



# Possible ways of implementing ex-ante efficiency incentives for Heathrow's capital expenditure

March 2019

CAA

**FINAL REPORT**



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## GLOSSARY

| Term                             | Interpretation as applied throughout this report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Efficiency                       | <p>When we discuss efficiency in this context, this is primarily related to cost efficiency but we acknowledge that there are other considerations such as quality.<sup>1</sup></p> <p>There are different phases through the project cycle where cost savings can be achieved. For example, design options that deliver the same output for a lower cost, cost savings in negotiations with suppliers or reducing costs in the delivery phase. Our models set the regulatory baseline at different points in time, which will impact on where the efficiencies may be achieved.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Efficiency incentive             | <p>Our report involves developing an ex-ante incentive framework to apply within the regulatory regime for Heathrow in future. The core aspect of this is the capex efficiency incentive (where efficiency is in relation to cost efficiency). In designing our options, we have considered wider issues around output-based regulation, delivery incentives and uncertainty mechanisms, many of which will be required in order to ensure that the incentive arrangements can function in practice.</p> <p>These incentives may form part of a broader incentive framework which means that they may need to interact with other aspects of the regime (e.g. with any timeliness incentives or business plan quality incentives).</p>                                                                                                                                                                                                                                                                                                                                                                      |
| Delivery obligations             | <p>Although we focus on cost efficiency, cost cannot be considered in isolation. The cost expended is linked to the scope delivered. This means we need to link scope of work to the cost allowance.</p> <p>Our preference is that costs are linked to outputs: this focuses HAL on delivering what is required as part of the programme, rather than specifying how this should be done (as would be the case when linking costs to inputs). However, estimates of an efficient cost cannot be developed without consideration for how this can be achieved.</p> <p>‘Delivery obligations’ as discussed in this report correspond to the scope of work to be delivered and are equivalent to ‘outputs’. In the absence of an agreed scope, the CAA would not be able to distinguish whether any cost savings (or overruns) were due to cost efficiency (or inefficiency) or due to providing a different scope of work.</p> <p>The term should not be read as creating legal obligations which might be included in the licence, rather they form the basis against which cost efficiency is assessed.</p> |
| Baseline (/ Regulatory Baseline) | <p>This is the term used to describe the cost target used as part of the efficiency incentive mechanism. The reward or penalty to be applied to actual costs will be calculated with reference to outturn costs relative to this term.</p> <p>In our governance model, there is both an initial baseline and a regulatory baseline based on cost information that is updated as the scope is refined. The regulatory baseline governs overall rewards and penalties, while the initial baseline is indicative (although this can be used to set charges).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Flexibility                      | <p>We refer to flexibility as the scope that HAL has to evolve its design and/or delivery of capex within a given scope of requirements set by the CAA.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Certainty                        | <p>We discuss in this report the greater certainty that can be provided by an ex-ante incentive regime. We interpret certainty as bounded cost and risk for either HAL or users. In that sense, certainty is a function of HAL/stakeholders’ ability to accurately predict the outcome of the CAA’s decisions with regard to capex spent by HAL.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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<sup>1</sup> We have made sure that our development of models takes into account considerations beyond cost efficiency.



## I. EXECUTIVE SUMMARY

This report sets out two practical options that the Civil Aviation Authority (CAA) could develop if it decides to introduce ex-ante capex incentives for Heathrow Airport Limited's (HAL) capital expenditure (capex) in H7. We comment on the practical issues of implementing each option, but at this stage have not conducted a detailed assessment of the options as the details of capacity expansion at Heathrow remain highly uncertain.

### Context

For a project of the scale of Heathrow's anticipated capacity expansion, ex-ante incentives<sup>2</sup> could be helpful in maintaining cost discipline. This is important because the CAA's primary duty is to further the interests of users of aviation services. The current ex-post approach applied to Heathrow rests on the CAA disallowing inefficient costs after the fact. Use of this approach may be impractical for a project of the scale and complexity of capacity expansion at Heathrow. Ex-post reviews are inevitably judgement-based and rely on being able to identify relevant evidence after the fact. And a review at the end of a 5-year control period creates an uncertainty that is likely to impact both financeability and the cost of finance.

The CAA has been considering the use of ex-ante capex incentives for Heathrow capacity expansion for some time. Previous consultation papers set out their advantages but the regulator also notes that there are a range of practical issues to be overcome in developing such incentives. The CAA has appointed CEPA to focus on setting out options that describe in more detail how ex-ante incentives might be implemented in practice.

Our starting assumption is that the objective of the incentive is to maintain pressure on the price that Heathrow estimates for the project, expose it to the risk of cost overruns and allow it to benefit from savings that it is able to make while still delivering the expected outcomes. Under the current regulatory framework HAL is effectively remunerated for what it spends efficiently. But there are significant affordability issues related to a project of this scale given the government's aspiration, set out in 2016, to keep landing charges close to current levels.<sup>3</sup> Creating an incentive to support delivery on this aspiration and, where possible, improve on it, could have material benefits to users and the wider UK economy. It is, however, important to note that the incentive needs to take into account HAL's ability to bear cost overrun and to limit the upside that can be earned; any incentive applied should be calibrated to drive the desired behaviour without jeopardising the company's financial sustainability or providing upside without sufficient passenger benefit being delivered.<sup>4</sup>

The planned Heathrow expansion is considerably larger than past airport expansion projects, and it is made up of many programmes of work some of which are inherently more unpredictable than others. At present there is no single design for the project. HAL is considering a number of options. We anticipate that the project will continue to evolve for some time even after the Development Consent Order (DCO) is granted, indeed the DCO may impose conditions that impact the design.

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<sup>2</sup> In this context, ex-ante means a mechanistic/rules-based framework, which considers estimates of future expenditure, rather than using a discretionary review of actual expenditure that has been incurred.

<sup>3</sup> [Government decides on new runway at Heathrow, 25 October 2016.](#)

<sup>4</sup> In this report we focus on practical issues we do not seek the scale the incentive, other than on an indicative basis. This work will clearly need to take place before any ex-ante incentive could be put in place.



A core tension within this work is to incentivise cost efficiency through the project (which requires suitable risk exposure for HAL), whilst still maintaining flexibility for HAL to develop and improve its capex plans over time.

With these considerations in mind, two ‘straw men’ options have been developed. These are titled the **regulatory model** and the **governance model**, and we consider a number of variant options within these two broad models. The models draw upon lessons learned from other large projects and both models start from the same set of underlying assumptions:

- We assume that H7 will start shortly (perhaps six months) after the DCO is granted;
- We assume that shortly after the DCO, HAL will have an overall design for the project that can be used to set the cost baseline determined by the CAA;
- As it is usual practice for CAA to adopt a five-year control period, we assume that H7 will last for 5 years.
- The regulatory baseline creates a cost target for the five-year period;
- Both models utilise a cap and floor mechanism set by the CAA, the values for which are established by reference to the baseline. The ex-ante incentive applies between the cap and floor, such that HAL is exposed to risk (a percentage share of cost overruns) between the baseline and the cap and is eligible for upside (a percentage share of cost savings) between the baseline and the floor. The cap and the floor would be set to represent low probability outcomes for given delivery obligations i.e. it is expected that they would only be breached in extreme circumstances;
- There is no scope for upside below the floor and only efficient costs above the cap will be allowed to be recovered. Both models are subject to an extraordinary review mechanism above the cap or below the floor. A review would seek to implement changes to bring the project back to the original baseline or, where this not practicable or desirable, establish a new baseline for the remainder of the control period reflecting the assessment of efficient costs; and
- Given the Government’s aspiration to broadly maintain current levels of passenger charges, we assume that Heathrow will carry cost overruns until the end of the control period or until an extraordinary review. This mirrors current practice under the ex-post incentive regime, but will need to be reconsidered later as HAL may not be able to carry these costs and/ or this could create a financial impact that is unacceptable.

