers. — Companies have re-openers for certain material risks outside of management control (e.g. legislative change).
Subcontractor default / bankruptcy	✓	✓		
Poor project management		✓		
Commissioning overruns	✓	✓		
Availability of facilities	✓	✓	✓	
Legislative / regulatory change	✓		✓	
5. Operation				
Service performance risk	✓		✓	— Operational risks generally shared between companies and customers. — Where contractors used for operational services it may be possible to share some of these risks in contracts. — Customers bear all demand or volume risk under current arrangements. — Appointed companies are subject to a range of statutory service obligations from which they can receive significant penalties but other aspects of service share risks with customers.
Resource or input risk	✓		✓	
Demand risk			✓	
Maintenance risk	✓		✓	
External and third party impact	✓			
6. Transfer				
Asset condition and performance at handback				— Not similarly present in current model.
7. Tender model specific risks				
Procurement failure				— Not similarly present in current model.

Figure 9: Potential risk allocation under the DPC model

Key Risks in Project Life Cycle	Stakeholder			Comments
	Appointee	CAP	Consumer	
1. Solution Development				
Data	✓		✓	— Allocation of early design and solution development risks likely to be similar under DPC to existing models. Especially for later tender models. — Early tender model may allow some greater sharing of risk with CAP.
Uncertainty	✓		✓	
Constraints	✓	✓	✓	
2. Planning				
Land purchase and site risk	✓		✓	
Environmental and social risk			✓	
Planning / Consent permission	✓		✓	
Third Party Consideration	✓	✓	✓	
3. Design				
Design process		✓	✓	— Allocation of design risks likely to be similar under DPC to existing models. Especially for later tender models. — Early tender model may allow some greater sharing of risk with CAP.
Design for construction	✓		✓	
Design for maintenance	✓		✓	
Resource availability and expertise	✓	✓		
Change in design required due to external influences	✓	✓	✓	
Materials and plant		✓		
4. Delivery				
Time and cost overrun risk		✓	✓	— Allocation of construction or delivery risks to the CAP from the appointed company is anticipated under the DPC model but assumed to generally be a direct transfer.
Resource availability of contractors		✓	✓	
Unforeseen ground or existing building conditions		✓	✓	

Third party claims		✓	✓	— Some opportunity for risk transfer from customers may be possible in the competitive tender process albeit that this is likely to be priced in the bid. — We assume that some re-openers to CAP revenue continue for material changes that are outside of management control (see section 4).
Subcontractor default / bankruptcy		✓		
Poor project management		✓		
Commissioning overruns		✓		
Availability of facilities	✓	✓	✓	
Legislative / regulatory change	✓		✓	
5. Operation				
Service performance risk	✓	✓	✓	— Allocation of operational risks to the CAP from the appointed company is anticipated under the DPC model but some service related risks may be difficult to transfer where they relate to statutory obligations. — Some opportunity for risk transfer from customers may be possible in the competitive tender process albeit that this is likely to be priced in the bid. — We assume that some re-openers to CAP revenue continue for material changes that are outside of management control (see section 4).
Resource or input risk		✓	✓	
Demand risk		✓	✓	
Maintenance risk		✓	✓	
External and third party impact		✓		
6. Transfer				
Asset condition and performance at handback	✓	✓		— Introduction of DPC model creates new asset transfer and hand-back risk which we assume is shared across appointed company and CAP. DPC contract would need to include requirements for asset transfer and hand-back.
7. Tender model specific risks				
Procurement failure	✓		✓	— Assume procurement risk is faced by both companies and customers where this results in delays or cost increases.

Comparing the risk allocations under the current arrangements versus the DPC model suggests that:

- Many of the risk allocations do not change under the DPC model versus the status quo arrangements. This is particularly true under the early design elements.
- Many of the construction/implementation and operation/maintenance risks that previously sat on the appointee are simply transferred to the CAP.
- There may be some opportunities to transfer risk from customer to the CAP through the competitive bidding process e.g. some demand or volume risk, some input cost risk from biddable indexation, etc.
- However, there are some residual risks that either cannot easily be transferred to the CAP (e.g. service performance risks relating to statutory obligations) or where there are new risks that previously did not exist in the arrangements (e.g. failed procurements and asset transfer and hand-back risks).

