Review of H7 Opex and Commercial Revenues: Final Assessment and Forecasts (Opex)

Civil Aviation Authority

28 June 2022

PUBLISHABLE FINAL REPORT

Important notice

This document was prepared by CEPA LLP (trading as CEPA) and its partners for the exclusive use of the recipient(s) named herein.

The information contained in this document has been compiled by CEPA and may include material from other sources, which is believed to be reliable but has not been verified or audited. Public information, industry and statistical data are from sources we deem to be reliable; however, no reliance may be placed for any purposes whatsoever on the contents of this document or on its completeness. No representation or warranty, express or implied, is given and no responsibility or liability is or will be accepted by or on behalf of CEPA or by any of its directors, members, employees, agents or any other person as to the accuracy, completeness or correctness of the information contained in this document and any such liability is expressly disclaimed.

The findings enclosed in this document may contain predictions based on current data and historical trends. Any such predictions are subject to inherent risks and uncertainties.

The opinions expressed in this document are valid only for the purpose stated herein and as of the date stated. No obligation is assumed to revise this document to reflect changes, events or conditions, which occur subsequent to the date hereof.

CEPA does not accept or assume any responsibility in respect of the document to any readers of it (third parties), other than the recipient(s) named therein. To the fullest extent permitted by law, CEPA will accept no liability in respect of the document to any third parties. Should any third parties choose to rely on the document, then they do so at their own risk.

Contents

EXECUTIVE SUMMARY

The Civil Aviation Authority (CAA) has commissioned CEPA and Taylor Airey to provide support with its assessment of Heathrow Airport Limited's (HAL) forecasts of efficient operating expenditure (opex) and commercial revenues over the H7 price control period (2022 to 2026) – and in determining an alternate set of forecasts where appropriate. CEPA has led the review of HAL's forecasts of commercial and cargo revenues, while Taylor Airey has led the review of HAL's forecasts of opex, with support from CEPA. This report sets out our final forecasts for opex during the H7 period. Throughout this report, we report in nominal prices, unless otherwise stated, and our forecasts on opex reflect the CAA's updated mid case passenger volume scenario.

Context to the H7 price control

The legacy of the COVID-19 pandemic remains the biggest issue facing the aviation sector in the UK and globally and is expected to continue to have significant impacts on Heathrow airport's operations during H7 even as governments worldwide continue to reduce travel restrictions. At the time of writing (early May 2022), there are signs that demand for air travel is increasing rapidly, albeit with great uncertainty and potential volatility.

One consequence of this is that airports are having to ramp up their staffing swiftly, particularly for front-line services such as security. Shortages of suitably qualified people in a competitive job market means that there are certain pressures on labour costs. Inflation and rising fuel prices are also resulting in upward cost pressure. Conversely, the period of the pandemic might be expected to have provided HAL with certain opportunities to explore the realisation of efficiency benefits by removing legacy constraints, enabling flexibility and facilitating more nimble operations than may have been possible in the past.

This means that the H7 price review is being undertaken in a context of considerable forecasting uncertainty.

Our initial forecasts

Our initial forecasts were published alongside the CAA's initial proposals in October 2021, CAP2265.[1] For these forecasts, we utilised a "base-step-trend" modelling approach, matching the approach taken by HAL to forecast costs in its business plan. We reviewed the assumptions and data sources used by HAL to produce its opex forecasts under this base-step-trend approach, and we considered the supporting rationale given by HAL and its advisors in each stage of its opex assessment. Most of the information we reviewed was contained within HAL's Revised Business Plan (RBP) from December 2020 and its RBP Update 1 from June 2021. We assessed the information in the RBP and RBP Update 1 'as seen' considering of the impacts of the COVID-19 pandemic, regulatory precedent, passenger behaviour, and the market and economic factors in play.

This approach ensured our review of HAL's opex and commercial revenue forecasts was conscious of the situation in which HAL is operating. We attempted to compile a balanced set of forecasts that avoided overly conservative or overly optimistic assumptions. Nevertheless, there remained key areas of uncertainty in our initial forecasts. **Our review led us to forecast total opex over the H7 period, using the CAA's passenger forecasts, of £5,607 million (£5,215 million in 2020 prices), 13% (£858 million) smaller lower than HAL's proposals at RBP Update 1.**

HAL RBP Update 2 and stakeholder responses to CAP2265

Since then, the CAA has consulted on its initial proposals (as informed by our initial forecasts), and HAL has published its RBP Update 2. In response to the CAA consultation, HAL and the airlines that operate at Heathrow provided comments directly on our initial forecasts. As part of the process to create our final forecasts as described herein, we have engaged extensively with HAL and the airlines to ensure a full understanding of their respective positions and to ensure that our analysis reflects HAL's current and proposed future operations.

[1] CEPA Taylor Airey (2020), Review of H7 Opex and Commercial Revenues: Initial Assessment and Forecasts.

The broad messages from the response to the CAA's consultation were as follows:

- Airlines agreed broadly with our approach and its outcomes in most opex areas, highlighting that understanding of some opex categories would be improved by more detailed, bottom-up analysis.
- HAL was concerned that our approach was overly simplistic, failed to account for uncontrollable costs, and double counted some key efficiencies.[2]
- HAL stated that our assessment of security opex produced extremely challenging results and did not reflect some of the operational constraints resulting from its ongoing security transformation programme,[3] as well as from volatility and difficulty in forecasting short-term passenger demand.
- HAL challenged our approach on cost overlays to the efficient 2019 baseline relating to enhanced services relating to the ramp-up of Terminal 4 on its re-opening, the provision of COVID-19-related cleaning and passengers requiring support (PRS), contending that we had not reflected their obligations to provide both of these services throughout the H7 period.
- HAL objected to our treatment of elasticities, input price inflation and insurance, stating that all three approaches resulted in underestimates of efficient opex.
- Specifically relating to elasticities, which capture projected changes in opex items and opex drivers (e.g., passenger volume), HAL stated that its experience of the pandemic showed it had a higher proportion of fixed costs than implied by the elasticity to passenger volumes (0.4) that we had used for many cost items.

Although in the second update to its RBP HAL has retained the same high-level modelling approach as used in its RBP Update 1, a number of key assumptions and calculations have been updated. **In its RBP Update 2, HAL has forecast total opex of £6,735 million in nominal terms (£6,130 million in 2020 prices) over H7, 20% (£1,129 million) higher than our initial forecasts.**

Our consideration of the issues

We have considered the feedback, summarised above, in our approach to producing our final opex forecasts. These forecasts have also been informed by additional information provided by HAL and a series of bilateral engagement sessions both with HAL and airlines, including "deep dives" to address specific issues in detail.

During the course of our analysis, we have noted strong links, interdependencies and, potentially, overlaps between opex forecasts, capex forecasts and service level requirements. To address this, there has been strong engagement between the CAA's opex, capex and outcome-based regulation (OBR) workstreams throughout the assessment. Overall, however, our approach to the analysis remains largely unchanged from our initial forecasts.

To establish a **base year efficient opex**, we have retained the same basic and transparent approach we adopted for IPs of taking HAL's average opex per passenger over the years 2017 to 2019 as reflecting the foundation of our assessment. We have then subtracted the efficiency savings generated by HAL's Cost of Change programme from this foundation, and added on cost increases due to the introduction of the London Living Wage (LLW) to HAL's supply chain, to generate an efficient baseline.

---

[2] In particular, HAL considered our assessment of an efficient baseline derived from 2019 opex, double counted efficiencies arising from Heathrow's Cost of Change Programme and cost cutting measures introduced during the pandemic.

HAL also objected to our application of an associated efficiency saving to the additional costs arising from application of the London Living Wage and was also concerned that our application of a 1% ongoing productivity improvement adjustment also introduced double counting with efficiencies elsewhere in our forecasts, particularly in our assessment of security cost.

[3] This programme has the primary objective of meeting mandatory requirements by mid-2024 and, subsequently, a secondary objective to deliver efficiency benefits in the security operation.

We note that this baseline efficiency adjustment agrees with the updated econometric analysis that HAL commissioned from KPMG to derive an opex efficiency frontier.[4] In summary, this means that we consider the outcomes of the Cost of Change Programme to be *additional* to the efficiency frontier and is, hence, not double counting, whereas HAL considers the outcomes of the cost of change programme to be essential to achieving the efficiency frontier.

Our allowance for HAL's decision to ensure all staff within its supply chain are paid the LLW has been increased in response to the improved supporting evidence provided. Concerning cost savings associated with staff reductions in reaction to the pandemic, we have changed our approach to reflect our view that these savings will be temporary rather than permanent opportunities cost savings during the H7 period. This is consistent with the representations that HAL has made in its response to CAP2265 and the forecasts in its RBP Update 2.

The subsections below set out the trend and step adjustments that we make to this efficient baseline.

People

We have revised our analysis of security staff costs to reflect additional information provided by HAL both on the current and future security operations and the security transformation programme.

H7 security costs are driven, principally, by the security transformation programme. This has the objective to meet mandatory security requirements for new technology by mid-2024. The later stages of the programme, post-2024, have the potential to deliver efficiency savings. HAL states that the scheduling of the programme is driven by its complexity, regulatory constraints and the technology supply chain. The impact of the programme, therefore, is to introduce additional costs in the early stages with cost savings from operational efficiency improvements only becoming available later. We note that if it were at all possible, the rescheduling the programme could deliver enhanced operational performance and efficiency savings earlier.

Our analysis, based on elasticities to account for volume effects and overlays to account for potential efficiencies, reflects the current status of the programme and our final forecasts are therefore considerably higher than our initial forecasts. Where we have applied efficiency savings due to enhanced security operations, e.g. reduced staffing and increased security lane throughput, we no longer apply a 1% annual efficiency saving to avoid the risk of double counting efficiency opportunities.

Other than to realign the ramp-up of staffing to support the re-opening of Terminal 4, the remainder of our analysis of people costs remains unchanged from our initial forecasts.

Operational costs

We have retained an elasticity of 0.4 to changes in passenger volumes in our analysis of operational costs, modelled relative to our efficient 2019 baseline. This is based on our assessment that for purely variable costs, as in security lane staffing, we would expect an elasticity to passenger volumes of 0.5 to 0.8. At the high end of this range an assumption of 50% fixed and 50% variable costs would result in an overall elasticity of 0.4. Frontier Economics observe that airport operating cost elasticities (for a mix of fixed and variable costs) normally lie in the range 0.5 to 0.7, thus as assumption of 0.4 for a 50% variable cost does not appear unreasonable.[5]

Concerning operational costs, we have also noted a potential overlap between the cost associated with provision of services for passengers with reduced mobility (PRM) and passengers requiring support (PRS). We have addressed this in our assessment of PRS for our final forecasts. We have also revised our assessment of insurance costs based on the observation that the insurance market has historically been cyclical in nature and forecasts derived

[4] KPMG (2021) Airport Operating Cost Efficiency Benchmark – Report for Heathrow Airport Limited.

[5] Frontier Economics (2019) Developing opex and commercial revenue elasticities for H7.

from Swiss Re.[6] This has resulted in an increase in our forecast for insurance from our initial forecasts, but our final forecasts remain smaller than HAL's in its latest update to the RBP.

Facilities and Maintenance

As facilities and maintenance costs are solely associated with third party contracts, we have not applied an elasticity adjustment to the efficient baseline but, as in the same way for our initial forecasts, analysed costs based on input price inflation and scope for ongoing efficiency (see below). Our acceptance that facilities and maintenance costs should be subject to a bespoke price series to reflect cost pressures that differ from CPI, results in a higher forecast.

Rates, Utilities and Distribution Contract, and General Expenses

For these cost categories, we have maintained broadly the same assumptions from our initial forecasts. However, our nominal forecasts have increased due to higher CPI and energy price inflation expectations over the H7 period.

Other overlays

As discussed above, our forecasting methodology applies a series of overlays to account for headwinds and tailwinds that are not captured in our baseline efficient opex.

The first major overlay addresses the impact of the COVID-19 pandemic. Our analysis is based on additional, detailed information provided by HAL and the current situation where all COVID-19 restrictions have been removed. Our forecasts, therefore, only include provision for costs associated with cleaning and some COVID-19 enforcement measures for early 2022. We assume that there will be no requirement for COVID-19 measures after the end of 2022 and, so, our forecasts are reduced considerably from our IPs.

The second major overlay considered is for the provision of enhanced services for PRS. It is possible to view this initiative as a purely service quality issue, which would not be considered as additional or, alternatively, an initiative to improve Heathrow's inclusivity and accessibility for vulnerable passengers. To account for this potential different in views, we have assessed two scenarios: the first where the PRS service is only a service quality enhancement, in which case our forecasts do not include its provision; or, second, where PRS is an additional service, in which case our final forecasts include its provision, adjusted for the overlap with the PRM service.

The third, resilience, overlay addresses the additional opex needed to maintain service quality levels for ageing passenger sensitive and operationally critical equipment, such as lifts, escalators, and boarding jetties. Our analysis is based on additional data provided by and engagement with HAL. This has resulted in a final forecast slightly higher than our initial forecast but still smaller than HAL's RBP Update 2.

We have made no changes to our approach on the other overlays – surface access initiatives, digital services, and automated journeys, concluding that none of these overlays created requirements that required an additional allowance. In its RPP Update 2, HAL agreed with this assessment.

Input price inflation

HAL provided further evidence in support of its proposals to assume real price effects for certain cost categories (i.e. assume its exposure to cost pressures in certain categories of spend differs from general price inflation, as measured by CPI). We have taken into consideration this evidence and allowed for real price effects for HAL's operational costs category.

We also update our estimates of inflation and wage growth, in line with the most recent projections. This has a significant effect on our nominal price projections, given expectations of high inflation in 2022. Our estimate of utilities price inflation has also increased substantially since our initial forecasts based on a forecast adopted by HAL in its latest RBP Update 2.

---

[6] Swiss Re Institute (2021) Sigma: Turbulence after lift-off: global economic and insurance market outlook 2022/23, No 5/2021, Table 6. Available at swissre.com.

Finally, in response to representations made by HAL, we have reconsidered our view that wage freezes implemented in 2020 and 2021 would lead to a permanently lower wage level when compared against economy wide wage growth. We now assume that wage growth in 2022 and 2023 will gradually reverse the effect of the pay freeze, such that cumulative wage growth between 2019 and 2024 is in line with the OBR's estimate of economy-wide wage growth.

Ongoing productivity and capital investment

We have considered the representations made by HAL and its advisors in support of a 0.1% ongoing productivity target in the absence of HAL receiving its request capex allowance. We continue to maintain that a 1% target is appropriate for setting an efficient H7 opex independent of any specific level of capex allowance, given longstanding regulatory precedent, more recent evidence around a limited long-term effect from the COVID-19 pandemic, and evidence around future productivity growth. Nevertheless, as the CAA is proposing to provide HAL with a capex allowance for H7, the evidence for using a 1% ongoing productivity target is strengthened.

We also bring forward our application of the ongoing productivity target for non-pay costs from 2022 to 2020, to reflect our view of opportunities for permanent efficiency potential from HAL's cost cutting actions in 2020. Such efficiencies were previously captured in our baseline adjustment, which we no longer apply.

Our final forecasts

In our final forecasts, we have sought to build on our work at initial forecasts, by updating our approach and assumptions based on our review of additional evidence and calculations provided by HAL, as well as by other stakeholders. The additional information provided since our initial forecasts has reduced the uncertainty surrounding our forecasts; however, the COVID-19 pandemic continues to impose forecasting uncertainty. As a result, key areas will require the judgement of the CAA as regulator.

In the mid-case of our final forecasts, under the CAA's passenger projections, we forecast a total of £6,742 million (£5,797 million in 2020 prices) of opex during H7. This is 0.1% (£7 million) higher than HAL's forecasts at RBP Update 2. Table E presents a breakdown of opex across H7 and opex categories in nominal terms.

Table E.1: TA opex final forecasts, using CAA mid pax projections (£ million, nominal)

	2022	2023	2024	2025	2026	H7
People	368	369	417	452	440	**2,045**
Operational costs excl. insurance	273	305	321	334	340	**1,573**
Insurance	17	18	19	20	21	**96**
Facilities and maintenance	178	192	193	195	197	**955**
Rates	131	136	138	141	143	**689**
Utilities	88	93	94	96	97	**467**
Distribution contract	33	34	32	32	33	**165**
General expenses	118	130	136	141	142	**666**
Surface access initiatives	6	6	7	7	6	**33**
Overlays	7	4	8	14	20	**52**
Total opex	**1,219**	**1,287**	**1,364**	**1,432**	**1,440**	**6,742**
Total per passenger (£)	**22.21**	**19.11**	**18.10**	**17.68**	**17.64**	**18.72**
Difference from HAL RBP U2 (£ million)	11	-21	-9	26	0	**7**

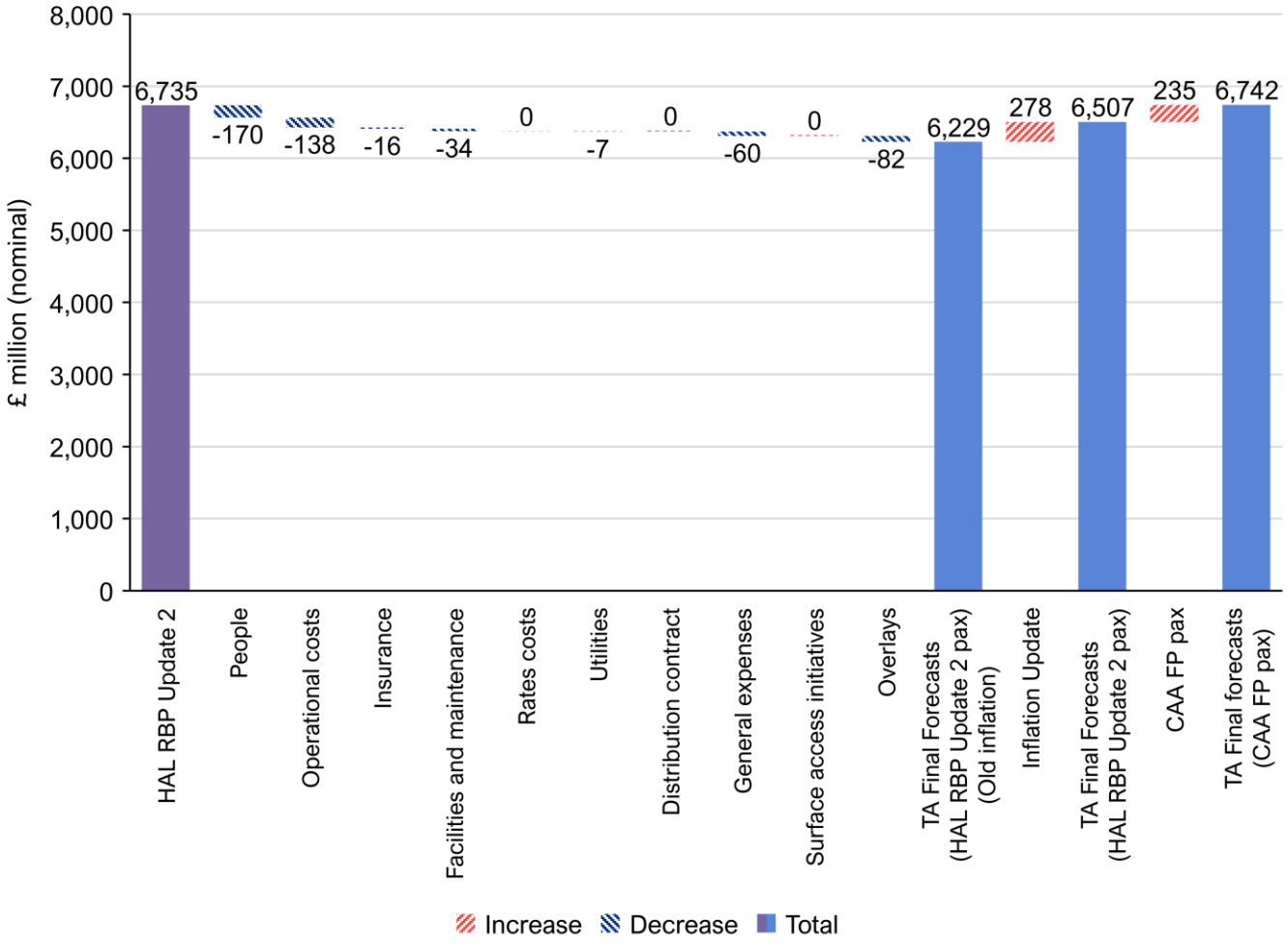
Source: TA analysis

We propose two further opex scenarios, to demonstrate the sensitivity of our results to these areas of forecasting uncertainty:

- **Under our high opex case, we forecast a total of £6,806 million (£5,853 million in 2020 prices) of opex during H7.** Here, we assume that HAL can mitigate only 5% of cost increases imposed by the London Living Wage; we assume that wage growth in 2020 and 2021 falls immediately in line with economy wide wage growth in 2022; and we include an allowance for People Requiring Support (PRS) costs.
- **Under our low opex case, we forecast a total of £6,718 million (£5,777 million in 2020 CPI prices) of opex during H7**. Here, we assume that the efficiencies of the security transformation programme can be achieved sooner, in 2024 as opposed to 2025.

Figure E.1 below demonstrates the items that drive the difference between our and HAL's opex forecast, including the effect of different passenger forecasts and updated inflation assumptions. Ignoring the effects of increased inflation and a more optimistic passenger forecast, our forecasts are 8% less than HAL's, due to challenges to HAL's assumptions on its People and Operational costs.

Figure E.1: Total H7 opex: TA Updated Forecasts vs. HAL RBP Update 2 (£ million, nominal)



Source: TA analysis, HAL RBP Update

Overall, we consider our conclusions a balanced set of final forecasts that capture both the cost pressures that HAL has identified in its RBP Update 2 and what we consider to be opportunities for enduring efficiency savings that we have captured through our forecasting methodology. The main areas that we have identified for efficiencies compared to HAL's forecasts are:

- The efficient baseline, where our comparison with previous years and HAL's own benchmarking show that 2019 outturn is not efficient. We have adjusted 2019 opex appropriately to reflect an efficient baseline. This predominantly affects people costs, operational costs, and general expenses.
- Further savings in people costs through the Cost of Change Programme where we consider the efficiencies delivered are additional to the efficient baseline whereas HAL considers the Cost of Change Programme necessary to achieve an efficient baseline. And finally, in people costs, our wage growth assumptions account for the freeze in pay levels in 2020 and 2021, which are not accounted for in HAL's forecasts.
- Savings in operational costs where we use an elasticity of 0.4, consistent with observations on the overall relationship between opex and passenger growth. HAL uses an elasticity of 0.2 based on the argument that the majority of operational costs are fixed whereas evidence from Frontier Economics and our own observations indicate that the elasticity is low and 0.4 is a reasonable estimate.
- Savings in various overlays. These include the COVID-19 overlay where, based on current policy, we have reduced the activities undertaken as COVID precautions and terminated additional costs at the end of 2022 but HAL has included a range of COVID precautions throughout the H7 period (albeit based on forecasts generated before the new policy was enacted). We have also adjusted the resilience overlay to account for the potential to extend equipment life due to inactivity during 2020 and 2021 because of the pandemic. For costs associated with passengers requiring support (PRS) we have two scenarios: our base scenario considers PRS as part as business as usual so we make not allowances for additional costs, whereas our high scenario includes additional costs for the PRS service adjusted to counter overlaps with the service provided for passengers with reduced mobility (PRM) that is accounted for elsewhere.

1. INTRODUCTION

The CAA has commissioned CEPA and Taylor Airey to provide support with its assessment of HAL's forecasts of efficient operating expenditure (opex) and commercial revenues over the H7 price control period (2022 to 2026) – and in determining an alternate set of forecasts where appropriate. CEPA has led the review of HAL's forecasts of commercial and cargo revenues, while Taylor Airey has led the review of HAL's forecasts of opex. Our initial forecasts were published alongside the CAA's initial proposals in October 2021.[7]

In this report, we present our final forecasts for opex. We review the representations made by HAL and other stakeholders in response to the CAA's Initial Proposals (IPs) that contained our initial forecasts and any additional evidence provided in subsequent engagement. We then present our considerations on each of the issues raised before detailing our revised forecasts. This report covers our consideration of issues related to opex only, while CEPA's assessment of issues related to commercial revenues is presented in an accompanying report.

1.1. OUR APPROACH

In reviewing HAL's opex forecasts and developing our own set of forecasts, we have been conscious of the situation in which HAL is operating. We have sought to take account of the unprecedented circumstances caused by the COVID-19 pandemic and the high degree of forecasting uncertainty affecting the H7 price review, both through our choice of assumptions and through our utilisation of scenarios that test the sensitivity of our forecasts to key assumptions. We have also followed a similar methodology as HAL to better understand where the key differences between our forecasts lie, and we have assessed the overlays and adjustments that HAL itself has identified as impacting its business during H7 (relative to a starting 2019 'baseline' of operating costs).

We presented our initial forecasts for IPs under four passenger scenarios; HAL's passenger forecasts from RBP Update 1, and the CAA's high, mid, and low passenger forecasts. In this report, we again present our forecasts under four passenger scenarios, but we have also developed two additional scenarios to reflect key uncertainties in our assumptions. We have constructed a:

- *low opex* scenario that reflects ambitious, stretching assumptions around HAL's ability to manage opex; and
- a *high opex* scenario that reflects more conservative assumptions.

Further details on how we have approached our assessment of opex for the H7 period is set out in subsequent sections of the report.

1.2. REPORT STRUCTURE

This report is structured as follows:

- In **Section 2**, we present a high-level summary of our opex forecasts for the CAA's initial proposals.
- In **Sections 3-9**, we present our updated view on each of the major elements of our opex forecasts. In each section, we discuss the approach underpinning our initial forecasts; consider the responses from HAL and other stakeholders to the CAA's consultation on the initial proposals; assess the new evidence and issues presented; and then provide our revised views. Sections 3-9 cover the following:
    - **Section 3**: Baseline
    - **Section 4**: People costs
    - **Section 5**: Operational costs

[7] CEPA and Taylor Airey (2021) Review of H7 Opex and Commercial Revenues: Initial Assessment and Forecasts.

- **Section 6**: Facilities and maintenance costs
- **Section 7**: Rates, utilities, and distribution contract costs
- **Section 8**: Other overlays
- **Section 9**: Input price inflation
- **Section 10**: Ongoing productivity and capital investment

- In **Section 11**, we present our overall final forecasts of opex over H7 and the results of our forecasts under our other scenarios.

2. SUMMARY OF OUR INITIAL FORECASTS

In this section, we present a high-level summary of our opex forecasts for the CAA's IPs. First, we set out the analytical approach we applied to calculate the initial forecasts. We then provide a comparison of these forecasts with HAL's RBP Update 1 proposal, the basis on which our initial forecasts were developed.