If the CAA concludes that an ex-ante capex incentive is an improvement on its ex-post approach, the assumptions above should be revisited as part of refining and calibrating the model to be adopted. For example, the CAA will need to consider the length of the price control and implications of this choice (which are broader than simply for capex efficiency incentives) when more information is available. For the DCO application, HAL will need to have developed a single settled plan that has been consulted on. This should permit the CAA to further progress development of its H7 proposals.<sup>5</sup>

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<sup>5</sup> The assumption used to develop our timelines is that the DCO decision might require some relatively minor changes to the expansion programme, rather than very substantial changes.



Ex-ante model summaries are provided in the text that follows and expanded upon in later sections of the report.

## The regulatory model

The regulatory option is developed as a single approach for all cost categories irrespective of their level of definition or predictability. It is similar to regulatory processes elsewhere e.g. setting cost allowances in the water regime. A firm baseline (with an associated cap and floor) would be set as part of the regulatory determination. HAL would then bear a pre-determined share of any under- or over-spends relative to this baseline. Significant uncertainty remains at this point, making it most appropriate to set delivery obligations at a high level. In summary this option works as follows:

- A single regulatory baseline (cost allowance) would be set at the regulatory determination for delivery over the whole price control period.
  - HAL would provide a business plan or capacity enhancement equivalent to the CAA, setting out what it expects to deliver over the H7 price control and the costs associated with delivery of those outputs. This will be informed by engagement with the airlines.
  - the CAA, likely with external technical support, would review the plan and set delivery obligations and establish a fixed regulatory baseline for H7 capex.
- The regulatory baseline would remain fixed ('firm') over the price control period for a fixed scope. The exception to this is a reconciliation at the end of the period, where an adjustment to the baseline may be required if outturn scope differs from the agreed delivery obligations.
  - It is understood that the capex programme will continue to develop after this date. The challenge for Heathrow would be to maintain those changes within the overall fixed cost baseline. The challenge for the CAA will be to identify any changes in scope that might lead to significantly worse outcomes for consumers compared with the plan reflected in the cost baseline and delivery obligations.
- For the purpose of comparing actual costs to the baseline, the baseline would be set in nominal terms and allowances are not uplifted for price inflation i.e. there is no mechanistic adjustment to the baseline.
- HAL would face a pre-determined share of any cost over- or under-spend for costs relative to the regulatory baseline. We expect that a low incentive strength would apply between the bounds of the cap and floor, given the level of uncertainty about design and costs.
- Delivery obligations under this model would be very high level. This provides flexibility for HAL to develop the programme most suitably as more information becomes available. However, delivery obligations are not straightforward to develop as capacity expansion would extend over more than one price control even where H7 starts a short period after the DCO is granted.
- All capex (both BAU and expansion) would be included under the baseline because we consider that it is unlikely to be practicable to separate the two for the CAA's purposes.
- The CAA would be responsible for setting the rules of how the model will work up-front at the price control determination. This includes the approach to ongoing



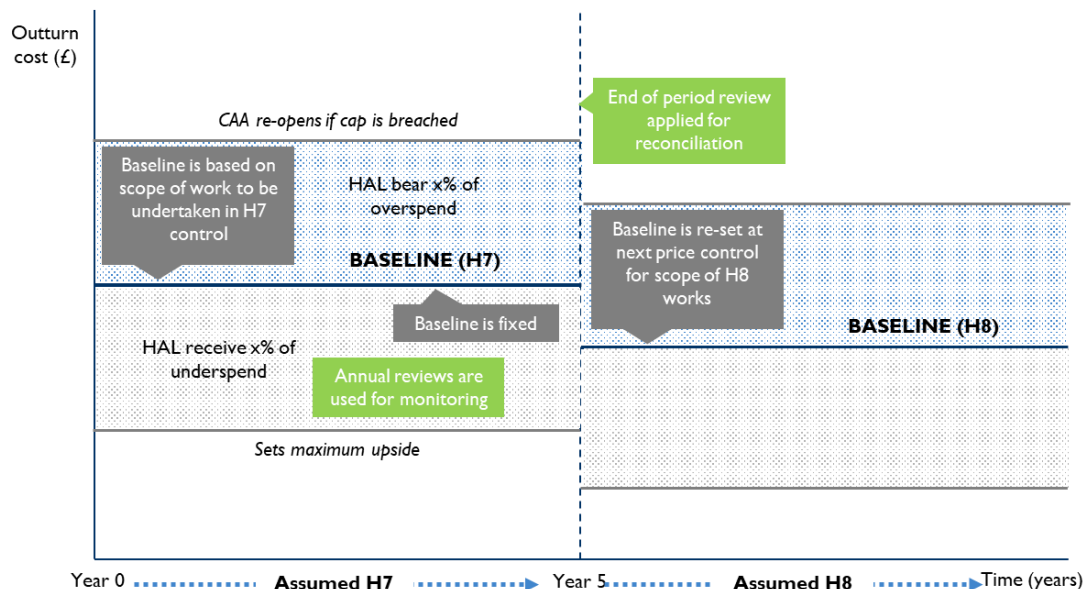
monitoring, the reconciliation process at the end of the price control, any adjustments to the regulatory baseline and the operation of the incentive itself.

- There would be an annual review process that monitors both costs and scope. This is important as the outturn scope is likely to differ to what was expected at the outset of H7. The annual review process would also be used for assessment of whether HAL is expected to breach the cap and floor.
- If costs are forecast to breach the cap or floor (as highlighted during the annual review process), the CAA would undertake an extraordinary review to assess efficient costs. This will not impact on outcomes between the floor and cap, but will determine the proportion of costs that can be recovered.

We also present a single variant to the regulatory option which includes within the incentive a narrower set of cost categories.

A simplified diagram of the regulatory model is presented below.

*Figure 1.1: Diagram summary of the core regulatory model*



## The governance model

The governance option recognises both inherent and timing uncertainty in cost estimates. It mirrors aspects of the current capex governance process at Heathrow. Inherently uncertain categories of cost would be excluded from the incentive. An initial baseline would be set on costs more suited to ex-ante incentives and becomes firm only once those costs reach a certain level of maturity.

In summary this option works as follows:

- An initial baseline would be set at the regulatory determination for delivery of obligations within included cost categories over H7.
  - HAL would provide a business plan or capacity enhancement plan equivalent to the CAA, setting out what it expects to deliver over the H7 price control and the costs associated with delivery of those outputs. This will be informed by effective engagement with the airlines.
  - The CAA, likely with external technical support, would review the business plan and set an initial regulatory baseline for the capex to be delivered over H7. This is for both



expansion and business as usual capex (given that expansion capex touches all parts of the airport we consider that separation will be difficult).

