Consumers and Markets Group

Working paper summarising affordability and financeability modelling for capacity expansion at Heathrow airport

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Enquiries regarding the content of this publication should be addressed to: dan.rock@caa.co.uk

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About this document

This working paper sets out our updated assessment of the affordability and financeability of the development of new runway capacity at Heathrow. It follows on from the initial assessment of affordability and financeability included within our consultation in April 2018, updating that assessment to take account of developments in HAL's masterplanning process for the expansion of Heathrow airport.

Views invited

We welcome views on all the issues raised in this working paper.

Please e-mail responses to economicregulation@caa.co.uk by no later than 13 August 2019. We cannot commit to take into account representations received after this date.

We expect to publish the responses we receive on our website as soon as practicable after the period for representations expires. Any material that is regarded as confidential should be clearly marked as such and included in a separate annex. Please note that we have powers and duties with respect to information under section 59 of the Civil Aviation Act 2012 and the Freedom of Information Act 2000.

If you would like to discuss any aspect of this document, please contact Dan Rock (economicregulation@caa.co.uk).

Updated assessment of affordability and financeability

Introduction

1.1 This working paper follows on from the initial assessment of the affordability and financeability included within the April 2018 Consultation.[1] It sets out our updated assessment and has also been used to inform our response to the Department for Transport's (DfT's) January 2019 request[2] for our views on whether there are "credible scenarios" in which Heathrow Airport Limited ("HAL") can deliver its proposed masterplan in line with the Secretary of State's ambition on airport charges remaining affordable.[3]

1.2 Since the April 2018 Consultation, there have been a number of developments in the wider expansion and masterplanning process, including that HAL has:

- identified a single preferred masterplan;
- changed the scope of the work due to take place during the H7 price control period (presently envisaged to be for the five year period between 2022 and 2026);
- revised its cost projections to set the overall capital expenditure envelope to deliver the new runway and associated infrastructure to about £14 billion[4] (in line with the change in the scope of work during H7 price control period noted above); and
- provided us with updated cost and revenue projections based on its single preferred masterplan.

[1] See CAP1658: Economic regulation of capacity expansion at Heathrow: policy update and consultation ("the April 2018 Consultation") www.caa.co.uk/CAP1658

[2] https://www.caa.co.uk/uploadedFiles/CAA/Content/Accordion/Standard_Content/Commercial/Airports/DfT%20response%20to%20Sept%202018%20enhanced%20engagement.pdf

[3] In October 2016 the Secretary of State stated that "The aim should be to deliver a plan for expansion that keeps landing charges close to current levels", see https://www.gov.uk/government/news/government-decides-on-new-runway-at-heathrow

[4] In 2014 prices

1.3 Throughout this working paper we refer to HAL's "preferred masterplan". Nonetheless it is important to recognise that it is still subject to consultation with airlines and through the statutory process under the Planning Act 2008.

1.4 The Government designated the Airports National Policy Statement (the "NPS") in June 2018.[5] The NPS states that an applicant for development consent "should demonstrate in its application for development consent that its scheme is cost efficient and sustainable, and seeks to minimise costs to airlines, passengers and freight owners over its lifetime."[6] An approach to capacity expansion that minimises whole life efficient costs should contribute towards making charges affordable and be consistent with the interests of consumers.

1.5 Stakeholders have consistently said that capacity expansion should be both affordable and financeable. Airlines, in particular, have retained a sharp focus on affordability, regarding it as a key indicator of success for the airport-airline engagement process, which is the focus of our "Section 16" reporting to Secretary of State and DfT.[7]

1.6 The assessment of affordability and financeability set out in this working paper is intended to update stakeholders on these matters following HAL's work on its single preferred master plan. HAL will also produce its statutory consultation for Heathrow expansion as part of the planning process, which it is due to launch on 18 June 2019.[8]

1.7 The April 2018 Consultation on affordability and financeability noted that the modelling of these issues relies on the quality and accuracy of the input data (including forecasts of costs, non-aeronautical ("non-aero") revenues and passenger traffic). While HAL has now produced its preferred master plan, significant uncertainties remain. These are in relation to the level of early

[5] See: https://www.gov.uk/government/speeches/airports-national-policy-statement

[6] Paragraph 4.39 of the NPS: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714106/airports-nps-new-runway-capacity-and-infrastructure-at-airports-in-the-south-east-of-england-web-version.pdf

[7] For more details of our Section 16 reporting, see: https://www.caa.co.uk/Commercial-industry/Airports/Economic-regulation/H7/Enhanced-Engagement-Section-16/

[8] http://mediacentre.heathrow.com/pressrelease/details/81/Expansion-News-23/11085

spending (i.e. before planning consent has been granted) and the level of overall programme spending. While we have modelled a base case (based on HAL's current masterplan) and a higher capital expenditure ("capex") scenario (with delays to the profile of capital spending), this approach does not necessarily reflect the full range of uncertainty with respect to these matters. We intend to consult further on early costs and the implications of the regulatory treatment of these costs for the regulatory and wider programme timetable later this month.

1.8 Following this working paper, we expect that the next assessment of affordability and financeability to be set out by HAL and included in its initial business plan. We anticipate that HAL will submit this to the CAA in December 2019 and commence its engagement with airlines on the plan at the same time.

Summary

1.9 The analysis in this working paper is high level and illustrative and is intended to update stakeholders in the light of the latest available information on capacity expansion at Heathrow. While the base case is informed by information from HAL's masterplan, the scenarios are illustrative rather than detailed "bottom up" or engineering led options. Nonetheless, the analysis is intended to inform stakeholders' understanding of the extent to which there are credible scenarios in which expansion of Heathrow is both affordable and financeable.

1.10 The analysis indicates that there are a range of credible scenarios that are both affordable and financeable. There are also scenarios where affordability and financeability would be more difficult. These broad findings are consistent with the results of our assessment in the April 2018 Consultation.

1.11 The scenarios we have assessed for this working paper are focused on HAL's masterplan, rather than variances that might emerge in the longer run, for instance if trends in commercial revenues or operating costs turn out to be different from current expectations. We also note that stakeholders may have their own views on the scenarios it is most appropriate to consider and on how affordability and financeability should be assessed.

1.12 We have continued to assume that affordability can reasonably be judged in terms of airport charges per passenger that are broadly consistent with 2016 levels in real terms. It was in 2016 when the Secretary of State indicated his preference for capacity expansion at Heathrow and stated that "the aim should be to deliver a plan for expansion that keeps landing charges close to current levels".[9] In assessing affordability, and considering our approach to affordability in the future, we will continue to be guided by our overall focus on the interests of consumers, informed by the views of airlines, and retaining their support for capacity expansion at Heathrow.

1.13 As for financeability, our work remains at a relatively early stage and our analysis is in terms of a simple notional financial structure (consistent with the approach economic regulators tend to take in setting price controls). Over the coming months, we expect to significantly enhance our analysis of financeability as we are developing our financial modelling capability and have appointed Centrus as strategic financial advisors.

1.14 Given our analysis is at a relatively early stage, it also has wider limitations:

- while the base data on capex comes from HAL's masterplanning process and has been subject to a degree of detail assessment, (a) HAL is continuing to consult on and develop its masterplan and (b) other key aspects of the base input data (including on operating expenditure ("opex"), non-aero revenues and passenger traffic) have been derived from relatively high level and stylized analysis;
- the scenarios are intended to be plausible assessments of possible upsides and downsides, but are not based on detailed engineering assessments and do not reflect the full range of possible outcomes for the capacity expansion programme and affordability and financeability; and
- the regulatory framework and price control arrangements have yet to be finalised, so there are a number of important aspects to be further developed, including the cost of capital, incentive framework, and the

[9] See https://www.gov.uk/government/news/government-decides-on-new-runway-at-heathrow

treatment of early costs (together with the possible implications of this for the wider programme timetable). The analysis assumes a notional financial structure similar to the arrangements used to set the existing Q6 price control and we will consider further whether this approach remains appropriate for our work on capacity expansion. All these factors could have a significant influence on both affordability and financeability.