2.1. OUR ANALYTICAL APPROACH

Our calculation of initial forecasts for IPs followed a "base-trend-step" approach as depicted in Figure 2.1. This base-trend-step approach broadly followed HAL's forecasting approach in its business plans.

Figure 2.1: Modelling approach for opex

BASE	For each opex category, take historical opex from 2019 base year
	Apply efficiency adjustment to base year to reflect view of efficient opex
	Apply other one-off adjustments to base year to reflect view of efficient opex (e.g. step-changes in opex experienced prior to start of H7 price control)
TREND	Apply price adjustment to the above baseline to reflect inflation and real price effects over the H7 period (2022-2026)
	Perform a volume adjustment to account for projected changes in opex drivers (e.g. passenger volumes), using elasticities between opex drivers and opex items
STEP	Apply overlays to account for headwinds and tailwinds
	Apply overlays to account for factors not addressed by volume drivers
	Apply adjustment for ongoing productivity improvements to reflect long-term trend in an efficient airport's ability to serve, over time, more passengers with a given number of inputs

In our review of HAL's forecasts and production of our own initial forecasts, we used a mixture of approaches:

- **Base:** We reviewed the evidence provided by HAL that supported its view that its opex in 2019 was efficient. We also reviewed evidence provided by airlines and from studies commissioned by the CAA assessing the efficiency of HAL's opex.
- **Trend:** We considered the justification for two types of trend adjustment in our opex modelling and the evidence and analysis to support these trend adjustments:
    - We reviewed the logic and evidence provided by HAL for inflating future expenditure using a price series other than the forecast for general inflation in the economy (i.e. real price effects).
    - We considered the justification for adjusting forecast opex to account for changes in volume related opex drivers.
        - For the choice of cost drivers and elasticities to project forwards from the baseline, we reviewed the evidence provided by HAL and from previous price controls. We considered whether HAL's choice of cost drivers were logical and comprehensive.
        - In some instances, we developed bottom-up elasticity estimates through an assessment of how much each cost category was driven by changes in passenger volumes based on our own independent analysis.

- **Step:** We assessed the overlays and adjustments that HAL itself identified as impacting its business during H7. In our assessment, we applied a three-part test:

  (i) We assessed whether there was a need for the overlay, i.e. whether there was an impact outside of HAL's control that affected its cost base; (ii) we considered whether the estimated overlay was likely to be genuinely additional to the trend effect already accounted for (or to other overlays already implemented); and (iii) we tested if the strength of the evidence supported the size of the adjustment proposed by HAL.

  For the first two tests, we tested the logic of the narrative provided by HAL and assessed the supporting evidence. For the final test, we reviewed the evidence provided by HAL and tried to identify independent sources of evidence that could be used to validate HAL's estimated impact.

  As part of our final step, we also applied an ongoing productivity adjustment. The ongoing productivity adjustment represents the ability of even the most efficient firms to increase their efficiency over time, producing more output for a given volume of inputs, or to maintain outputs but with a lower volume of inputs.

Despite the circumstances presented by the pandemic, we sought to challenge HAL to identify the areas of forecasting uncertainty, and areas in which HAL could challenge itself further to the benefit of airport users. We therefore strongly challenged HAL in areas in which it provided insufficient evidence, on the condition that we would review these challenges in light of additional evidence presented by HAL.

The approach we took ensured that our review of HAL's opex forecasts was conscious of the situation in which HAL is operating. We attempted to compile a balanced set of forecasts, that avoided overly conservative or optimistic assumptions. Nevertheless, there remained multiple areas of uncertainty in our forecasts.

2.2. Comparison of our initial forecasts with HAL's RBP Update 1 proposal

In Table 2.1 below, we present our initial forecasts of opex using HAL's projections of passenger numbers from its mid scenario. Over the H7 period, we forecast opex to be £5,451 million in nominal terms, compared with HAL's forecast of £6,464 million. Even when controlling for different passenger forecasts, there was a 15.7% opex gap between HAL's RBP Update 1 and our initial forecasts.

Table 2.1: TA opex initial forecasts, using HAL mid pax projections from RBP Update 1 (£ million, nominal)

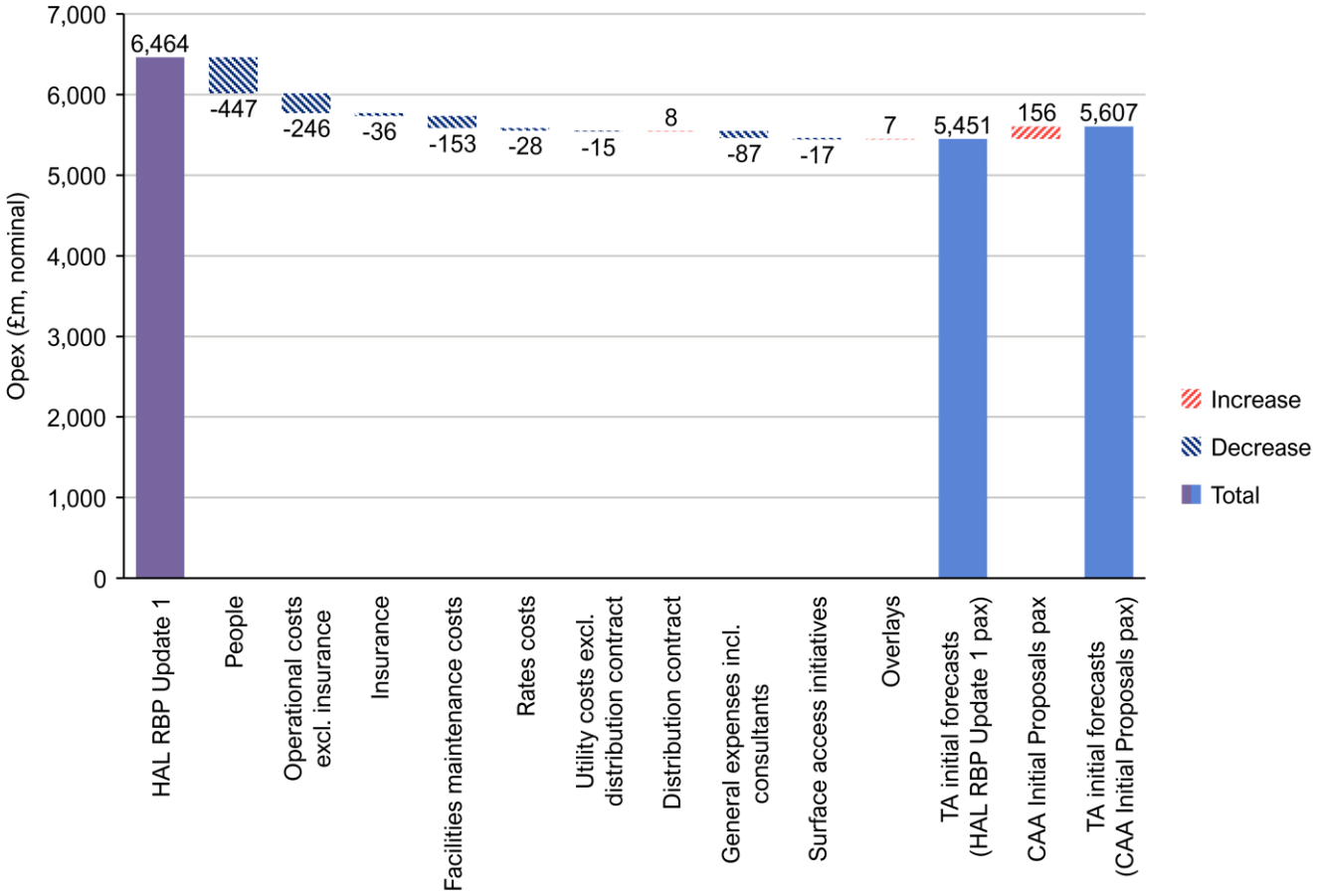
	2022	2023	2024	2025	2026	H7
People	244	266	280	283	283	**1,356**
Operational costs excl. insurance	223	253	273	283	288	**1,320**
Insurance	17	18	18	19	20	**92**
Facilities and maintenance	146	161	172	180	185	**845**
Rates	123	125	127	130	132	**637**
Utilities	54	62	67	70	74	**328**
Distribution contract	32	33	31	31	32	**159**
General expenses	104	114	121	125	128	**592**
Surface access initiatives	9	10	10	13	13	**55**
Overlays	18	17	14	11	8	**68**
Total	**970**	**1,058**	**1,116**	**1,145**	**1,162**	**5,451**
Total per passenger (£)	**23.35**	**18.83**	**17.00**	**16.27**	**16.13**	**17.83**
Difference with HAL forecast	-138	-169	-200	-235	-271	-1,013

Source: TA analysis, HAL RBP Update 1

As demonstrated in Figure 2.2 below the difference in our forecasts were predominantly driven by:

- The adjustments made to 2019 opex to define the efficient baseline.
- Predominantly using CPI rather than RPI as the indicator of input cost inflation.
- The elasticities used for operational and non-operational staff costs.
- Our application of a 1% per annum efficiency improvement across all opex categories.
- De-linking the benefits delivered by the security transformation programme from the capital plan.

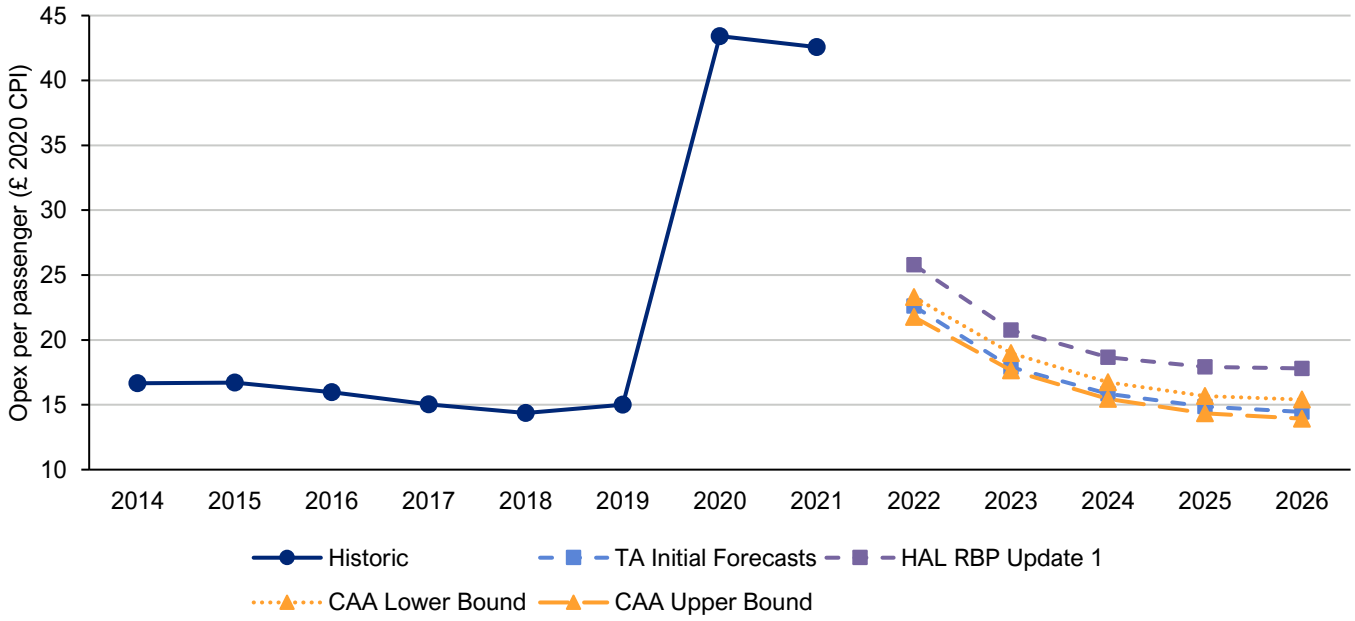
Figure 2.2: Total H7 opex: TA initial revenue forecasts vs. HAL RBP Update 1 (£ million, nominal)



Source: Taylor Airey analysis, HAL RBP Update 1, CAA Initial Proposals

The effect of our proposed changes to HAL's forecasts at IPs reflected a decrease in per passenger opex of c. £4 across H7, as demonstrated in Figure 2.3. Between 2019 and 2026, opex per passenger was forecast to fall by 3.8%, appearing to return to a long-term trend that was disrupted by the COVID-19 pandemic.

Figure 2.3: Opex per passenger (£, 2020 CPI prices)



Source: Taylor Airey analysis, HAL RBP Update 1, CAA Initial Proposals

2.3. STAKEHOLDER FEEDBACK ON OUR OVERALL APPROACH

2.3.1. HAL

In its response to the CAA's consultation, HAL argued that our initial forecasts were not deliverable for consumers, as it was based on inappropriate assumptions and double counted both baseline adjustments and ongoing savings. HAL argued that we had not assessed the deliverability of our initial forecasts, and the high-level sense checks showed that the implied cost savings for H7 were unrealistic and unachievable.

2.3.2. Airlines

The airline operators committee at Heathrow and London (Heathrow) Airport Consultative Committee (AOC/LACC) and Virgin Atlantic Airways (VAA) welcomed our overall approach to reviewing HAL's proposals at RBP Update 1. The AOC/LACC and the wider airline community also engaged PA Nyras (PA) to undertake a peer review of our forecasts and to corroborate our findings. PA found some minor differences between our initial forecasts and theirs but confirmed that they materially supported our forecast.

British Airways (BA) commented that our top-down analysis of operating costs was a useful first step for our initial forecasts. However, they considered it a necessary second step for our revised opex forecasts to be built from the bottom-up.

2.3.3. Our response to the comments

Deliverability of our forecasts

Our initial forecasts were produced based on the evidence provided by HAL and aimed to provide a fair bet assessment of HAL's efficient opex over H7. Importantly, our forecast of opex per passenger by 2026 (in real terms) was broadly in line with the levels achieved by HAL in 2018, as shown in Figure 2.3 above. We considered this to be an achievable target, given the scale of structural efficiencies achieved during 2020 and 2021.

Nevertheless, in the remainder of this report, we have reviewed in detail the representations made my HAL and have adjusted our forecast where appropriate. We also update our deliverability assessment of our revised forecasts.

Top-down vs bottom-up analysis

We have maintained a largely top-down approach to producing our revised forecasts as an input into the CAA's final proposals, but we have taken a more granular approach where we considered it valuable to do so and where the data provided by HAL allowed us to do so.

Our main rationale for not undertaking a full bottom-up analysis is the challenge of doing so under the backdrop of COVID-19 related uncertainty. Building up a bottom-up estimate in such a context will require making a series of assumptions that may not be very well substantiated, without providing any benefit in terms of producing a more accurate or precise forecast. The sheer volume of assumptions required would also make it challenging to review and critically assess the reasonableness of those assumptions.

3. DEFINING THE BASELINE

In this section, we discuss our development of an efficient baseline for our opex forecasts. We review representations made by HAL and airline stakeholders, considering the extent to which HAL was efficient in 2019, any structural efficiencies HAL has been able to implement since then, and any headwinds HAL has been exposed to between 2019 and 2022. We then present our revised view of baseline efficient opex.

3.1. OUR INITIAL PROPOSALS

We considered five issues when determining the need for adjustments to our 2019 baseline:[8]

- **The efficiency of 2019 as a baseline** – We considered whether the information presented by HAL demonstrated it was operating at the frontier of efficiency in 2019.
- **HAL's adjustments to its 2019 baseline** – We reviewed whether the adjustments HAL made to its 2019 costs before using it as a baseline, were appropriate. In doing so, we considered both the reasons for the adjustments and the size of the adjustment. In particular, we looked for evidence to show that staff costs associated with the Heathrow Expansion Programme had been fully removed and that these were not included in the base and projected forwards.
- **Actions taken since 2019** – We reviewed the extent to which HAL's cost control actions taken in 2020 and 2021 were sustainable and could be carried forward into the H7 period.
- **Cost of Change programme** – We reviewed the savings proposed by HAL in relation to its Cost of Change programme, which made changes to staff legacy terms and conditions and was agreed with airlines.[9]
- **Renegotiation of the baggage contract** – We noted HAL's procurement strategy to rationalise their supply chain and achieve greater value from having fewer suppliers with larger strategic partnerships. We also noted that HAL identified £✂ million per annum savings from renegotiating the baggage operations and maintenance contract.

Our consideration of the issues listed above was used to inform our assessment of the need for an adjustment to our 2019 opex to make it a suitable baseline for our forecast. In the table below, we summarise the adjustments we made to the baseline in our initial forecasts and compare them to the adjustments proposed by HAL.

Table 3.1: Comparison of HAL and Taylor Airey views regarding the need for base year adjustments

		HAL	Taylor Airey	
		£m (2019 prices)	£m (2019 prices)	Category
1	Efficiency of 2019 as a baseline	0.0	-17.1	Pro-rated across categories
2	HAL adjustments to 2019 baseline	10.4	5.9	Multiple
3	Actions taken since 2019	0.0	-25.6	People
4	Cost of Change programme	✂	✂	People
5	Renegotiation of baggage contract	✂	✂	Facilities and Maintenance

Source: Taylor Airey analysis

[8] In our report for IPs, we did not explicitly present the savings associated with the Cost of Change programme and renegotiation of the baggage contract as baseline adjustments. They were, however, treated as such within our analysis.

[9] As part of the agreement, HAL guaranteed to deliver a £35 million (2019 prices) saving per annum (at 2019 passenger volumes) in return for the cost of change being added to the RAB. This saving will be applied to each year until the cost of change is fully depreciated.

Taking each of the five issues in turn:

- **The efficiency of 2019 as a baseline** – While there was a general consensus that HAL's Q6 performance showed improvement across the period, we considered that this did not imply that efficient levels had been achieved. Although HAL did meet the Q6 price control targets, this was not universal across all categories of cost and people costs were a notable exception.

  We also considered that HAL's opex benchmarking against other airports did not provide compelling evidence, and highlighted substantial increases in expenditure between 2018 and 2019 for certain cost categories that could not be explained by volume effects.

  As a result, we reduced base year opex to the per passenger average over the period 2017 to 2019 (after accounting for inflation), to smooth out opex increases observed in 2019.

- **HAL's adjustments to its 2019 baseline** – There were two main adjustments proposed by HAL. The first was a downward adjustment to reflect the removal of expansion costs, which we used pending further assessment. The second was an upward adjustment to Facilities and Maintenance cost to reflect the cost of ensuring workers in Heathrow Airport's supply chain were paid the London Living Wage (LLW). We agreed with the principle of including an overlay, but we considered further evidence was required before allowing the full overlay and, therefore, proposed allowing only 75% of the adjustment.

- **Actions since 2019** – HAL stated that approximately £260 million in 2018 RPI prices of operating cost reductions had been delivered in 2020 compared with 2019 costs. While HAL suggested that very little of these savings could be sustained into H7, airlines disagreed.

  We took the view that some of these changes were temporary and will be reversed or superseded prior to H7. However, we considered that at least 50% of the benefits of reorganisation identified by HAL (equating to £25 million in 2018 RPI prices) would be sustainable over a longer period.

- **Cost of Change programme** – We proposed a separate adjustment to account for the Cost of Change programme, which we understood to be separate from, and additional to, the benefits arising from the organisational changes referred to in the previous bullet. This was also additional to the adjustment we made to set base year costs as the average over the period 2017 to 2019 (see above).

- **Renegotiation of the baggage contract** – We accepted the savings proposed by HAL in relation to its renegotiation of the baggage contract.

3.2. Responses to CAA's consultation on the initial proposals

HAL

In its response to the CAA's consultation, HAL made the following comments in relation to our baseline adjustments:

- HAL considered that our inclusion of a Cost of Change adjustment and an adjustment to reflect our view of historic inefficiency represented a double count. It argued that people costs had increased over Q6 due to factors outside its control, including higher passenger numbers, the introduction of the apprenticeship levy, and increases in National Insurance contributions.

- HAL also argued that its estimates of the efficiencies from the Cost of Change programme were a better view of its efficiency potential than the baseline adjustment we made by averaging costs between 2017 and 2019. HAL argued this was simplistic and ignored uncontrollable and justified cost increases between 2018

and 2019, such as additional activities to improve security and resilience, and investment in the Magenta program.[10]

- HAL presented updated econometric analysis by KPMG,[11] which concluded that while HAL was operating at the efficiency frontier in 2018, costs increased in 2019 creating a 4.1% gap to the frontier (equivalent to £0.47 per passenger in 2018 RPI prices).[12] HAL argues that the savings associated with the Cost of Change Programme brings its baseline back to the efficiency frontier, and that any further efficiency adjustment would in effect be double counting.
- HAL contends that the staff savings associated with reorganisation actions taken since 2019: (i) have occurred through revised terms and conditions in the Cost of Change programme or voluntary severance; and (ii) will return as the traffic volume increases. As such, subtraction of these savings from the baseline would represent a double count.
- Finally, HAL has updated its estimate of the impact of bringing its suppliers in line with the LLW, increasing it by £✂ million to £✂ million based on contract changes brought in up to April 2022.[13] HAL also suggests it would be inappropriate to expect suppliers to mitigate some of the cost increases associated with paying the LLW.

Airlines

In the responses to the CAA's consultation, there was a general consensus among airlines that 2019 was not an efficient baseline.

PA, in its analysis for the AOC/LACC, argued that while opex performance had improved over Q6, "*it is a considerable leap to assume that efficient levels have been achieved*".[14] Its report argued that given HAL's ability to achieve savings across multiple cost categories indicated a potential for further cost efficiency. The report also suggested that HAL remained the highest cost large airport in Europe. Finally, PA did not agree with the upward adjustment to account for the payment of the LLW, which it considered to be unnecessary given its view that HAL's 2019 expenditure was already above efficient levels.

During engagement following the CAA's consultation, airline stakeholders raised the following additional points:

- There was an agreement among airlines that the benefits associated with the Cost of Change programme ought to be considered additional to any baseline efficiency adjustment. Similarly, they argued that the savings realised to date through the Magenta programme undertaken by Heathrow Support Services should be used as a basis for H7 forecasts.
- Airlines also agreed with the assumptions we made to prepare our initial forecasts that some of the savings introduced in 2021 through re-organisation should be retained over a longer period.
- Finally, some airlines suggested that the LLW cost increases should be viewed in the light that some of HAL's suppliers are outside of the LLW area and that many are subject to fixed priced contracts. Virgin Atlantic Airways (VAA) in particular contended that Heathrow remains the highest cost hub airport in

[10] The Magenta programme is an internal capital programme to transform Heathrow's support services through a series of technology and system upgrades. The programme will cover core finance processes, the people lifecycle, asset management and business intelligence. HAL claim that the benefits associated with Magenta programme will be to reduce capitalisable costs, and will not directly lead to lower opex.

[11] KPMG (2021) Airport Operating Cost Efficiency Benchmark – Report for Heathrow Airport Limited.

[12] HAL (2021) CAP2265 response, p.138.

[13] HAL (2021) CAP2265 response, p.140. Price base is unclear but assumed to be 2018 RPI prices. HAL's RBP Update 2 model used a higher figure of £14.8 million in 2018 RPI prices. We use the higher of these two figures in our forecast.

[14] PA Consulting (2021) Review of CEPA/Taylor Airey review of H7 Opex and Commercial Revenues, p.9.

Europe (by a significant margin), and the opex cost per passenger remains relatively high by comparison with other large airports, as is noted in the PA report.

3.3. OUR ASSESSMENT OF THE ISSUES

Efficiency-related adjustments

Despite our concerns with the validity of the methodology applied, we note that the updated analysis provided by HAL from KPMG is consistent with our conclusion that HAL's expenditure in 2019 does not represent an efficient baseline. We also note that the efficiency adjustment we made at IPs was roughly equivalent to £0.20 per passenger in 2018 RPI prices, whereas KPMG's estimate of the efficiency potential is £0.47 per passenger. The key area of disagreement is whether the savings associated with the Cost of Change programme should be considered additional to the efficiency potential identified by us and KPMG.

We continue to take the view that these two baseline adjustments are additional to one another. Our understanding of the material presented by HAL and from our discussions with airlines, is that the Cost of Change programme was designed to tackle long-standing structural inefficiencies, by modernising terms and conditions of HAL staff. Our efficiency adjustment to 2019 expenditure of £17.1 million, on the other hand, is designed to remove what appear to be inefficient spending increases over the period 2017 to 2019 illustrated by a simple comparison of the evolution of opex per passenger over those years. As noted earlier, KPMG's benchmarking results reach a similar conclusion finding an efficiency potential of £0.47 per passenger. We also note that KPMG consciously excluded structural cost differences between airports from its efficiency analysis.[15]

Finally, we accept the representations made by HAL that certain cost cutting measures introduced by HAL in response to the pandemic, e.g. a large proportion of the £25.6 million adjustment we made to base year expenditure, will need to be reversed as passenger volumes recover rather than being a permanent efficiency. However, we do not consider that these cost cutting measures double count the efficiencies we have captured elsewhere, given that they predominantly apply to non-operational staff and non-staff costs.

Non-operational staff costs have reduced substantially between 2019 and 2021 beyond what can be explained by the Cost of Change programme and lower passenger volumes. As such, with a few exceptions (i.e. asset maintenance), we are sceptical that the cost cutting measures will need to be reversed on a step-change basis in 2022, the first year of H7. Instead, we consider it more prudent for there to be a glide path for the reversal of the cost cutting measures, in line with the recovery of passenger volumes at the airport. While not a permanent efficiency saving – as we assume that non-operational staff costs revert back to the 2019 efficient baseline level consistent with the recovery of passenger volumes from the pandemic – we consider a glide path to be a better reflection of the operational circumstances of the airport. We have captured this effect as a modelling overlay to our efficient 2019 opex base.