3 Identifying appropriate DPC projects

3.1 How is the DPC model different to the current arrangements for the delivery of large infrastructure projects by appointed water companies?

Whilst there are a range of different models in place across companies in the sector currently, it is very common within those arrangements for water companies to tender out the construction (and parts of the design phase) of projects as well as some aspects of operations.

Therefore, whilst the scale of eligible DPC projects could make them large, more complex and therefore atypical compared to the rest of companies capital programmes many of the technical risks involved in the successful delivery of DPC projects are likely to be presented and similarly allocated in the current status-quo arrangements. The key technical and engineering risks will remain unchanged and are generally expected to be allocated between customers, the appointee and the contractors they use to complete the detailed design, build and potentially operation of the assets. However, we do consider that there are likely to be some technical residual risks under the DPC model, i.e. risks that are either not present under the current arrangements or risks that cannot easily be transferred to the DPC entity or priced and managed under a contract. These include:

— Risks relating to an unsuccessful procurement or DPC tender process- the current models of capital delivery in the sector generally do not involve the competitive tendering of the ownership and financing of the assets. Whilst some PFI schemes do exist in Scotland and Northern Ireland predominantly for treatment assets, these models are not common in England and Wales raising a risk that DPC results in an unsuccessful procurement.

— Some aspects of service performance risk, particularly where this relates to statutory or licence obligations. Appointed companies have obligations in their licences around for example water quality and other factors. These obligations will remain with the appointee regardless and indeed appointees already have significant supply chains. However, the effective management of these risks via a contract with the CAP and in particular the effective and efficient pricing of them by the market may be difficult.

— Asset transfer and hand-back conditions- under the existing arrangements appointed companies generally use supply chains for aspects of the design, build and in some instances operation of these assets. It is not common for third parties to own and operate assets for an extended period of time before having to transfer that ownership back to the appointee. This may change the nature of this risk compared to the current arrangements.

It is important to note that we do also consider that the DPC model raises certain new or different commercial issues or risks, for example new counterparty risks compared to the current arrangements but this is beyond the scope of this report.

The DPC framework does however introduce separate ownership, financing and operation of new assets. This raises a series of questions around how the incumbent and the service provider should best interact to deliver a high quality low cost holistic service.

Whilst there are likely to be significant transaction costs created from the need to run a full and fair competitive tender process for DPC projects, since the existing arrangements within companies are unlikely to be fit for purpose, to some extent these costs would have been incurred anyway. The need for a new process is driven to a large extent by the size of the project rather than by the fact that the process is a DPC one (although this may vary across schemes and companies). However, the DPC arrangements are likely to drive a need for new contracts to be developed, including covering some risks such as service performance risk that may need to be treated differently to how they are under the current contracting arrangements, as well as an ongoing contract management element which may be more expensive than under the status quo given the breadth of issues covered by the contract and the nature of them.

However, overall DPC could be seen as an evolution from companies' already well developed contracting or alliancing arrangements throughout their current supply chains. It is also the case that Scottish Water and Northern Ireland Water already have PFI-style contracts in place with third parties.

3.2 What projects are appropriate for the DPC model from a technical perspective?

One of Ofwat's key criteria for a DPC project, is that the project needs to be relatively 'discrete'. Indeed this is the only filtering criteria that appears to obviously relate to technical issues, but our analysis would suggest that it is one of a number of criteria that should be considered.

It is preferable for a project to be somewhat discrete so that there can be clarity on which assets/activities each party is responsible for. Furthermore, an asset that is deeply integrated into an incumbent's operations, may require extensive contracting arrangements. There may be economies of scale or scope between the operation of the asset and the rest of the network, which could impact on the overall efficiency and effectiveness of the DPC arrangement and the benefits for customers versus the alternative of the asset being owned and operated by the appointee.