- The baseline would be updated as projects mature in design/ detail to a sufficient level to allow HAL to procure a supplier. It is this evolving regulatory baseline (not the initial baseline) that is binding for the purposes of the incentive.
- For the purpose of comparing actual costs to the baseline, the baseline would be set in nominal terms and not uplifted for price inflation.
- The CAA would monitor progress at programme (groups of projects) level, with separate 'pots' of expenditure associated with each programme.
- Delivery obligations would be set at programme level to allow HAL flexibility to let the work evolve. We expect the CAA to use around 10-15 pots and associated obligations, based on an initial assessment (noting that information on which to base a judgement is limited).
- There would be a more substantial role for the Independent Funds Surveyor (IFS) or a technical adviser in this model as monitoring would be an ongoing process. This party would make recommendations to the CAA on how and when to update the regulatory baseline based on project-level costs. The CAA would not be bound to adopt these recommendations, but would take a proportionate approach; the CAA could step-in for a more detailed review where programme costs diverge materially from the initial view of efficient costs. The IFS could also highlight contentious cost items for detailed consideration by the CAA.
- Despite utilising programmes of projects and 'pots' of expenditure, a single incentive would apply to all included costs at overall baseline level. i.e. programmes would be aggregated and the cap and floor mechanism would work at this overall baseline level (as per the regulatory model).
- The incentive strength would be greater in this model than in the regulatory model. This reflects the greater level of confidence in the baseline.
- In this option ex-ante incentives would not apply for all cost categories. The costs included in the incentive are those which HAL has a reasonable degree of control over and are more predictable in nature. Our initial review finds that the ex-ante incentive would cover around 55% of capex over the H7 period. Costs not included would be subject to ex-post efficiency assessment, similar to the CAA's current approach.

We also present a small number of variants to this core governance option. These include the use of market prices to update the baseline, different (earlier) timing for finalising the baseline, using a mechanism where the baseline covers the whole project and on the treatment of excluded costs.



We present below a diagrammatic representation of how the governance model would work, based on the model at the time of the regulatory determination, and how this evolves over time.

*Figure 1.2: Diagram summary of the core governance model*

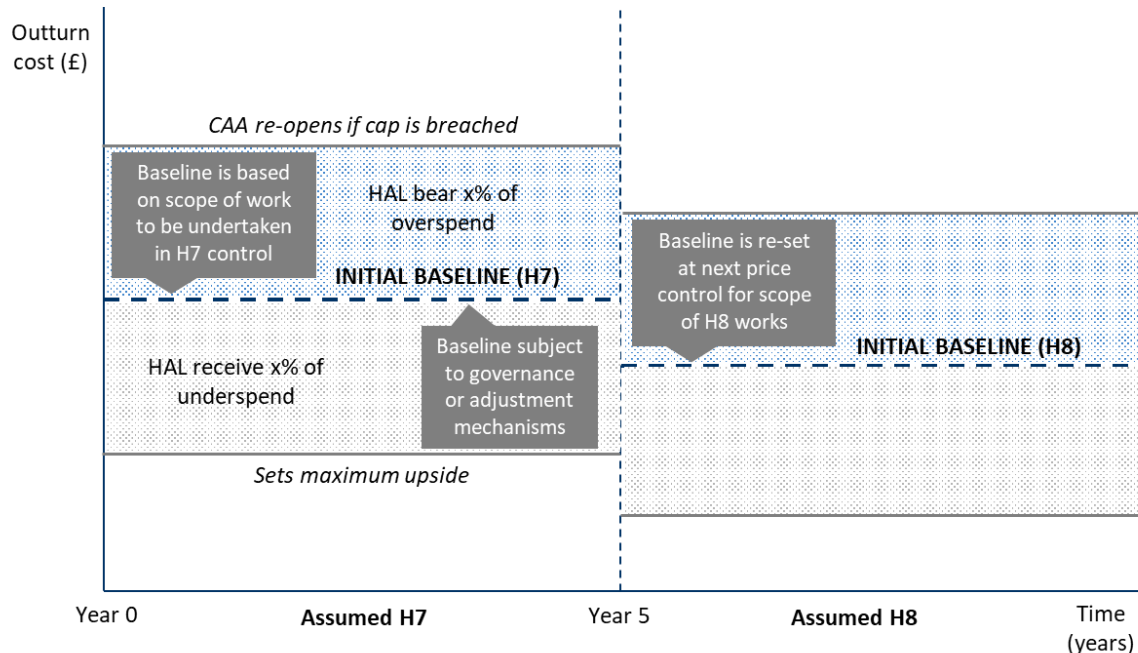
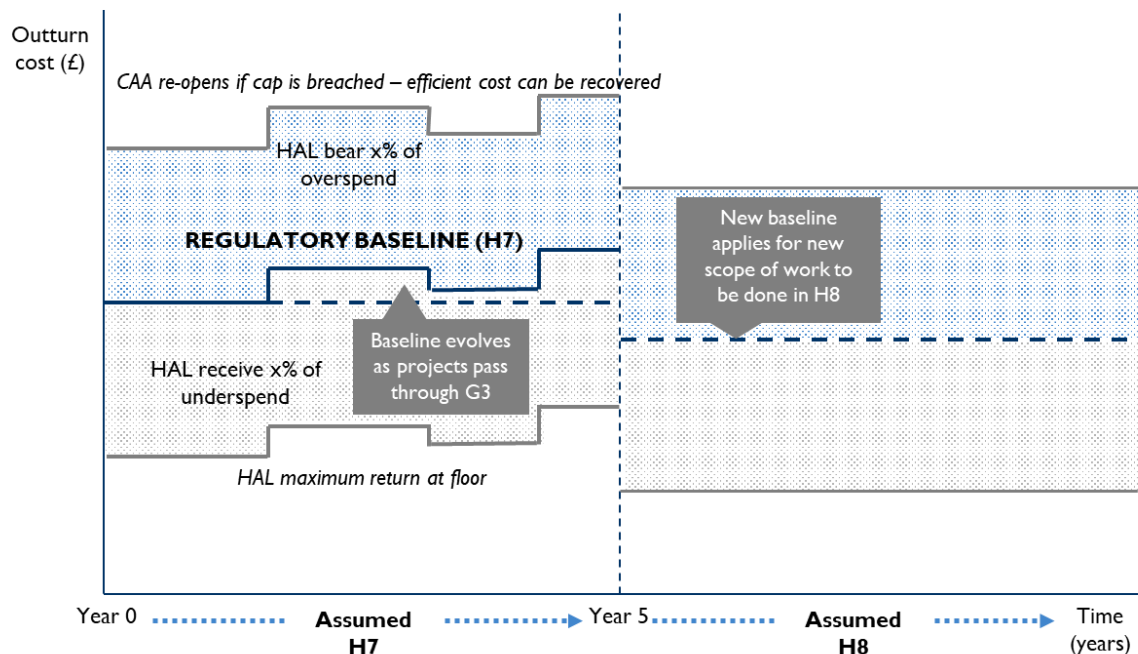


*Figure 1.3: Illustration of how the core governance model might look as the price controls evolve*



## Ongoing monitoring and impact on the CAA

A consequence of allowing flexibility for the capacity enhancement plan to evolve is that ongoing monitoring of progress under both models is necessary so that the CAA can maintain line of sight from the baseline to the actual programme. This is a practical challenge that we consider in more detail later in the report. For each model we envisage an annual review process taking place. It both maintains line of sight and facilitates calculation of the incentive outcome at the end of the control



period. This level of monitoring will require the CAA to be involved as the project progresses, but we anticipate that the regulator will be supported on an ongoing basis by a technical adviser that would undertake the monitoring process and advise the CAA.