As we discuss in subsequent sections of the report, we have also concluded that, on balance, HAL should be expected to have realised some level of permanent efficiency saving (long term productivity improvement) in other elements of its opex base (e.g., elements of operational costs (excluding insurance) and facilities and maintenance) arising from the cost cutting measures and operating circumstances that were introduced during the height of the pandemic. Given uncertainty of the level of permanent/ long term productivity improvement that should have been realised by HAL for these elements, we have captured this effect in our modelling by changing the starting year from which we compound our 1% ongoing productivity target from 2022 to 2020. In effect, this means we adopt a stronger ongoing efficiency challenge for certain non-staff related opex items than other parts of the opex base to

[15] We note that CEPA, in its advice to the London (Heathrow) Airport Consultative Committee, argued that the KPMG analysis did not fully account for efficiency differences between Heathrow and other airports. KPMG had explicitly assumed that any systematic differences in cost between the various airports, was down to structural issues that were outside of management control (e.g. differences in airport infrastructure or input costs).

capture that some level of permanent saving/ long term efficiency improvement could be expected from elements of HAL's opex arising from the circumstances and measures introduced during the pandemic.[16]

London Living Wage

We have examined the additional evidence provided by HAL in support of its LLW adjustment, which confirms the £✂✂ million (2018 RPI prices) cost estimate. The evidence also shows that this has been dealt with through changes to fixed price contracts. However, HAL has not addressed the view we took at our initial forecasts that there were efficiencies to be gained from paying the LLW that were not accounted for in HAL's estimates. We would expect the payment of the LLW to lead to lower levels of absenteeism and lower levels of turnover, both improving productivity and reducing costs from recruitment, training and onboarding. This view is supported by a study by researchers from Queen Mary, University of London, which found that paying a living wage led to fewer sick days and lower levels of turnover.[17]

The study also estimated that, for a transport services provider, implementing the LLW in its cleaning contract would lead to an approximate 20% increase in costs due to higher wages, and an approximate 2% reduction in costs due to lower recruitment and training costs and lower levels of sickness absence.[18] This implies a 10% saving from paying the LLW. Another article by McKinsey suggests companies with strong environmental and social governance can drive down costs by up to 10%.[19]

Analysing these reports we conclude that targeting a 10% reduction is reasonable. Nevertheless, we acknowledge the efficiency potential from implementing the LLW is uncertain and as a result, we test the sensitivity of this assumption; in our high opex scenario, we test a lower 5% efficiency adjustment.

3.4. Our revised efficient baseline

In the table below, we present our revised baseline adjustments, and compare them with HAL's proposals (RBP Updates 1 and 2) and our initial view for IPs. The main changes between our initial and revised forecasts are:

- In line 2 of the table, we have adjusted our estimate of the impact of the LLW from £✂✂ million to £✂✂ million. This change accounts for HAL's updated (and higher) estimate of the impact of the LLW on its cost base and captures our introduction of a 10% efficiency to that estimate, which replaced the 25% cut to the cost estimate that we previously applied for IPs.
- In line 3 of the table, we have removed all permanent impacts of the post-2019 savings associated with staff reductions. This is in line with HAL's comment that these staff reductions are not permanent and would be reversed as traffic recovers. We have dealt with this recovery in our overlay and ongoing productivity assumptions.

[16] See Section 10 for further discussion.

[17] Linneker and Wills (2012) The costs and benefits of the London living wage. Available at qmul.ac.uk.

[18] Linneker and Wills (2012) The costs and benefits of the London living wage, Table A3.11. Available at qmul.ac.uk.

[19] McKinsey (2021) Buying into a more sustainable value chain. Available at mckinsey.com.

Table 3.2: Taylor Airey revised view on base year adjustments (£ million, 2019 prices)

	HAL		Taylor Airey	
	RBP Update 1	RBP Update 2	Initial	Revised
1 Efficiency of 2019 as a baseline	0.0	0.0	-17.1	-17.1
2 HAL adjustments to 2019 baseline	10.4	15.2	5.9	13.7
3 Actions taken since 2019	0.0	0.0	-25.6	0.0 *
4 Cost of Change programme	✂	✂	✂	✂
5 Renegotiation of baggage contract	✂	✂	✂	✂

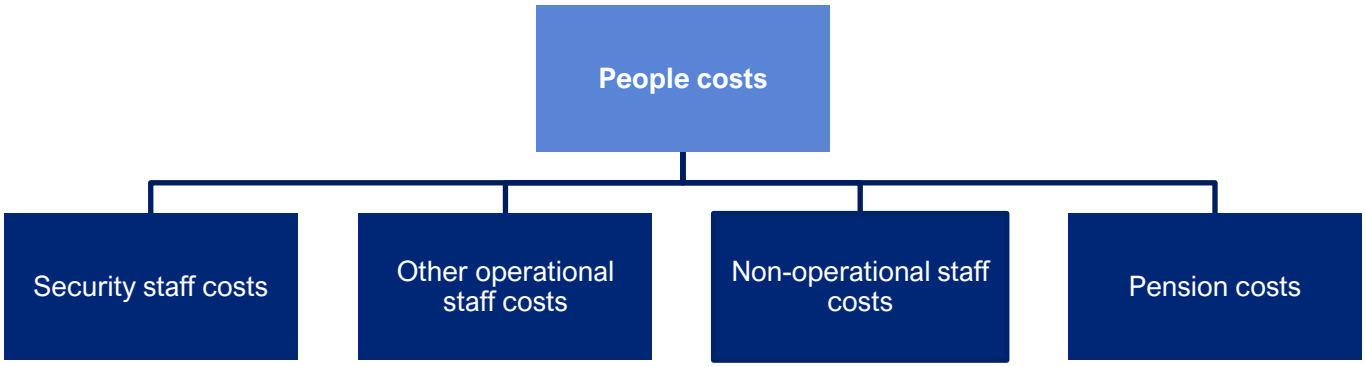
Source: Taylor Airey analysis

** As a baseline adjustment. See comments above on non-staff related costs.*

4. PEOPLE COSTS

People costs cover the salary and pension costs associated with directly employed HAL staff. While in its RBP and RBP Update 1 HAL forecast people costs as a single category, to enable us to apply bottom-up modelling as far as possible we separated out costs into security staff, other operational staff, non-operational staff, and pension costs, using figures provided in HAL's regulatory accounts, as illustrated below.

Figure 4.1: Breakdown of people costs



4.1. OUR INITIAL FORECASTS

As noted above, in our initial forecasts we split out people costs into four categories, taking the following broad approach:

- **Base year adjustment** – As described in the previous section, we applied a downward adjustment to base year expenditure to reflect our view that HAL's 2019 expenditure was not reflective of an efficient baseline. We pro-rated this adjustment across the various opex categories, in line with each category's share of the growth in expenditure between 2017 and 2019, including people costs.

  We also applied an additional adjustment to account for further structural efficiencies HAL had been able to implement through the Cost of Change programme and other actions taken in response to the pandemic. These adjustments were pro-rated across categories based on each category's share of 2019 expenditure, again including people costs.

  For all four people costs categories collectively, this meant a £63.9 million (2019 prices) reduction to the baseline, which contrasted with HAL's proposed adjustment of £✂✂ million to reflect the Cost of Change programme only.

- **Price adjustment** – We agreed with HAL that people costs would be exposed to RPEs, i.e. cost pressures in this category would vary materially from general inflation, namely wage growth. We also agreed with using the OBR wage forecasts as the basis of projecting input price inflation.[20] However, we considered it was not necessary to allow for wage increases in 2020 and 2021, given HAL was going through a round of voluntary severance and pay restraint. We discuss this further in Section 9.

- **Volume adjustment** – We applied different elasticities depending on how responsive we considered staffing levels to be to passenger volumes.

  - For the variable component of security staff, we estimated the elasticity with respect to passenger numbers to be 0.7. This implied an overall elasticity of security staff of 0.56, when accounting for staff in fixed roles.

[20] Office of Budget Responsibility (2022) The economy forecast: Labour market. Available at obr.uk.

- For other operational staff, we used an elasticity of 0.4 and for non-operational staff, we assumed an elasticity of 0.
- For pension costs, we used an elasticity of 0.4 with respect to passenger volumes. This implied an overall elasticity of staffing levels with respect to passenger volumes over H7 of 0.37, compared with a HAL estimate of 0.39.

- **Overlays** – We then applied overlays to account for step changes in people costs. This covered the security transformation programme, and the impact of Terminal 4's closure.
- **Ongoing productivity** – Finally, we applied a 1% year-on-year efficiency to all categories of people costs as per our estimate of ongoing productivity improvements. We discuss the application of this adjustment to people costs below but discuss ongoing productivity more generally in Section 10.

The resulting difference in overall forecasts between HAL's RBP Update 1 and our initial forecasts for IPs are shown in the table below.

Table 4.1: HAL and Taylor Airey people cost forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	291.5	338.5	370.8	392.7	409.4	**1,802.9**
TA Initial Forecasts	244.3	265.8	280.4	282.8	282.7	**1,356.0**
Difference	-47.2	-72.7	-90.3	-109.9	-126.7	**-446.9**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

The key assumptions that underpinned our forecasts are set out above. In the following subsections, we go into further detail around the key areas of difference between our initial forecasts and HAL's proposals in its RBP Update 1. In particular, we focus on our approach and assumptions related to security staff costs (including the impact of the security transformation programme) and the impact of Terminal 4's closure.

4.1.1. Security staff (including security transformation programme)

Security can be separated into:

- **Fixed posts**, which we expect to be very weakly correlated with passenger numbers, although the number of posts required will be driven by terminal closures/opening.
- **Passenger and hand baggage screening**, which is strongly driven by passenger numbers.

Passenger and hand baggage screening is currently in a period of transition, with existing screening technologies due to be replaced by new computed tomography (CT) scanning technologies and body scanners. This transition is mandatory and must be completed by June 2024.

HAL expected the introduction of the new scanning technologies to temporarily lead to reductions in throughput levels as the new equipment was bedded in. It also created a greater staffing requirement, with each pair of lanes with the new technologies requiring 15 staff, compared with 11 staff currently. This increase is driven, principally, by additional security officers required to staff body scanners compared to those needed for traditional archway metal detectors. However, over time, the technologies will also give HAL the opportunity to re-engineer security processes and deliver workforce efficiencies, which it has labelled the security transformation programme. In particular, the technologies will allow:

- Fewer images to process per passenger, improved throughputs as passengers will no longer have to remove liquids and laptops from bags etc, slightly offset by a longer screening time per image owing to the three-dimensional images being more complex to interpret.

- Centralised image processing (CIP) where the bag is screened by the most suitable operators, not necessarily the one staffing the lane through which the passenger is passing enabling some reduction in staffing levels.
- Alarm only screening, where artificial intelligence (AI) algorithms are used to screen the bags with the human operator only screening those that are identified as requiring this by the AI algorithm. This will reduce the number of images to be screened by the human operator, thereby enabling reducing staffing levels.

HAL notes that these technologies will ultimately enable staffing to be reduced to 10 or 11 security officers per pair of lanes.[21]

In the RBP Update 1, HAL did not specifically include an overlay for the security transformation programme for two reasons:

- It considered any efficiency opportunity would only be realisable if the £1.7 billion enhancement capex it requested was allowed as part of its £4.2 billion capex plan. It stated that the lower capital plan only included the regulated compliance element of the programme, involving the installation of new screening equipment which, on its own, would not deliver operating cost savings.
- It also argued that the transformation programme was not sufficiently mature to be able to develop robust benefit estimates.

As security staff costs represented between 40-45% of the staff cost base in Q6, we would have expected the benefits of security transformation to be modelled in detail during the business planning process, informed by pilot projects. We also expected that HAL would have commenced process improvement initiatives to ameliorate the well-known throughput penalties of operating the new systems with existing processes. Airlines noted that HAL presented investment case slides showing an aspiration to move from 140 passengers per hour (pph) per lane to 220 pph per lane (i.e. 57% improvement in flow rate).

Consequently, for our initial forecasts:

- We developed a simple queuing model to estimate the elasticity of security staff numbers with respect to passenger volumes. The model did not predict absolute staff numbers but rather the elasticity of staffing levels (or staffing costs before accounting for wage growth) with respect to passenger volumes. The model estimates an elasticity in the range 0.6 to 0.8 for variable staff and in the range from 0.48 to 0.65 when fixed post staff are included. The elasticities were then used to predict security lane staffing requirements using 2019 as the baseline, with actual traffic figures for 2020 and 2021, and forecasts thereafter.
- Fixed post staffing was assumed to be constant over the H7 period, other than adjustments made to account for terminal closures.
- We then overlaid the model with expected efficiencies, which we used to inform our efficiency overlays. These included the following:
    - throughput improvements associated with the new technologies – improvement from 140 pph, current, to 220 pph in the future over a five-year period after the new technologies start to be introduced (2022) at a rate of 11% per year;
    - staffing reductions from 15 staff per pair of lanes when the new technology is introduced to 12 staff per pair of lanes (compared with 11 per pair of lanes as of today) enabled by CIP, alarm only screening and process improvements starting from 2023 at a rate of 2% per year;

[21] HAL (2022) CAA Initial Proposal Response Bilateral – Operating Costs – Deep-Dive 3.

- adjustment for terminal closures during 2020, 2021 and 2022 for fixed post staff; and
- for our initial forecasts, we overlaid an overall ongoing productivity improvement of 1% per year for both security lane and fixed post staff.

Staff numbers were translated into costs based on the 2019 cost per security FTE derived from the regulatory accounts.

4.1.2. Terminal 4 closure and reopening

HAL included an overlay to account for the reopening of Terminal 4, considering that costs would need to be ramped up before the full reopening of the terminal. We used HAL's overall approach but considered that staffing could be ramped up at a slower trajectory over a six-month period.

4.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

4.2.1. HAL

Security staff (including security transformation programme)

In response to our initial forecasts for IPs HAL stated that our assumptions were "*highly ambitious*, …[given]… *challenges due to COVID-19 and changes to passenger demographics*",[22].

In its response to the CAA's consultation, HAL raised some questions and issues concerning our bottom-up modelling:

- HAL questioned how the model treated the opening of lanes to meet demand, and specifically whether the model used fractional lanes. We clarified in later bilateral engagement that our bottom-up model did not use fractional lanes, with only integer numbers of lanes allowed, rounded up to meet demand.
- HAL understood our model to predict absolute staff numbers. We clarified that the model calculated elasticities with respect to passenger volumes, rather than projecting absolute staff numbers.
- HAL argued that adding an overarching ongoing productivity adjustment over the specific efficiencies related to improved security technology and processes was double counting. Having reviewed HAL's representations, we agree with HAL that this was double counting and consequently, we have removed the ongoing productivity adjustments from our forecast of lane security staff.

HAL raised several additional points concerning our security staff modelling, which it considered had not been accounted for in our overlays for security staff:

- Reduction of lane throughput from 140 pph down to between 90 and 115 pph depending on terminal due to COVID-19 social distancing requirements and other associated impacts.
- Dual running of current and new technology lanes in the transition period where, for regulatory reasons, it is not possible for staff to work on the two types of lane during the same shift, plus the training overhead associated with the new technology.
- The difficulty of matching roster supply with passenger demand due to increased peakiness in the demand profile within each day and the volatility of the demand profile from day-to-day, creating a challenge in forecasting demand reliably. In its forecasts HAL dealt with this by applying an efficiency factor – *coverage efficiency* – reflecting how well the roster supply matches demand. This parameter allows for 2 hours of

[22] HAL (2021) CAP2265 response.

breaks and movement time within each 8.5 hour shift, and can, therefore, only reach a maximum of around 76.5%. HAL estimates the current level is around 69%.[23]

To address the points that HAL raised, we held several deep dive sessions with the appropriate staff to ensure that we fully understood the current and future operations, the phasing of the security transformation programme and the impact of this on performance, such as passenger throughput, as well as staffing requirements. The main points that came out of these discussions are as follows:

- HAL noted that the introduction of new lanes, and the associated benefits, will depend on the successful delivery of the capital security transformation programme and the scheduling of that programme. HAL has described the complexity of running the security operation whilst upgrading and replacing the technology supporting the introduction of new security lanes. There are regulatory constraints restricting the swapping of staff between lanes with "new" and "old" technology, which introduces rostering inefficiencies. During the bedding-in of the new technology and processes, passenger throughput will reduce compared to current operations. Technology and processes that will increase throughput and reduce the number of staff needed on each lane will not be available until the later stages of the programme, influenced by regulatory constraints and the technology supply chain.
- HAL provided information on the execution of the security transformation programme that will meet new mandatory security requirements and enable security efficiencies through new technologies and processes. This programme is sequenced to meet the mandatory requirements by the due date of June 2024 and, following this, enhancements will likely be made to deliver efficiencies. HAL explained that the programme is driven by: (i) the regulatory requirements; (ii) limitations in the supply chain as all UK airports are upgrading their security equipment to the same timescales; and (iii) certification of new technologies and algorithms, e.g. for alarm-only screening.
- Considering these limitations, HAL stated that the benefits in increased throughput and reducing staffing per lane due to the new technology and processes will not start to be realised until 2025, as opposed to our initial assumption of 2023. It states that the security transformation programme has initially assumed resourcing of 15 security officers per pair of lanes reducing to 11 security officers per pair of lanes (the same as the current technology and process) with a potential stretch end state in H8 of 10 security officers per pair of lanes. HAL does not commit to an end state throughput per lane but does state that, for example, alarm only screening algorithms could reduce the number of images to be screened by a security officer by 70%. It was noted that staffing requirements are subject to regulatory restrictions.
- HAL provided updated data for use in the security model. This including staffing requirements for new and old lanes (as detailed above), and details of the number of new security lanes that will be delivered by the security transformation programme during H7, as detailed in the table below.

Table 4.2: Proportion of new security lanes

	2023	2024	2025	2026
Proportion of new lanes	14%	60%	95%	100%

Source: TA analysis of HAL data

Other operational staff

HAL commented that we use the general cost elasticity of 0.4 for other operational staff costs, without making a judgement on the validity of this approach. Within the people costs category, HAL itself uses a general elasticity of 0.3 in RBP Update 2, reduced from 0.39 in RBP Update 1.

[23] HAL (2021) CAP2265 response.

Non-operational staff

HAL stated that the assumption that non-operational staff costs do not vary with passenger numbers is incorrect, acknowledging, however, that any linkage is indirect. HAL also stated that it intended to reintroduce the 500 management roles that were removed in 2020 and 2021 as traffic recovers, starting in 2022, although a number of these roles will be capitalised and ongoing efficiencies will mean that not all costs will return. Again in the people costs category, HAL applied an overall elasticity of 0.3 with respect to passenger volumes in RPB Update 2, lower than its previous elasticity estimate of 0.39. HAL argued that a reduced elasticity was justified due to practical difficulties in ramping resourcing up and down without a significant lag behind changes in passenger demand.

Pensions costs

In its CAP2265 response, HAL highlighted our approach of applying the general elasticity of 0.4 to pensions again without making a specific judgement on the validity of this. HAL then continued to describe the uncertainties associated with pensions, in particular that with ongoing valuation and covenant review (to assess HAL's ability to support the defined benefit scheme) not being available until September 2022 and April 2022 respectively.

Terminal 4 closure and reopening

HAL has revised its top-down estimate of the impact of the Terminal 4 closure, using a bottom-up estimate instead. It calculates the net saving from the Terminal 4 being closed for half of 2022 (leading to a 50% saving) and a gradual ramp up in costs to cover recruitment and training, of 10% costs six months before opening and 50% costs two months before reopening. This results in a net saving of 38.3% of typical Terminal 4 expenditure. Assuming a staffing requirement of 206 FTE and an average cost per FTE of £47k, this results in a net saving of £3.7 million (nominal).

4.2.2. Airlines

Airlines broadly agreed with the approach we took for our initial forecasts and agreed that we ought to be using different elasticities for specific staffing categories. Our elasticity estimate was supported by BA,[24] and PA Consulting, advising the AOC/LACC.[25] The latter argued that our elasticity estimate was more accurate than HAL's estimate.

VAA noted that where HAL has attempted to rebut our conclusions, HAL failed to explain its grounds for doing so or suggest alternatives. For example, HAL claims that the estimate for security staff costs is based on incorrect assumptions, and that these assumptions do not reflect the operational reality and cost impacts of the current operation, without explaining what the operational reality and costs impacts are.

BA welcomed our modelling of staff costs as it considered HAL's proposed elasticities not supported by the evidence.

AOC/LACC feedback suggested that our report should be considered fully, particularly our analysis on security screening which draws on industry experience and knowledge at other airports. In our bilateral engagement with the airlines, they stated that there was very limited data forthcoming from HAL in relation to the pilot security lanes and the efficiency of roster coverage during periods of volatile demand. Airlines reiterated that they expect HAL to be responsive and flexible to demand and recent capital investment was designed to help HAL better plan the security operation

The airlines also stated that HAL previously verbally outlined various benefits of the security transformation programme – and included the eventual delivery of a lane throughput of 220 passengers per lane per hour, an increase from the 140 achieved in 2019.

[24] British Airways (2021) British Airways Response to CAP2265.

[25] PA Consulting (2021) Review of CEPA/Taylor Airey review of H7 Opex and Commercial Revenues.

BA suggested that employee costs disclosed by HAL under the regulatory accounts are inflated by 7.5% due to the employment of all staff through a Shared Services Agreement with LHR Airports Ltd (an entity which ultimately falls under the group of companies controlled by FGP Topco Ltd). BA estimate that this could amount to an annual over-statement of operating costs of £27.1 million in Heathrow's regulatory business plans based upon the £388 million employee costs consolidated at FGP Topco Ltd, though this will depend on the specific accounting treatment at group level. BA noted the importance of finalising our analysis to produce a fully formed, detailed and bottom-up analysis of Heathrow's cost base as the basis of H7 Final Proposals. Our interpretation is that these comments refer to related party transactions, is principally an accounting issue and is not visible in our analysis of opex. Furthermore, we believe that related party transactions have been dealt with in a separate study commissioned by the CAA. This is, therefore, not addressed in this report.

4.3. Our assessment of the issues

Consistent with our initial forecasts for IPs, we have combined assumptions of the elasticity of staffing levels with respect to passenger volumes, alongside targeted bottom-up modelling of the impact of the security transformation programme and reopening of Terminal 4 operations, to inform our updated forecasts of security staff costs.

Our assumptions on RPEs for people costs are discussed in Section 9.

4.3.1. Security staff (including security transformation programme)

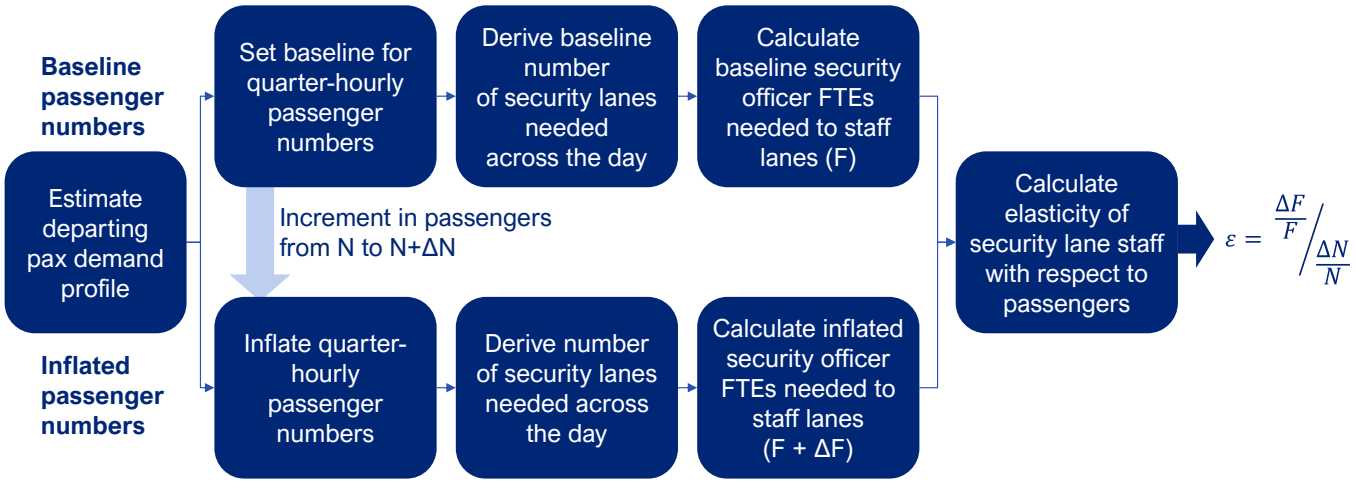
Security lane staff

Our modelling assumptions for security lane staff have been updated in line with new information provided from HAL, including:

- The scheduling of the capital programme to meet mandatory requirements by June 2024, subsequently delivering efficiencies gradually to the end of the H7 period. This scheduling is based on HAL's description of the security transformation programme. We understand the constraints of this programme but note that, without these constraints, benefits could potentially be delivered much earlier.
- Lane staffing requirements from 15 per pair of new lanes initially down to 11 per pair of new lanes when new technologies and processes are bedded-in.
- Lane throughputs, initially reflecting the low throughputs observed in early 2022 of between 95 and 115 passengers per lane per hour, increasing gradually to 2019 levels of 140 passenger per lane per hour in 2023, up to a maximum level of 220 passengers per hour per lane for the new lanes, conservatively by 2030. HAL has not committed to long-term throughput figures and therefore, our assumptions are based on industry sources, experience and evidence provided by airline stakeholders.
- Constraints on roster efficiency set as a coverage efficiency ratio. We set this initially at 69% reflecting the current volatility and peakiness of the demand profile, but gradually increase this through to a realisable optimum of around 76% by the end of H7.
- Terminal 4 re-opening, which increases the required number of fixed positions.

We applied the same modelling approach to assessment of security opex that we applied to generate our initial forecasts. The first step is to calculate the elasticity of security lane staff with respect to passenger numbers using a simple queueing model. The overall approach is illustrated in Figure 4.2.

Figure 4.2: Approach to calculating the elasticity of security lane staff with passenger numbers

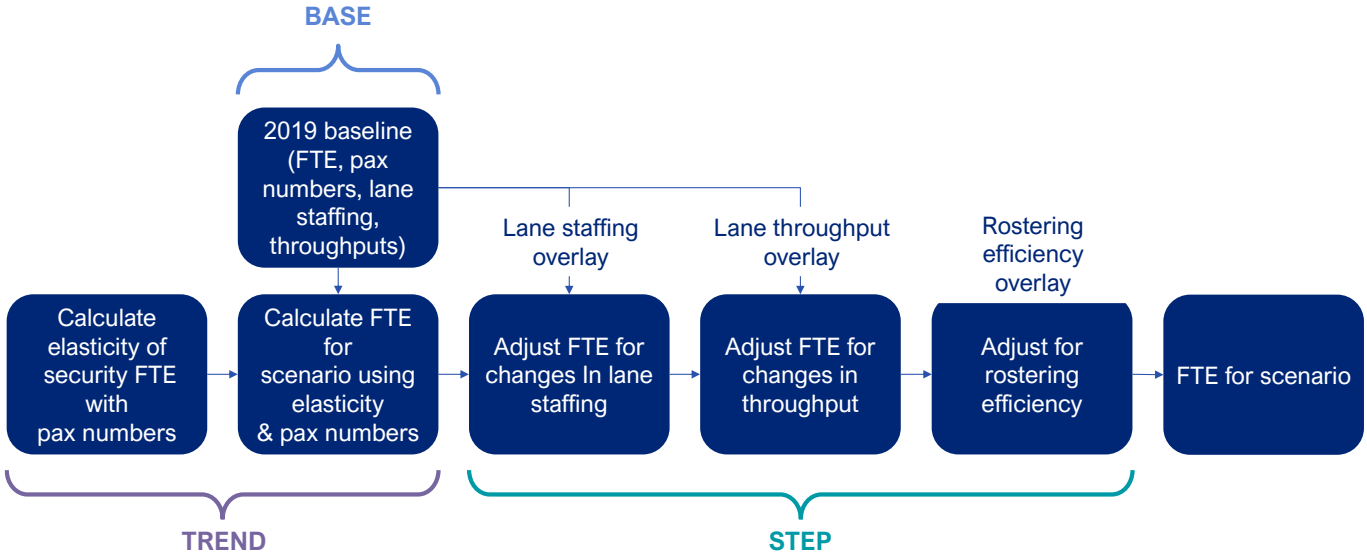


Source: Taylor Airey

The model calculates the number of security lanes for a given passenger load, rounded up to the nearest whole number of lanes, needed for a given throughput per lane at 15-minute intervals. It then uses the staffing per lane to calculate the number of security staff full time equivalents (FTE) needed to meet the demand. The passenger load is then inflated and the new FTE number calculated. The elasticity is then calculated as the ratio of the proportional change in FTE to the proportional change in passenger numbers. As a result of this modelling, we maintain our security lane staff elasticity of 0.7.