The financial model, data and scenarios

The financial model

1.15 The analysis described in this working paper was conducted using the same underlying model which we used to conduct the analysis we published in the April 2018 Consultation.[10]

1.16 We made this model available[11] and have since received feedback on it from a range of stakeholders. We have subsequently updated the model in the light of these comments. The aims of the updates were to:

- improve the reliability and useability of the model; and
- adopt best practice where practical.

1.17 We note that many of the stakeholder comments indicated that this model is not easy to use. In response to this feedback we are developing a new price control model ("PCM"). The PCM represents the next major step in our modelling capability. The PCM will provide a wider range of functionality while being more transparent.

Data and assumptions

1.18 The main drivers of the model results are the following input data and assumptions:

[10] The notional regulatory framework described by the Regulatory Financial Model remains unchanged from April 2018.

[11] See: https://www.caa.co.uk/Commercial-industry/Airports/Economic-regulation/H7/Financial-Modelling/

- an opening regulatory asset base (derived from the current Q6 price control period) and depreciation profiles;
- capital expenditure (capex);
- operating expenditure (opex);
- non-aero revenues (commercial revenues HAL derives from operating the airport that are in addition to airport charges);
- passenger traffic volumes; and
- the cost of capital.

1.19 The analysis presented in this working paper is based on data provided by HAL following its programme milestone known as M4 Exit ("M4E"). This is the first point at which HAL has identified a single preferred masterplan for expansion.

1.20 Important context for the M4E numbers is that they relate to a different phasing of construction from the "Westerly Option" numbers that we used for our analysis of affordability and financeability in the April 2018 Consultation. The overall level of capex before runway opening has remained at about £14 billion, albeit that the change in phasing means that, by that point , a different scope of works[12] will have been completed.

1.21 We understand from discussions with HAL that its focus in developing the M4E figures has principally been on the capital expenditure (capex), for which a detailed and phased disaggregation was available.

1.22 Closely related to the capex figures are the capacity and passenger volumes used in the model. We used HAL's data for our base case passenger volume profile. This profile reflects an assumption of relatively high[13] passenger demand growth and was developed with input from airlines (and so is not a HAL forecast). As well as the additional volumes resulting from the incremental runway capacity, three key drivers contribute to further growth within this profile:

- fleet "densification" (i.e. a greater number of seats per aircraft over time);

[12] Which will still be consistent with national policy statement requirements.

[13] In the context of other passenger volume forecasts such as HAL's P50 case.

- optimisation of slot and network use to boost passenger load factors; and
- consolidation of some carriers' London network at Heathrow in a staged manner following runway opening.

1.23 This passenger demand profile was then constrained to the capacity profile that HAL developed in conjunction with the M4E capex profile.

1.24 We have discussed with HAL how best to produce projections for opex and non-aero revenues. For the period of the H7 price control, opex and non-aero revenues will derive largely from existing infrastructure. We expect that, with the opening of new capacity (currently planned for late 2026), opex and non-aero revenues will increase as passenger numbers rise.

1.25 Nonetheless, we remain at a relatively early stage in the process for producing detailed forecasts of opex and non-aero revenues. The detail of new terminal infrastructure has yet to be designed and security standards and arrangements may evolve over time. We have discussed and worked with HAL on how best to make projections of opex and non-aero revenues consistent with the capex and passenger volume profiles. The high level approach to these projections is discussed further in Appendix B, which also includes charts summarising the input data used in our scenarios.

1.26 We discuss the cost of capital and depreciation profiles in the section below.

Scenarios

1.27 Our overall aim is to assess whether there are 'credible scenarios' for the development of expansion that are both affordable and financeable. To do this, we examined a range of scenarios and looked at what each of those implied for airport charges and a range of measures of creditworthiness (as discussed further in the financiability section below).

1.28 The focus of our analysis is on the impact of capex and associated risks (such as construction delays and their consequential impacts). We have taken this approach as it aligns with HAL's focus in producing its masterplan. Capex tends to have a greater impact on both affordability and financeability than items such as opex and non-aero revenues (since, historically, opex has tended to grow in a

manner both equal and opposite to non-aero revenue in the "single till" calculations we use to set HAL's price control).

1.29 We have focused on HAL's masterplan information rather conducting a full range of sensitivities or looking at longer term risks (although more work will be needed on these matters in due course). This contrasts with our analysis for the April 2018 Consultation which did include some limited assumptions about longer term risks, such the broad impact of different longer term trends in opex and non-aero revenues. This change in approach reflects the fact that our earlier analysis was our first examination of affordability and financeability and we wanted at that time to set out an initial examination of a wider range of factors. By contrast, the analysis in this working paper is focussed more tightly on the capex information that has emerged from HAL's master planning process.

1.30 The base case in our analysis uses the capex numbers submitted by HAL and high level assumptions on passenger traffic, with other costs and revenues derived in a way consistent with the capex forecasts. In addition to a base case, we have sought to develop credible scenarios that look at upsides and downsides compared to the base case, with a focus on the impact of changes to capex.

1.31 We have not yet reached a decision on the appropriate cost of capital for the H7 price control period. This will involve important further work on financeability (as discussed in chapter 1 of the March 2019 Consultation[14]) and an assessment of whether the size of the capacity expansion programme will mean that there would be benefits to consumers in providing investors with greater certainty on returns beyond the expected five year period of the next price control.

1.32 Nonetheless, our modelling of affordability and financeability requires a cost of capital as an input, so we have looked at the impact of a range of different values. We have looked at scenarios with WACC values of 4%, 5% and 6%.[15] These values are not intended to be indicative of the CAA's current or eventual

[14] See CAP1782: Economic regulation of capacity expansion at Heathrow: policy update and consultation ("the March 2019 Consultation") http://publicapps.caa.co.uk/docs/33/CAP1782%20March%202019%20.1.pdf

[15] All in "pre-tax real" terms.

policy on WACC for H7. Rather, they are intended to illustrate the relationship between WACC and affordability and financeability.

1.33 The scenarios we present are illustrative scenarios rather than detailed bottom up engineering led options. HAL has engaged with us to help us develop meaningful scenarios, but these remain indicative scenarios rather than options constructed from detailed bottom up assessments. We have modelled three scenarios:

- "base case": this scenario uses HAL's capex figures, based on its master plan and complementary assumptions on passenger traffic, other costs and revenues;
- "lower capex": this scenario assumes lower capex, no delays to the delivery of new capacity and a 4% real weighted average cost of capital ("WACC"); and
- "higher capex": this scenario assumes that capex will exceed the baseline, that there is a two year delay in construction and runway opening and a 5% real WACC. This is not intended to be a "worst case" scenario (longer delays and larger overspends are possible), but it is intended to illustrate how capex influences affordability and financeability.

1.34 In our analysis for the April 2018 Consultation, our lower capex scenario also assumed that construction happened faster than in the base case. We consider that such a scenario is no longer credible as a review of HAL's expansion plans by the Independent Funds Surveyor ("IFS") suggested that the planned construction timetable was "possible albeit subject to a number of risks" and did not identify significant scope for an accelerated construction timetable.

1.35 The model inputs used in our scenarios is summarised in Table 1 below, with further information provided in Appendix B.

Table 1: summary of modelled scenarios

Parameter	Base case	Lower capex	Higher capex
Capex	HAL's M4E capex profile, includes risk contingencies of 27%[16]	No delay, included risk contingencies of 20%	Two year delay starting from 2021 and recovered by 2031[17]. Includes a total of 34% risk contingencies.
Depreciation	Depreciation profile provided by HAL which broadly follows accounting principles and depreciates assets on a "straight line" basis over their useful life	Base case depreciation scaled pro-rata to opening RAB to take account of the different capex profile.	
Passenger numbers ("pax")	Westerly Option dashboard case demand constrained by the capacity implied by the M4E capex profile.		
Opex	Figures derived using a simple cost model and input assumptions provided by HAL.		
Non-aero revenues			
WACC (pre-tax, real)	Tested at 4%, 5% and 6%	4%	5%

Source: CAA

1.36 The scenarios are intended to allow stakeholders to see the impact of different levels for some of the key inputs. Where the scenarios all use the same, or close to the same, values (for example opex and non-aero revenues), this should not be seen as an indication that the levels of these items are certain. We will explore the impacts of variation in these items in future when we have a better view of the potential scale of the possible variation.