Based on our knowledge of the sector, we developed a hypothesis that it would be possible to put contracting arrangements in place for any project so that it could be treated as a DPC project. Indeed we note that this conclusion was similar to that reached from a similar exercise undertaken in the design of the Competitively Appointed Transmission Owner (CATO) model by Ofgem.[6]

[6] Jacobs (2015) 'Technical Input for Extending Competition in Transmission'

We then tested our hypothesis with the sector at the external workshop. There was some agreement with the hypothesis, although it was noted that it may be necessary to include or remove existing adjacent assets into the DPC project to make it discrete enough to manage during operation (i.e. for it to be 'asset dependent').

We remain of the view that any project could be treated as a DPC project. However, establishing and monitoring contracts, as well as managing interactions under a contracting framework bears a cost. Therefore, a project should only be considered appropriate for DPC where the benefits of using a DPC approach[7] are likely to exceed the contracting costs.

Ofwat's threshold of £100 million whole-life totex, seeks to filter out the smaller projects where complex contracting arrangements would likely exceed the benefits from DPC. In an earlier report we suggested that a £100m capex filter would be more appropriate. Whether the benefits of DPC would exceed the contracting costs for larger projects would depend on the nature of the project in question.

Benefits are likely to be greater the earlier the project is in the project life-cycle (see section 2) although the early model is also likely to lead to the most risk being priced. This gives the greatest opportunity for cost savings and innovation to be introduced from the use of a competitively appointed provider (CAP). Conversely, using a DPC route may impact economies of scope/scale of tendering a portfolio projects at once (depending on the tendering process adopted).

Costs will be driven by the nature of the project, and how it will interact with the appointee's existing operations. We discuss below the key areas that may drive costs due to the introduction of a CAP.

3.3 Technical criteria for a project to be appropriate for DPC

Based on our knowledge of the sector, and workshop discussions, we have compiled below a set of criteria which may also make a project appropriate for a DPC approach. These could be used in conjunction with or as part of that broader cost benefit approach to drive decisions around the allocation of projects to DPC or otherwise. For example for smaller schemes that align more closely to the £100m totex minimum threshold these criteria could be used to decide if the scheme would be suitable for a DPC approach:

— **Manageable interactions with stakeholders and statutory obligations** – generally the greater the level of interaction with different stakeholder groups, the more costly the project. For example, the appointee will be interacting with the Environment Agency regardless, having a large number of duplicate engagements is likely to drive cost. There may be reasons to assume that the incumbent has advantages over an entrant CAP in undertaking this stakeholder management activity, including the long period of local in-area experience working with these stakeholders as well as particular legal powers. However, there are other examples

[7] For example, more efficient financing, delivery, and operation, innovation, and information revelation.

of new entrant entities being created and managing these issues successfully (e.g. Thames Tideway). Furthermore, where the project can drive significant compliance issues, it may be more suited for a licencing arrangement rather than simply contracting arrangements. It is important not to overstate this risk, companies already have well developed supply chains that they rely on in various circumstances to support them in meeting their statutory obligations but the pricing of these risks by the CAP may be challenging. To some extent these risks can be reduced, perhaps significantly in some instances, by adopting a later tender model. When assessing the appropriateness of a candidate project, **appointed companies should consider the nature of these interactions and, where possible, seek early support from stakeholders for using the DPC model. Where an asset had a material impact on the incumbent's statutory obligations then it may be less appropriate for DPC. Similarly where stakeholder interactions are particularly complex a later tender model may be more appropriate.**

— **Limited interaction points with existing network** – a project that is located in a relatively stand-alone location is likely to be more separable than one that is highly-integrated into the network. Similarly, one that connects to the network at a single defined point (or a low number of points) is likely to have more straightforward interactions with the incumbent than a project with many different points of connection. One potential exception could be an asset that is shared by multiple companies, for example a water supply investment built to provide resource to a group of companies within a region. In this case, having the project provided by a CAP may improve the coordination between parties. As well as the number of interaction points, the nature of the interaction points is also a cost driver. For example, at the workshop it was suggested that a project that had significant influence over system operation would be more complex than a 'passive' asset such as a length of pipe. When assessing the appropriateness of a candidate project, **appointed companies should consider interactions with the broader network carefully and seek to identify and wherever possible quantify, for example through cost relationships, the extent to which there are economies of scale and scope with the rest of the network which may be damaged by a DPC route to the detriment of customers. Again this can inform when an asset might not be appropriate for DPC.**