This elasticity is then used to project lanes security staff numbers from the 2019 baseline using passenger numbers, actuals for 2020 and 2021 and forecasts thereafter. We have added overlays to reflect the shift to new lanes as part of the security transformation programme, illustrated in Figure 4.3.

Figure 4.3: Modelling lane security FTE numbers



Source: Taylor Airey

These overlays account for the evolution throughout the H7 period of:

- Lane staffing requirements;
- Lane throughputs; and
- Rostering efficiency.

In line with comments made by HAL, we do not apply our standard ongoing productivity assumption to our Security staff forecasts, to avoid double counting the efficiencies included within the overlays.

We have investigated several scenarios principally driven by lanes staffing requirements. In our mid-case scenario, we assume that the reduction from 15 staff per pair of lanes to 11 officers per pair of lanes starts in 2025 when the proportion of new lanes reaches 95% of the total lanes (according to HAL's latest estimates). As a more optimistic case, we assume that this reduction starts in 2024, when the proportion of new lanes is forecast to be 60% of the total. We consider that both these cases represent a reasonable estimate of the delivery of benefits from an efficient and well-managed security transformation programme. It should be noted that while we agree with HAL's position that efficiencies will mainly accrue from the security transformation programme we also consider that smaller efficiencies will arise from process improvements and these present opportunities to realise efficiencies ahead of the main programme.

We note that the transformation programme extends into H8 with benefits coming later in the programme. To account for staff-shift from old to new lanes in our modelling we have taken what we consider to be the reasonable and pragmatic assumption that this higher lane throughput of 220 will only be achieved in 2030.

Fixed post staff

As with our initial proposals we have assumed that fixed post staff are required at 2019 levels, other than when terminals have been closed. As these posts are fixed we have assumed a zero elasticity with passenger volumes and have applied a 1% per annum efficiency improvement from 2023 onwards.

4.3.2. Other staff

We have not made any substantive changes to our initial forecasts from IPs. We maintain our previous elasticity of 0.4 for operational staff with respect to passenger volumes, and an elasticity of zero for non-operational staff. However, we note that non-operational staffing has been reduced by HAL in 2020 and 2021, in response to the pressures faced by HAL during the pandemic.

We have used an overlay to account for these staffing reductions assuming that they will be reversed in line with the recovery in passenger volumes, rather than immediately reversed in 2022.

Finally, for both operational staff and non-operational staff, we assume a 1% per annum efficiency improvement from 2022 onwards. This is discussed in more detail in Section 10.

4.3.3. Pension costs

We have changed our modelling of pension costs so that it is directly linked to total wage costs for security staff, operational staff and non-operational staff. This replaces out previous modelling, which projected pension costs using a passenger driven elasticity. In the absence of further information our approach to modelling pension costs remains unchanged, using an elasticity of 0.4 and assuming that pension costs grow in line with average wages.

4.3.4. Terminal 4 closure and reopening

In RBP Update 2, HAL assumed that Terminal 4 would operate as a red-list terminal, with associated cost of £9.5 million (nominal) from January until its full reopening in July 2022. This operation as a red-list terminal did not in fact occur, so we have omitted this from our assessment.

We assume that Terminal 4 will reopen in July 2022 and have aligned our modelling with HAL's, using their revised assumptions, allowing additional opex as Terminal 4 operations ramp up.

4.4. OUR REVISED FORECASTS

Table 4.3 below shows our revised forecasts for people costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2.

Other than the impact of revised assumptions around wage growth and on-going productivity, the main difference between our initial and revised forecasts is driven by our remodelling of the staffing levels needed for security. In our revised forecasts, we have followed the sequencing in HAL's security transformation programme to estimate the costs and benefits of the programme, whereas in our initial forecasts we assumed an optimised sequence for implementation of new technologies and processes that delivered benefits, in terms of throughput and staff productivity, earlier.

Table 4.3: Taylor Airey revised people cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	291.5	338.5	370.8	392.7	409.4	**1,802.9**
HAL RBP Update 2	342.9	383.2	413.3	414.8	422.1	**1,976.3**
TA Initial Forecasts	250.2	271.1	288.4	293.5	294.1	**1,397.3**
TA Revised Forecasts	340.2	345.4	395.8	426.3	420.3	**1,927.9**
Difference from HAL RBP U2	-2.7	-37.8	-17.5	11.5	-1.8	**-48.4**
Difference from TA IF	90.0	74.3	107.3	132.7	126.2	**530.6**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

5. OPERATIONAL COSTS

Operational costs cover all the external costs associated with operating Heathrow airport. Within HAL's modelling, it has been split into insurance costs and other operational costs excluding insurance. The latter category covers a range of contracts with suppliers including the air traffic control contract with NATS, IT costs, policing costs, and bus shuttle services.

5.1. OUR INITIAL FORECASTS

5.1.1. Operational costs excluding insurance

Although this category of opex covers a range of non-pay costs, we followed HAL's methodology of using a top-down approach to forecasting overall expenditure within the category, rather than separately forecasting each individual component. At initial forecasts, we took the following approach:

- **Base year adjustment** – As described in Section 3, we made a base year efficiency adjustment to reflect our view that HAL's expenditure levels in 2019 was not representative of an efficient company. We reduced expenditure to remove half of the growth in per passenger opex between 2017 and 2019, pro-rating this reduction across the opex categories that had seen the most growth over this period. For the operational costs excluding the insurance category, this meant a £7.6 million (2019 prices) reduction to the baseline. This contrasted with HAL's view that no base year adjustment was required.
- **Price adjustment** – We assumed the cost of the services provided in this category would grow in line with general price inflation in the economy, and we used CPI as our measure of general price inflation. This contrasted with HAL's view that such costs would be exposed to price pressures exceeding general price inflation. We discuss this further in Section 9.
- **Volume adjustment** – We used a generic elasticity of 0.4 to estimate how costs would change relative to 2019 levels given different passenger volumes. This contrasted with HAL's view that a more appropriate elasticity was 0.2, given a large proportion of the costs within this category were considered fixed.
- **Terminal closure overlay** – We included a downward overlay to account for the fact that Terminal 4 was expected to be closed during 2022 and part of 2023 and as such, some of the costs associated with running the terminal would not be needed. Our estimates were broadly in line with those proposed by HAL.
- **Ongoing productivity** – Finally, we applied a 1% year-on-year efficiency as per our estimate of ongoing productivity improvement.

In developing these forecasts, we also reviewed HAL's expenditure for specific major cost items – police costs, PRM costs, and air traffic control costs. We did not find any issues warranting a change in our top-down approach.

In the table below, we compare the results of our initial forecasts with HAL's proposals in its RBP Update 1.

Table 5.1: HAL and Taylor Airey operational cost forecasts excluding insurance using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	272.1	298.8	318.6	332.2	343.6	**1,565.2**
TA Initial Forecasts	222.7	252.9	273.2	282.8	288.1	**1,319.6**
Difference	-49.4	-45.9	-45.4	-49.3	-55.6	**-245.6**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

5.1.2. Insurance costs

For insurance costs HAL did not use an elasticity-based approach, instead proposing that costs will increase by ✂% per annum (before inflation) due to increasing premiums. HAL argued this was a conservative view given current market conditions.

In our initial forecasts we did not make any adjustments to the baseline and instead, assumed insurance would grow by 5% per annum in nominal terms. We noted that HAL's insurance cost forecast for 2021 was revised down in its RBP Update 1 relative to its original RBP submission, and we also noted that airlines had not seen similar increases in their own premiums, despite operating in the same sector.

The resulting differences in our forecasts can be seen in the table below.

Table 5.2: HAL and Taylor Airey insurance cost forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	19.7	22.2	25.1	28.4	32.2	**127.6**
TA Initial Forecasts	17.0	17.7	18.4	19.1	19.9	**92.0**
Difference	-2.7	-4.5	-6.7	-9.3	-12.3	**-35.6**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

5.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

5.2.1. HAL

Operational costs excluding insurance

HAL's comments in relation to operational costs largely focused on our choice of baseline:

- They considered that our forecasts overestimated the efficiency gains required to ensure the baseline was efficient (see discussion in Section 3).
- They also updated their analysis of the impact of their supply chain paying the London Living Wage on their costs. While at RBP Update 1, these additional costs were solely allocated to facilities and maintenance costs, HAL has since clarified that some of the additional cost associated with paying the London Living Wage relates to operational costs.

HAL separately contend that:

- Our forecasts overestimated the impact of lower passenger volumes on operational costs by failing to recognise the level of fixed costs at an efficient airport. They argue that given the operational reality of Heathrow Airport, with a large proportion of its cost base being fixed in the medium term, a more accurate elasticity would be 0.2, rather than 0.39. This is based on the assumption that half the costs are fixed (elasticity of zero) and half the costs have an elasticity of 0.39, giving an average elasticity of 0.2.
- Our forecasts used incorrect assumptions regarding the ramp up in costs ahead of Terminal 4 reopening. They also updated their analysis of the impact of the Terminal 4 closure and reopening to reflect the revised reopening date of Summer 2022.
- Our forecasts overestimate the potential for ongoing efficiency through ongoing productivity improvements in the absence of CAA providing a capex allowance.
- Our forecasts underestimate the impact of increasing input prices and inflationary cost pressures.

We discuss the issues related to the choice of baseline in Section 3 above, our considerations in relation to HAL's exposure to inflationary cost pressures in Section 9, and our treatment of ongoing productivity in Section 10. We discuss the remaining issues in the subsequent subsection.

Insurance

HAL argued that the latest market data suggested that its RBP Update 1 assumption was a conservative estimate, drawing on data from Marsh Speciality and Global Placement. Its response also stated that our 5% assumption was unsubstantiated. Nevertheless HAL updated its estimate to a *nominal* 10% per annum increase in insurance premiums rather than a real 10% increase.

5.2.2. Airlines

PA, in its analysis for the AOC/LACC,[26] noted that its estimates were closely aligned with our initial forecasts, as shown in the table below.

Table 5.3: PA forecast – adjusted for HAL 2026 passengers (2018 RPI prices)

Year	2019	2026		
		PA	TA Initial Forecasts	HAL RBP Update 1
Operational costs (excluding insurance) (£m)	270	233	237	280
Insurance (£m)	16	19	16	26
Operational costs total (£m)	286	252	253	306
Passengers (mppa)	80.9	72.1	72.1	72.1

Source: HAL, Taylor Airey, PA analysis

5.3. Our assessment of the issues

5.3.1. Operational costs excluding insurance

Baseline adjustments

For operational costs excluding insurance (see below), we have made an adjustment to the 2019 baseline to account for potential inefficiencies inherent in that year's cost base evidenced by an increase on cost per passenger in 2019 compared to previous years (see Section 3 for a full discussion).

HAL implies that the increase in opex in 2019 is due to drivers other than passenger volume, as well as uncontrollable costs.[27] However, HAL's own benchmarking analysis, performed by KPMG, [28] suggests that opex in 2017 was nearer to the efficiency frontier and that in 2018 was efficient based on econometric benchmarking with a selection of other airports but suggests a central estimate for an opex efficiency gap of £0.47 per passenger (~£38m in total). In order for the KPMG benchmarking to be valid it must account for non-passenger drivers and uncontrollable costs highlighted by HAL. These drivers will likely also be experienced by other airports in the comparator set, so it is not sensible for HAL to make one-off adjustments to neutralise these factors, which if the airport were operating at the efficiency frontier would have been offset by efficiencies elsewhere. We conclude, therefore, that the efficiency gap in the 2019 baseline is real. Our efficient 2019 baseline is set such that this efficiency gap is closed, with the difference being distributed across the different cost categories proportionately.

[26] PA Consulting (2021) Review of CEPA/Taylor Airey review of H7 Opex and Commercial Revenues.

[27] HAL (2021) CAP2265 response, p.139.

[28] HAL (2021) CAP2265 response, p.138.

Elasticities

Based on an assumption of 50% fixed costs with zero elasticity and 50% variable costs with an elasticity of 0.4, HAL uses an overall elasticity of 0.2 for operational costs. We agree that a substantial proportion of operational costs are fixed and incurred through contracts, such as for policing. Other costs are more likely to be more variable and related to traffic in some way, for example bussing and air traffic control costs, although the details of these contracts are not available. Our view is that the variable costs are likely to have an elasticity substantially higher than 0.4. This is based on our assessment that for purely variable costs, as in security lane staffing, we would expect an elasticity of 0.5 to 0.8. At the high end of this range an assumption of 50% fixed and 50% variable costs would result in an overall elasticity of 0.4. Frontier Economics, in its analysis for HAL in 2019 observed that airport operating cost elasticities (for a mix of fixed and variable costs) normally lie in the range 0.5 to 0.7,[29] thus an assumption of 0.4 for a 50% variable cost does not appear unreasonable. We have, therefore, retained our assumption of an elasticity of 0.4 for operational costs.

Terminal 4 closure and reopening

In line with HAL's RBP Update 2, unchanged from Update 1, we assume a marginal cost of £50/m^2 in 2018 RPI prices to reflect the operational cost savings associated with the closure of Terminal 4.

We have aligned our modelling with HAL's updated assumptions on terminal opening, in July 2022 allowing additional opex as T4 operations ramp up and are prepared for operations.[30] This ramp-up is built up as 25% three months from opening, increasing to 50% two months from opening, 75% one month from opening and the full 100% on opening. Based on HAL's conservative traffic forecasts, it is questionable whether T4 would need re-opening as early as summer 2022. However, based on airlines' more optimistic forecasts and operational requirements, e.g. for check-in facilities at peak times, there is an argument for opening T4 as early as possible. As these conflicting positions are not resolved, we have retained July 2022 as the opening date for Terminal 4.

PRM

We note that PRM costs comprised approximately 9% of total operational costs in 2019. We assume that the same provision is made in HAL's RBP forecasts but would highlight that there is a potential overlap and double count with the overlay proposed for the passengers requiring support (PRS) service (see section 8), recovered through Other Regulated Charges (ORCs). We have accounted for this potential double count in our treatment of the PRS service by reducing the PRS overlay in proportion to our assessment of the double count for PRM.

Input price inflation and ongoing productivity improvements

Our view on input price inflation is set out in Section 9, while our ongoing productivity target of 1% per annum is discussed further in Section 10. The main changes from our initial forecasts are that:

- We now assume that HAL will be exposed to cost pressures that differ from general consumer inflation, following representations made by HAL.
- We bring forward our application of the 1% per annum ongoing productivity improvement target to 2020, following a reassessment of the potential for long-term efficiency improvements following the COVID-19 pandemic.[31]

5.3.2. Insurance

For its RBP Update 2, HAL has a ✂% nominal year-on-year increase in insurance costs from an assumed starting point in 2022, although it has also applied a 1% year-on-year efficiency. Figure 5.1 below shows HAL's RBP Update

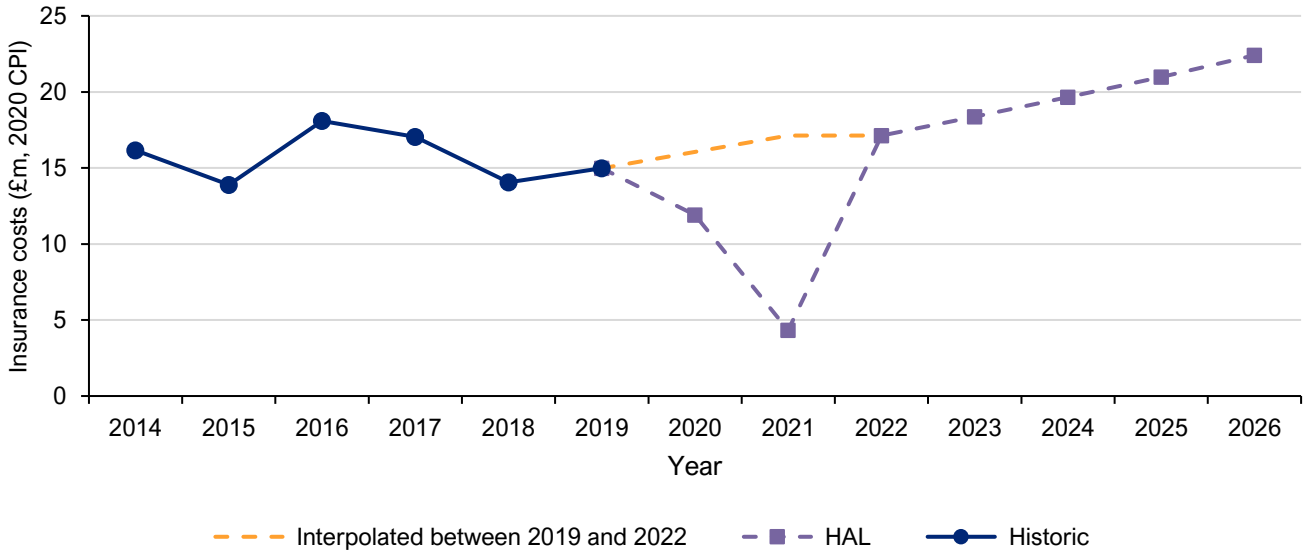
[29] Frontier Economics (2019) Developing opex and commercial revenue elasticities for H7.

[30] HAL (2021) RBP Update 2, para 1.3.30.

[31] See discussion in Section 3.3 above.

2 forecast for insurance costs for H7 in nominal terms as well as the actual costs incurred from 2014 to 2021. We understand that the large reductions in 2020 and 2021 were due to the reduced requirement for insurance during the height of the pandemic, as well as temporary government supports,[32] rather reductions in premiums.

Figure 5.1: HAL's RBP Update 2 projections for insurance costs, 2020 CPI prices



Source: HAL, Taylor Airey

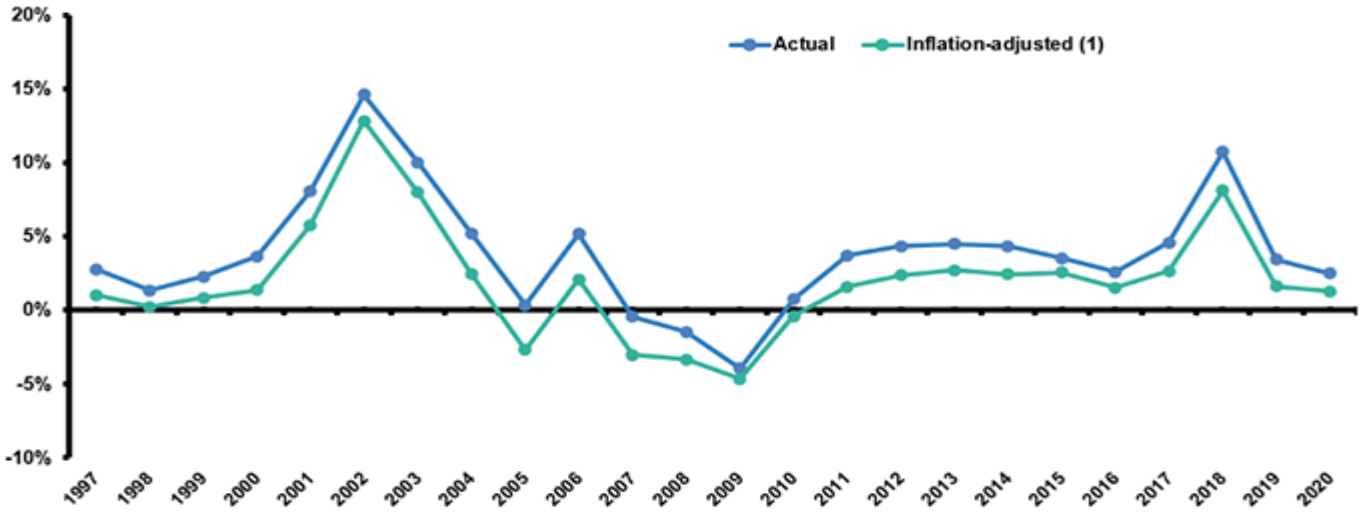
These large reduction means that the step change in insurance costs from 2021 to 2022 represents an increase of over 300%. To check that this (and hence the 2022 value used by HAL as its starting point) is reasonable, we grew insurance costs from 2019 using actual growth in premiums reported by Swiss Re to estimate the reasonable level for insurance costs in 2022.[33] Our extrapolation results in a 2022 estimate for insurance of approximately 4% lower than that used by HAL. We have used this lower estimate as the basis for our insurance cost forecasts. While we note that premiums have increased markedly since mid-2019, insurance premiums tend to be cyclical over a period of two to four years and the current trend in premium costs appears to be downwards, as illustrated below.[34]

[32] HAL has confirmed that the £12 million it received in 2021 from the Airport and Ground Operations Support Scheme has been allocated to insurance costs.

[33] Swiss Re Institute (2021) Sigma: Turbulence after lift-off: global economic and insurance market outlook 2022/23, No 5/2021, Table 6. Available at swissre.com.

[34] Insurance Information Institute (undated) Commercial Insurance: Market Conditions: Cycles and Cost. Available at: iii.org.

Figure 5.2: Evolution of property and casualty insurance premiums



Source: NAIC data, sourced from S&P Global Market Intelligence; Insurance Information Institute. Available at iii.org.
Note: (1) Adjusted for inflation by the Insurance Information Institute using the GDP implicit price deflator.

We also note that airlines have not reported an increase in their insurance premiums. In our assessment we use a forecast by Swiss Re, adjusted for the impacts of the pandemic. We provide further detail of our revised forecast in Section 9.

5.4. Our revised forecasts

Table 5.4 below shows our revised forecasts for operational costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The main change we have made from our initial forecasts are:

- Reallocating some of the LLW baseline adjustment from facilities and maintenance costs to operational costs, as HAL has done in its RBP Update 2.
- Providing an allowance for input price increases that differ from CPI as discussed in Section 9, and updating our assumptions around inflation over H7, reflecting expectations of higher inflation in the shorter term.
- Assuming Terminal 4 re-opens sooner than previously assumed, as per HAL's revised re-opening plan.

Table 5.4: Taylor Airey revised operational cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	272.1	298.8	318.6	332.2	343.6	**1,565.2**
HAL RBP Update 2	288.1	308.4	320.8	329.6	337.2	**1,584.1**
TA Initial Forecasts	228.5	258.7	282.4	296.1	302.9	**1,368.7**
TA Revised Forecasts	258.3	290.6	308.7	319.3	327.7	**1,504.7**
Difference from HAL RBP U2	-29.8	-17.8	-12.1	-10.2	-9.5	**-79.5**
Difference from TA IF	29.8	31.9	26.3	23.2	24.8	**136.0**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

Table 5.5 below shows our revised forecasts for insurance costs, in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. From our initial forecasts, we have

updated our modelling using forecast growth rates in insurance premiums derived from Swiss Re data, to replace our previous assumption of 5% annual growth.

Table 5.5: Taylor Airey revised insurance cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	19.7	22.2	25.1	28.4	32.2	**127.6**
HAL RBP Update 2	18.2	19.9	21.6	23.5	25.6	**108.9**
TA Initial Forecasts	17.0	17.7	18.4	19.1	19.9	**92.0**
TA Revised Forecasts	17.5	18.5	19.3	20.1	21.1	**96.5**
Difference from HAL RBP U2	-0.8	-1.4	-2.4	-3.4	-4.6	**-12.4**
Difference from TA IF	0.5	0.8	0.9	1.0	1.2	**4.4**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

6. FACILITIES AND MAINTENANCE COSTS

Facilities and maintenance costs cover maintenance, baggage, and cleaning.

6.1. OUR INITIAL FORECASTS

For our initial forecasts, we estimated facilities and maintenance costs as follows:

- **Base year adjustment** – We made two adjustments to our base year estimate of facilities and maintenance costs. We made a downward adjustment to reflect savings from HAL's renegotiation of the baggage contract, in line with the estimate provided by HAL. And we made an upward adjustment to reflect additional costs associated with requiring suppliers to pay the London Living Wage.
- **Price adjustment** – In line with HAL's assumption, we assumed HAL would be exposed to RPEs within this opex category. We assumed costs would be half driven by CPI and half driven by increases in wage costs. We discuss this further in Section 9.
- **Volume adjustment** – We disagreed with HAL's use of an elasticity with respect to terminal space as the statistical evidence supporting such an estimate was weak. Instead, we used an elasticity of 0.4 with respect to passenger volumes.
- **Ongoing productivity** – Finally, we applied a 1% year-on-year efficiency as per our estimate of ongoing productivity improvement.

In the table below, we compare the results of our initial forecasts with HAL's proposals in its RBP Update 1.

Table 6.1: HAL and Taylor Airey facilities and maintenance cost forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	178.0	191.3	203.3	209.4	215.7	**997.5**
TA Initial Forecasts	146.2	161.4	172.5	179.8	184.6	**844.5**
Difference	-31.7	-29.9	-30.8	-29.5	-31.0	**-153.0**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

6.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

6.2.1. HAL

HAL raised four issues in relation to the forecasts of facilities and maintenance costs:

- **London Living Wage** – As discussed in Section 3, HAL disagreed with our proposed efficiency adjustment to the LLW and has increased its estimate of the impact of extending LLW to its supply chain.
- **Elasticity** – HAL disagreed with our choice of using an elasticity of 0.4 with respect to passenger volumes for facilities and maintenance costs. Its response argued that it was more appropriate to use an elasticity of 0.66 with respect to changes in utilised terminal space, as estimated by Frontier Economics,[35] given terminal use, rather than passengers, is the main driver of costs. HAL also assert that while using an elasticity estimate on a bottom-up basis may be preferable in principle, data for comparator airports is not consistently available at a sufficient level of granularity to make this possible.

[35] Frontier Economics (2019) Developing opex and commercial revenue elasticities for H7, A report prepared for Heathrow Airport.

- **Terminal 4 reopening** – HAL stated that it did not include a ramp up of facilities and maintenance costs prior to Terminal 4 re-opening, as it did with operational costs. The ramp up, which included an allowance of 25%, 50% and 75% of total costs in the three months prior to scheme opening, aimed to reflect the build-up of costs when terminals are being prepared. HAL asserted that this exclusion was an oversight, which it has now corrected for within its RBP Update 2.