[16] Risk contingency is an allowance for an amount in excess of the expected level of a cost to recognise the risk of overspend. The amount of contingency as a percentage of the underlying capex varies year to year.

[17] This capex profile remains consistent with national policy statement requirements that targets a 2030 runway opening.

Assessment of affordability and financeability

Affordability

1.37 Our analysis indicates a range of possible price paths between a lowest charge of £16 per passenger (in the base case scenario with WACC set at 4%)[18] and a highest charge of almost £29 per passenger (in the base case scenario with WACC set at 6%).[19] These figures are broadly similar to those derived from our analysis for the April 2018 Consultation, which indicated a range of prices between £16 and £30.[20] A high level reconciliation of our current analysis to the analysis for the April 2018 Consultation is provided in Appendix C.

1.38 As a benchmark, the Airports Commission assumed that charges at Heathrow might need to rise to £29 per passenger[21] to help fund capacity expansion. The airport charge per passenger in 2016 was £21.75.

1.39 We have reported the results of our analysis in 2014 prices.[22] This is to be consistent with previous analysis such as the April 2018 Consultation and HAL's approach to reporting in relation to expansion. The 2014 price base is now five years out of date and rebasing to April 2019 prices, using the CPI, would cause approximately a 7% uplift in the cost and price estimates presented in this working paper.

1.40 The results of this analysis should be interpreted with caution and in the context described in the above paragraphs. This analysis is intended to illustrate the extent to which there may be credible scenarios which are both affordable and financeable. That does not imply that any of the specific scenarios modelled will come to pass. Material aspects of the regulatory settlement are not yet

[18] In subsequent years the lower capex case produces the lowest charge per passenger though the lowest single value, as noted here, derives from the base case with 4% WACC.

[19] All prices reported in this section are in 2014 prices unless otherwise stated.

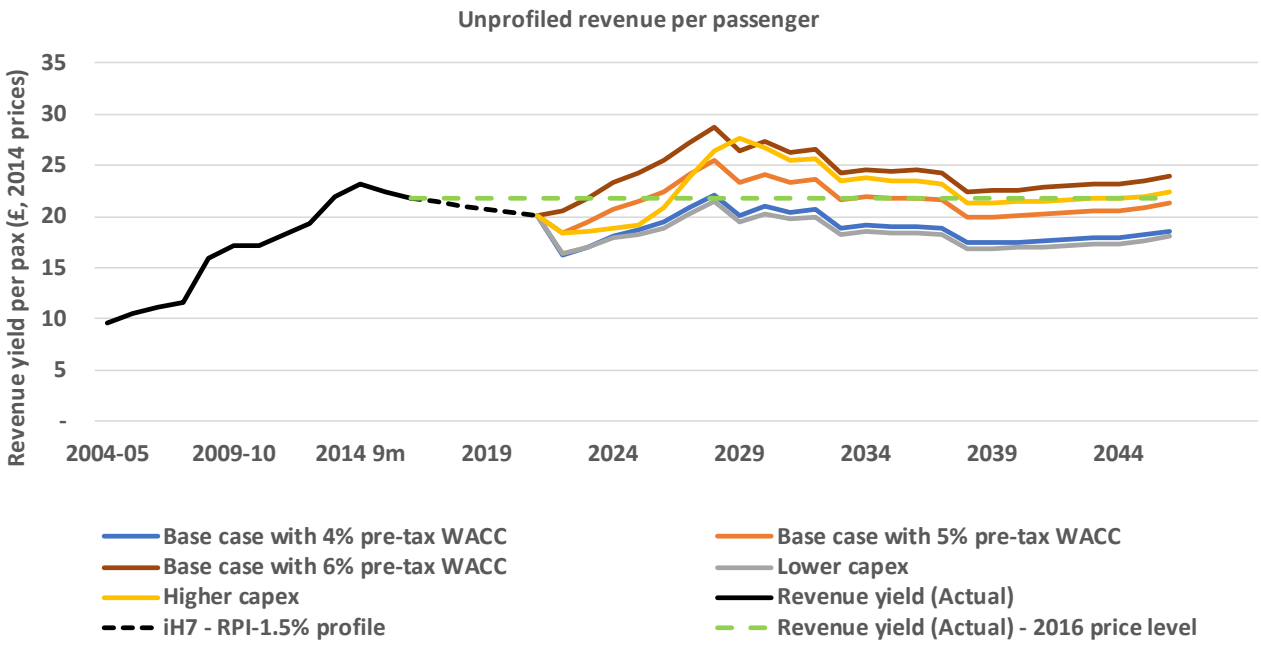
[20] See www.caa.co.uk./CAP1658

[21] Table 11.4 of the Airports Commission Final Report, July 2015. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf though note that the Airports Commission did not make explicit assumptions about how airports will be regulated in the future.

[22] Using RPI to rebase prices.

determined, and this could affect both affordability and financeability. The projections of costs and passenger traffic could also change significantly both as the design matures, and as a result of the planning process. We will also need to develop our views on the appropriate cost of capital.

Figure 1: illustrative price paths



Source: CAA analysis

1.41 The profiles shown in figure 1 above do not include any price "smoothing". The minimum, average and maximum values from the price paths shown in figure 1 are summarised in Table 2 below:

Table 2: Summary of price paths

£/pax	Min	Average	Max
Base case with 4% pre-tax WACC	16.27	18.86	22.06
Base case with 5% pre-tax WACC	18.45	21.51	25.42
Base case with 6% pre-tax WACC	20.16	24.14	28.76
Lower capex	16.31	18.33	21.41
Higher capex	18.32	22.47	27.59

Source: CAA analysis

1.42 The results shown in Figure 1 above show a wide range of possible price paths and indicate that there are credible scenarios which are broadly consistent with

the Secretary of State's ambition. For example, the base case at 4% and the lower capex scenario both broadly keep prices below the level in 2016.[23] By contrast, the remaining cases all show prices exceeding 2016 levels in real terms at some point.

1.43 A comparison of the different base case scenarios illustrates the highly material impact of the cost of capital on charges, with a one percentage point movement in the cost of capital driving a change in the price path of between £2.50 and £3.00 over the entire period.

1.44 A comparison of the two scenarios using a 5% WACC (the 5% base case and the higher capex scenario) illustrates the impact of delay and overspend on capex. The effect of delay in construction is to keep charges lower for longer, while the overspend causes the longer term level of prices to be higher by approximately £2 before steadily reducing over time.

1.45 The current assessment of affordability focuses solely on charges and is separate from analysis that would be required to understand longer term value for money[24] and the impact of HAL's slower phasing[25] to achieve prices close to 2016 levels. There are benefits to consumers in the timely delivery of capacity expansion, and it remains important that HAL takes a proportionate and efficient approach to timely delivery. We will discuss these matters further in our consultation on costs and timetable, which we intend to publish later this month.

1.46 The higher capex scenario assumes a significant capex overspend. As with our previous analysis, we would expect that a number of mitigations could be deployed to avoid these higher airport charges materialising that have not been considered here, including:

[23] The question of whether charges are 'close' to 2016 levels is a judgemental one but we would expect that all parties would agree that a price path which stays below 2016 levels meets the ambition.

[24] For example, to assess the value for money offered by expansion taking account of a wider range of factors such as community impact.

[25] The 'slower' phasing referred to here is the base case phasing for this analysis. It is slower relative to the phasing used in the previous affordability and financeability assessment in April 2018.

- management action to mitigate the risk of capex increases and to seek out offsetting efficiencies;
- appropriate regulatory incentives on HAL to mitigate the risk of delay and manage cost risk; and
- further possible re-phasing of capex in response to any slower than expected passenger growth.