### **Airline involvement**

We anticipate that the role of airlines will change under these incentives. At present airlines are involved in capex governance at a granular level on discrete and often optional projects. The nature of the process is expected to change for H7, which is comprised of a series of interrelated projects, many of which are essential to timely delivery of expansion. The nature and scale of the H7 programme means that we consider continuing with the current capex governance process will be impractical and it is unlikely that airlines would have the technical expertise to engage at this level. However, airlines are a key stakeholder and we recognise the importance of their involvement. We would expect there to be effective engagement between airport and airlines in developing the plan for the project both before and after DCO and in the regulatory process that sets the baseline cost. Thereafter this engagement should continue as the project progresses and decisions are made about the design. An important part of the annual review process will be for HAL to evidence that it has listened to and taken on board airline comments on changes that have been made to the programme. In the event of an extraordinary review we would expect airlines to be involved in discussions about whether it is possible to bring the project back in line with the baseline or whether the baseline should be changed.

### **Next Steps**

Although we have sought to consider and address a range of practical issues that could affect the operation of the models, they have not been formally evaluated and we therefore make no recommendations as to the choice of model or variants within it. An assessment of the options against the counterfactual ex-post incentives has also not been undertaken at this stage. Further development of the project approach, design and cost is, in our view, important to being able to discriminate between models and to conclude on the appropriateness of ex-ante incentives. As more information becomes available it will also be possible to calibrate models in particular to consider the appropriate level of risk exposure that HAL would bear and the upside that it could obtain through efficient management of the project.



## 2. INTRODUCTION

This section introduces the CAA's work to date in the area of ex-ante incentives, and discusses how CEPA's work supports further development of the CAA's approach to ex-ante incentives.

### 2.1. BACKGROUND

In October 2016, the Heathrow North-West runway was announced as the Government's preferred option for airport capacity expansion in the South-East of England. The CAA had been considering the use of ex-ante incentives for this project even before the Government announced its preferred option, including commissioning a study in early 2016 into potential approaches for ensuring cost efficient delivery of new airport capacity.<sup>6</sup>

The CAA has indicated that it sees a need to develop regulatory mechanisms that incentivise HAL to deliver the capacity expansion in a timely and efficient way, and to facilitate efficient financing of "very substantial expenditure programmes".<sup>7</sup> The CAA recognises the need to strike an appropriate balance between ex-ante and ex-post efficiency incentives and for HAL to work within clear budgets for project delivery. Further work has included:

- A 2017 consultation on the regulatory regime, including incentives.<sup>8</sup>
- An April 2018 consultation on economic regulation of capacity expansion at Heathrow.<sup>9</sup>
- A May 2018 working paper focusing on the cost of capital and incentives.<sup>10</sup>

In these documents the CAA highlighted key advantages of ex-ante incentives as:

- **"Stronger and clearer incentives for HAL to ensure capex is incurred efficiently."** With an ex-ante sharing mechanism in place, HAL would be aware of the exact percentage of any overspend that it would have to absorb (and what percentage of any underspend that it would get to keep).
- **"Reduced regulatory uncertainty, since the outcome is not dependent on a subjective retrospective review of HAL's performance."** With incentives set ex-ante, HAL is aware upfront of how its expenditure will be treated, rather than waiting for an ex-post review to determine whether costs were incurred efficiently or not.
- **"A focus on preventing overspends rather than disallowing inefficient costs after the event."** HAL would know in advance what it will receive and what it is being paid to

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<sup>6</sup> This was delivered in 2017: KPMG (2017) "[Approach to overseeing the cost efficiency of new airport capacity](#)"

<sup>7</sup> CAA (2017) "[Economic regulation of the new runway and capacity expansion at Heathrow airport: consultation on CAA priorities and timetable](#)"

<sup>8</sup> The first of several consultations was: CAA (2017) "[Economic regulation of the new runway and capacity expansion at Heathrow airport: consultation on CAA priorities and timetable](#)"

<sup>9</sup> CAA (2018) "[Economic regulation of capacity expansion at Heathrow: policy update and consultation](#)"

<sup>10</sup> CAA (2018) "[Economic regulation of capacity expansion at Heathrow: working paper on the cost of capital and incentives](#)"



deliver, rather than finding out after the fact that some expenditure was considered “inefficient” and is disallowed.

- **“Ensuring that airlines receive some protection from the impact of any overspend.”** An ex-ante sharing factor means that HAL and its customers share in any under or overspend, providing some protection for airlines and passengers.

However, the CAA also recognises the potential disadvantages of using ex-ante incentives. Setting ex-ante incentives relies on the ability to determine in advance the efficient cost over the five-year price control period – this requires reliable cost estimates, otherwise HAL and consumers may be exposed to forecasting risk. These cost estimates need to be closely linked to verifiable outputs, with the ability to accommodate changes (such as to the design). This is a complex process and may prove particularly difficult for some components of the expansion programme given its scale and complexity. Cost and output targets are difficult to determine in advance for a five-year period, given the potential for design changes, scope changes, or other changes that react to circumstances that are difficult to control (such as additional works required from issues identified during site clearing/preparation). The CAA also highlighted that ex-ante incentives based on cost estimates may provide incentives for HAL to inflate its cost forecasts, a risk that the CAA will need to mitigate if it adopts this approach.

## 2.2. DESCRIPTION OF OUR ASSIGNMENT

CEPA was appointed by the CAA to work alongside its technical adviser (Arcadis) to examine possible ways of implementing ex-ante<sup>11</sup> efficiency incentives for Heathrow’s capex.<sup>12</sup> Our assignment focuses on developing illustrative options (“straw men”). The CAA highlighted in its May 2018 working paper that there are practical challenges to applying incentive arrangements such as the ability to accurately forecast capex over a relatively long time period, and so in developing options for ex-ante capex incentives we place extra focus on considering the practical challenges, and how these challenges might be overcome.<sup>13</sup>

We draw on our knowledge of similar incentives in this and other sectors to ensure that our developed options take precedent from other large-scale projects noting that, in addition to being practical, any incentive design should also take account of impacts on HAL’s ability to finance the project.

Considering the potential benefits, but aware of the risks to be overcome, in its consultations and working papers the CAA set out three high-level initial options for ex-ante incentives from H7 onwards. These are summarised in Figure 2.1.

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<sup>11</sup> In this context, ex-ante means a mechanistic/rules-based framework, which considers estimates of expenditure, rather than using a discretionary review of actual expenditure.

<sup>12</sup> Opex efficiency incentives are outside the scope of this project.

<sup>13</sup> We note that improving the model to address one practical challenge will have implications and other challenges may arise from the mitigation that has been introduced.