— **Well understood contributions to supply/capacity and easily specified outputs** – while supply/demand will inevitably vary over time, in general, it is easier to establish operational contracts for assets whose usage patterns are well understood. It may be more complicated to draft contracting arrangements for an asset that is rarely used but may be required to be used at short notice. Such assets may require capacity payments, and regular testing to make sure that the capacity could be made available within an appropriate notice period. The volatile nature of operating costs in such circumstances may have implications for the financing arrangements of the CAP, or the payment arrangements between the appointee and the CAP. Similarly, where outputs are difficult to specify, for example if the appointee was trying to procure a reduction in a supply/demand deficit in a certain period, it might be very difficult to specify that output required given the factors outside of the CAPs control and the challenges associated with assessing different projects, e.g. demand side schemes versus water transfer storage. When assessing the appropriateness of a candidate project, **appointed companies should consider carefully what capacity is required from the asset and the payments arrangements with the CAP will be structured. Similarly, they should consider the extent to which outputs can be easily specified. In some circumstances this may imply that the DPC model would not be cost effective for customers.**

— **Well understood asset and operational failures** – there is always a risk of failure. The better failures are understood (i.e. the predictability of the impact from failure) the easier these could be accounted for within the contacting arrangements and priced efficiently. This is true for all stages of the asset life, including the eventual transfer of the asset from the CAP to the incumbent, where (assuming the asset lives exceed the contract period) an appropriate assessment will need to take place of the asset's condition. The maturity of the supply chain will be an influencing factor on the ability of third parties to construct and operate the asset in question as well as the track record of similar assets and the availability of robust historic information on failure rates. Other operational risks like price escalation or one-off costs could impact the financeability of the CAP. When assessing the appropriateness of a candidate project, **appointed companies should consider the risks associated with the project, provide an outline contract that shows how risks could be allocated under the CAP and set out the various proposed contracting mechanisms available for managing/allocating the risks (see section 4) such as incentives and re-openers.**

Based on our work we have developed a simple framework of technical criteria to consider in assessing whether a project is likely to be appropriate for the DPC model, i.e. whether the DPC model is likely to deliver benefits for customers. These could be used as part of that broader cost benefit approach to drive decisions around the allocation of projects to DPC or otherwise. For example for smaller schemes that align more closely to the £100m totex minimum threshold these criteria could be used to decide if the scheme would be suitable for a DPC approach. This is set out below.

Figure 100: 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. 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.

3.4 Examples of potential projects

We set out below a number of illustrative examples[8] with the technical criteria applied. In practice, the assessment under these principles will be determined by the specific projects in question, rather than generic examples and this is a very important limitation of this exercise.

Project examples and technical criteria

	Stakeholders and obligations	Interaction points	Capacity and outputs	Failure	DPC Suitability
Reservoir	A reservoir will require extensive engagement with a range of stakeholders during the initial stages of the project life cycle, each with their unique agenda and concern. E.g. DWI, EA, Consumer Groups, Environmental Pressure and Lobby Groups etc. Types of challenges include desire for companies to demonstrate alternate means of meeting supply demand balances via leakage reduction. Some of the concerns of these stakeholder groups will best be managed by the	In their simplest form reservoirs typically only have one point from which water is drawn but they can be used as storage and water is often pumped into them during dry periods from elsewhere on the network. Have limited interaction points but there are relationships between these and other network assets i.e. reservoirs impact other assets and downstream also impact them.	The volume of water in the reservoir can be easily assessed/communicated. Usage of these assets are subject to variation depending on a range of factors such as demand and weather. However modelling for various scenarios is mature with long range forecasts complemented with frequently revised forecasting for the short term. The use of such modelling can be utilised for effective management of usage.	Quality failures are generally well understood, but can be complex to manage and in some cases may require mitigation that extend beyond the reservoir itself, adding complexity. A quality incident at the reservoir will have implications for other downstream assets which need to be managed. Catastrophic failure (e.g. the reservoir embankment bursting) is more complex, however, risk models do exist.	