Financeability

1.47 To protect consumers' interests, it is important that capacity expansion is efficiently financed. This requires us to be able to demonstrate that the regulatory framework supports financeability so that HAL can continue to access cost effective investment grade debt finance. Our emerging approach to achieving this and assessing financeability is described in chapter 1 of the March 2019 Consultation.

1.48 A key element of this approach is to consider all the elements of the price control holistically so that we find a package of measures that provides incentives for efficiency while also allowing for efficient financing, so that overall costs to consumers are no higher than necessary. We will develop detailed proposals in respect of these matters as part of the work we will do for the H7 price control review.

1.49 Consequently, the financeability assessment we present here is an initial and illustrative view of the potential impact of different scenarios on key credit metrics. Credit metrics are commonly used by credit rating agencies as part of their assessment of the credit risk of different financial instruments and issuers of debt. By looking at credit metrics we get some sense of the extent to which the scenarios might be financeable.

1.50 We have also assumed a simple notional financial structure with gearing at no more than 60%. We have not considered HAL's existing business securitisation model and debt platform in detail, which has allowed HAL to support significantly higher levels of gearing.

1.51 In addition to a more detailed assessment of financeability, financial structures and credit metrics, the main price control will look at qualitative factors and the role of equity. The credit metrics presented in this working paper were chosen to illustrate the impact of the scenarios on both HAL's ability to service debt year to year and the impact on longer term financial position.

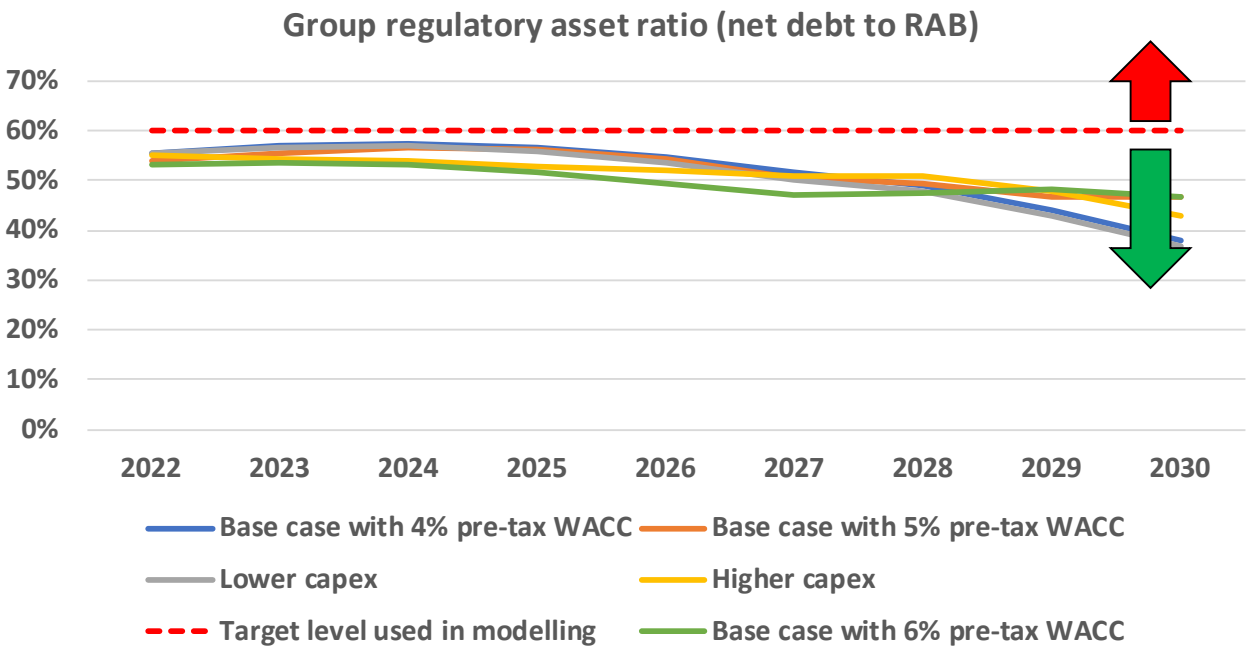
1.52 Below we present the results of our initial and simplified analysis of financeability in terms of several key credit metrics. The charts below present illustrative threshold levels for A- and BBB+ investment grade credit ratings. These thresholds assume no change in rating agencies' approach or assessment of qualitative assessment of the risk associated with HAL's debt.[26]

1.53 We have focused on 3 of the most important credit metrics:

- net debt to RAB;
- funds from operation (FFO) to net debt; and
- debt to earnings before interest, tax, depreciation and amortisation (EBITDA).

Figure 2: Net debt to RAB

[26] In practice it is possible that the thresholds could move if rating agencies' views about HAL's business risk profile changes as a result of the expansion program.



Source: CAA analysis

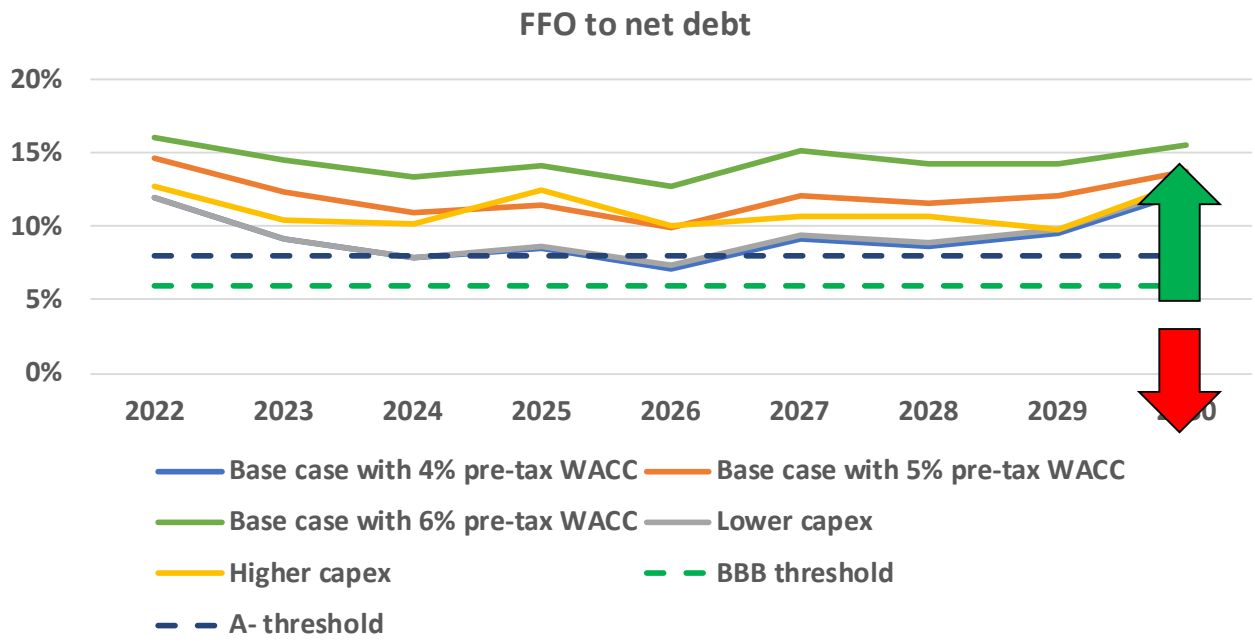
1.54 Net debt to RAB (or the regulatory asset ratio) is calculated by dividing net debt (debt less cash) by the RAB. This is often a key credit metric in regulated sectors as it indicates the relationship between long term liabilities and the business' ability to meet them through returns generated by the RAB.

1.55 In this analysis, the regulatory asset ratio serves as a key credit metric and also illustrates the modelling issues we have encountered with gearing. For all of these scenarios, we have set the model to target a gearing level of 60%. As shown in Figure 2, the model achieves gearing levels that averages around 50%. This is due to the model inputs resulting in a level of retained earnings in the business which does not allow for the level of dividends required to achieve a gearing level of 60% or higher.[27] The further work we are due to undertake on our financial model and financeability will allow us to explore higher levels of gearing. Nonetheless, the efficient level of gearing for capacity expansion may be somewhat below the relatively high levels seen as part of HAL's existing business securitisation model.