- **Input price inflation** – Finally, HAL updated its estimate of its exposure to RPEs based on an analysis of its contract rates for facilities and maintenance. We provide a detailed discussion of its updated estimate and our assessment of it, in Section 9.

6.2.2. Airlines

PA, in its study for the AOC/LACC, noted that while we and HAL had included savings from the renegotiation of the baggage contract, we had not included any other savings from contract renegotiations. PA argued that it was unclear why savings from other COVID-19 related contract savings could not be retained.

6.3. Our assessment of the issues

As discussed in Section 3, we have allowed for an adjustment to the baseline to account for the introduction of the LLW to HAL's supply chain, albeit with a 10% efficiency. We have updated our modelling to reflect more accurately (based on the assumptions provided by HAL), the proportion of the increase that will be accounted for within facilities and maintenance costs (as opposed to operational costs). In our initial forecasts, all of the LLW impact was included within facilities and maintenance costs.

In both Update 1 and Update 2 to the RBP, HAL applied an elasticity of 0.66 driven by utilised floor space to facilities and maintenance costs, other than for Terminal 4 red list use where an elasticity of 0.42 has been applied, without rationale. The figure of 0.66 is derived from Frontier Economics work,[36] where Frontier note that, "*the single elasticity for facilities & maintenance is of limited use in isolation. It is necessary to combine this figure with a separate forecast for every other opex category to produce the total opex forecast*".

We continue to maintain that it would be preferable to use a bottom-up elasticity estimate based on an analysis of HAL's contracts and the extent to which they are based on utilised terminal area and/or passenger volumes. Nevertheless, in the absence of such analysis by HAL, we have opted to use its elasticity estimate with respect to utilised floor space in place of our previous assumption of 0.4 with respect to passenger volumes.

We have used HAL's elasticity estimate to inform our overlay to account for the temporary closure of Terminal 4 and the ramp-up of costs prior to the reopening of the terminal. We have accepted HAL's rationale for the ramp-up and use their assumptions of 25% costs incurred three months prior to reopening, 50% of costs incurred two months prior to reopening, and 75% of costs in the month before reopening. This results in a weighted average utilised terminal area in 2022 of 7% less than 2019.

Finally, we discuss in detail our treatment of RPEs in Section 9 and our application of a 1% per annum ongoing productivity target in Section 10. The main change from our initial forecasts is that we bring forward our application of the 1% per annum ongoing productivity improvement from 2022 to 2020, following a reassessment of the potential for long-term efficiency improvements following the COVID-19 pandemic. Again, the rationale for this is discussed in Section 3.3 above.

[36] Frontier Economics (2019) Developing opex and commercial revenue elasticities for H7, A report prepared for Heathrow Airport.

6.4. OUR REVISED FORECASTS

Table 6.2 below shows our revised forecasts for facilities and maintenance costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. For this category, our revised forecasts are marginally higher than HAL's forecasts in nominal terms, due to us using more recent projections of inflation that reflect expectations of higher inflation in 2022 and 2023.

The main changes from our initial forecasts are due to:

- Baseline adjustments associated with the LLW.
- Assumptions on input price inflation, which now reflect HAL's actual contracts with suppliers.
- Our assumptions on the re-opening of Terminal 4, which are now in line with HAL's assumptions in RBP Update 2.

Table 6.2: Taylor Airey revised facilities and maintenance cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	178.0	191.3	203.3	209.4	215.7	**997.5**
HAL RBP Update 2	174.3	190.0	193.0	196.2	199.5	**953.1**
TA Initial Forecasts	149.9	165.0	178.3	188.3	194.2	**875.6**
TA Revised Forecasts	177.7	191.9	193.2	195.1	197.3	**955.1**
Difference from HAL RBP U2	3.3	1.8	0.2	-1.1	-2.2	**2.1**
Difference from TA IF	27.8	26.9	14.8	6.8	3.2	**79.5**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

7. OTHER OPEX (INCLUDING RENT, RATES AND UTILITIES)

This section discusses our forecasts of rates costs, general expenses, spending on utilities, and the cost of a contract with UK Power Networks relating to the leasing of the electricity distribution network at Heathrow airport.

7.1. OUR INITIAL FORECASTS

7.1.1. Rates

In its RBP, HAL proposed making business rates an ORC, which would mean that the costs were fully passed through to airlines. HAL's argument was that it had limited control over business rates and therefore should not benefit from any windfall gains or lose from unanticipated rates increases. Ultimately, the regulatory treatment of Rates costs is a decision for the CAA and beyond the scope of our study. As such, we did not address this point in our initial forecasts.

At initial forecasts stage, we kept rates costs constant in real terms at 2019 levels, in line with HAL's approach. However, instead of assuming rates costs would be indexed by RPI as proposed by HAL, we assumed these costs would grow by CPI, in line with the Government's stated intention. We also did not apply our standard ongoing productivity assumption to rates costs given HAL had limited control over such costs.

In the table below, we compare the results of our initial forecasts with HAL's proposals in its RBP Update 1.

Table 7.1: HAL and Taylor Airey rates cost forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	125.6	128.9	132.7	136.7	140.8	**664.8**
TA Initial Forecasts	122.5	124.9	127.3	129.8	132.4	**636.9**
Difference	-3.1	-4.0	-5.5	-6.9	-8.4	**-28.0**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

7.1.2. Utilities

For our utilities cost forecast, we were broadly in line with HAL's approach. We assumed utilities costs would grow in line with energy prices, using a forecast produced by the Department of Business, Energy, and Industrial Strategy (BEIS). To account for volume effects, we used an elasticity of 0.4 with respect to passenger volumes. And we applied an overlay to account for the temporary closure of Terminal 4, in line with HAL's assumption. The key difference between our forecasts was our use of a 1% ongoing productivity improvement assumption.

Table 7.2: HAL and Taylor Airey utilities cost forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	55.6	65.0	70.7	74.5	77.4	**353.2**
TA Initial Forecasts	54.3	62.3	67.5	70.3	73.8	**328.2**
Difference	1.3	-2.7	-3.2	-4.2	-3.6	**-15.0**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

7.1.3. Distribution contract

The electricity distribution fee is a lease payment HAL makes to UK Power Networks for the use of the local electricity distribution network. The contract was renewed in 2016 and forms the basis for HAL's forecast in H7. Given the materiality of other issues we did not prioritise review of this fee and instead, we used HAL's forecasts for the fee.

7.1.4. General expenses

General expenses cover a range of cost components, including marketing and communications, consultancy spend, intra-group charges, and other general costs.

For our initial forecasts, we took the following approach:

- **Base year adjustment** – We made a downward base year adjustment to reflect our view that HAL's expenditure in 2019 was not efficient, and because general expenses was one of the opex categories that had seen the most growth between 2017 and 2019.
- **Price adjustment** – We assumed prices would grow in line with CPI, whereas HAL assumed prices would grow in real terms. We discuss this further in Section 9.
- **Volume adjustment** – We used an elasticity with respect to passenger volumes of 0.4, broadly in line with HAL's estimate of 0.39.
- **Ongoing productivity** – Finally, we applied a 1% year-on-year efficiency as per our estimate of ongoing productivity improvement.

The resulting difference between our forecasts is shown in the table below.

Table 7.3: HAL and Taylor Airey general expenses forecasts using HAL mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	114.8	127.8	138.3	146.1	152.0	**679.0**
TA Initial Forecasts	103.7	114.0	121.2	125.5	127.8	**592.2**
Difference	-11.1	-13.7	-17.1	-20.7	-24.2	**-86.8**

Sources: Taylor Airey Initial Forecasts, HAL RBP Update 1

7.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

7.2.1. HAL

Rates

HAL noted in its response to the IPs that it had reflected the CAA's decision not to treat business rates as an ORC. HAL however state that they do not accept the CAA's proposal to retain the existing 80/20 cost sharing arrangement for business rates as the basis of an efficiency mechanism, partly because they are currently engaging with the VOA (Valuation Office Agency) regarding the revaluation of business rates due to come into effect from April 2023. HAL state that this is contrary to the agreement between HAL and the Airline Community that business rates should be subject to a full pass through (while acknowledging that disagreement exists over the mechanism to achieve this).[37]

In its forecasts, HAL has accepted our view that rates should be modelled to increase in line with CPI to reflect government policy, rather than in line with RPI as previously modelled.[38]

Finally, although we had requested that HAL provide details around any business rates relief it expects to receive during H7, this does not appear to be mentioned in RBP Update 2.

[37] IATA (2020) Airline Community Constructive Engagement Feedback. Annex 13, slide 2.

[38] HAL (2021) CAP2265 response, para 4.10.24

Utilities

HAL noted that we agreed with its position that utilities costs scale with terminal floor space and agreed with its assumption that costs would be ramped-up prior to the re-opening of Terminal 4.

HAL also noted in its response to the CAA's consultation that they face a number of headwinds in relation to utilities costs due to energy price increases and HAL's significant use of gas and electricity. HAL classify utilities costs as being 'semi-fixed' and state that it has not budgeted for significant changes to its heating provision in the H7 capital plans. HAL also state that it has no hedging in place for H7 once the existing hedging arrangement expired in April 2022. This lack of hedging is justified by HAL on the basis that 'current forecasts suggest prices will be on a downward trajectory from the current spot level', and because the limited ability for HAL to buy energy in advance 'given the current volatility in the supplier market'.

In response to these headwinds, HAL has updated its estimate of input price inflation with respect to Utilities costs, using a forecast for electricity and gas prices produced by EIC (which forms the majority of Utilities expenditure). We review this estimate in Section 9.

Distribution contract

Little additional commentary is provided by HAL in relation to the distribution contract except to state that the distribution contract is linked to RPI. This is consistent with our initial forecasts.

General expenses

HAL anticipates all the costs within the general expenses category will return as the airport recovers from the pandemic, other than the permanent cost reductions implied by HAL's ongoing efficiency assumption. No justification is provided for this view, other than to state that those costs associated with marketing, car park advertising commission and retail ambassadors will scale proportionally with passenger numbers. The one exception to this is that the costs associated with insulating homes from aircraft noise and repairing damage to homes from aircraft vortices are currently paused (and so presumably will not be restarted for a given period of time, currently unspecified).

In relation to the elasticity assumptions, HAL considered there was a contradiction between our statements at initial forecasts stage, which suggested that certain general expenses would not be volume related (such as marketing or professional services, including consultancy), and our choice of elasticity at 0.4. Nevertheless, HAL stated that it considered the use of a passenger driven elasticity appropriate, given that £70m of savings had been made in 2021 compared with 2019 in response to the fall in passenger volumes. HAL stated that these savings will be reversed as passenger volumes recover, though no supporting evidence was provided.

Finally, in response to our proposal to forecast general expenses by CPI rather than a mixture of RPI and wage growth, HAL provided further supporting evidence to justify the use of a CPI and wage blend.

7.2.2. Airlines

Rates

While no specific comments were made on our approach, BA and the AOC/LACC stated that they welcome the CAA's position on business rates, with neither supporting the reallocation of business rates to the ORC cost base (as they do not represent a marginal cost). While BA expressed a lack of clarity on the reasoning to retain the 80/20 risk sharing arrangement, VAA were supportive. In general airlines agreed on the need for improved governance around business rate valuations.

Utilities

VAA stated their strong support for our approach to use a bespoke price series with respect to utilities, facilities and maintenance to ensure the input prices were accurately captured.

The PA report noted our consideration that utilities costs should continue to decline during H7 due to energy demand management projects (through a combination of capex and process improvement) and our adoption of HAL's assumptions on electricity usage reductions. However PA noted that both our forecasts and those of HAL are similar by 2026 and higher than 2019 in real terms which, in their opinion, appears conservative. The PA forecast is smaller than our forecasts on the assumption that the efforts to reduce utilities consumption seen in Q6 continue, as well as lower energy consumption being a feature of HAL's carbon neutrality strategy.

Distribution contract

PA's review, on behalf of the AOC/LACC, noted that our approach followed that employed by HAL in assuming the UK Power Networks electricity distribution contract cost is in line with the contract and has no benefit from terminal closures and no efficiency frontier adjustment. PA's own forecast is also in line with the distribution contract price profile in our forecasts.

General expenses

PA's review noted the limited detail provided on the general expenses category despite its relatively large size. The report notes that this cost category would be expected to have some elasticity to traffic recovery along with flexibility to manage costs during the H7 traffic recovery. PA agreed with our position that this is an area to reduce costs however they applied a more conservative ongoing productivity target of 0.5% compared to our 1% target, which they considered to be a 'stretch'.

7.3. Our assessment of the issues

7.3.1. Rates

We retain our initial forecast of business rates assuming these costs would grow by CPI in nominal terms, in line with the Government's stated intention. We continue not to apply our standard ongoing productivity assumption to rates costs given HAL's limited control over such costs.

7.3.2. Utilities

We make three changes to our utilities cost forecasts:

- As detailed in Section 9, we have updated our estimate of input price inflation to account for recent energy price increases. We use the assumptions provided by HAL in its RBP Update 2.
- We have aligned our modelling with HAL's in relation to the temporary closure of Terminal 4 and the subsequent ramping up of operations prior to the reopening of the terminal. We use HAL's unit utilities cost estimate of £25/m^2 in 2018 RPI prices to estimate this. We estimate the closure of Terminal 4 for six months reduces costs by approximately £4.1 million, while the ramp-up increases costs by approximately £1 million.
- We bring forward our application of the 1% per annum ongoing productivity improvement target to 2020, following a reassessment of the potential for long-term efficiency improvements following the COVID-19 pandemic.[39]

7.3.3. Distribution contract

We have performed a cross-check to ensure the Distribution Contract has been accurately reflected in the model. Having completed this cross-check and in the absence of any new information, we retain our initial forecasts.

[39] See discussion in Section 3.3 above.

7.3.4. General expenses

In line with the position of the airline community we would expect Heathrow to disaggregate and provide further detail on the breakdown of categories labelled "other general costs" and "other general expenses" as these are likely to be material in the context of total opex during H7. However this has not been forthcoming, nor has any new information been provided by HAL.

As a result we retain our initial forecasts, which we consider sufficiently challenging:

- We continue to make a base year adjustment to account for inefficient growth in expenditure between 2017 and 2019. This accounts for a £5.8 million (2019 prices) reduction in base year expenditure.
- In addition to this, we use an elasticity of 0.39 with respect to passenger volumes, in line with HAL's assumption, to account for elements of general expenses spending that is volume related. As noted in our report that supported our initial forecasts, we considered that some elements of general expenses spending would not be volume related. However, as HAL has not provided detail on the remaining elements within general expenses, we are unable to form a judgement as to whether such spending is driven by passenger volumes. This would have been particularly valuable in determining an appropriate bottom-up elasticity to use. Consequently, we have opted to continue using the general elasticity estimate.
- We continue to assume that spending on general expenses will continue to grow in line with CPI, rather than a bespoke price series as proposed by HAL. We discuss our rationale in Section 9
- Finally, we continue to apply a 1% ongoing productivity assumption, as discussed in Section 10, but bring forward its application to 2020 instead of 2022, following a reassessment of the potential for long-term efficiency improvements following the COVID-19 pandemic (again, see Section 3.3 for further discussion on the supporting rationale for this).

7.4. OUR REVISED FORECASTS

Rates

Table 7.4 below shows our revised forecasts for rates costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The main change to the rates forecasts relates to the updating of inflation assumptions.

Table 7.4: Taylor Airey revised rates cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	125.6	128.9	132.7	136.7	140.8	**664.8**
HAL RBP Update 2	126.6	129.0	131.9	134.8	137.7	**659.9**
TA Initial Forecasts	122.5	124.9	127.3	129.8	132.4	**636.9**
TA Revised Forecasts	130.7	136.0	138.1	140.7	143.5	**689.0**
Difference from HAL RBP U2	4.1	7.0	6.2	5.9	5.8	**29.1**
Difference from TA IF	8.2	11.1	10.8	10.9	11.1	**52.1**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

Utilities

Table 7.5 below shows our revised forecasts for utilities costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The main change between our initial forecasts and revised forecasts is our use of revised assumptions around utilities price inflation, which we align with HAL's assumptions from RBP Update 2.

Table 7.5: Taylor Airey revised utilities cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	55.6	65.0	70.7	74.5	77.4	**343.2**
HAL RBP Update 2	82.6	90.3	92.1	93.6	95.0	**453.5**
TA Initial Forecasts	55.8	63.7	69.8	73.6	77.6	**340.5**
TA Revised Forecasts	83.2	88.5	90.2	91.7	93.1	**446.7**
Difference from HAL RBP U2	0.6	-1.8	-1.8	-1.9	-1.9	**-6.8**
Difference from TA IF	27.4	24.8	20.5	18.1	15.5	**106.2**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

Distribution contract

Table 7.6 below shows our revised forecasts for distribution contract costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The main change to the forecasts relates to the updating of inflation assumptions.

Table 7.6: Taylor Airey revised distribution contract cost forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	31.3	31.7	29.4	29.0	29.6	**151.1**
HAL RBP Update 2	33.4	34.3	32.0	31.9	32.9	**164.6**
TA Initial Forecasts	32.3	33.0	30.9	30.8	31.8	**158.7**
TA Revised Forecasts	33.4	34.3	32.0	31.9	32.9	**164.6**
Difference from HAL RBP U2	0.0	0.0	0.0	0.0	0.0	**0.0**
Difference from TA IF	1.2	1.2	1.2	1.2	1.2	**5.9**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

General expenses

Table 7.7 below shows our revised forecasts for general expenses costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. As with the other opex categories within this section, the main change to the forecasts relates to the updating of inflation assumptions.

Table 7.7: Taylor Airey revised general expenses forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	114.8	127.8	138.3	146.1	152.0	**679.0**
HAL RBP Update 2	117.8	128.2	136.7	142.0	146.4	**670.9**
TA Initial Forecasts	106.3	116.6	125.3	131.4	134.4	**614.0**
TA Revised Forecasts	111.6	123.4	130.5	134.5	137.4	**637.4**
Difference from HAL RBP U2	-6.1	-4.8	-6.2	-7.5	-9.0	**-33.6**
Difference from TA IF	5.3	6.8	5.2	3.1	3.0	**23.4**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

8. OTHER OVERLAYS

In this section, we discuss the treatment of overlays that have not been allocated to any specific cost category. They cover three specific overlays that have been proposed by HAL in its business plans:

- A **COVID-19 overlay** covering additional costs associated with pandemic, such as more intensive cleaning requirements.
- An **enhanced service overlay**, which covers additional costs HAL states it requires to deliver an improved service to customers.
- A **surface access initiatives overlay** covering the additional operating costs associated with administrating and policing the recently introduced terminal drop-off charge, as well as other surface access projects.

For each of the overlays proposed by HAL, we applied a three-part test:

- **Need** – Was there a need for the overlay, i.e. whether there was an impact outside of HAL's control that affected its cost base?
- **Additionality** – Was the impact genuinely additional to the trend effect already accounted for (or to other overlays already implemented)?
- **Efficiency** – Was the size of the overlay efficient or reasonable?

In the subsections below we summarise our assessment of each of these overlays against this three-part test.

8.1. OUR INITIAL FORECASTS

8.1.1. COVID-19 overlay

For HAL's proposal for an additional allowance to reflect COVID-19 costs, we proposed a smaller overlay than that proposed by HAL, as shown in Table 8.1.

Table 8.1: Comparison of COVID-19 overlay proposals between HAL's RBP Update 1 and our initial forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 1	11	12	13	13	14	**62**
TA initial forecasts	11	9	6	3	0	**29**

Source: HAL RBP Update 1, Taylor Airey analysis

The rationale for our adjustment to HAL's overlay was as follows:

- **Need** – We recognised there was a need for additional expenditure during the pandemic, but we found that HAL had not provided a compelling case for why such effects would be expected to continue throughout H7.
- **Additionality** – We saw an overlay as being additional to effects captured elsewhere, but we were not able to determine whether the cost estimates provided partially duplicated activities that had already been accounted for.
- **Efficiency** – We concluded that the need for an additional allowance for COVID-19 costs would generally taper off rather than stay at levels seen in 2020 and 2021. As a result, we proposed an overlay that tapered to zero by 2026.

8.1.2. Enhanced service overlay

The enhanced service overlay consisted of four components:

- **Providing additional assistance to passengers requiring support (PRS)**. HAL considered this spend component to be different and additional to the assistance service provided to passengers with reduced mobility (PRM) and instead targeted at the 39% of passengers that would benefit from assistance in some way different to addressing reduced mobility. HAL allocated £8 million per annum in 2018 RPI prices to this service. We argued that this is essentially a service quality initiative and that there is little evidence that there is a significant service quality gap at Heathrow and, therefore, it failed the needs test.
- **Additional maintenance to support the resilience of passenger sensitive equipment** that is nearing the end of its nominal life, offsetting previous capital underinvestment. While we found that the needs and additionality tests had been met, the evidence provided by HAL in support of the size of the overlay was limited. As a result, we did not allow for the full overlay but rather reduced HAL's proposals by 50% based on the argument that equipment in Terminals 2 and 5 was not nearing the end of its life and this represented around 50% of the total.
- **Provision of digital services to fill the perceived gap regarding customer queries.** HAL allocated £2 million per annum to this overlay. We argued that this is part of business-as-usual activities, failing the additionality test. As such we proposed not including it as an overlay.
- **Automation of the passenger journey, for example using touchless, self-service equipment.** HAL allocated £1 million per annum to this overlay. We argued that this was also part of business-as-usual activities and, therefore, not required as an overlay.

Table 8.2 below, shows how our proposed overlay compared with HAL's proposals.

Table 8.2: Comparison of enhanced service overlay proposals between HAL's RBP Update 1 and our initial forecasts (£ million, nominal)

		2022	2023	2024	2025	2026	Total
HAL RBP Update 1	PRS	9	9	9	9	10	**46**
	Resilience	15	16	16	17	17	**80**
	Digital Service	2	2	2	2	2	**11**
	Automated Journeys	1	1	1	1	1	**6**
Taylor Airey Initial Forecasts	PRS	0	0	0	0	0	**0**
	Resilience	8	8	8	8	8	**39**
	Digital Service	0	0	0	0	0	**0**
	Automated Journeys	0	0	0	0	0	**0**

Source: HAL RBP Update 1, Taylor Airey analysis

8.1.3. Surface access initiatives overlay

For the surface access overlay, in the absence of any data for detailed analysis we accepted HAL's proposal for the additional opex associated with the terminal drop-off charge, but we proposed that the component associated with the surface access strategy (SAS) be removed based on the following three-part assessment:

- **Need** – We recognised there was potentially a need for additional expenditure costs arise from the introduction of terminal drop-off charging which is new to HAL's operation and if terminal drop-off charging revenues are to be included in the forecast for the H7 price control, it would therefore be consistent to include the operating cost of generating those revenues.

- **Additionality** – We concluded that there was insufficient evidence to determine whether the operational costs associated with terminal drop-off charging are additional. For example, there may already be an element of operational costs associated with staff marshalling traffic on the forecourts and this change may just mean that existing staff do their job in a different way.
- **Efficiency** – We concluded that without any historical data, it is difficult to determine whether the costs proposed by HAL are efficient.

We proposed, therefore, to retain the Terminal Drop-off Charge cost overlays suggested by HAL provided it generates the revenue returns detailed elsewhere in the plan. However, we did not include other SAS costs as an overlay as HAL has not provided any clear rationale for their inclusion.

Table 8.3: Comparison of surface access overlay between HAL's RBP Update 1 and our initial forecasts (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 1	9	12	14	18	18	**71**
TA initial forecasts	9	10	10	13	13	**55**

Source: Taylor Airey analysis, HAL RBP Update 1

8.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

8.2.1. HAL

COVID-19 overlay

In response to the CAA's consultation, HAL argued that the COVID-19 overlay was essential to deliver the "*I feel comfortable and secure at the airport*" consumer outcome.[40] HAL stated that the COVID-19 overlay also supported an increased target for passenger satisfaction scores related to cleanliness from 4.0 to 4.15, as well as a new quality measure for hygiene safety testing and a quality measure on the ease of understanding of Heathrow's COVID-19 related safety information.[41]

Countering our assumption that specialist COVID-19 cleaning could eventually be subsumed into business-as-usual (BAU) cleaning, HAL's response implied that the team providing COVID-19 cleaning must be entirely separate from the BAU cleaning team. HAL emphasised the differences between BAU cleaning, which involves ensuring the terminal is clean and litter free using a team of cleaners with general cleaning products and machines, and the Safe to Fly programme, which ensures a heightened cleaning and hygiene regime exists above the scope of BAU cleaning. The requirements of the Safe to Fly programme include specialist cleaners with specialist equipment, answering passenger queries, enhanced cleaning of regular touchpoints, ultra-violet sanitisation of agreed locations, and daily testing.

In its RBP Update 2, HAL revised its forecasts for the COVID-19 overlay downwards, as illustrated in the following table. These forecasts are independent of passenger growth but include provision for terminal re-opening in 2022.

[40] HAL (2022) CAA Initial Response Bilateral – Operating Costs – Deep-Dive 2.

[41] HAL (2021) CAP2265 response, para 4.7.4.

Table 8.4: Comparison of HAL RBP Updates 1 and 2 forecasts for the COVID-19 overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 1	11	12	13	13	14	**62**
HAL RBP Update 2	8	8	9	9	9	**42**

Source: HAL RBP Updates 1 and 2

Note: Figures presented here have been converted from 2018 RPI prices, as presented in HAL's modelling, to nominal terms using our current inflation projections.

HAL also provided more detail and transparency on the cost components that make up the COVID-19 overlay. These components were:

- Enhanced cleaning with a heightened cleaning regime delivered by specialist cleaners using special cleaning products;
- COVID-19 marshalling to ensure compliance with face mask requirements;
- Additional security shuttles for transfer of passengers from red list countries;
- Personal protective equipment (PPE), including masks, sanitisers and wipes;
- Ad hoc one-off costs, which are undefined.

Enhanced service overlay (ESO)

On the basis that they are not material, HAL agreed with our initial assessment that the ESO costs for digital services and automated journeys should be excluded and removed them in its RBP Update 2.

For **PRS** in Update 2 to the RBP, HAL reduced its assessment of opex associated with PRS by 37.5%. HAL also provided a definition of the scope of PRS and the relationship with the assistance service (PRM), illustrated below. This table shows that there is overlap between PRS and PRM.