[8] These are broadly based on the type of schemes that companies described in their responses to Ofwat's data request.

Project examples and technical criteria					
	Stakeholders and obligations	**Interaction points**	**Capacity and outputs**	**Failure**	**DPC Suitability**
	license holder, for example land rights. Reservoirs have statutory requirements that must be strictly managed throughout its operational life. Failure to comply with any statutory requirements will be the responsibility of the license holder.				
Water treatment works	Extensive engagement with some stakeholders throughout, for example, the DWI. Additional complexities in stakeholder management may present depending on the site selection.	Water treatment works generally have one input point and one output point.	Water treatment works are operated consistently with variations in inputs and outputs that are dependent on a range of factors including input availability and output which vary with demand and weather requirements. A number of Environmental and Quality factors also exist which impact the ability to predict usage and operation of the asset such as algal blooms.	General water treatment work failures are well understood.	

Project examples and technical criteria					
	Stakeholders and obligations	**Interaction points**	**Capacity and outputs**	**Failure**	**DPC Suitability**
Desalination plant	Extensive engagement with some stakeholders throughout, for example, the DWI. Additional complexities in stakeholder management may present depending on the site selection.	Desalination plants generally have one input point and one output point.	Desalination plants are likely to only be used in dry years or when there is reduced capacity elsewhere. Highly variable, requires significant maintenance costs continuously to ensure fit for operation when needed.	Known risks and failures can be planned for incorporating international experience of these assets. However, there is limited precedent of desalination plants in the UK, which might make understanding the risks more challenging.	
Wastewater treatment works	Extensive engagement with some stakeholders throughout, for example, the EA. Additional complexities in stakeholder management may present depending on the site selection.	Wastewater treatment works generally have one input point.	Wastewater treatment works are generally in constant use and experience some variability in volumes depending on types of systems and process, demand and weather.	General wastewater treatment work failures are well understood.	
Water transfer scheme	Extensive engagement with some stakeholders throughout, for example, the EA and DWI. Complex stakeholder management depending on the scheme ranging from minimal to significant for those	This will be driven heavily by the specific scheme.	This will be driven heavily by the specific scheme. May be intended for use only in specific scenarios which do not regularly present. Some assets within the scheme may require consistent	This will be driven heavily by the specific scheme. Management of failures will become more challenging if the scheme is comprised of multiple assets, involves natural water courses, has a wide geographical span and	

Project examples and technical criteria					
	Stakeholders and obligations	**Interaction points**	**Capacity and outputs**	**Failure**	**DPC Suitability**
	schemes involving transfers across multiple borders, coordination with multiple WoCs/WaScs, use of any natural water courses, large diameter pipe work will require HSE and EA engagement,		maintenance even through though not in use.	involves coordination of multiple stakeholders to execute repairs	
Network Enhancement	Possible engagement with EA depending on size and location of scheme but likely to be more limited.	Network enhancements will be a highly integrated component of a network but are often relatively 'dumb' assets.	As an integrated part of the network, it is likely a network enhancement will be used on a constant basis.	Pipeline failures are well understood. Contingency measures can be developed and planned for with monitoring in place to proactively manage the risk of failure.	

Project examples and technical criteria

	Stakeholders and obligations	Interaction points	Capacity and outputs	Failure	DPC Suitability
Reuse schemes	Extensive engagement with many stakeholders, for example, the EA and DWI in addition to other customer and stakeholder interest groups. Reuse schemes can present complex stakeholder management. Consumer and other interest groups can have emotive reactions to these schemes that requires significant and careful engagement for the success of the scheme.	Reuse scheme will consist of a number of processes that eventually input into the distribution system.	This will depend on the design of the scheme.	Failures are understood but can present significant risk. Effective proactive quality monitoring should be integrated to manage failures.	