[27] In our future analysis, using the PCM, we will explore the impact of higher gearing levels on affordability and financeability in line with our stated financeability policy set out in the March 2019 Consultation.

1.56 Credit rating agencies do have thresholds for regulatory asset ratio though they are not shown in Figure 2 as the A- and BBB thresholds are materially above 60%.

Figure 3: Funds from operations to net debt



Source: CAA analysis

1.57 Figure 3 shows FFO to net debt and the threshold levels for A- and BBB levels of investment grade credit ratings.[28] This shows that, around 2026, the scenarios using a 4% WACC produce a FFO to net debt ratio below the level consistent with an A- credit rating. This indicates that financeability could be challenging, although it does not necessarily indicate that these scenarios are unfinanceable for the following reasons:

- these scenarios do not include any measures intended to bolster financeability. Such measures could be taken by either HAL (for example changing the parameters of expansion[29], greater cost control, or other measures) or, if necessary, to protect the interests of consumers, the CAA;

[28] The threshold levels are taken from summaries of credit rating agencies' methodologies. Rating agencies' specified thresholds for a given rating may change over time and they may choose to put more or less weight on any given metric in their overall assessment.

[29] For example, the scope and specification of expansion

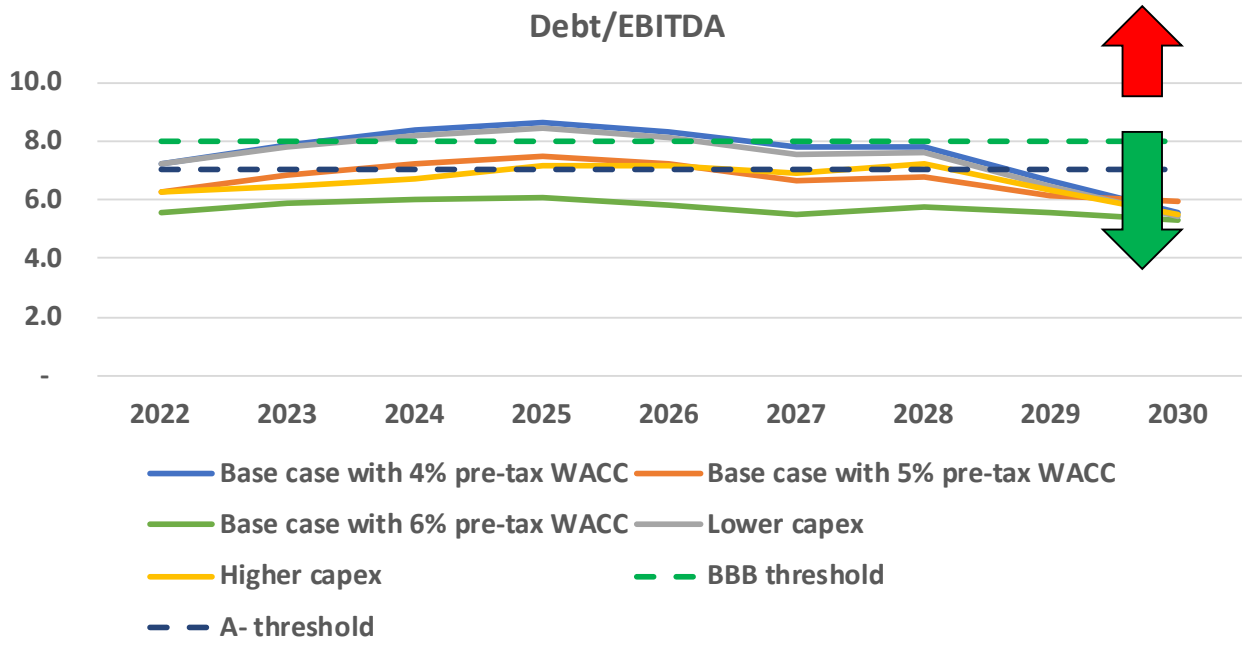
- it is not a settled matter which level of credit rating is required. We invited views on this matter in the March 2019 Consultation; and
- temporary breaches of threshold levels of individual metrics do not necessarily lead to credit rating downgrade. Rating agencies will also look at the wider picture and consider qualitative factors.

1.58 The FFO definition we have used in our analysis is a "cash based" measure. We note that Standard & Poor's use a definition of FFO which is "accruals based".[30] We are continuing to consider which measure is more appropriate to use in our financeability analysis. Our analysis to date suggests that the net impact of using the Standard & Poor's definition is not significant.

1.59 We also note that rating agencies sometimes look at the ratio of FFO to gross debt (i.e. not taking account of the cash held by the company). The FFO to gross debt ratio breaches the BBB threshold for all scenarios with a 4% WACC. We do not consider that this is a particularly meaningful measure of financeability during expansion when HAL could be holding significant large cash balances in order to ensure adequate liquidity to fund construction.

Figure 4: Debt to EBITDA

[30] I.e. which reflects the funds from operation and interest charge as per the income statement which may include non-cash items such as movement in working capital and accretion on index linked debt.



Source: CAA analysis

1.60 The term EBITDA describes earnings before interest, tax, depreciation and amortisation and is sometimes used as a rough proxy for cash generated by a business.

1.61 Figure 4 shows that the debt/EBITDA ratio comes under significant pressure during the H7 price control period, particularly in the scenarios and sensitivities that assume a 4% WACC. At least to some extent, this may reflect the sharp increase in the level of debt as new capacity is developed and the lag until revenues fully increase to reflect the increasing RAB. Once the new capacity opens and starts supporting higher revenues we see that the debt to EBITDA ratio improves.

1.62 Further assessment of these matters will be an important part of our future work on financeability. We are committed to finding an approach to financeability that allows HAL to continue to have access to cost effective investment grade finance, to both support financeability but also the overall deliverability and affordability of the capacity expansion programme.

Conclusions and next steps

1.63 When we examined these issues for the April 2018 Consultation, we concluded that there were credible scenarios in which capacity expansion can be delivered affordably and financeably. Our current analysis suggests that this remains the case. Unsurprisingly, lower costs and a lower cost of capital lead to greater affordability, but a lower cost of capital can also put pressure on financeability. We also note that stakeholders may have their own views on the scenarios it is most appropriate to consider and on how affordability and financeability should be assessed.

1.64 Our analysis has focused on the purely quantitative aspects of affordability and financeability. Qualitative assessment is also important and has a bearing not only on affordability and financeability, but also on the question of what exactly is being delivered and to what time scales. For example, as noted above, HAL has changed the scope of what will be delivered by 2026 to retain a budget of £14 billion for capex and there are questions about the level of early costs and the overall programme timetable.

1.65 It is also important to bear in mind that this analysis is at a relatively early stage and has significant limitations:

- while the base data on capex comes from HAL's masterplanning process and has been subject to a degree of detail assessment (a) HAL is continuing to consult on and develop its masterplan and (b) other key aspects of the base input data (including on opex, non-aero revenues and pax) have been derived from relatively high level and stylized analysis;
- the scenarios are intended to be plausible assessments of possible upsides and downsides but are not based on detailed engineering assessments and do reflect the full range of possible outcomes with respect to the capacity expansion programme and affordability and financeability; and
- the regulatory framework and price control arrangements have yet to be finalised and so there are a number of important matters to be determined, including the cost of capital, incentive framework, and the treatment of early

costs and the possible implications of this for the wider programme timetable. All these factors could have a significant influence on both affordability and financeability.