Figure 2.1: Summary of the options set out in the CAA's 2018 [WACC and incentives working paper](#)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) A uniform, moderate incentive (e.g. 25% sharing mechanism) to apply to HAL's entire capex programme.</p> <ul style="list-style-type: none"><li>• The 25% suggested incentive rate, towards the lower end of those applied elsewhere, recognising that a cautious approach may be appropriate for the CAA's first use of ex-ante incentives - and is still strong enough to provide a meaningful incentive.</li><li>• This is the most simple of the three approaches, as it represents a single approach for all cost categories.</li></ul> | <p>(2) A moderate (e.g. 25%) incentive to apply only to certain categories of capex, with an ex-post review of the remaining categories.</p> <ul style="list-style-type: none"><li>• This option would be most attractive if it appears that some cost categories are much better suited for ex-ante incentives than others.</li><li>• The administrative burden could be reduced by focusing ex-ante incentives on only the most appropriate categories.</li><li>• Requires clear boundaries between cost categories, and ways to prevent HAL from 'gaming' by re-allocating costs between categories.</li></ul> | <p>(3) A weak ex-ante incentive (e.g. 10%) that applies to HAL's H7 capex in addition to ex-post efficiency reviews.</p> <ul style="list-style-type: none"><li>• Retaining ex-post reviews while ensuring that HAL has some financial efficiency incentive across all parts of the programme.</li><li>• This option could be used alongside stronger ex-ante incentives for appropriate cost categories.</li></ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

We have developed two models each with variant options, the models draw upon but are not bounded by the CAA's earlier thinking. The two approaches in our straw men options have been developed to draw out the positives that ex-ante incentives can offer while seeking to mitigate the risks. Following the CAA's lead, the options that we have developed are intentionally cautious, with the potential for a lower percentage on the sharing mechanism than has been applied by other regulators, to recognise that this is a new approach for CAA and to minimise the risk of unintended consequences.<sup>14</sup>

Our approach has been to develop the models and refine them using variant options to address particular issues. We present models we consider to be feasible in practice, but further work would be required prior to introducing the incentive mechanism to refine the design and understand more about the implications of the mechanism when more developed information is available on works expected to be undertaken during H7.

We have worked closely with Arcadis to benefit from its detailed knowledge of HAL's expansion programme and the process of estimating costs for different parts of the programme. It is important to note that the information currently available to Arcadis is uncertain and subject to change, for example HAL is currently consulting on several potential masterplans. HAL expects the project to ultimately combine aspects of each of these rather than implement a single option in its entirety. At present there is no agreed scope or cost estimate for the project at a detailed level. We cite the documents that we have used in our analysis but it should be noted that where we refer to aspects of the expansion programme, e.g. delivery obligations, these are purely illustrative at this stage.

## 2.3. REPORT STRUCTURE

This remainder of this report is structured as follows:

- Section 3 provides background and context for our consideration of ex-ante incentives drawing on lessons from their use elsewhere.

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<sup>14</sup> The incentive strength applied to opex has typically been higher than for capex in regulatory precedent, such that the incentive strength for capex is not directly comparable to incentive strengths for totex (whereby capex and opex are bundled together as total expenditure (totex), e.g. as used by Ofwat and Ofgem).



- Section 4 discusses the Heathrow capacity expansion, the level of uncertainty around the detail of this portfolio at this stage of its development and it sets some underlying assumptions for the straw men options.
- Sections 5-6 introduce our two straw men options.
- Section 7 provides a summary and comparison of the two straw men options.

We also include appendices that provide more detailed information on our case studies, cost characteristics and general issues around setting ex-ante capex incentives.



### 3. BACKGROUND OF EX-ANTE INCENTIVES

This section provides regulatory precedent for ex-ante incentives, including considering:

- how and why ex-ante incentives may be appropriate for this project or parts of it (rather than relying on ex-post incentives alone);
- what lessons we can learn from previous infrastructure programmes and regulatory regimes that apply ex-ante incentives; and
- challenges faced when setting incentives, which may represent trade-offs where the CAA will need to make a choice as to how to balance conflicting objectives.

As discussed in the introduction, our ex-ante models are developed using a range of sources, and we consider that precedent (from regulatory regimes and other large-scale projects) represents an important input. We consider that HAL, its stakeholders and lenders will take some comfort from the use of mechanisms consistent with established precedent.

Although capacity expansion requires a tailored approach to best address its scale and complexity, we consider it a sensible approach to start from tested options which can then be adjusted as appropriate.

#### 3.1. HOW AND WHY EX-ANTE INCENTIVES COULD BE APPROPRIATE

The CAA currently employs ex-post efficiency incentives in the regulatory regime at Heathrow. For capacity expansion it is considering a shift to ex-ante incentives. Table 3.1 sets out a description of the key differences between ex-ante and ex-post incentives.<sup>15</sup>

Table 3.1: Description of ex-ante incentives and ex-post incentives

| Ex-ante incentives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ex-post incentives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• These are set in advance of the relevant activity being carried out, based on an estimate or expectation of expenditure.</li><li>• In the case of a regulatory regime, ex-ante incentives are set as part of the regulatory determination for the full regulatory period.</li><li>• The exact values (e.g. price caps, revenue caps) do not necessarily have to be set up front, instead there could be a mechanistic approach to determining incentive values (e.g. setting an initial value which changes each year of the regulatory period according to a pre-selected index or formula).</li><li>• These mechanisms facilitate an up-front assessment of risk and reduce regulatory uncertainty through the setting of a pre-determined share of under- or overspend. There is no separate assessment of whether the under- or overspend is efficient.</li></ul> | <ul style="list-style-type: none"><li>• These apply regulatory judgement after an activity has been carried out based on the actual expenditure but with principles/guidance set out in advance.</li><li>• In the case of a regulatory regime, the regulatory determination does not set out firm values (e.g. price caps, revenue caps) but instead presents principles and expectations that will be applied in the ex-post assessment.</li><li>• The regulator would typically undertake a review at the end of the regulatory period of all activity and/or expenditure.</li><li>• Ex-post incentives rely on a clear framework for how the regulator would apply its judgement, and a track record of it applying that framework. Absence of either would make it difficult to assess risk exposure.</li></ul> |

While ex-ante and ex-post define extremes of the approach to setting incentives, in practice approaches sit on a spectrum; regulators (or large-scale infrastructure programme developers) may

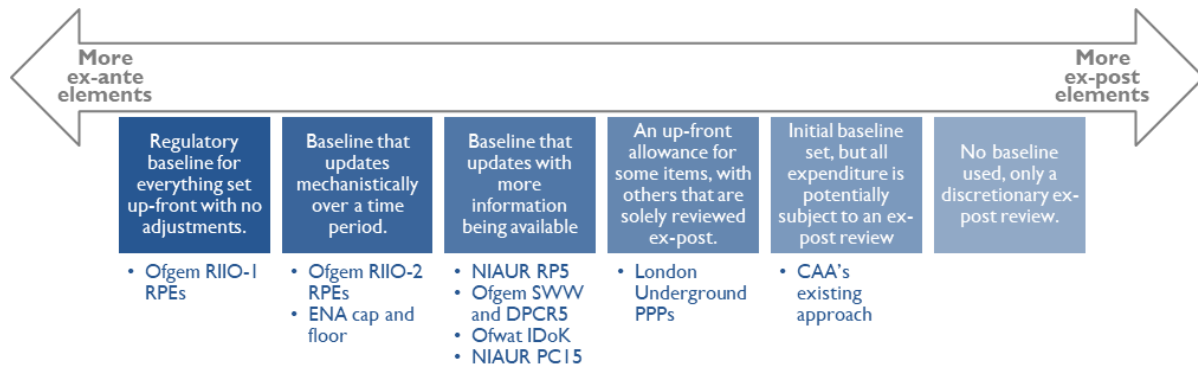
<sup>15</sup> We note that HAL has submitted to the CAA a report by its consultants that argues that ex-ante incentives are not well suited to Heathrow's expansion programme, and that this could result in higher costs for users if an ex-ante capex incentive is introduced.



use a combination of incentive types, as illustrated in Figure 3.1. We note that ex-ante incentives have been more prevalent in the energy and water sectors than for airports. This could be because regulators in those sectors have more confidence in the cost allowances they set because:

- those sectors typically include a number of companies conducting similar activities, allowing for benchmarking; and
- it is possible that that energy networks and water companies deliver more “repeat” (similar) projects that allow for cost trends over time to be assessed.