4 Implications for contracting

In simple terms the contracting mechanism for the DPC model is expected to operate via two key elements:

- **A license condition sitting with the appointee**- this condition would provide the mechanism to allow revenues to be passed from customer bills to the DPC via the appointee any changes to the revenue stream from customer bills may need to be reflected in the licence (for example to re-open revenues); and
- **A contract between the appointee and the DPC**- this contract would cover all other aspects of the contracting arrangements between in appointee and the DPC. Effectively this model would have some similarities with a PPP-like arrangement.

The implications for the contracting mechanisms arising from the technical risks are principally related to the contract rather than the licence condition.

4.1 Contracting mechanisms

Appointees will develop and agree a contract with the CAPs. Ofwat also considers that appointed companies taking forward DPC projects would require licence changes to provide certainty to appointee, DPC providers and customers.[9]

The previous sections have set out a series of risks that need to be considered within the contracting framework. There are different contracting tools at companies' disposal to allocate, mitigate and manage these risks, including:

- **Incentive framework** – in order to align the CAP's incentives with the appointee's, an incentive framework should be included within the contract. Having a clear understanding of how the project is likely to affect the appointee's obligations will help ensure that incentives are aligned across the different parties.

A range of incentives could be introduced into the contract between the appointee and the CAP. Some which are common in other comparable regimes include incentives for i) timely delivery of the asset (CATOs), ii) asset availability/capacity (OFTOs, CATOs and HS1), iii) operational service performance for example mirroring/sharing Outcome Delivery Incentive or Performance Commitment rewards and penalties through the contract where the asset's performance contributes to them (CATOs, HS1 and some PPP/PFI contracts) and it may also be sensible to include incentives around asset condition and hand-back. Other aspects of the commercial arrangements in the contract could be made part of the tender bid, for example biddable inflation (OFTOs, CATOs) and degrees of volume risk. These incentive arrangements in the contract could help to allocate risks to the CAP and drive the right behaviours in the delivery of the DPC to maximise the value for customers.

[9] Ofwat (2017) 'Delivering Water 2020: consultation on PR19 methodology - Appendix 10: Direct procurement for customers'

— **Step-in rights** – this is where the contract specifies a set of circumstances where the appointee would have the right to assume control of the project/asset. These can be used where there is consistent failure to meet standards, or potentially where the CAP were to become insolvent.

Given the scale of the threshold for DPC projects, it is likely that the CAP will be delivering a critical asset for the existing appointee. It therefore appears sensible that the contract (and potentially the licence conditions on the appointee) allow for certain step-in rights in certain circumstances. These might include a) where the CAP was failing to meet the timetable for the implementation or delivery of the asset, b) where the CAP was failing to meet the required statutory performance standards of the appointee (for example around water quality) or where the CAP was failing to provide the capacity of the asset that the appointee needed to fulfil its legal obligations or c) in the event of a default by the CAP. Generally those attending the workshops accepted that the criticality of these assets for appointed companies in the successful delivery of their legal obligations meant that such step-in rights were needed. Indeed, a large number of attendees considered that a more appropriate mechanism for the DPC model would be to licence these entities entirely.

— **Re-openers** – having a mechanism in place whereby the contract is re-opened under a certain set of circumstances would result in the transfer of certain risks between the parties. Re-openers can be used to address changes in costs, performance, or levels of risk.

The current approach used within the water sector is that re-openers are considered for costs that are material and outside of management control. Similarly, in the energy sector, Offshore Transmission Owners (OFTOs) are allowed to pass through certain costs that are outside of their control (for example, changes in the licence fee), and have an exceptional events mechanism where an allowance is made for exceptional events beyond the OFTO's reasonable control. In Public-Private Partnerships (PPPs) it is common to have re-openers such as a) certain items of cost pass through in the contract, where these are agreed up-front or period market testing of some costs, b) arrangements to account for qualifying changes in the law or c) force majeure events.