1.66 This working paper marks an important step in developing our analysis of affordability and financeability at the point that HAL has developed its initial masterplan and is about to embark on its statutory consultation. Following publication of this working paper we will continue to refine our analysis and further develop our policy in respect of affordability and financeability. This will involve:

- enhancing our financial modelling capabilities with development of the PCM;
- working with Centrus as our strategic financial advisors;
- delivering the work programme on the cost of capital set out in the February 2019 Working Paper;[31]
- developing our approach to financeability following the March 2019 Consultation, with a further update planned for October 2019;
- consulting further on the treatment of early costs and the implications of this spending for the overall programme timetable in June 2019;
- taking account of further information that emerges from HAL's masterplanning process and statutory consultations; and
- considering HAL's assessment of affordability and financeability that we expect will published as part of its initial price control business plan in December 2019;
- more detailed assessment of scenarios where airport charges are both affordable and reasonably support financeability. This analysis will include stress testing to look at the impact of volume[32] and cost risks; and

[31] See CAP 1762: Working paper on the cost of capital: the implications of the RP3 draft performance plan for Heathrow Airport Limited (HAL) ("the February 2019 Working Paper") www.caa.co.uk/CAP1762

[32] For example by using lower passenger profiles such as the P50 profile HAL has developed as well more severe downsides.

- we will also look at the implications of financial structures other than the ones modelled in this analysis. In particular, we note that HAL has a level of gearing materially higher than the 60% target level used in this analysis and we will also identify and consider similar capital structures to those HAL is likely to use to support its capacity expansion programme.

Appendix A

Our duties

1. The CAA is an independent economic regulator. Our duties in relation to the economic regulation of airport operation services ("AOS"), including capacity expansion, are set out in the CAA12.

2. CAA12 gives the CAA a general ("primary") duty, to carry out its functions under CAA12 in a manner which it considers will further the interests of users of air transport services regarding the range, availability, continuity, cost and quality of AOS.

3. CAA12 defines users of air transport services as present and future passengers and those with a right in property carried by the service (i.e. cargo owners). We often refer to these users by using the shorthand of "consumers".

4. The CAA must also carry out its functions, where appropriate, in a manner that will promote competition in the provision of AOS.

5. In discharging this primary duty, the CAA must also have regard to a range of other matters specified in the CAA12. These include:

   - the need to secure that each licensee is able to finance its licensed activities;
   - the need to secure that all reasonable demands for AOS are met;
   - the need to promote economy and efficiency on the part of licensees in the provision of AOS;
   - the need to secure that the licensee is able to take reasonable measures to reduce, control and/or mitigate adverse environmental effects;
   - any guidance issued by the Secretary of State or international obligation on the UK notified by the Secretary of State; and
   - the Better Regulation principles.

6. In relation to the capacity expansion at Heathrow, these duties relate to the CAA's functions concerning the activities of HAL as the operator at Heathrow.

7. CAA12 also sets out the circumstances in which we can regulate airport operators through an economic licence. In particular, airport operators must be subject to economic regulation where they fulfil the Market Power Test as set out in CAA12. Airport operators that do not fulfil the Test are not subject to economic regulation. As a result of the market power determinations we completed in 2014 both HAL and GAL are subject to economic regulation.

8. We are only required to update these determinations if we are requested to do so and there has been a material change in circumstances since the most recent determination. We may also undertake a market power determination whenever we consider it appropriate to do so.

Appendix B

Summary of model input data and assumptions

Introduction

1. This appendix details the inputs and assumptions we have used to construct our scenarios. The base case figures reflect HAL's M4E masterplan case. The higher capex and lower capex scenarios were developed by the CAA to test a range of outcomes and assumptions.

Capex and depreciation

2. The capex base case includes a risk contingency of approximately[33] 27%, i.e. the profile is approximately 27% higher than the expected cost of construction to allow for the possibility of things costing more than expected.[34] This profile is designed to achieve opening of the new runway in 2026, albeit that significant further work associated with expansion will happen beyond 2026.

3. The lower capex profile includes a smaller risk contingency (of 20%[35]) to reflect the possibility of works being completed at a lower cost than in the base case. Nonetheless, given the scale and complexity of the project, we considered that it was prudent to continue to include some risk contingency rather than remove it entirely. The lower capex profile also assumes runway opening in 2026.

4. The higher capex profile includes a larger risk contingency of 34% which we consider is appropriate in light of comments made by the IFS".[36] This scenario

[33] The level of risk contingency varies year to year.

[34] HAL's capex plans have been reviewed by the IFS. The IFS noted that the costs, contingent provisions and management reserve together "provides an appropriate coverage for delivery of the scope".

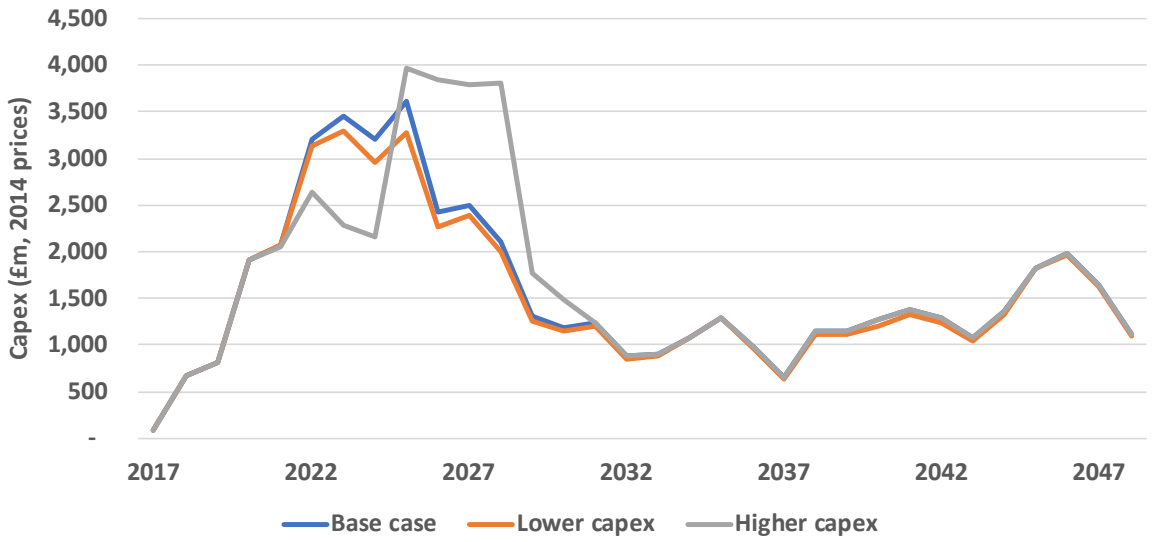
[35] For the lower capex case, we obtained from HAL a capex profile reflecting the P38 probability percentile in order to have a profile consistent with the phasing of the base case but in which a lower level of contingency was required. The use of the P38 profile reflects the CAA's judgement that it was appropriate to examine a lower capex scenario but not to go so far as to assume that no contingency at all was required.

[36] The IFS's role is to assure that capital funds are invested efficiently to meet agreed project objectives. It does this by assuring the programme and project development process through major gateways followed by monthly reviews through the design and delivery phases. The IFS reports its findings to HAL and the airlines,

also includes a two year delay starting in 2021 during which construction slows down before starting to catch up to the original timetable. This scenario assumes that by 2031 work has caught back up to the original timetable and that after 2031 costs are at the same level as the base case.