Figure 3.1: Example of types of efficiency incentive with more ex-ante or ex-post elements



As discussed briefly in Section 2.2, in principle ex-ante elements bring strong and clear up-front incentives to consider when incurring expenditure throughout the price control, with reduced regulatory uncertainty given the limited scope for ex-post review. It also focuses on preventing overspends, rather than waiting until expenditure has been incurred before deciding, in an ex-post review, whether cost was incurred efficiently or not. The regulatory uncertainty of an ex-post approach is hard to assess (especially in the case of a project of this scale, which is materially different to anything regulated ex-post by CAA previously). In electing to use ex-ante approaches it must be clear that the subject of the mechanism can manage the risks that are inherent in the incentive and can act on the added clarity to deliver required outcomes more efficiently.

We do not, however, envisage that the CAA would implement efficiency incentives that are purely ex-ante, without any adjustments throughout the price control period (e.g. the option represented on the left-most description in Figure 3.1). We consider some mechanistic adjustments may have merit and ex-post review might continue to be appropriate, particularly for any large elements of the programme where the costs or outputs are inherently difficult to determine in advance.

### 3.2. LESSONS LEARNED FROM APPLIED APPROACHES TO EX-ANTE INCENTIVES

In developing options, our starting point has been to examine previously applied approaches. While it is unlikely that any example will be a perfect match for capacity expansion at Heathrow, the CAA have made it clear that options must be practical and take into account (among other criteria) the impact of regulatory incentives on affordability and financeability. It is important to investors and financiers that they are familiar with components of the approach, and so it is sensible to ensure that the options we develop contain elements that they recognise and can take some comfort in.

To support this, we developed several case studies in two categories: large-scale infrastructure development, and regulatory treatment of uncertain projects. From these we draw six key lessons for the design of incentives and for wider regulatory best practice regarding large investment programmes, as summarised in Figure 3.2, which feed into the development of our straw men



options. We have selected those lessons that appear to us to be most relevant to the development of ex-ante incentives for H7, especially where common themes emerge across the case studies.

The case studies themselves are set out in Appendix A.

*Figure 3.2: Summary of lessons learned from studying approaches to ex-ante incentives applied elsewhere*

|                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson 1: Cost allowances and outputs should remain flexible for as long as is feasible | Heathrow capacity expansion is a large and complex programme of works, which is expected to span more than one control period (CAA control periods are typically five years). It is important that the design can evolve and that the incentive does not constrain HAL in delivering required outputs. At the same time, if cost allowances and outputs are set too late, efficiency benefits can be muted and there could be scope for delays in delivery.                                                                                                                                                           |
| Lesson 2: Reopeners and adjustments to allowances can be useful tools                   | While we consider that it is appropriate to consider ex-ante incentives for capacity expansion, we also recognise that some areas of costs will be difficult to set in advance. Reopeners and adjustments which are focused on pre-determined terms (e.g. thresholds at which they are triggers, categories that are included, indices that will be used) can be useful tools for ensuring that allowances remain linked to input costs and required outputs without introducing uncertainty and risk.                                                                                                                |
| Lesson 3: Importance of a programme-level contingency                                   | The Heathrow North-West Runway is a large and complex programme of works, bringing a high degree of uncertainty that makes it difficult to ascertain the most appropriate value of contingency to provide for each of the individual aspects. While some contingency can be allocated to more developed projects from the outset, developers find it useful to also have a contingency that is kept at the programme-level until it is clear where it is required – rather than allocating the entire programme budget to its projects. This contingency enhances the opportunity for flexibility as discussed above. |
| Lesson 4: There are various approaches to managing risk and uncertainty in contracts    | The CAA should consider whether an alternative approach to managing risk could be useful when setting the regulatory approach for the development of the Heathrow capacity expansion. The commercial procurement approach to be adopted by HAL is still uncertain. Until there is greater certainty, the CAA is not in a position to know whether the preferred regulatory incentive mechanism is likely to achieve its desired outcomes given the different procurement approaches that HAL may choose.                                                                                                              |
| Lesson 5: Annual targets are unlikely to be an effective incentive mechanism            | Although it may be useful from a planning perspective to set out the anticipated annual expenditure, it would be unsuitable for the Heathrow capacity expansion given its scale and uncertainties – as emphasised through the other lessons in this section, flexibility will be key. There could however be benefit in tracking costs against programme annually, for monitoring purposes.                                                                                                                                                                                                                           |
| Lesson 6: Investors seek downside protection                                            | There are various ways in which downside protection can be included to better appeal to investors' risk appetites. Given the scale of the Heathrow capacity expansion programme, the CAA should carefully consider the level of risk that HAL is willing and able (from a financeability perspective) to take on. We consider that a cap and floor mechanism might provide investors with a useful downside protection against 'extreme circumstances'. Sharing mechanisms then provide an ongoing incentive within the cap and floor.                                                                                |

### 3.3. GENERAL CHALLENGES WITH INCENTIVE DESIGN

In Appendix B we provide a more detailed discussion of the key challenges that exist when designing an incentive model. An important consideration is that there are trade-offs that mean that it is not possible to design a perfect mechanism. The CAA will need to make judgements where tensions exist between competing objectives. In Table 3.2, we provide a summary of some of the trade-offs discussed further in Appendix B.



*Table 3.2: Overview of key regulatory choices*

| Policy option                                                     | Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timing of setting a cost allowance and delivery obligations       | More detailed information is available over time, meaning later estimates of costs should be more accurate. However, setting allowances later potentially removes the incentive on the regulated company at earlier stages in their project development cycle. In the case of capacity expansion however the parties will need to be mindful of the political pressure to present lower cost options up front which are difficult to deliver in practice. |
| Level of granularity for cost allowances and delivery obligations | Focusing on aggregate costs is in theory simple, creates a lower resource burden and is flexible, however the ability to set an accurate baseline at this level and monitor it effectively is more challenging.                                                                                                                                                                                                                                           |
| Level of detail within delivery obligations                       | More detailed delivery obligations limit the ability to 'game' the incentive by earning rewards for capex efficiency that are due to reductions in scope (either in volume or in quality). However, the additional detail could restrict the flexibility HAL has to improve the overall design.                                                                                                                                                           |
| What costs are included as part of the incentive                  | Different treatment of some costs can lead to changes in priority or gaming, however including costs that are less predictable or more uncertain, risks a broader range of outcomes and could result in HAL making windfall gains or losses as a result of factors outside of its control.                                                                                                                                                                |
| How to set the incentive strength                                 | Incentive strength should be proportionate to the confidence in the baseline. An accurate baseline might have a strong incentive, while a highly uncertain baseline would justify a weaker incentive.                                                                                                                                                                                                                                                     |

A consideration of these trade-offs has informed the development of the straw men options and represent a sub-set of the design choices available for creating an efficiency incentive mechanism.