The stakeholders we spoke to did not suggest that there was an essential requirement for re-openers for DPC projects (beyond the treatment of regulatory/legal risk). However, the fewer the re-openers present, the more the CAP would price risk into its bid. The use of some selective re-openers could help reduce the level of risk priced into the project cost, which may be particularly appropriate where the appointee would have been better placed to manage the risks through its larger asset portfolio or where there is a concern around the ability of the market to price the risk effectively and efficiently. One approach would be to include a single broad reopener for events outside of management control that led to a material change in costs, this would be similar to the re-openers available to appointed companies and somewhat consistent with the arrangements observed in PPPs. There may also be a need for a re-openers to be established to cover certain changes in law.

The risks and interaction points will need to be well understood, and then the contracting tools should be tailored to best ensure that incentives are aligned, and that risks are suitably allocated between the parties.

There is also a question, outside of the contract, around the extent to which the conditions introduced into the appointee licence to take account of the CAP arrangements (and for example provide visibility of CAP revenues from customer bills) should be amended to help manage or mitigate technical risks. Generally we consider that the contract would be the most appropriate and effective way of managing the technical risks (there may well be other risks to be addressed through the licence where they relate to the revenue from customers such as to return refinancing gains to customers as per the CATO/OFTO models) but the licence conditions should allow for the re-opening of the DPC revenues from customers in the event of a default by the DPC.

5 Monitoring the progress of DPC projects

The DPC guidance provided by Ofwat does not set out the requirements for monitoring DPC projects. Monitoring arrangements will be important both to check the progress of major schemes that have a material impact on customer bills but also because of the evolutionary nature of decisions around major new infrastructure projects, where over time the needs, scope and design of schemes are likely to be subject to change.

The guidance does include a number of tender models ranging from early to very late and split. These models will include key hand off points between participants in the DPC process. A complete review of data and information concerning the technical development of the project is necessary for all parties at these hand offs in any event to understand the technical risks present and potential mitigations of these risks. Figure 10 illustrates these review stages aligned to the handoffs in the various tender models, while Table 2 outlines some of the key types of technical documentation that should be reviewed or assured at these critical stages.

We understand that a key concern raised by respondents to the consultation was around the need for there to be regulatory certainty going into a DPC procurement process. We recognise that Ofwat may want to reserve final agreement to proceed with a DPC as far as possible into the process of developing the project given the uncertainties in the data in early stages of the project development and the potential for revisions to the scope and approach to the project. However, the later this agreement is provided the greater the risk there is that the effectiveness of the procurement process is hindered by the threat of regulatory intervention. The technical 'gates' developed for figure 10, based on frameworks in other sectors, could form a suitable basis for 'final' Ofwat review and decision in the case of different handover points if Ofwat did not feel comfortable agreeing to the DPC projects as part of companies' final determinations- which would provide the earliest regulatory certainty.