5. These profiles are shown in Figure 5 below.

Figure 5: Capex profiles



Source: CAA analysis

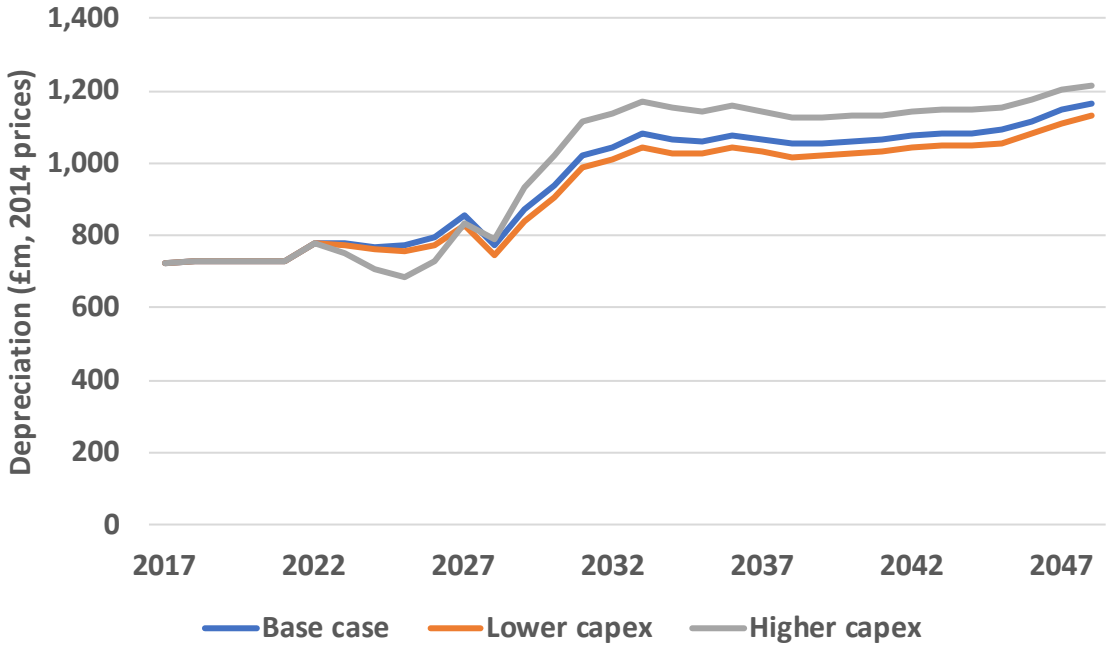
6. Along with the capex profile, HAL provided an associated depreciation profile. We understand from HAL that this depreciation profile was calculated using the straight line method of depreciation in which assets are depreciated evenly over the expected useful economic lives.

7. From this base case depreciation profile, we calculated depreciation profiles for the higher and lower capex scenarios pro rata to the opening RAB.

8. These profiles are shown in figure 6 below.

including on confidential matters.

Figure 6: Depreciation profiles



Source: CAA analysis

Passengers

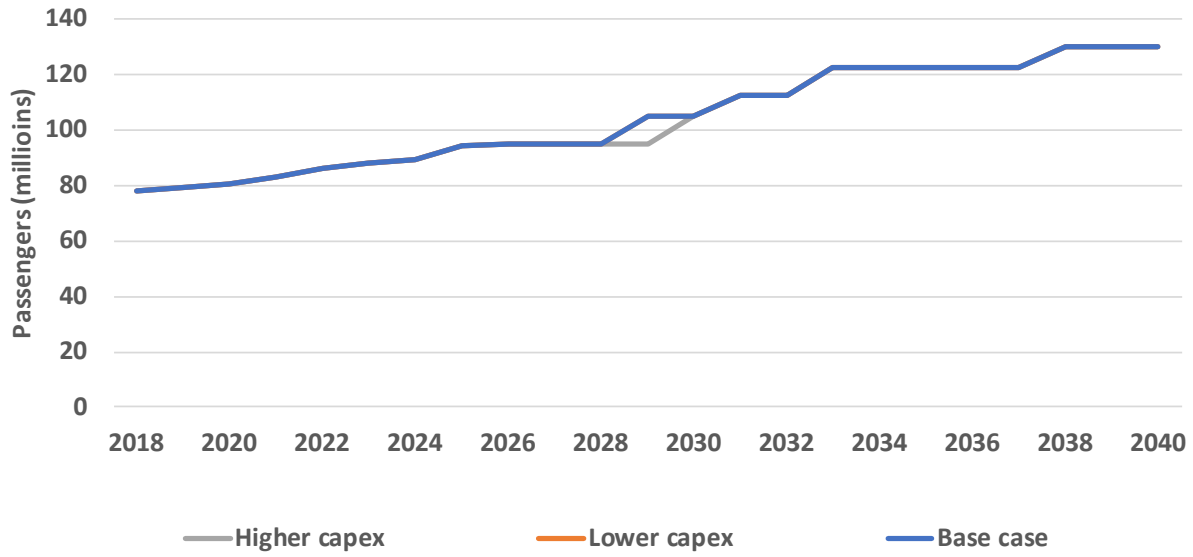
9. HAL provided an airline assumptions based profile of passenger volumes that we used for the base case. HAL calculated this profile by constraining demand projections from the Westerly Option Dashboard Case ("WODC") with the capacity profile resulting from the M4E master plan.

10. Our lower capex scenario has the same underlying capex profile as the base case (i.e. the timing of capex is the same as the base case). Consistent with this, we have used the same passenger profile for the lower capex case.

11. The higher scenario includes a two year delay in construction. To model the impact of this delay on passenger numbers we obtained from HAL a capacity profile that reflects the same two year delay. We then constrained the WODC demand figures to the delayed capacity profile.

12. These profiles are shown in figure 7 below. Note that the 'lower capex' line is not visible as it is coincident with the 'base case' line.

Figure 7: Passenger profiles



Source: CAA analysis

Operating costs and non-aero revenues

13. HAL has provided a cost model that breaks down operating costs into the line items reported in the regulatory accounts. The model calculates values for each line item using a detailed set of assumptions for incremental costs, revenues and elasticities. HAL provided values for these assumptions that were determined "based on management judgement and experience".

14. We reviewed this cost model and concluded that (together with passenger forecast) it could assist in establishing a logical and methodical approach to determining opex and non-aero revenues. We were then able to use the cost model to calculate opex and non-aero revenue figures consistent with the passenger volumes in our downside case.[37] Our review of HAL's work allowed us to obtain a basic level of assurance as to the reasonableness of HAL's figures.[38]

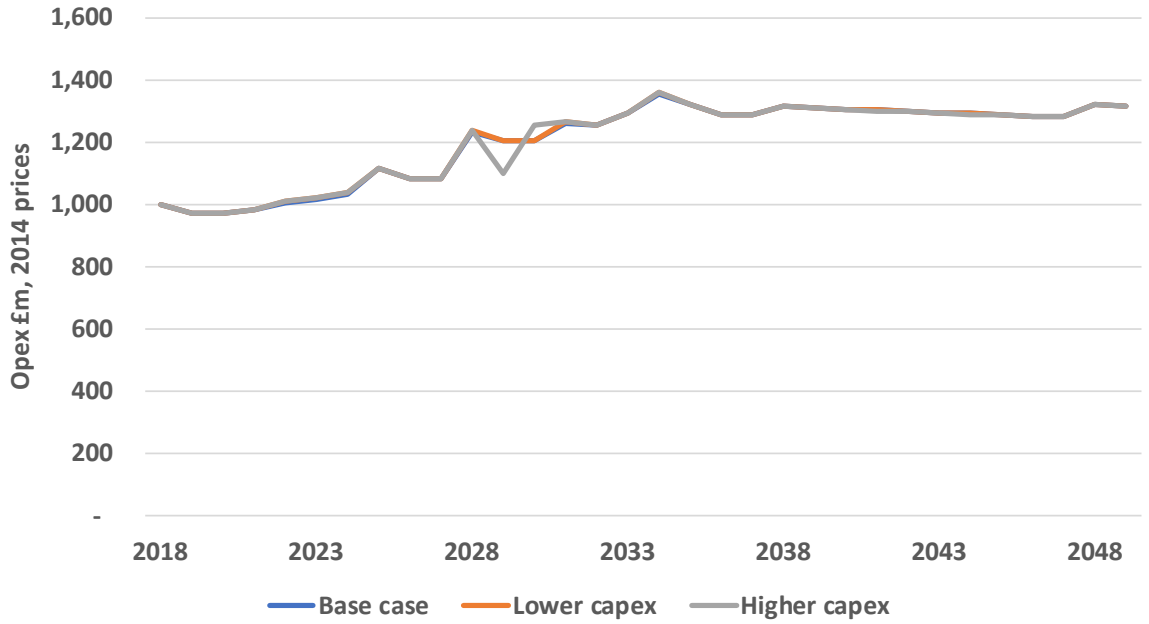
[37] It was not necessary to do the same exercise for the lower capex case as the lower capex case shares the same passenger volume profile as the base case.