## 4. APPLYING INCENTIVES TO THE HEATHROW EXPANSION

In this section, we consider the programme of works that make up the capacity expansion, and how its scale and complexity influence the approach to ex-ante incentives. The expansion is among the highest-cost infrastructure projects in Europe, and the construction period is expected to span more than one control period. The construction is made even more complex through being undertaken on an airport that will continue to function throughout the expansion, creating additional interfaces and risks to be managed.

Even with this level of complexity, there will still be some cost categories that can be estimated in advance with some confidence, and to which CAA can attach clear delivery obligations – a key consideration when implementing ex-ante incentives, as discussed in Section 3. Based on analysis of current information we consider that at least 55% of the expected capex cost could be considered to be suitable for ex-ante incentives.

We also consider the current uncertainties about the regulation of HAL for the expansion programme, and make the following assumptions which are used in our ex-ante model options:

- The H7 control period will begin after the Development Consent Order (DCO) is in place, and H7 will be five years.
- The single masterplan will also be completed after the DCO is in place, and will be used to set the regulatory baseline.
- There will be a baseline (either initial or firm) set as part of the H7 determination, setting a cost target for aspects of the project that will occur during the control period.
- There will be a cap and floor in addition to the cost target, with extraordinary reviews triggered by breaches of these levels.

The Heathrow capacity enhancement programme is particularly large in scale and complex, given its development alongside existing operational infrastructure. Projects that are expected to cost over £1bn are generically known as ‘mega projects’, with three additional UK-based examples set out below:

- Crossrail describes itself as the largest construction project in Europe at an initial estimated cost of c.£15bn, a figure which is increasing given recently acknowledged cost overruns.
- HS2 will displace Crossrail as the largest construction project, as it moves into the main construction phase.
- The only other project in construction in the UK of even similar size is the Thames Tideway Tunnel (TTT) at c.£4.2bn.

In reality, Heathrow capacity expansion is a collection of a mega projects each of which includes a portfolio of smaller (although still very large scale in project/contracting terms) projects, all of which must fit together into a master programme to deliver new capacity. As currently described, capacity expansion touches all areas of the airport – from extending the existing airfield to providing new terminal buildings and facilities which support delivery of new capacity. It also impacts very significantly on the areas surrounding the airport, e.g. construction of the new runway requires river and road diversions before wider surface access projects are even considered.

The risk associated with mega projects is generally considered to be inherently greater than for other projects given their long planning timeline and complex interfaces. The planning challenges for



Heathrow are well documented,<sup>16</sup> the project is required to be delivered whilst limiting any increase in noise or congestion and expansion takes place in a densely populated area which requires a large scale commercial and domestic property purchase scheme/compulsory purchase. In addition, the work will take place in and around a busy airport that continues to operate close to its capacity. Maintaining safe operation while construction takes place requires interface management on a level that arguably exceeds the burden on other projects – e.g. HS2 and TTT. Previous large projects at Heathrow, including T5 and T2, have been delivered around other operational assets, although these are not to the scale or complexity of the forthcoming expansion programme.

Given their complexity mega projects are characterised by long development periods. Typically, there are four main stages of development, and at present the Heathrow capacity enhancement project is in the planning stage (which extends as far as a detailed feasibility assessment/outline design). This will be followed by detailed design, construction and close out. At present there is no single masterplan and no planning consent (development consent order, DCO). Only in future, post-DCO, will detailed design develop, and that will likely overlap with early phases of site preparation, which effectively makes space for construction work to commence. This uncertainty impacts the timing of associated regulatory control periods and makes setting firm delivery obligations for a control period more challenging,<sup>17</sup> however by the time delivery obligations need to be set more information will be available.

At this stage the procurement approach for the project is not defined in detail. HAL has indicated it expects to use P13, a collaborative approach which involves suppliers working closely with the asset owner and its key advisers (see Box 4.1). This builds on HAL's approach to T5 development and its current practice of procuring through a small number of 'tier 1' suppliers. At this stage there is little information on how the projects which make up the programme will be bundled for procurement.

**Box 4.1: Introduction to P13, a collaborative approach being used for the Heathrow expansion**

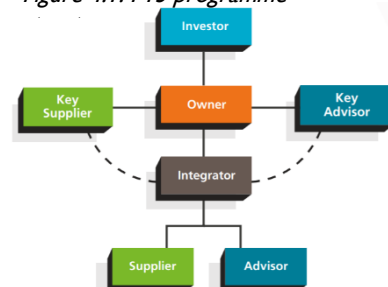
P13 (Project 13) is an initiative launched in 2018 by the Institute of Civil Engineers (ICE), which seeks to improve the delivery of infrastructure projects through a collaborative approach, which is tailored for each user but typically requires clearer coordination between the relevant parties rather than traditional contractual relationships and risk transfer.

Figure 4.1 sets out the basic structure, with the key differences to more traditional models being the addition of an integrator (to act as a coordinator) and there being a key supplier working alongside the owner.

HAL proposes implementing P13 for the upcoming capacity expansion, taking lessons learned from elsewhere:

- T5 demonstrated the value of a “**capable owner**”, which takes all accountability and most of the risk, and builds a team to mitigate those risks.
- Crossrail highlighted that there should be **performance management** of the supply chain.
- **Off site logistics hubs** used assist delivery: they are located closer to suppliers to facilitate better communication with suppliers, vertical integration by suppliers, and pre-assembly of outputs.
- An **innovation hub** is established to improve communication and knowledge management. This requires selecting individuals who are responsible for bringing together “innovative ideas” (which are

Figure 4.1: P13 programme



<sup>16</sup> [The Guardian, The challenges Heathrow airport must face over third runway, 25 October 2016](#)

<sup>17</sup> Where good quality information does not exist for setting delivery obligations, this uncertainty could also imply greater difficulty in the end of period reconciliation process.



innovative to HAL, but not necessarily new in general) and considering whether they might play a part in addressing key challenges and objectives.

Source: ICE (2018) "[PI3 Blueprint](#)"; ICE (2018) "[From T5 to Heathrow Expansion](#)"

## 4.1. WHAT WE KNOW ABOUT THE PROGRAMME

At present HAL is still consulting on its plans, although we have a figure for total cost<sup>18</sup> and some understanding at a high level of the components of the expansion programme. However, the information that we are using will change and that change could be significant.

We have drawn upon Arcadis' knowledge of capacity expansion and on materials that the Arcadis team has access to; namely the Purple Book (HAL's estimate of costs) and an indicative schedule of works based upon a report from HAL to the Department for Transport (DfT) on procurement from March 2018. These reports are now out of date or have been superseded, with expectations that the plan will change further. Notwithstanding this, our work uses this material to illustrate how incentive options might work, e.g. which components of the overall project might be subject to a particular incentive and to develop indicative delivery obligations.