Table 8.5: Comparison of PRS and PRM services

Need for enhanced service	Passengers Requiring Support (PRS)	Assistance Service (PRM)
Physical	✓	✓
Sensory	✓	
Cognitive	✓	
Psychological	✓	
Culture & Identity	✓	

Source: HAL, CEPA/TA summary of HAL information

HAL also provided information in relation to customer satisfaction indicating the need for an enhanced service specifically targeted at PRS based on service quality scores. According to a new departure QSM pilot survey from July/August 2021 Passengers Requiring Support scored 4.17 while Passengers not Requiring Support scored 4.39. Similarly, according to recent surveys the levels of customer dissatisfaction among Heathrow *PRM* users is significantly higher (at 22%) when compared to other consumer sectors such as the telecoms sector (16%), banking (11%) consumer durables & insurance (10%) and automotive (6%).[42]

[42] IPSOS (2020) IPSOS UK Customer Satisfaction Survey 2020, and HAL (2019) Heathrow Special Assistance Service Survey 2019

Based on a study performed by Revealing Reality, HAL has identified a set of objectives for the PRS service applicable to 39% of passengers in 2019 highlighted below:[43]

Table 8.6: Objectives for the PRS service

Objective	Cared for	Predictable & reliable	Enjoyable connected	Basic comforts
Maintain and **improve** our **Assistance and Lanyard** services by reviewing what and how we offer the service, consider whether a more flexible service needs to be delivered. Allow people to specify what they need, level of support and where.	✓			
Allow the feeling of **control** and help settle nerves before getting to the airport by clearly communicating, via multiple channels, airport processes and options (e.g. self/manned check-in, fast-track, e-gates/manned immigration). Including information on how they can spend their time depending on how long they have at the airport and what they want to do (e.g. shop, eat or relax).		✓	✓	
Make things **easy** by improving wayfinding and information – both physical and digital. Real time info at key stages of the journey, manage expectations of how longs things will take and what's next. Live maps showing nearest facilities like toilets, seating or refreshments. Declutter physical signage & clear communications.		✓		
Create a '**warmer**', more relaxing environment – such as greenery and open space.			✓	
Offer a range of **seating** options – more comfortable, accessible and with dedicated areas for quiet and relaxation				✓
Welcoming, attentive, proactive **staff**, capable of and confident reading when people need help and when people need their own space. Key point where improvements are needed – check-in, Security search, Immigration, baggage reclaim.	✓			

Source: HAL, CEPA/TA summary of HAL information

In RPB Update 2, in addition to reducing PRS opex, HAL aligned the profile of its proposed expenditure with forecast passenger demand although there is no specific breakdown describing what will be delivered, other than it includes a dedicated in-terminal team to deliver the service.

For **resilience**, HAL clarified that this component of the ESO is associated solely with reactive spend to resolve faults and maintain 2019 service levels for equipment whose reliability is degraded because it is at or beyond their nominal life expectancy. In its RBP Update 2, HAL reduced proposed expenditure within this line item by just under 40% compared to RBP Update 1. This reduction was due to reprofiling the timing of opex requirements in-line with expectations of the need to undertake a higher level of servicing and repair throughout H7 as asset reliability degrades with age. Based on discussions with HAL, we also understand that some of the older and more operationally critical assets will be replaced as part of the capex programme during H7.

[43] Revealing Reality (2019) Understanding the airport needs of passengers requiring support, CAA-H7-606

HAL has also provided additional data on the age profiles, as of 2021, of assets broken down by terminal and other areas. HAL has also provided examples of areas where additional opex has been expended to repair assets that are at or beyond their nominal life expectancy.

Summary

HAL's revised costs for the ESO are shown in the following table.

Table 8.7: HAL RBP Update 2 forecasts for the enhanced service overlay (£ million, nominal)

Enhanced Service Overlay		2022	2023	2024	2025	2026	Total
HAL RBP Update 2	PRS	4	5	6	8	8	**31**
	Resilience	2	5	10	17	22	**56**
	Digital Service	0	0	0	0	0	**0**
	Automated Journeys	0	0	0	0	0	**0**

Source: HAL, CEPA/TA analysis of HAL data
Note: Figures presented here have been converted from 2018 RPI prices, as presented in HAL's modelling, to nominal terms using our current inflation projections.

Surface access overlay

In line with our initial forecasts HAL removed the "Other SAS Costs" relating to its surface access strategy from its RBP Update 2 forecasts on the basis that the costs do not pass HAL's materiality test. HAL also reduced the provision for Terminal Drop-off Charge Costs. The following figure compares the surface access overlay for Updates 1 and 2.

Table 8.8: Comparison of HAL RBP Updates 1 and 2 forecasts for the surface access overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 1	9	12	14	18	18	**71**
HAL RBP Update 2	6	6	7	7	6	**33**

Source: HAL RBP Updates 1 and 2

8.2.2. Airlines

COVID-19 overlay

Airlines noted that the overlays associated with COVID-19 were not fully explained and the costs are not transparent.

Enhanced service overlay

Airlines stated that there is confusion on the similarities and differences between PRM and PRS and there is likely an overlap between the two. In particular, airlines observed that PRM services were a legal requirement whereas HAL's proposals for PRS services were not, and as such, a clear distinction should be made between the two. Airlines noted that there is a service quality issue with PRM and suggested that service quality levels and surveys should be both set and performed by the CAA. Due to the overlap between PRS and PRM, if ESO is implemented then the airlines' view was that there should be a concomitant reduction in PRM costs and an improvement in PRM satisfaction scores.

Surface access overlay

The airline view is that in the absence of detailed information, our initial forecast is a reasonable view of potential additional costs linked to the increased revenue stream associated with the terminal drop-off charge.

8.3. OUR ASSESSMENT OF THE ISSUES

8.3.1. COVID-19 overlay

The situation concerning the COVID-19 overlay has changed considerably during the development of our final forecasts. Initially, we reviewed HAL's proposals in RBP Update 2 with the following conclusions:

- For cleaning, HAL does not provide a rationale for the combination of COVID-19 and BAU cleaning over time. Therefore, we would still expect this consolidation to occur albeit possibly over several years.
- For COVID-19 marshalling, we would have expected the requirement for mask-wearing to be removed by the end of 2022 at the latest.
- We would not expect any requirement for additional security shuttles as the red list terminal ceased operations in late 2021.
- We would expect the requirement for PPE to reduce over the H7 period.
- Ad hoc/one-off costs are not defined but we would assume this is some sort of contingency.

However, during the analysis period all COVID-19 restrictions and legal requirements in England were lifted. Based on this, we propose that the forecast costs from the end of 2022 onwards reduce to zero, with the increased satisfaction score for cleanliness being addressed through BAU cleaning.

We have estimated the 2022 costs based on:

- HAL's proposed cost for cleaning;
- 25% of HAL's proposed cost for COVID-19 marshalling;
- no requirement for additional security shuttles;
- 50% of HAL's proposed cost for PPE; and
- No ad hoc or one-off costs.

Forecast costs are then reduced to zero from 2023 for the remaining period of H7. Our forecast costs for the COVID-19 overlay are summarised in the following table.

Table 8.9: Comparison of our revised forecasts and HAL RBP Update 2 forecasts for COVID-19 overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 2	8	8	9	9	9	**42**
TA revised forecasts	6	0	0	0	0	**0**
Difference	-1	-8	-9	-9	-9	**-36**

Source: TA analysis, HAL RBP Update 2

8.3.2. Enhanced service overlay

PRS

In our initial assessment, the proposed PRS overlay did not meet the "need" test for an overlay as it was interpreted as a service quality issue and, therefore, part of business-as-usual activities. However, based on discussions with HAL and the CAA and additional data (discussed below), the principal objective of PRS appears to be to improve accessibility to and inclusivity for vulnerable passengers through provision of targeted services and facilities, which could be interpreted such that the PRS overlay would, in fact, pass the "need" test. We consider the decision on

whether to allow PRS costs as part of the opex cost base is one for the CAA, to be aligned with its assessment of appropriate outcome targets.

Consequently, we have evaluated two different scenarios:

- In the first of these, which we use in our mid and low cases, we take the position that the costs associated with PRS fail to meet the needs test.
- In the second scenario, we have assumed that the PRS service is included as a component of opex, but with an efficiency adjustment as described in more detail below. We use this scenario in our high-case forecast.

Efficiency of PRS costs

The PRS overlay is the cost associated with providing an enhanced service to meet the needs of vulnerable passengers, including PRM. Based on HAL data, it is understood that PRS comprises 39% of the total passenger mix and PRM comprises 2% of the total passenger mix.[44] Therefore, PRM would make up around 5% of PRS passengers.

In the initial RBP and Update 1 the target satisfaction level for PRS was stated as 4.00 contributing to an overall satisfaction level of 4.26.[45] These targets would imply a satisfaction level of 4.43 for non-PRS passengers. In Update 2 and HAL's CAP2265 response to initial proposals,[46] a PRS satisfaction level of 4.17 is reported along with a non-PRS satisfaction level of 4.39. Albeit in the low traffic levels of 2021, this could be interpreted that the initial PRS target has been met. However, using data provided by HAL comparison of QSM scores for PRM alone indicate that these were around 4.10 in peak traffic Q3 of 2019, reaching a high of around 4.25 in the very low traffic levels of Q3 2020 and reducing to 4.15 at the end of 2021.[47] Therefore it appears that the overlay would mainly be required to counter the negative effects of increased passenger numbers and crowding.

There is still a gap between PRS and non-PRS satisfaction scores. One of the objectives of the PRS overlay may be to bring the experience of that 39% of passenger nearer to the same level of the other 71%, that is close the gap between PRS and non-PRS QSM scores rather than meet an absolute target. However in this case, there is a question whether it is realistically feasible to reach absolute parity because many of the initiatives associated with PRS will also benefit non-PRS passengers thereby increasing their satisfaction levels in parallel. It is likely impossible, therefore, to close the 5% gap between PRS and non-PRS satisfaction scores completely.

It is also not clear how many of the objectives in Table 8.6 above are directly related to HAL's opex as several are associated with the activities of other stakeholders, such as the airlines, handlers and Border Force, whilst others are infrastructure related, such as additional seating, wayfinding, physical and digital information, open spaces and greenery. The likely opex components are:

- Additional passenger assistance staff to provide a quicker and more responsive service;
- Enhanced training to passenger assistance staff to target and provide a more tailored service to PRS.

HAL has not provided any indication of the numbers of additional staff envisaged or the level of training required. The operational concept is also not clear: whether the additional passenger assistance staff will be specialists focused on PRS provision or whether all passenger assistance staff will be trained to provide PRS services. Based on simple assumptions, we estimate that HAL's proposed PRS overlay would result approximately in an additional

[44] Revealing Reality (2019) Understanding the airport needs of passengers requiring support, CAA-H7-606

[45] HAL (2021) RBP Update 1, Chapter 5.4 H7 operating costs update, Table 6.

[46] HAL (2021) CAP2265 response, p.163.

[47] HAL (2022) CAA Initial Proposal Response Bilateral – Operating Costs - Deep-Dive 2, CAA-H7-547.

10 to 15 passenger assistance staff on duty in each terminal in 2022 doubling to an additional 20 to 30 passenger assistance staff per terminal on duty in 2026, which do not appear to be unreasonable.

In conclusion, there is no real transparency in HAL's proposal with several uncertainties on what the additional opex for the PRS overlay is buying:

- There is a clear overlap between PRS and PRM implying the risk of double-counting, with PRM making up around 5% of the PRS cohort;
- The gap between PRS and non-PRS service quality scores appears to be relatively small at around 5% (4.17 compared to 4.39);
- There is no rationale showing how the proposed opex and increased staff numbers will raise the PRS service quality either compared with non-PRS service quality or in absolute terms;
- Some of these levers proposed to improve the PRS service are associated with capex rather than opex, such as additional seating, improved wayfinding, and more greenery and open space;
- Some of the levers will need to be pulled by external parties, such as airlines and Border Force.

However, increasing accessibility and inclusivity is clearly a laudable objective. Given this, without further detail and transparency, it is difficult to challenge HAL's proposals other than the overlap between PRS and PRM. We propose, therefore, to reduce HAL's Update 2 proposals by 5%.

Table 8.10: Comparison of our revised forecasts and HAL RBP Update 2 forecasts for the PRS enhanced service overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 2	4	5	6	8	8	**31**
TA revised forecasts – High Case	3	5	6	8	8	**29**
Difference	-0	-0	-0	-0	-0	**-2**
TA revised forecasts – Mid / Low Case	0	0	0	0	0	**0**
Difference	-4	-5	-6	-8	-8	**-31**

Source: TA analysis, HAL RBP Update 2

Resilience

Based on standard engineering and maintenance practices, HAL's approach to assuring service levels by increasing provision for the (mainly reactive) maintenance of ageing assets is reasonable. However, it is difficult to judge the scale and cost of the increased maintenance. The assets age data provided by HAL is difficult to interpret because it is provided: (i) as averages for example asset types, whereas the age distribution would be more informative; and (ii) histograms of asset numbers are in five-year age bins. No data on equipment failure rates is available.

Our assessment of the available data suggests that in 2026:[48]

- approximately 6% of assets will be greater than 25 years old; and
- 18% of assets will be between 20 and 25 years old.

The corresponding proportions in 2021 were 4% and 2% respectively.

[48] HAL (2021) LEPC Assets Age Profile as of September 2021, CAA-H7-605

Unsurprisingly these ageing assets are mainly located in Terminals 3 and 4 and other areas, with almost none in Terminals 2 and 5. Without substantive data on the increase of failure rates with asset age it is difficult to gauge the precise impact of this age profile. However, it is reasonable to assume a nominal, average asset life of 25 years and an increased failure rate when the asset reaches 80% of this life, i.e. 20 years.

In 2026, therefore, HAL has a substantial proportion of assets at risk of increasing failure rates that would justify additional repair-related opex. Again without detailed data on equipment failure rates and repair costs across the entire asset base as well as an understanding of the capital replacement programme, it is not possible to calculate the size of the overlap bottom-up. However, as a simple sense check, it is possible to estimate age-related increased maintenance opex from normal maintenance based on the proportion of assets that are age-limited and an assumption on the level of extra maintenance required. In 2026, we have assumed that the proportion of assets that are age-limited, i.e. greater than 20-years old, is 24%. Based on assumptions of between 25% and 50% additional maintenance needed for these assets and an overall facilities maintenance cost of £184.6 million (2018 RPI prices) as proposed by HAL, that results in a range of between £11 million and £22 million for the 2026 resilience ESO. HAL's proposal for a £16 million overlay for resilience falls exactly in the middle of this range.

Therefore, we have based our assessment on HAL's RBP Update 2 proposed opex for resilience with one caveat. As the majority of assets have been underutilised during the majority of 2020, all of 2021 and early 2022 due to reduced traffic volumes and terminal closures, we would expect asset life to be increased by a small margin. We have modelled this by assuming the approximately two-year underutilisation extends asset life by approximately six months on average. We have, therefore, applied a six-month offset on HAL's proposed resilience opex profile through H7, as illustrated in the following table.

Table 8.11: Comparison of our revised forecasts and HAL RBP Update 2 forecasts for the resilience enhanced service overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 2	2	5	10	17	22	**56**
TA revised forecasts	1	4	8	14	20	**46**
Difference	-1	-1	-3	-3	-2	**-10**

Source: TA analysis, HAL RBP Update 2

8.3.3. Surface access overlay

In the absence of any further detailed information from HAL, we have followed the same approach as for the initial forecasts and applied HAL's overlay for the terminal drop-off charge. Over the H7 period, this represents a decrease to the surface access overlay of £35 million compared to HAL's RBP Update 1 and £19 million compared to our initial forecasts.

Table 8.12: Comparison of our revised forecasts and HAL RBP Update 2 forecasts for the surface access overlay (£ million, nominal)

	2022	2023	2024	2025	2026	Total
HAL RBP Update 2	6	6	7	7	6	**33**
TA revised forecasts	6	6	7	7	6	**33**
Difference	0	0	0	0	0	**0**

Source: Taylor Airey analysis, HAL RBP Update 1

8.4. OUR REVISED FORECASTS

Table 8.13 below shows our revised forecasts for rates costs in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The main changes from our initial forecasts are as follows:

- For the COVID-19 overlay, based on the removal of all pandemic-related restrictions in spring 2022, we have removed costs associated with most precautions during 2022 and have removed the overlay entirely from the end of 2022.
- For the resilience overlay we have revised our analysis based on additional information provided by HAL between our initial and revised forecasts.
- For our mid/low case scenarios, we have not changed our approach to the PRS overlay but for our high case scenario we have included HAL's proposals for PRS costs minus a proportion to account for overlap between PRS and PRM services.

Table 8.13: Taylor Airey revised forecasts of other overlays (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	19.9	23.4	26.7	31.2	31.9	**133.0**
HAL RBP Update 2	24.3	24.5	32.0	39.9	43.3	**164.0**
TA Initial Forecasts	27.2	26.1	24.6	24.2	20.9	**123.1**
TA Revised Forecasts	13.8	10.0	14.6	21.0	25.9	**85.3**
Difference from HAL RBP U2	-10.5	-14.5	-17.3	-18.9	-17.4	**-78.7**
Difference from TA IF	-13.5	-16.1	-10.0	-3.2	5.0	**-37.8**

Sources: Taylor Airey analysis, HAL RBP Updates 1 and 2

9. INPUT PRICE INFLATION

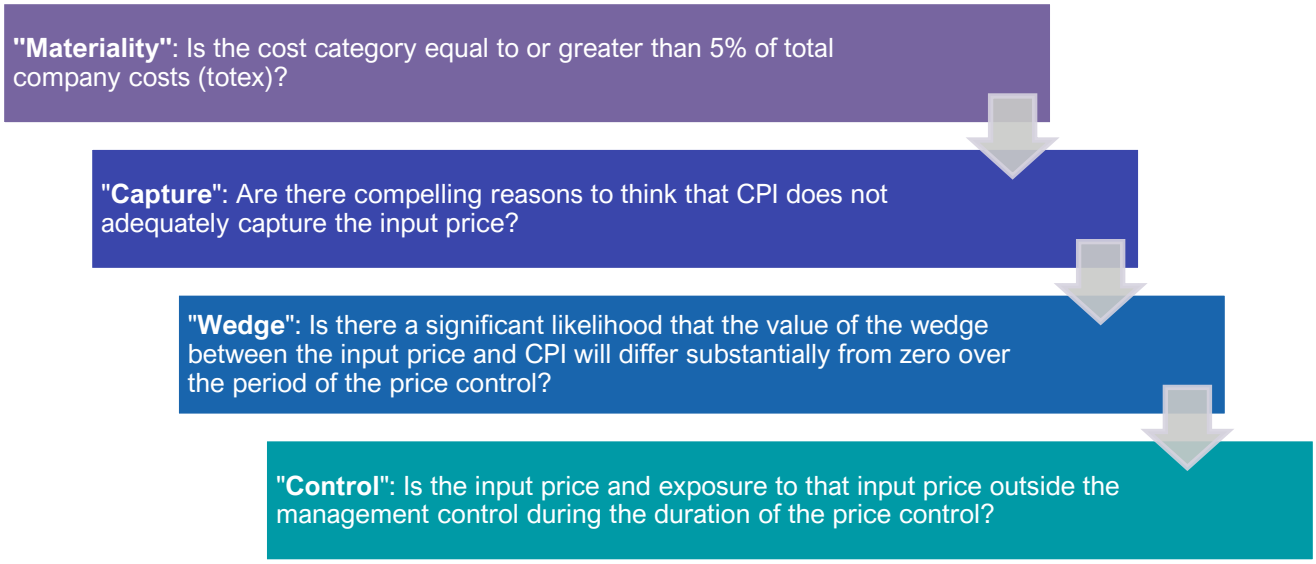
In this section, we discuss our treatment of input price inflation. We specifically look at whether there is a case for assuming expenditure in a particular cost category will grow in nominal terms by a rate other than the general rate of inflation in the economy.

9.1. OUR INITIAL VIEW

For our initial forecasts, we took the view that the most appropriate inflation index to use as the general rate of inflation in the economy, was CPI instead of RPI as used by HAL. As such, we assumed expenditure in most categories would grow by CPI in nominal terms rather than by RPI. However, we recognised that certain cost categories may be exposed to real price effects, i.e. the costs of the underlying inputs may grow by at a rate that differs materially from CPI.

To determine whether it was necessary to apply a unique price series to grow nominal expenditure in a particular cost category, we applied the decision framework used by Ofwat during PR19.[49] The framework considers the following criteria for determining if a unique price series should be applied:

Figure 9.1: Input price inflation decision framework



Source: Adapted from Ofwat

For our initial forecasts, our assessment against the criteria was largely based on judgement, using the evidence and narrative provided by HAL at the time. We also opted to not strictly apply the materiality criterion. Instead, we have allowed for a bespoke price series where the other criteria have been met and where we assess the wedge between CPI and the input price series to be significant.

Using this framework, we concluded that it was necessary to allow for a bespoke input price inflation series for People, Facilities & Maintenance and Utilities costs. We defined the following bespoke price series:

- **People costs** – We used the same wage inflation series from the OBR that HAL suggested, but we assumed that wages remained constant in nominal terms in 2020 and 2021, consistent with the pay constraint implemented by HAL.

[49] Ofwat Criteria adapted from https://www.ofwat.gov.uk/wp-content/uploads/2019/01/Supplementary-technical-appendix-Europe-Economics-Frontier-Shift-and-Real-Price-Effects.pdf (Table 0.1).

- **Utilities** – We used the same power inflation series from BEIS that HAL suggested, but as the BEIS forecasts are presented in real terms, we applied them to our CPI series (to get a nominal forecast) rather than HAL's RPI series.
- **Facilities and Maintenance** – We used a blended rate that is half driven by CPI and half driven by the OBR's wage series.

We also used a bespoke input price inflation series for the following two cost categories which did not pass the materiality test but did pass the subsequent three tests:

- **Insurance** – As insurance costs had risen significantly in recent years, we assumed insurance costs increase at a rate of 5% per annum in nominal terms. This was less than HAL's forecast of 10% per annum growth.
- **Distribution Contract** – We also used an RPI index for the contract relating to the use of Heathrow's electricity distribution network, given it is a long-standing contract that is indexed to RPI.

Finally, we did not apply a bespoke price series to the following cost categories, contrary to HAL's initial approach:

- **Operational costs:** We argued that operational costs are in HAL's control, due to the contract-based nature of operational costs. As a result, price increases can be managed through supplier negotiations. Operational costs therefore did not satisfy the control criteria.
- **General expenses:** We argued that there was no evidence to suggest that general expenses were not adequately captured by CPI, or that the wedge between the input price and CPI would substantially differ from zero over H7. General expenses therefore did not satisfy the capture and wedge criteria.

9.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

HAL

HAL noted the following areas of disagreement with our initial approach:

- **Baseline inflation measure***:* Frontier Economics, in its advice to HAL,[50] agreed with our approach of using CPI as the baseline inflation series, unless HAL was able to provide evidence showing RPI to be a more appropriate benchmark for specific cost items. In line with Frontier Economics' suggestion, HAL has provided evidence for the use of RPI based on a review of their contracts, for operational, facilities and maintenance, and distribution contract costs.
- **People:** HAL states that it has benchmarked its salaries to market rates using external market data from Willis Towers Wilson. They therefore argue that people costs should be tied completely to OBR wage inflation, without adjustment to account for the historical pay freeze. Implicit in this argument is the assumption that salaries among competing jobs rose in line with the OBR inflation series.
- **Operational**: HAL argued that its operational costs should be subject to a bespoke price series, linked to wage inflation, RPI and CPI. Based on an analysis of the cost drivers of the key items under operational costs, they propose a price series that is weighted 25% on the OBR wage inflation series, 25% on RPI, and 50% on CPI. This sits in contrast to our proposal for IPs that operational costs should be linked to CPI, due to their contract-based nature.

[50] Frontier (2021) H7 IP Opex Review.

- **Insurance**: Frontier Economics recommended that HAL use CPI to index insurance costs. However, HAL has argued for a 10% increase in insurance costs per annum, based on a review of the latest market data from Marsh Speciality and Global Placement.
- **Facilities and maintenance:** Frontier Economics' defended HAL's use of a 60% / 40% split between labour and material costs, based upon an analysis of 2019 facilities and maintenance costs. They agree with HAL and our conclusion that people costs should be linked to a labour price input series. However, Frontier Economics suggested that CPI was the most appropriate price series for materials costs, unless HAL was able to provide evidence to support an alternative benchmark for specific cost items [51] At RBP Update 2, HAL updated its analysis in response to Frontier Economics' advice, and proposed a bespoke price series weighted 15% on labour, 45% on CPI and 40% on RPI, based on a review of its contracts.
- **Rates**: HAL has accepted our proposal to link rates costs to CPI.
- **Utilities**: In its most recent submission, HAL argued that they will be exposed to the significant price increases seen in the energy market since the submission of RBP Update 1. Their existing electricity and gas advances (which protect them from the current price increases) conclude in April 2022, and due to an expected downwards trajectory of energy prices from current levels, HAL has argued that it is not in their interest to hedge for H7. They also argued that the current energy market limits the ability to buy energy in advance due to supplier volatility.
- **General Expenses**: Frontier Economics agreed with our conclusion that general expenses should be linked to CPI, though they note that this is conditional on HAL providing evidence to support the need to index partly on wage inflation. In its RBP Update 2 submission, HAL provided evidence to support the use of a 50% blend between the OBR's wage inflation series, and CPI.

In addition to their support for HAL as described above, Frontier Economics also noted that the CMA rejected the first step in Ofwat's decision framework, namely the "materiality" criterion. It therefore argued that the materiality criterion should not apply in our considerations.

9.3. Our assessment of the issues

The materiality criterion in the input price inflation decision framework

Frontier Economics argue that the materiality criterion should be omitted because it was omitted by the CMA for Ofwat's PR19 price control. However, we note that the CMA remained undecided on the benefits of the materiality criterion. Ofwat and its advisor, Europe Economics, abandoned its materiality criteria which discounted cost items that accounted for less than 10% of companies' totex. This was because companies contended that the threshold was arbitrary and excessive, and because it discounted small cost items with a large real price effect.[52]

CEPA proposed an alternative materiality criterion in its assessment of real price effects for Ofgem in RIIO-2 that addressed the latter critique of the materiality criterion. First, cost items passed the materiality criterion if the cost item represented over 10% of totex. Second, if the cost item represented between 5-10% of totex, a cost item passed the materiality criterion if the effect of the cost share times the wedge was greater than 0.5% of totex.[53]

[51] Frontier Economics (2021), H7 IP Opex Review. p.15 and Table 6

[52] Europe Economics (2019) Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations.

[53] CEPA (2020) RIIO-GD2 and T2: Cost Assessment – Frontier shift methodology paper (see Ofgem (2020), RIIO-2 Draft Determinations – Technical Annexes – 2, Draft Determinations - Frontier Shift Annex).