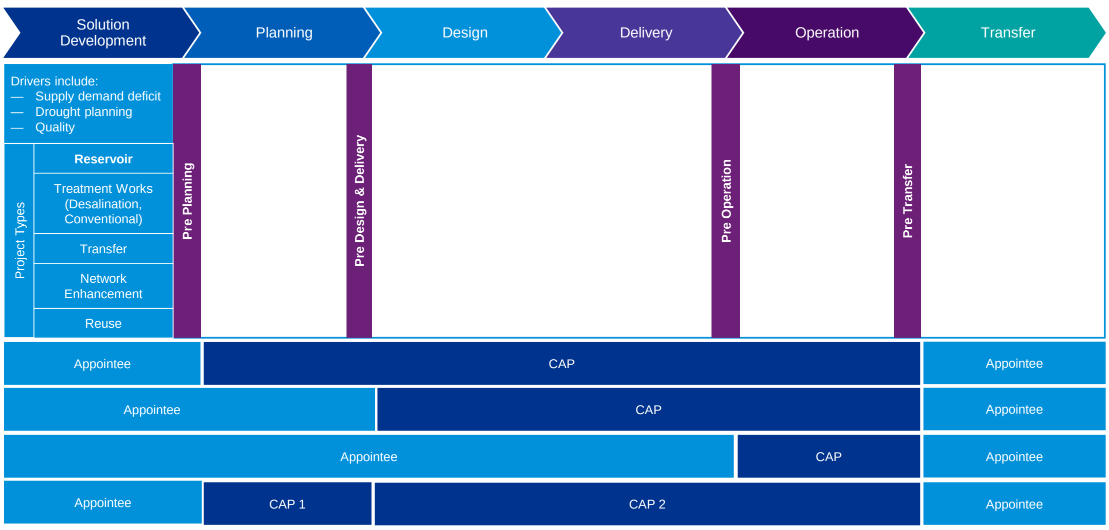


Figure 11: Key interaction points to review technical risks

Table 2: Technical documentation for critical stages in project life-cycle

Technical Documentation	Rationale
Pre-planning	
— Documentation supporting the need e.g. historic flooding data, future demand forecasts etc. — Documentation of methodologies used for forecasting, impact assessment, cost benefit appraisal etc. — Assurance reports of all data, techniques, and models used to ensure industry standards or best practice approaches have been used to ensure a best possible assessment of need and solution development. — Data on source and quality of the outline costs of the scheme, benchmarked where possible.	The technical information at this stage will provide confidence to parties that a robust best practice process has been used to identify the preferred option. It further assures that a number of options were assessed using a suitable methodology and that no alternate more efficient options are better suited to meet the need and deliver value for customers.
Pre-Design & Delivery	
— Planning applications, correspondence related to planning and approvals to provide understanding of any conditions or stipulations to delivery that may impact future stages of the project materially, e.g. environmental considerations that stipulate how or result in a change of site location. — Surveys undertaken that ensure any findings are accounted for and do not present any added risk. — Specification documents on the output of the asset to review that the need is still met, i.e. the required output for asset has not changed since the needs assessment stage, to ensure construction of the appropriate asset. — Specification documents for the future performance of the asset, monitoring requirements and data collection BIM model. — Detailed design plans and drawings, information on selection of materials, techniques, labour use of specialist plant or equipment along with any supporting research or evidence of efficacy of new techniques in similar projects to review and confirm the design considers innovative	This is a critical stage for review of technical information by the DPC parties as it provides the opportunity to understand current and future risks of project delivery, and how best to mitigate these efficiently for delivery and operation stages of the project. All technical reports and documentation produced should have an appropriate level of assurance to provide confidence to the parties involved.

Technical Documentation	Rationale
techniques, materials and processes for construction and future operation to deliver best value. — Relevant certificates for all contractual parties and equipment along with a plan used to demonstrate and monitor compliance with all applicable standards, including the assurance of fully accredited personnel. — Adequate contingency plan to ensure the management of risks during construction. — Programme management documentation and controls. — Site plans.	
Pre-operation	
— Commissioning test reports to ensure all required tests have passed without any issues. — Project appraisal reports. — Handover documentation, O&M manuals, training guides, as built drawings etc. — Contingency plans, if applicable. — Change control documentation indicating any deviation from standards or original specification for asset performance and acceptance to any deviations. — Specification documentation on data and reporting requirements during the operational phase, e.g. condition monitoring, failure reporting, cost data etc.	Ahead of operation all parties should review relevant technical documentation from the delivery and planning phases to ensure the constructed asset will meet the need as specified and that any changes or risks resulting from delivery and their implication for future operation of the asset is well understood.
Pre-transfer	
— Data on performance, condition failure, root cause analysis. — Maintenance reports and inspections survey outputs. — Changes in specified operation modes, e.g. manual overrides. — Operational costs.	At the transfer stage of the asset, at the end of the specified contract period, data and information from the operational phase should be reviewed to understand the condition and ability of the asset to deliver its required performance in the future. Data on condition and failures during operation will be critical to understand the deterioration of the asset and future expected costs for refurbishment and maintenance.

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