[38] It was not practical to conduct an in depth review of these figures at this stage in the process. This is partly a reflection of the fact that the numbers HAL provided are top down estimates, and partly a reflection of the short time available to conduct our analysis prior to HAL's statutory consultation in June 2019. We will conduct a comprehensive review of HAL's figures when we receive its initial business plan, expected in December 2019.

15. Our lower capex passenger profile is identical to the base case profile (as described in paragraph 10). Consequently, the lower capex operating cost profile is identical to the base case operating cost profile. The higher capex operating cost profile was calculated by inputting the higher capex passenger volume profile into the same operating cost workings.

16. These profiles are shown in figure 8 below.

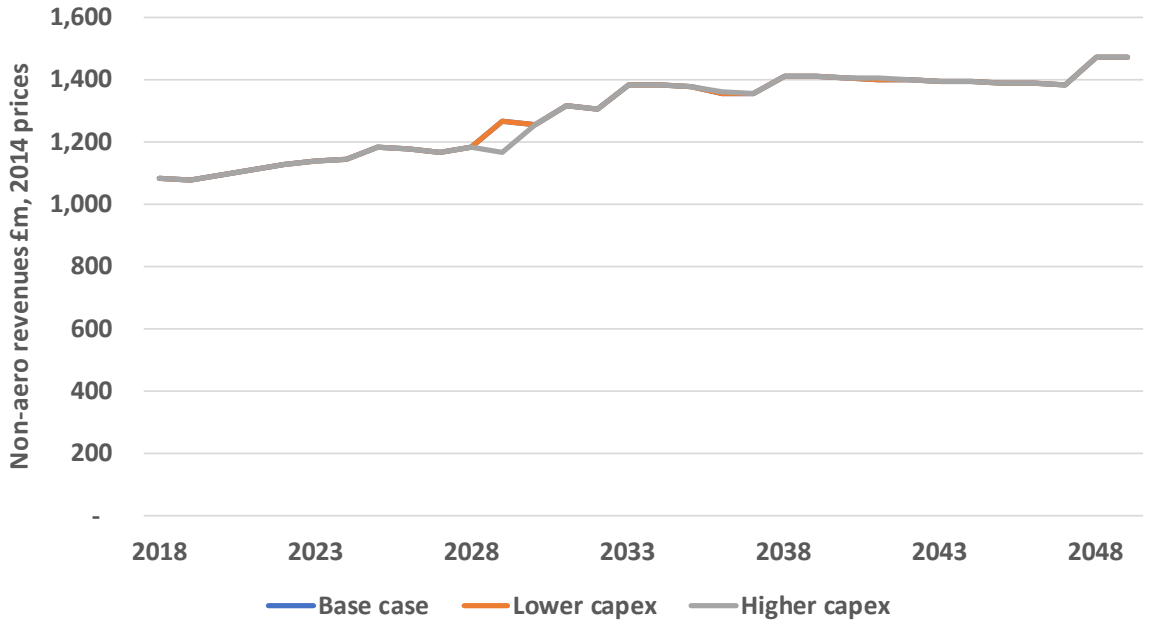
Figure 8: Operating costs



Source: CAA analysis

17. For non-aero revenues, the lower capex case is identical to the base case and the higher capex case differs only in the shift in passenger volumes caused by the capacity delay. These profiles are shown in Figure 9 below.

Figure 9: Non-aero revenues profile



Source: CAA analysis

18. With both operating costs and non-aero revenues, we have not made any adjustments in respect of year on year efficiencies or real price effects in the longer term. We made this decision in order to keep the focus of the analysis on HAL's masterplan base case.

19. If different trends in operating costs and/or non-aero revenues emerge over time, these could have a significant bearing on affordability and financeability in the longer term.

Weighted average cost of capital

20. The WACC values we have used in our analysis were chosen on the basis that they collectively describe a range of plausible scenarios. The WACC values are not intended to be indicative of the CAA's position of what might be an appropriate WACC value for H7. This is not least because we outlined in the March 2019 Consultation[39] how the decision on WACC will be taken as part of a holistic assessment of the overall price control package and financeability, which we will work in 2020 and 2021.

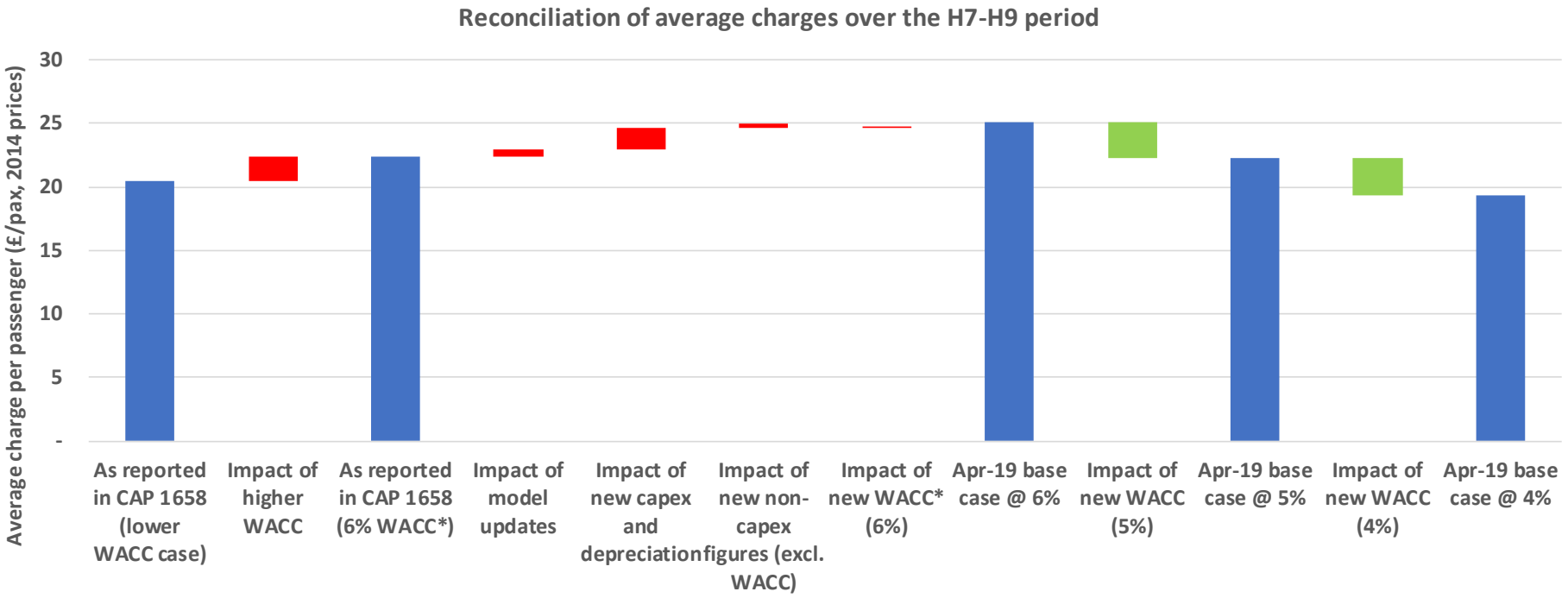
[39] See www.caa.co.uk/cap1782

21. Further, the WACC values used in this analysis are not intended to bound the range within which our eventual determination on WACC may fall. The WACC values of 4% to 5% come from our own analysis. The WACC value of 6% has been used in previous analysis by the Airports Commission and was also used in the April 2018 Consultation.

22. In October 2019, we plan to publish an update to our view of the regulatory framework for H7 price control and capacity expansion. This will include an update on our approach to financeability, incentives and estimating HAL's WACC.

Appendix C

High level reconciliation to April 2018 analysis



*** In CAP 1658 we presented a case using a WACC of 6% for the H7 period and declining thereafter due to reductions in the cost of debt. The 'impact of new WACC (6%)' shown here assumes a WACC of 6% throughout the modelled period.**