The CMA considered the above information and came to a final decision to maintain Europe Economics' final proposal, which excluded the materiality criterion, because the criterion had no bearing on the outcome of the review. However, they remained open to the use of the criterion in future:

> *"We decide not to use materiality as an additional criterion in this redetermination because it would not change our decisions."*[54]

> *"[We] do not rule out the usefulness of materiality criteria as a possible improvement on the EE approach."*[55]

For our revised forecasts, we have followed our approach at initial forecasts, and opted to not strictly apply the materiality criterion. Instead, we have allowed for a bespoke price series where the other criteria have been met and where we assess the wedge between CPI and the input price series to be significant.

Application of new evidence to our decision framework

HAL,[56] Frontier Economics,[57] PA,[58] and BA,[59] all agree that, unless sufficient evidence is presented to suggest otherwise, CPI should be used as the baseline for inflation. This is in line with regulatory precedent from Ofwat at PR19, Ofgem at RIIO-2, and recommendations of the Office of National Statistics.[60] We therefore maintain this position, and thus if any cost category fails the decision framework, we link its input price inflation to CPI.

In light of the new evidence submitted in response to CAA's Initial Proposals, we update our decisions according to the decision framework above. Table 10.1 presents our findings for the opex categories that we discussed at IPs, alongside the categories for which HAL has provided evidence for input price inflation. For all other opex categories (such as rates costs), we apply a CPI price series.

Table 9.1: Updated decision framework for input price inflation

	Materiality	Capture	Wedge	Control	Price series
People	Pass	Pass	Pass	Partial pass	Bespoke
Operational	Pass	***Pass***	***Pass***	***Partial pass***	***Bespoke***
Insurance	Fail	Pass	Pass	Pass	Bespoke
Facilities and Maintenance	Pass	Pass	Pass	Partial pass	Bespoke
Utilities	***Pass***	Pass	***Pass***	Partial pass	Bespoke
General expenses	Pass	Fail	Fail	Fail	CPI
Distribution contract	Fail	Pass	Pass	Pass	RPI

Source: Taylor Airey and CEPA analysis
Note: Entries in bolded italics differ from our proposals at IPs.

We have made the following decisions with regards to the new evidence submitted:

---

[54] CMA (2021) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: Final report, para 4.678.

[55] CMA (2021) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: Final report, para 4.679.

[56] HAL (2021) CAP2276 response.

[57] Frontier Economics (2021) H7 IP Opex Review.

[58] PA Consulting (2021) Review of CEPA / Taylor Airey Review of H7 Opex and Commercial Revenues.

[59] BA (2021) British Airways Response to CAP2265 Economic regulation of Heathrow Airport Ltd H7 Initial Proposals.

[60] ONS (2018) Shortcomings of the Retail Prices Index as a measure of inflation. Available at ons.gov.uk.

- **Operational costs**: We have updated our assessment of the capture and wedge criteria from "Unclear" to "Pass". HAL's evidence demonstrates 35% of their total operational costs are linked to RPI (23%) and labour (12%) due to existing contracts. A further 13% of total operational costs are assigned to labour cost inflation because some subcategories (such as PRM costs and passenger ambassadors) are labour based by nature. We consider this is sufficient to demonstrate that CPI does not adequately capture the existing operational costs incurred by HAL, and that the wedge between CPI and the expected inflation experienced will be significantly different from zero.

  We have also updated our assessment of the control criterion from "Fail" to "Partial Pass". Where contract costs are almost entirely driven by labour costs, it is reasonable to assume the contract will be linked to wage increases. However, a number of HAL's existing contracts are tied to RPI. As discussed in our initial forecasts report, we consider the use of RPI to index contracts to generally be inappropriate as there is no evidence to suggest RPI better reflects the cost pressures HAL, or its supply chain, are exposed to. Generally, we consider the use of indexation should be avoided, as the onus should be on HAL's supply chain to manage cost pressures rather than operating under the presumption that cost increases will automatically be passed through. Nevertheless, where it is necessary to index a contract to inflation, CPI would be most appropriate in the majority of cases.

  Within operational costs, HAL's contract with NATS is indexed to RPI. The contract was extended in October 2021 for 5 years, with the contract now ending in 2030.[61] NATS is the largest air navigation services provider in the UK and the only one with experience of Heathrow's operational complexity. As such, we consider that HAL may have less bargaining power when compared with other parts of its supply chain and, therefore, less ability to negotiate a switch to CPI. Nevertheless, we consider that in the longer-term, it would be efficient to switch the NATS contract from RPI to CPI indexation, to mitigate the risk of inefficient increases in expenditure. We therefore recommend that the CAA allows the indexation of RPI until the contract's expiry (2030), but henceforth considers only allowing indexation to CPI.

- **Insurance**: Based on the scale of insurance expenditure as a proportion of total opex, accounting for only 1.2% of 2019 opex, insurance fails the materiality criterion. However, HAL provided compelling evidence to demonstrate that there is a significant inflation wedge between insurance costs and CPI, such that we should consider a bespoke price series regardless of the materiality criterion.[62] Insurance also passes the control criterion, as HAL is unlikely to have bargaining power in insurance markets. As a result, we have applied a bespoke price series to insurance costs.

- **Utilities**: We continue to apply a bespoke price series to utility costs, given utilities expenditure forms a significant proportion of HAL's total opex and given current expectations of a significant wedge between energy price inflation and general consumer price inflation.

- **General Expenses:** We do not allow a bespoke input price inflation to be applied to General Expenses, and maintain the use of CPI for this item. HAL argue that their Consultants and Marketing fees, which account for 57% of total general expenses, are linked to labour costs. However, we maintain that consultancy and marketing spend are not wholly driven by wage pressures, and firms operating in such industries are unable to automatically pass-through increases in labour costs. Marketing and consultancy firms primarily provide knowledge services as opposed to direct labour services. We therefore think that the Capture and Wedge criteria are not passed.

- **Distribution contract:** We accept the evidence provided by HAL on its distribution contract, and in line with the direction provided by the CAA, we directly apply the forecasts produced by HAL in RBP Update 2. While we recognise that the distribution contract fails the materiality test, it strongly passes the Control,

[61] NATS (2021) NATS lands Heathrow 5-year contract extension. Available at nats.aero.

[62] HAL (2021) CAP2265 response.

Capture and Wedge tests, given the contract is linked to RPI and is a long-standing contract. We therefore use RPI to inflate costs. However, as per the NATS contract, we would encourage the CAA to expect any future renegotiated contract to be indexed to CPI.

Bespoke price series

HAL has also provided evidence to support the updating of existing bespoke price series, refining their approach based upon a review of contracts and other arguments. In light of this evidence, we propose the following bespoke price series for the relevant cost categories.

- **People**: We continue to agree with HAL that people costs should be subject to a bespoke price inflation series instead of indexation to CPI.

  For our initial forecasts, we had assumed flat wages in 2020 and 2021 to reflect a weak aviation labour market and a period of pay restraint within the sector, before reverting to the OBR's forecast of general wage growth. In effect, this meant that the labour price index that was applied to people costs always remained below the OBR wage index.

  HAL disagreed with this approach, arguing that wages should be indexed using the OBR's forecasts of economy-wide wage growth without adjustment, on the basis that:

  - its salaries were re-baselined to market rates in 2020; and
  - it faced the same labour market pressures as other firms in the economy.

  We accept HAL's argument that it is subject to competitive labour market pressures like other companies in the UK economy and, at least in the medium term, that its salaries and remuneration policies will need to remain competitive to retain and attract staff. As a result, we have concluded it is appropriate to assume that the wages index that we apply to HAL's people costs should, during the period of H7, converge with the index implied by the OBR's forecasts for economy-wide wage growth.

  However, we also consider it would be a strong assumption to make, given the pay settlements that were agreed in the sector during 2020 and 2021, that the wage price index that should be used to project HAL's people costs (from a 2019 base) should start at the same level in 2022 as the OBR's for the general economy. The aviation labour market in 2020 and 2021 was considerably weaker than other sectors of the UK economy, which was reflected in widespread pay freezes and pay cuts across the sector. We consider that such pay freezes and pay cuts are unlikely to immediately be reversed in the first year of the price control, 2022, and instead, that it may take a number of years for the impacts of the pandemic to unwind as the business goes through its annual salary and remuneration settlements.

  While HAL is subject to competitive labour market pressures, aspects of the management of its people costs are within its control.[63] We might expect that:

  - the airport would seek to mitigate future cost escalation;[64]
  - where feasible, manage the underwinding of the sector pay freezes over time across its new and existing staff base; and
  - seek to benefit from some stickiness in negotiated wage levels for existing roles in the catch-up to the levels observed, in aggregate, in the wider economy.

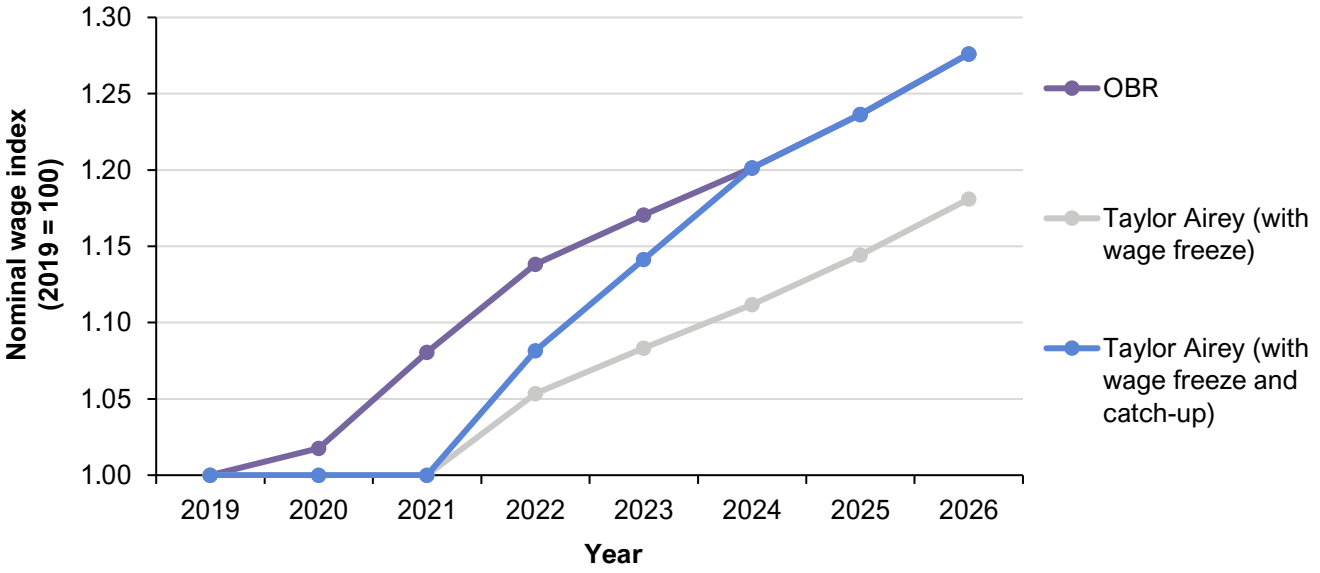
  As a result, we propose using a new wage forecast that assumes zero growth in 2020 and 2021 and above average wage growth in 2022 and 2023, so that by 2024 cumulative wage growth from 2019 is in line with the levels implied by the OBR's most recent forecast. We illustrate this in the figure below. Our revised

[63] For example, through payroll policies and decisions on the occupational mix of staff resources.

[64] Particularly given the outlook for demand for air travel remains uncertain.

modelling approach ensures that our final forecasts assume a real increase in wage levels for HAL staff during H7 given that our price index converges with the OBR index for the final three years of H7.

Figure 9.2: Taylor Airey wage index for projecting people costs



Source: Taylor Airey analysis, OBR

Another key difference between our initial forecasts and HAL's proposals in RBP Update 1 was the choice of wage index within the OBR's forecasts. The OBR typically produces two wage forecast series – Wages and Salaries, which estimates the total economy-wide wage bill, and Average Earnings, which is calculated by dividing Wages and Salaries by the number of employees.

In our initial forecasts we used the Wages and Salaries index on what we now consider to be an incorrect interpretation that it represented hourly earnings and, therefore, would be less affected by distortions related to furlough or related to employees changing their working patterns. The Wages and Salaries index – as compared to the Average Earnings index – will be driven in part by the increase in number of jobs over time, and so is not a pure price index. For these reasons, in contrast to our view at Initial Proposals, we do not consider it is a good choice of index for the purposes it is applied in our opex forecasts.

While HAL has updated its choice of wage index, based on the advice of Frontier Economics, to align with the Wages and Salaries index, we believe this is also based on the same incorrect interpretation. As a result, we have updated our choice of index to the Average Earnings series.

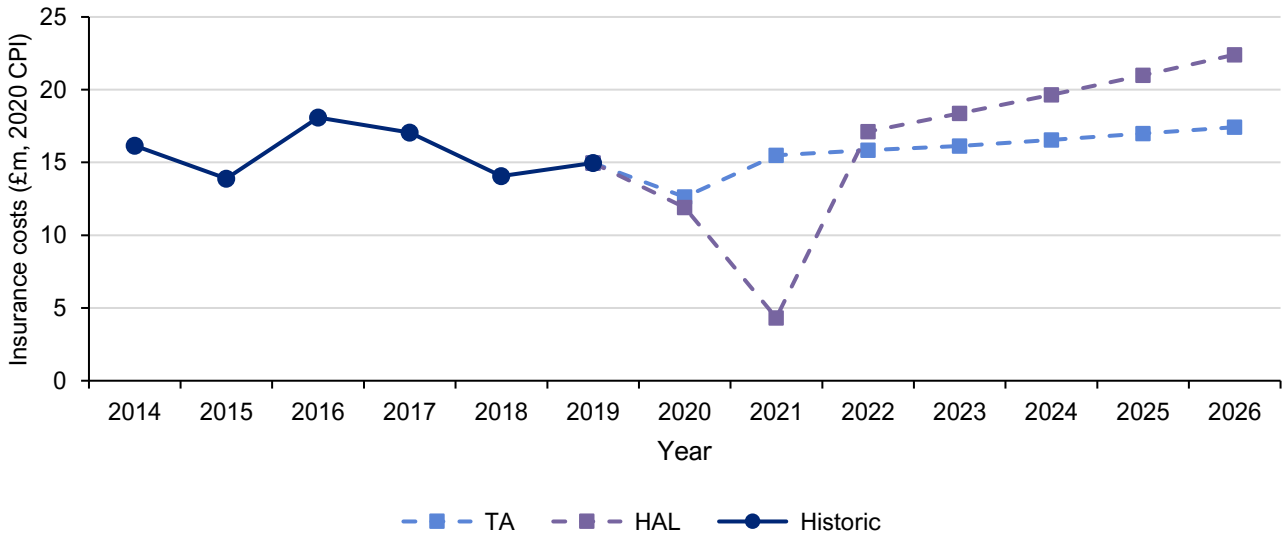
- **Operational**: We accept HAL's evidence to support the indexation of components of operational costs to RPI and Labour inflation, for the H7 price control. We therefore use a bespoke price index with a 25%/52%/23% split between Labour, CPI and RPI inflation, based on a bottom-up analysis of HAL's contracts.[65]
- **Insurance**: We have not adopted HAL's 10% per annum increase in insurance costs, and instead favour an index based on evidence from the Swiss Re Institute.[66] HAL demonstrate that current insurance inflation rates exceed 10%, but do not justify why inflation rates will continue to increase at 10% per annum over the course of H7. As discussed in Section 5, we can see from historical trends that the insurance market operates cyclically, with periods of restricted supply (creating upwards price pressure) and periods of

[65] Labour inflation is used for costs related to Police, PRM and Passenger Ambassadors. RPI inflation is used for costs relating to NATS, Rent and Track Access performance.

[66] Swiss Re Institute (2021) Sigma No. 5/2021 - Turbulence after lift-off: global economic and insurance market outlook 2022/23.

excess supply (leading to downwards price pressure). Instead of HAL's 10% assumption, we use data from the Swiss Re Institute which forecast real increases in insurance costs of 3.6% in 2022 and 2.9% in 2023. We then calculate the Compound Annual Growth Rate over the five-year period 2019 to 2023 to forecast growth from 2024 onwards. The resulting forecast, compared with HAL's forecast is shown in Figure 9.3.

Figure 9.3: TA and HAL Insurance forecasts (£m, 2020 CPI prices)



Source: TA analysis, HAL RBP Update 2

- **Facilities and Maintenance:** We accept HAL's evidence to support the indexation of components of cleaning costs to increases in wage rates but reject the use of RPI for HAL's existing baggage contract. We therefore use a bespoke price index with a 14%/86% split between labour-cost and CPI inflation. HAL submitted evidence that shows that 14% of their facilities and maintenance costs are tied to labour, due to labour costs for cleaning. They also demonstrate that 39% is indexed to RPI, due to an existing baggage contract. While we accept that the existing baggage contract is indexed to RPI, we consider there is no rationale for indexing the contract to RPI instead of the more established economy wide price index, CPI.
- **Utilities**: We accept HAL's evidence to support the indexation of energy costs to its bespoke utilities forecast. The forecast is a weighted average of CPI, electricity and gas inflation forecasts, weighted according to utility costs in 2019. The forecast inflation series for electricity and gas is derived from an EIC report, commissioned by HAL.[67] The interaction between HAL's existing utility contracts and the inflation forecast presented by the EIC is not clear. HAL chooses a pessimistic EIC energy scenario to base its inflation forecast on, but the inflation forecast produced is not highly sensitive to the choice of EIC scenario.[68] On balance we believe the approach taken by HAL appears reasonable. We adjust the final bespoke power inflation forecast to use the recent OBR CPI inflation forecast for consistency with our overall approach.

  We note that the EIC report was originally published in November 2021 and since then, there have been significant movements in wholesale gas and electricity markets. The extent to which recent movements will affect HAL will depend on its hedging strategy and depend on whether prices revert to the forecast produced by EIC. As we have not received any representation from HAL in relation to the effect of recent

[67] EIC (2021) Delivered Electricity Price Forecast.

[68] HAL use inflation forecasts generated by EIC's Scenario 1 ("Carbon Conundrum"), which reflects a low-case scenario for net-zero development. This is chosen in favour of, for example, Scenario 3 ("Gas Transition"), which reflects a mid-case scenario for net-zero development.

increases in energy prices on its cost base, we have opted not to make any adjustment to the price series proposed by HAL in its RBP Update 2.

9.4. Our revised view

Table 9.2 presents the inflation series we use in our modelling, for each of the opex line items. There are a large number of bespoke input price inflation series used, reflecting the large evidence base presented by HAL.

Table 9.2: TA updated input price inflation assumptions

Cost item	Price series
People	OBR wage inflation series - 2020 and 2021 pay freeze, with above average wage growth in 2023 and 2024 before returning to OBR-implied wage growth
Operational	52/23/25 CPI/RPI/Labour blend
Insurance	TA bespoke series
Facilities maintenance	86/14 CPI /Labour blend
Rates	CPI
Utility	HAL bespoke series
Distribution contract	RPI
General expenses	CPI
Other	CPI

Source: TA analysis

10. ONGOING PRODUCTIVITY AND CAPITAL INVESTMENT

In this final section, we discuss our assumption around ongoing productivity improvements, i.e. the potential of an efficient HAL to deliver further efficiencies over the H7 price control period. We discuss this alongside HAL's capital investment proposals, which can influence the potential for ongoing productivity improvements.

10.1. OUR INITIAL FORECASTS

In its RBP Update 1, HAL proposed two separate estimates of ongoing productivity:

- It proposed a 0.1% per annum productivity based on the Bank of England average annual total factor productivity forecast for 2020-23 Q1 included in its January 2020 Monetary Policy Report.[69]
- It proposed an additional 1.1% savings per annum (increased from 0.9% in HAL's original RBP), relating to the capital substitution effect. This element of the ongoing productivity was contingent on CAA approval of its £4.2bn capital plan.[70]

In our initial forecasts, we agreed that there was likely to be two broad factors contributing to the opportunity for improved efficiency in H7 – a total factor productivity (TFP) type benefit, and improvements in labour productivity above TFP growth, such as opex benefits arising from capital investment.

However, we disagreed with the approach taken by HAL to calculating this latter 'capital substitution' effect and did not consider that its approach was supported by the First Economics study or the precedents it quoted. We expected, to some degree, capital investment to have a lagging effect when it comes to delivering benefits, and to not be solely linked to projects in train as part of the H7 capital plan. As such we argued that making the 1.2% per annum efficiency improvement conditional on particular projects being allowed in H7 capital plan, was not supported by precedent or the evidence provided.

While recognising that more recent price determinations (e.g. RIIO-GD2) had considered ongoing productivity targets greater than 1%, we applied an overall estimate of 1% reflecting ongoing productivity gains supported by precedent developed over several HAL price controls and reflecting that large, one-off efficiency savings are captured as overlays. We proposed not linking the ongoing efficiency target with the size of the capital plan.

Following HAL's approach, we applied our ongoing productivity estimate from 2022 onwards, to all cost categories except for rates, the electricity distribution contract, and the new cost overlays introduced for H7 (e.g. opex related to the terminal drop-off charge, COVID-19 overlay etc).

10.2. RESPONSES TO CAA'S CONSULTATION ON THE INITIAL FORECASTS

In its response to the CAA's consultation, HAL continued to argue for 0.1% as an appropriate frontier shift estimate for H7. HAL combines this with an updated assumption of 0.9% efficiency linked to the delivery of its capital investment programme, resulting in a proposed ongoing efficiency target in its RBP Update 2 of 1.0%.

In its consultation response, HAL highlighted various statements by the Bank of England and the OBR that productivity trends have slowed since the 2008 financial crisis, and that the pandemic had the potential to have negative/ scaring effects on the level of productivity. HAL cited a Bank of England report from January 2020, which

[69] Bank of England (2020) Monetary Policy Report, January 2020.

[70] HAL (2021) RBP Update 1, p.24.

projected short-to-medium term TFP growth of 0.1%.[71] HAL also cited the OBR, which noted concerns for long-term productivity "scarring" as a result of the pandemic.[72]

HAL[73] and its advisors Frontier Economics[74] made the following comments on our proposal to adopt a 1% ongoing productivity target at IPs:

- They argued our proposal for a 1% ongoing productivity target was based on regulatory precedent alone and this leads to the overweighting of evidence on TFP from 2008 and earlier, and discounting evidence from 2008 onwards where evidence of long-term productivity has fallen. They argue that using recent evidence suggests that the ongoing productivity estimate should be reduced.

  Frontier Economics also contend that while the CMA discounted weighting more recent evidence more heavily for the energy and water sectors, its rationale for doing so did not apply to the airport sector. Namely, that productivity data since 2008 in sectors that operate in similar conditions as Heathrow showed evidence of relatively stagnant productivity growth.

- HAL also argue that an efficient airport would struggle to achieve ongoing productivity improvements in line with historical precedent under a lower expenditure capital plan. Its response to the CAA's consultation highlights that the capex to opex ratio implied by the CAA's initial proposals was substantially lower than the capex to opex ratio in previous HAL and Dublin Airport price controls.

  They argued that a portion of operating cost efficiency gains can only be delivered through capital substitution. Given that CAA provisionally allowed a much smaller capital plan in H7 when compared to Q6, they argued that the ongoing productivity target should be reduced.

- On the basis that capital investment has a lagged effect on delivering efficiency benefits, a reduction in the level of capital spend during the COVID-19 pandemic means that ongoing productivity expectations for the upcoming years should be reduced.

  More broadly, Frontier Economics suggest that in establishing an ongoing productivity target for H7 it would be reasonable to take account of the impact of COVID-19 on investment across the economy and impact on supply chains.

- HAL state that it has adjusted its approach to calculating the impact of efficiencies as a result of its capital plan, i.e., as a result of capital substitution, by including "a one-year lag in our calculation and incorporating the specific phasing of investment included in the plan." This has led HAL to update its capital efficiency assumption to 0.9% for the H7 period.

- Finally, Frontier Economics also suggest that it would be reasonable to expect that a hypothetical efficient airport operator may struggle to achieve productivity benefits in an environment of uncertain/ volatile demand which makes business planning more challenging.[75]

In addition, PA, on behalf of the AOC/LACC, suggest a productivity estimate of 0.5%, based on Bank of England data.[76] However, they also considered that the CAA should adopt a 1% ongoing productivity target if there is sufficient evidence to do so, in order to provide HAL with the appropriate efficiency incentives.

---

[71] Bank of England (2020) Monetary Policy Report, January 2020 Table 1.B, and May 2021.

[72] Office for Budget Responsibility (2021) Economic and fiscal outlook, October 2021.

[73] HAL (2021) CAP2265 response.

[74] Frontier Economics (2021) H7 IP Opex Review.

[75] Frontier Economics (2021) H7 IP Opex Review.

[76] PA Consulting (2021) Review of CEPA / Taylor Airey review of H7 Opex and Commercial Revenues.

10.3. OUR ASSESSMENT OF THE ISSUES

Regulatory precedent and use of a longer time horizon

We consider that recent regulatory precedent is an important source to consider when determining an ongoing productivity target. Although recent regulatory determinations have tended to focus on longer-term trends that include pre-recession productivity data, the most recent decisions by Ofgem (RIIO-GD2 and T2) are based on analysis which includes post-GFC productivity data as well.

The 1% productivity target has also been the long-term regulatory precedent for airport price controls at the CAA. We think it is therefore incumbent on HAL and its advisors to comprehensively demonstrate that a 1% target is not achievable in the H7 period. Based on the representations made by HAL and Frontier Economics in response to IPs, we do not consider that this bar has been met:

- The price controls we cite include RIIO-2, which considered an ongoing productivity target of over 1%.[77] The RIIO-2 price control determination was appealed to the CMA, which considered the issue around the use of pre-recession productivity data. The CMA agreed with Ofgem's approach of using a long-term horizon when estimating productivity gains in 2021.[78]
- The CMA also discounted recent productivity numbers on the argument that regulated sectors were likely to be less impacted than other sectors by recent trends of low productivity.[79] And while we note the comments and findings with regards to TFP in the Bank of England's Monetary Policy Report from January 2020, more recent reports show that labour productivity growth was 1.25% in 2020 and 1% in 2021.[80]
- Although we acknowledge that HAL is subject to demand risk via its price controls in a way that regulated utilities such as water companies and energy networks are not, we consider that Heathrow's price control framework does permit a higher degree of investment/ cost recovery certainty than companies operating in other sectors of the economy which should be supportive of achieving long term productivity targets. While demand for air travel remains uncertain, there are signs that demand for travel is now increasing which should over time reduce the effects of volatile demand (see further discussion below). Additionally, the CAA has proposed introducing a risk sharing mechanism which partially insulates HAL from future volatility.
- Frontier Economics' counterargument that First Economics' analysis showed evidence of stagnant productivity growth in comparable sectors, is not, in our view, borne by the evidence, as shown in the table below. These estimates of productivity do not show a consistent reduction in productivity following the 2008 financial crisis, in sectors that are comparable to Heathrow.