### 4.1.1. Review of cost suitability for ex-ante incentives in H7

As noted earlier, the cost breakdown for the programme includes costs estimates which span the range of uncertainty, i.e. some costs are more predictable than others. At a high level we have reviewed the programme to assess HAL's ability to define and control costs.

In Figure 4.2 below, we present an assessment of those activities expected to be completed during the H7 price control and an initial approximation of these costs during this period relative to two of the most important assessment criteria, namely HAL's ability to control costs and HAL/CAA's ability to define outputs. Our analysis suggests that HAL will have a medium to high degree of control over a significant proportion of costs and the CAA will be able to define outputs for at least half of the project costs as grouped below.<sup>19</sup>

We then use this analysis to assess which costs might be included within the straw men options set out in subsequent sections of this report.

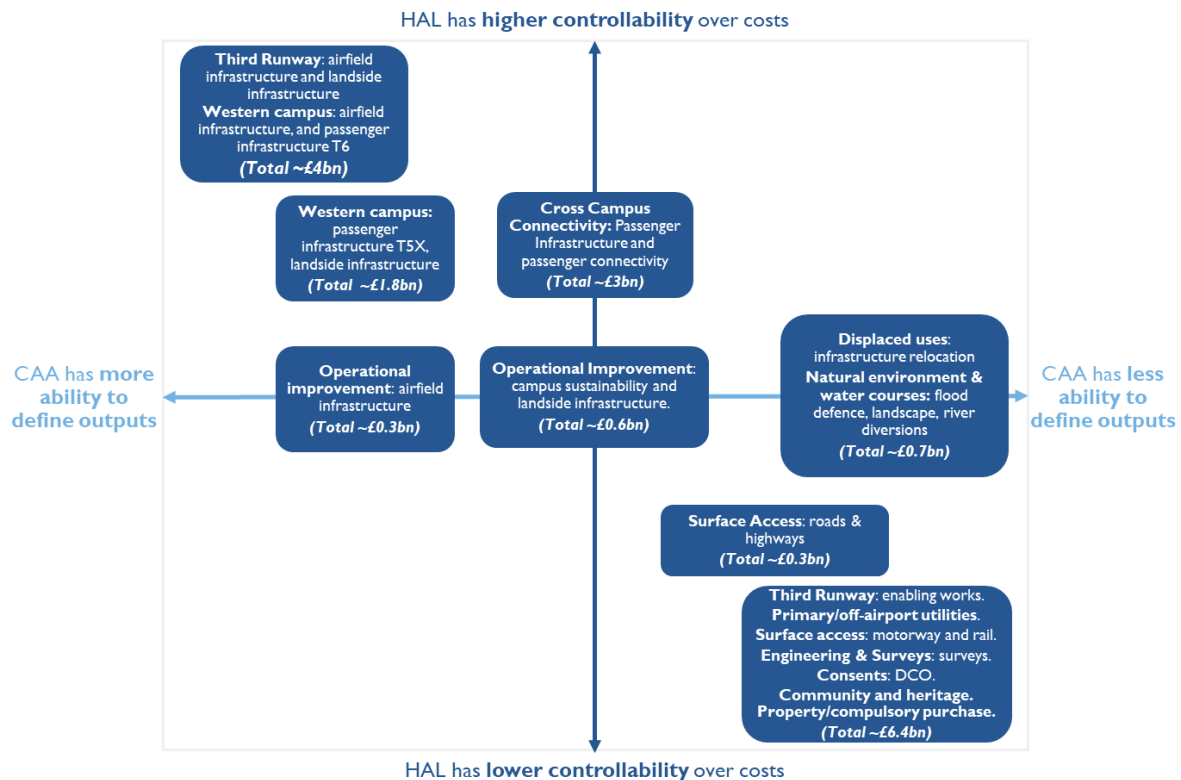
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<sup>18</sup> This is based on HAL's cost plan, The Purple Book, version 0.63 (dated 30 June 2017). We note that HAL reduced its costs for the third runway by £2.5bn in December 2017.

<sup>19</sup> This is based on an assessment of broad cost categories within The Purple Book. Within each cost category, not every £ will perfectly align with the grouping above.



Figure 4.2: Our assessment of suitability of costs for application of an ex-ante incentive mechanism (H7 activities only<sup>20</sup>)



Source: CEPA analysis of information shared by Arcadis, based on HAL Purple Book (June 2017).

As noted above, further information will become available in due course and provide greater certainty on the timing and volume of cost associated with different categories. With this information being unavailable at present, our assessment is intended to be indicative.

## 4.2. UNDERLYING CONTEXTUAL ASSUMPTIONS

The limited information available at this stage requires us to make some further assumptions. These general assumptions apply to all straw men options developed in Sections 5 and 6, in the following areas:

- When the H7 control period will commence, relative to the expansion programme timeline.
- When the single masterplan will be finalised.
- Control period length.
- Regulatory baseline acting as a cost target.
- Cap and floor mechanism.
- Extraordinary review.

<sup>20</sup> Cost information is included only to provide an illustration of the proportion of the project that falls into each quadrant of the diagram. The cost allocation used in this model is consistent with the breakdown provided in The Purple Book, but we note that this has been superseded.



- Treatment of overruns.

We have based these assumptions on information that is in the public domain at present. We do not comment on the likelihood that these assumptions will hold by the time the CAA has to make its decision on H7. We briefly discuss each of these assumptions in turn below.

### When the H7 control period will start relative to expansion programme timeline

**We assume that the H7 control period begins shortly (perhaps 6 months) after the DCO for the expansion has been given.** We understand that there are likely to be conditions attached to the DCO and we would expect there to be a period after DCO approval when the expansion plan and design, is refined in response to those. We expect this refined version of the programme to form the basis of cost assessment for the H7 price control.

At this stage we have no information about the likelihood and magnitude of these conditions. Clearly substantial additional requirements could impact the time line for the price control and so this represents a risk that the CAA will need to consider further as it develops thinking on the time period to be covered by the H7 review.

### When the single masterplan will be finalised

At present, HAL is considering key components of the overall programme with the aim of formulating a preferred masterplan. There are currently multiple masterplans, rather than a single version. While this might be a reasonable approach for developing the best single masterplan, it makes it more difficult to anticipate the contents of that single masterplan.

Once the DCO is in place, we understand that this single masterplan will be developed and finalised, along with an overarching programme for the project. Some, perhaps material, uncertainty of scope and cost will remain but there will be significantly greater certainty on the scope and cost of the project than is the case today.

**We assume that the masterplan will be used to form the delivery obligations for H7 and set the baseline around which ex-ante incentives will operate.**

### Control period length

**We assume a five-year regulatory period;** however, we consider that a six-year or seven-year control could make some forms of ex-ante incentive easier to apply e.g. because delivery obligations are more straightforward to specify for the whole project. However, decision about extending a control period requires more information than is available at this stage, including a more certain programme and project durations.

### Regulatory baseline acting as a cost target

Under our five-year assumption, not all works will be completed within H7; further costs are expected to be incurred during H8. However, based on the current plan the majority of construction will be complete in H7, with some activities due to start in the mid- or late-2020s. **Our illustrative delivery obligations focus on the scope of work currently envisaged for H7.** This scope and associated costs set the baseline for H7.

**Both our models start from the setting of a regulatory baseline (cost allowance(s) set as part of the H7 determination).** This acts as a cost target for the project within the control