  On balance, we consider these factors tip the balance towards placing weight on longer term evidence to inform Heathrow's ongoing efficiency target.

[77] Ofgem (2021) RIIO-2 Final Determinations – Core Document (REVISED). Available at ofgem.gov.uk.

[78] CMA (2021) Cadent Gas Limited, National Grid Electricity Transmission plc, National Grid Gas plc, Northern Gas Networks Limited, Scottish Hydro Electric Transmission plc, Southern Gas Networks plc and Scotland Gas Networks plc, SP Transmission plc, Wales & West Utilities Limited vs the Gas and Electricity Markets Authority: Final determination, Volume 2B: Joined Grounds B, C and D, paras 7.77 to 7.104. Available at gov.uk.

[79] CMA (2020) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations – Final report, April 2020, para 4.537. Available at gov.uk.

[80] Bank of England (2022) Monetary Policy Report May 2022. While the Bank of England have not reported on Total Factor Productivity since the January 2020 Monetary Policy Report, we note that the report projected labour productivity growth of 0.5%, materially lower than outturn levels reported in the May 2022 report.

Table 10.1: Average annual growth in total factor productivity, illustrating the impact of using a shorter time horizon, as proposed by HAL's advisors, versus a longer time horizon

Sector	EU KLEMS		ONS	
	1995-2016	2009-2016	1995-2021	2009-2021
Professional, scientific, technical, administrative and support service activities	1.3%	1.9%	0.2%	-0.2%
Transportation and storage	0.4%	0.2%	0.1%	-0.4%
Information and communication	2.8%	1.9%	7.3%	5.5%
Electricity, gas, steam and air conditioning supply	-3.1%	-5.5%	0.2%	-1.1%
Water supply; sewerage; waste management and remediation activities	-0.6%	0.8%	-3.7%	-1.7%
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.6%	2.1%	-0.2%	0.9%
Unweighted average	**0.2%**	**0.2%**	**0.7%**	**0.5%**
Unweighted average (excl. electricity, gas, steam and air conditioning supply)	**0.9%**	**1.4%**	**0.8%**	**0.8%**

Source: CEPA and Taylor Airey analysis of EU KLEMS and ONS data

Looking at Heathrow's operations specifically, we consider that the pandemic has also presented airport management a unique opportunity to consider operational improvements that in the longer term, improve efficiency. Given Heathrow has historically operated at close to full capacity, the reduction in passenger volumes should allow airport management greater flexibility to undertake process improvements than would otherwise not be possible at a full airport. In our work at other airports, we have seen such process improvements being actively considered and implemented.

Ongoing productivity and capital investment

One explanation for the decline of productivity growth seen from 2008 onwards can be explained by a reduction in capital investment. We do not consider this applies to HAL as it was provided with a capital allowance for Q6.

While we recognise that HAL's capital expenditure was limited in 2020 and 2021 due to the COVID-19 pandemic, and that the pandemic has created challenges atypical for a regulated business, we also note that the CAA has proposed providing HAL with a capital allowance for H7. As such, a 1% ongoing efficiency target is more consistent with HAL's capex contingent target, rather than the 0.1% target.

Impact of COVID-19 pandemic on productivity growth

Recent evidence from the OBR, ONS and Bank of England all suggest there is little evidence of long-term scarring as a result of the COVID-19 pandemic.

- A study by the Bank of England found that recent evidence suggested pandemic related scarring on TFP was closer to zero rather than the previous estimate of 1%.[81]
- The OBR, in its March 2022 Economic and Fiscal Outlook, reduced its estimate of pandemic-related scarring, in response to the Bank of England study and research from the OECD.[82]

[81] Bloom, N. et al. (2022) The impact of Covid-19 on productivity.

[82] OBR (2022) Economic and Fiscal Outlook, March 2022.

- Multi-Factor Productivity (MFP) estimates from the ONS suggest that productivity rates have returned to pre-pandemic levels.[83] MFP is a measure of productivity growth that takes account of capital and quality-adjusted labour growth. Average MFP rates across all sectors was 0.6% from 2010-2019 (data is available until 2021).

Effect of volatile demand

Frontier Economics' argument that an efficient airport may struggle to ramp up and down operations efficient in response to volatile demand, is a reasonable one when considering security staffing. Security staffing is most exposed to day-to-day, month-to-month, and season-to-season fluctuations in demand. As such, we have explicitly accounted for this in our modelling of security staffing, through a roster coverage adjustment.

However, for other cost categories, demand volatility is less of an issue and not one that we consider needs accounting for within our estimate of ongoing productivity. As we discuss above, even where demand is for a period of time more volatile than historically, Heathrow continues to benefit from a supportive regulatory framework – including the price reset process itself – to support investment and business change initiatives.

Assumption of no ongoing productivity improvements in 2020 and 2021

In our initial forecasts, we had chosen not to apply ongoing productivity target in 2020 and 2021, as our base year adjustment included both catch-up efficiencies and cost savings introduced as a result of the pandemic. These efficiencies could have included some frontier shift efficiency improvements. In our revised forecasts, we have updated our analysis such that any cuts to non-pay expenditure introduced in 2020 will be fully reversed once passenger numbers recover. However, this revised approach fails to capture the potential, in our view, for permanent savings to these cost categories following the pandemic.

We account for this by applying our ongoing productivity target to non-pay costs from 2020 onwards, rather than from 2022 as previously. We consider this an appropriate way of capturing the potential for permanent efficiencies to non-pay costs as a result of the pandemic. It also ensures we align our application of ongoing productivity with our application of RPEs. See further discussion on this issue in Section 3.

For non-security pay costs, we retain our application of the ongoing productivity from 2022 onwards, as we have already captured some of the permanent efficiency potential through our Cost of Change adjustment. Finally, for security pay costs, we take a bottom-up view of the efficiency potential as discussed in Section 4, which is tied into the delivery of the Security Transformation Programme.

10.4. Our revised view

We have considered the arguments put forward by HAL and Frontier Economics. Despite the evidence provided by HAL and Frontier, on balance we believe that an ongoing efficiency target of 1% per annum throughout H7 remains reasonable. The table below summarises our application of ongoing efficiency by cost category.

[83] Office for National Statistics (2022) Productivity overview, UK: October to December 2021. Available at ons.gov.uk.

Table 10.2: Summary of application of on-going productivity target by cost category

Cost category	Ongoing efficiency target	Years applied
Security staff	Fixed posts: 1% Variable posts: Bottom-up	Fixed posts: 2023 – Variable posts: 2025 –
Other staff	1%	2022 –
Pension costs	No target	
Operational costs excl. insurance	1%	2020 –
Insurance	1%	2020 –
Facilities and maintenance	1%	2020 –
Rates	No target	
Utilities	1%	2020 –
Distribution contract	No target	
General expenses	1%	2020 –
Overlays	No target	

Source: TA/CEPA analysis

11. OVERALL FORECASTS

11.1. TA FINAL FORECAST OF MID-CASE

Our final forecast for total opex over H7 is £6,742 million in nominal terms, using the CAA's mid case passenger projections for FPs**.** To contextualise this figure, we compare our mid-case forecasts to the results produced by HAL's RBP Update 2, our initial forecasts, and the CAA's Initial Proposals.

Comparison to HAL RBP Update 2

Table 11.1 below presents our final forecasts of opex using the CAA's passenger projections. **Our forecasts are £7 million (or 0.1%) higher than HAL's forecasts at RBP Update 2.** On a more like-for-like comparison, where we use HAL's passenger projections and use inflation forecasts more consistent with those used to prepare HAL's RBP Update 2, our forecasts are £507 million (7.5%) lower than HAL's RBP Update 2 forecasts.

Table 11.1: TA opex final forecasts, using CAA pax projections (£m, nominal)

	2022	2023	2024	2025	2026	H7
People	367.7	368.6	416.6	452.4	440.2	**2,045.4**
Operational costs excl. insurance	272.7	305.2	321.0	334.1	339.9	**1,572.9**
Insurance	17.5	18.5	19.3	20.1	21.1	**96.5**
Facilities maintenance costs	177.7	191.9	193.2	195.1	197.3	**955.1**
Rates costs	130.7	136.0	138.1	140.7	143.5	**689.0**
Utility costs	87.8	93.0	93.8	95.9	96.6	**467.2**
Distribution contract	33.4	34.3	32.0	31.9	32.9	**164.6**
General expenses	117.8	129.6	135.7	140.7	142.5	**666.2**
Surface access initiatives	6.4	6.2	6.9	7.1	6.3	**33.0**
Overlays	7.4	3.8	7.7	13.8	19.6	**52.3**
Total	**1,219.0**	**1,287.1**	**1,364.2**	**1,432.0**	**1,440.0**	**6,742.3**
Total per passenger (£)	**22.21**	**19.11**	**18.10**	**17.68**	**17.64**	**18.72**
Difference with HAL forecast	11	-21	-9	26	0	**7**

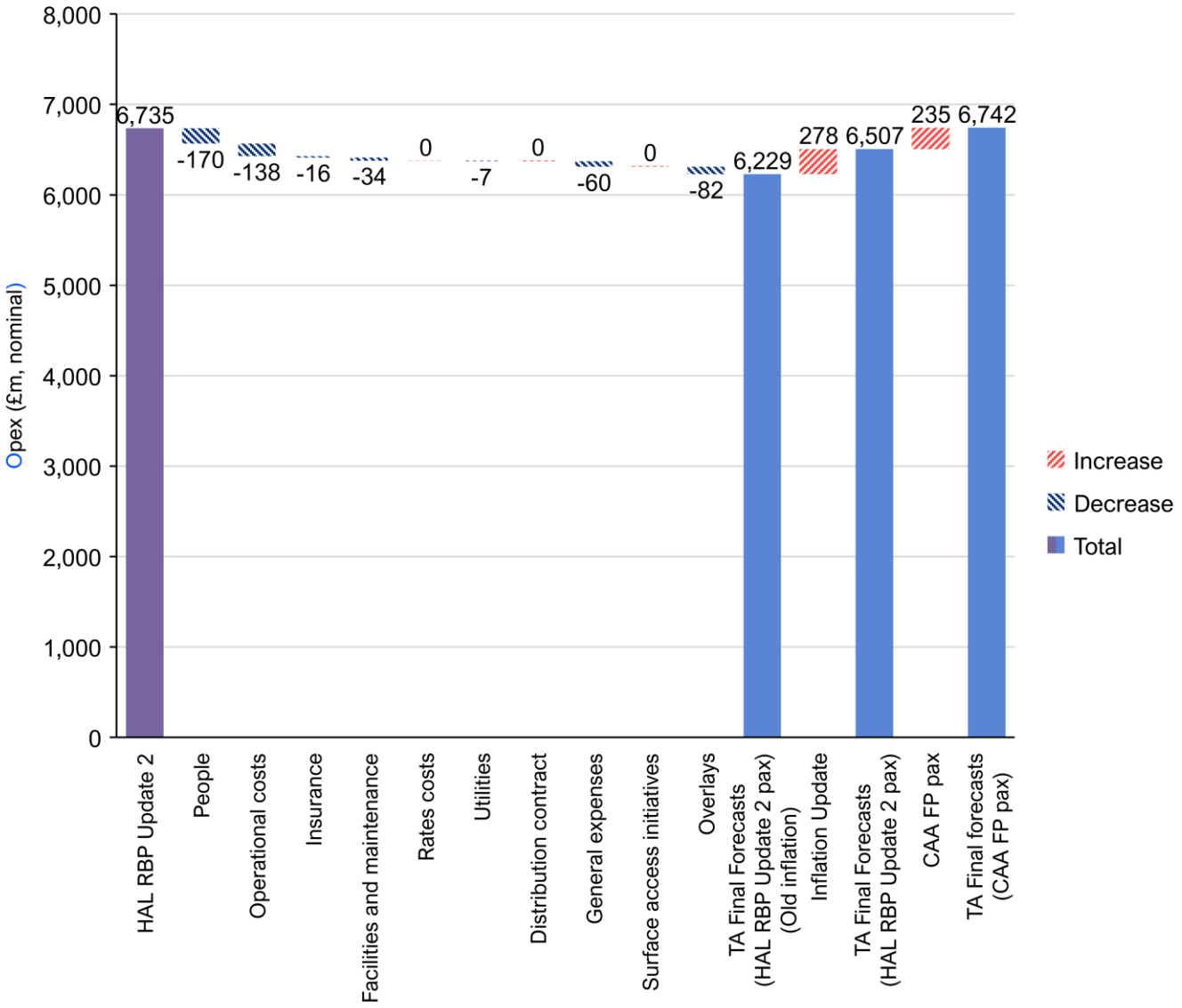
Source: TA analysis, HAL RBP Update 2

Figure 11.1 demonstrates the items that drive the difference between our and HAL's opex forecast. Excluding the effect of different passenger forecasts and updated inflation assumptions, the largest drivers of the gap are:

- **People costs:** We have made an adjustment to the baseline to reflect inefficient expenditure growth between 2017 and 2019, which predominantly affects people costs, and we have assumed the efficiencies delivered by the Cost of Change programme are additional to this efficient baseline. HAL, on the other hand, considers the Cost of Change programme necessary to achieve an efficient baseline and do not make any further adjustment. Our wage growth assumptions also account for the freeze in pay levels in 2020 and 2021, which are not accounted for in HAL's forecasts.
- **Operational costs:** As with people costs, we have made an adjustment to the baseline to reflect inefficient expenditure growth between 2017 and 2019, which is not accounted for in HAL's forecasts. We also differ in the elasticity we use to account for the impact of reduced passenger volumes in earlier years of the price control, using an elasticity with respect to passenger numbers of 0.4 compared with HAL's assumption of 0.2.

- **Overlays:** We make a number of adjustments to HAL's proposed overlays, including the COVID-19 overlay where, based on current policy, we have reduced the activities undertaken as COVID precautions and removed any additional costs from the end of 2022. In contrast, HAL has included a range of COVID precautions throughout the H7 period (albeit based on forecasts generated before the new policy was enacted). We have also adjusted the resilience overlay to account for the potential to extend equipment life due to inactivity during 2020 and 2021 because of the pandemic. For costs associated with passengers requiring support (PRS) we have two scenarios: our base scenario considers PRS as part as business as so we make not allowances for additional costs, whereas our high scenario includes additional costs for the PRS service adjusted to counter overlaps with the service provided for passengers.

Figure 11.1: Total H7 opex: TA Updated Forecasts vs. HAL RBP Update 2 (£ million, nominal)



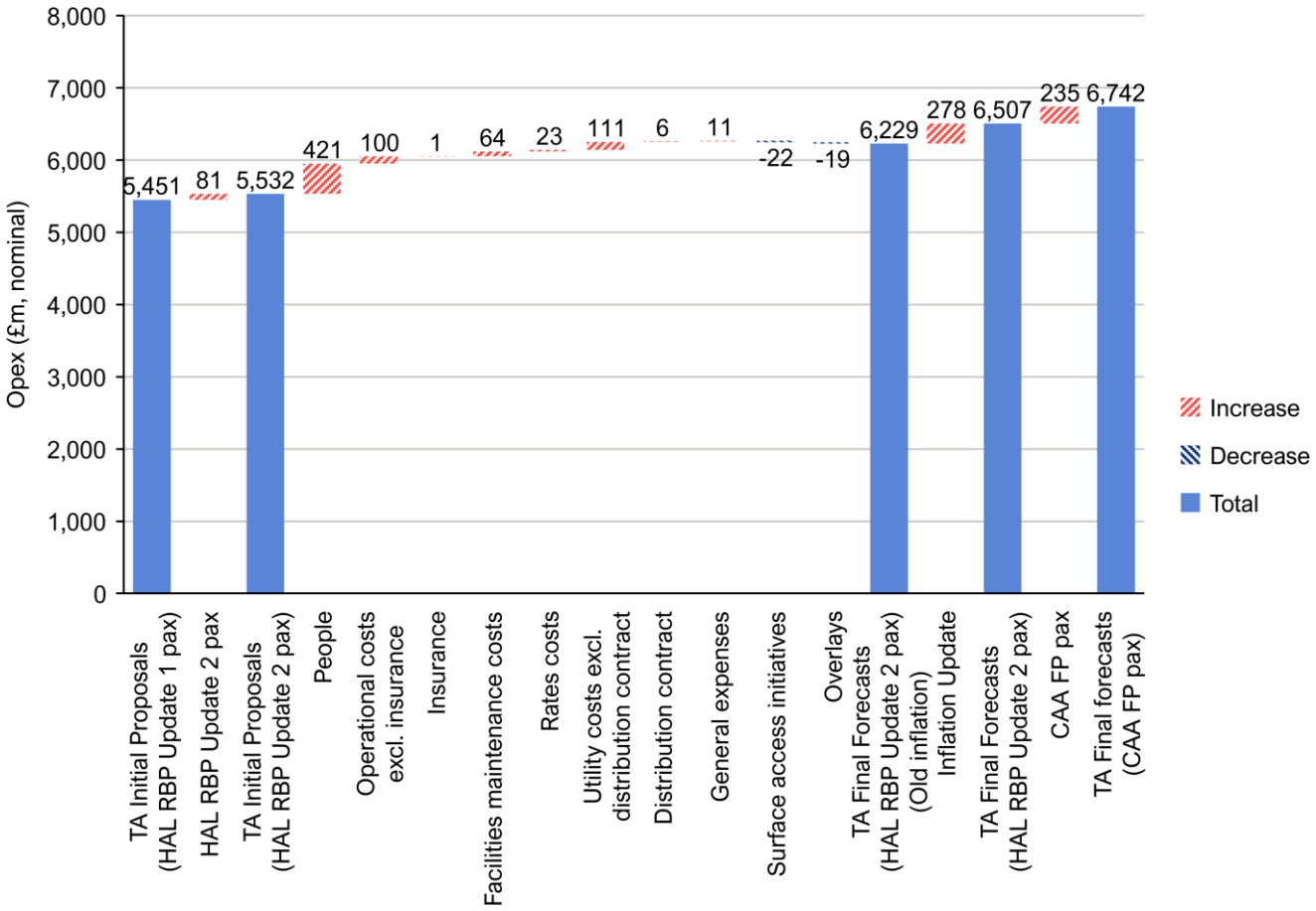
Source: TA analysis, HAL RBP Update 2
Note: Comparison between our forecasts and HAL's forecasts from RBP Update 2 do not align with those shown in earlier tables as these do not exclude the updates in core inflation assumptions.

Comparison to TA initial forecasts

Figure 11.2 compares our final opex forecasts with our initial forecasts. **Our final forecast for total opex over H7 is 20.3% larger than our initial forecasts.** Ignoring passenger forecasts and inflation, the following items form the biggest change between our final forecasts and initial forecasts:

- **People costs,** where the main changes are associated with security costs where our modelling now reflects HAL's security transformation programme, particularly relating to the efficiency benefits that are only delivered toward the end of H7 and probably into H8. In our final forecasts, we have allowed the staff reductions achieved in 2020 as a result of the pandemic to be reversed as passenger volumes recover whereas in our initial forecasts we considered these saving as permanent.
- **Utilities,** where we have increased our estimates to account for expected increases in electricity and gas prices.
- **Operational costs,** where the main changes are associated with differences in the ramp-up of operations for Terminal 4 reopening as well as changes in assumptions on input price inflation for outsourced services that comprise the major part of operational costs.

Figure 11.2: Total H7 opex: TA initial proposals vs. TA updated forecasts (£m, nominal)



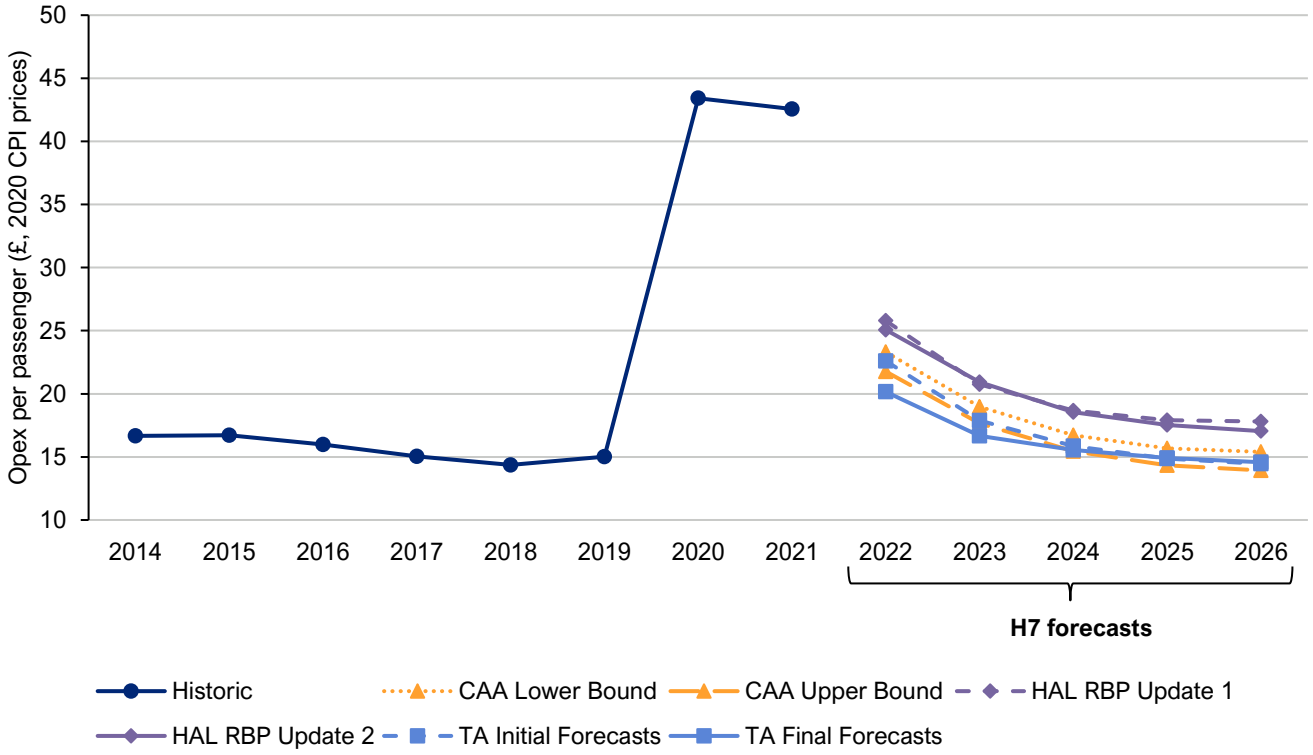
Note: The changes compared to our initial forecasts differ from here when compared to the body text, due to the separation of effects such as the ongoing productivity target and updated passenger forecasts.

Comparison to CAA Initial Proposals

Figure 11.3 compares our forecast opex per passenger to the CAA's lower and upper bound forecasts at Initial Proposals, alongside HAL's forecasts at RBP Update 2. **By 2026, we forecast opex per passenger of £14.58 in 2020 CPI prices, a 2.9% reduction from 2019.**

This figure shows that TA and HAL's forecasts have converged in comparison to the first round, towards the CAAs' Initial Proposal lower bound. HAL's 2026 opex per passenger forecast at RBP Update 2 is 16.9% larger than TA's final forecast, compared to a 23.2% gap between HAL's RBP Update 1 and TA's initial forecast.

Figure 11.3: Opex per passenger excluding cargo: TA, CAA and HAL (£, 2020 CPI prices)



Source: TA analysis

11.2. TA FINAL FORECASTS UNDER OTHER SCENARIOS

Passenger forecasts

The mid case forecast we present above uses the CAA's mid passenger forecasts for the final proposals. Table 11.2 presents the sensitivity of our results to the choice of CAA's passenger scenarios. **Compared to the CAA's mid passenger forecast, total opex is £138.2 million (2.1%) larger under the high passenger scenario in nominal terms, and £477.5 million (5.6%) smaller under the low passenger scenario in nominal terms.**

Table 11.2: TA final forecasts under different passenger forecast scenarios

	2022	2023	2024	2025	2026	H7
Total opex (£ million, nominal)						
HAL passenger forecast	1,166.4	1,238.5	1,322.4	1,380.6	1,399.3	**6,507.2**
CAA mid passenger forecast	1,219.0	1,287.1	1,364.2	1,432.0	1,440.0	**6,742.3**
CAA high passenger forecast	1,263.5	1,325.7	1,397.2	1,444.1	1,449.9	**6,880.5**
CAA low passenger forecast	1,118.8	1,198.5	1,291.9	1,361.1	1,394.5	**6,364.8**
Per passenger opex (£, nominal)						
HAL passenger forecast	25.65	21.35	19.54	19.22	18.87	**20.52**
CAA mid passenger forecast	22.21	19.11	18.10	17.68	17.64	**18.72**
CAA high passenger forecast	20.28	17.79	17.06	17.23	17.27	**17.82**
CAA low passenger forecast	30.25	23.81	20.82	19.91	19.03	**21.87**

Source: TA analysis

Sensitivity of forecasts to other key assumptions

There are a few key assumptions that remain subject to significant uncertainty and materially affect our opex forecasts. As a result, we have chosen to develop two additional scenarios to test the sensitivity of our opex forecasts to these assumptions.

We define our high and low opex scenarios as follows:

- For our **low opex case**:
    - We assume security transformation efficiencies can begin to be achieved sooner. In our mid case, we assume efficiencies are first introduced in 2025. In the low opex scenario, we assume efficiencies are brought forward by a year, to 2024.
- For our **high opex case**:
    - We assume that HAL can mitigate only 5% of cost increases imposed by the London Living Wage
    - We assume that wage growth in 2020 and 2021 falls immediately in line with economy wide wage growth in 2022
    - We include an allowance for People Requiring Support (PRS) costs.

Table 11.3 presents the effect of these scenarios on total commercial and cargo revenues. **Total revenues are £64.1 million (0.9%) larger over H7 under the high revenue scenario in nominal terms, compared to the mid case, while they are £23.7 million (0.4%) smaller under the low revenue scenario in nominal terms.**

Table 11.3: Total opex under alternative management stretch assumptions

	2022	2023	2024	2025	2026	H7
Total opex (£ million, nominal)						
High opex case	1,242.8	1,302.3	1,371.5	1,440.7	1,449.0	**6,806.3**
Low opex case	1,219.0	1,287.1	1,356.8	1,423.4	1,432.3	**6,718.6**
Per passenger opex (£, nominal)						
High opex case	22.65	19.34	18.20	17.79	17.75	**18.90**
Low opex case	22.21	19.11	18.00	17.57	17.55	**18.65**

Source: TA analysis

UK

Queens House

55-56 Lincoln's Inn Fields

London WC2A 3LJ

T. **+44 (0)20 7269 0210**

E. **info@cepa.co.uk**

www.cepa.co.uk

Australia

Level 20, Tower 2 Darling Park

201 Sussex Street

Sydney NSW 2000

T. **+61 2 9006 1308**

E. **info@cepa.net.au**

www.cepa.net.au

cepa-ltd @cepaltd