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

Civil Aviation Authority

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PUBLISHABLE FINAL REPORT

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EXECUTIVE SUMMARY

The Civil Aviation Authority (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.

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. 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]

We sought to take account of the unprecedented circumstances and the high degree of forecasting uncertainty affecting the H7 price review by following a similar methodology as HAL, namely a "base-step-trend" modelling approach. We reviewed the assumptions and data sources used by HAL to produce its commercial revenue forecasts under this base-step-trend approach, and we considered the supporting rationale given by HAL and its advisors. 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.

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.

We made an initial forecast of total commercial and cargo revenues over the H7 period, of £5,121 million in nominal terms.[2] This is equivalent to £4,750 million in 2020 prices.

HAL RBP Update 2 and stakeholder responses to CAP2265

Since our initial forecasts, the CAA has consulted on its initial proposals (as informed by our initial forecasts), and HAL has published its RBP Update 2.

In its response to the CAA's consultation HAL highlighted several concerns with our forecasts and introduced new evidence to support the points raised. In some areas, HAL updated its approach to respond to the issues we had raised in our initial review of HAL's RBP Update 1. The main areas of disagreement were in relation to the retail revenue forecasts, the cargo revenue forecasts, and our decision to apply a management stretch target[3].

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

- For most revenue categories, airlines broadly agreed with the approach we had taken in our initial forecasts. In some instances, they provided additional evidence to support this view.
- With respect to retail revenues, HAL's response focused on discouraging our use of top-down approach to estimating the impact of the two major tax changes – the removal of airside VAT free for non-UK and non-EEA travellers, and the introduction of alcohol and tobacco excise duty free for EEA travellers. HAL also updated its bottom-up approach, which reduced the difference with our initial forecasts.

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

[2] Throughout this report, we report in nominal prices, unless otherwise stated.

[3] To reflect the long-term potential for HAL's management to drive the airport's commercial revenues over time, over and above passenger growth (or other revenue drivers captured in our forecasts).

- For surface access revenues, HAL provided further information and data to improve its approach in several ways, such as updated mode share assumptions, an updated view on the impact of the COVID-19 pandemic on car parking and car rental revenues, new approaches to estimating the impact of various headwinds on rail revenues, and updated estimates of revenues from the terminal drop off charge. In their responses, airlines provided suggestions around the mode share assumptions and provided alternate forecasts of revenues from the terminal drop off charge.
- For property revenues, HAL developed an alternative approach to developing the forecasts, resulting in a higher forecast than its forecast in RBP Update 1. For service revenues, HAL updated its approach to bring it in line with our forecasts.
- For cargo revenues, HAL disagreed with our elasticity assumption and developed an alternate approach to the forecasts. It considered its revised approach better reflected its view that the increase in cargo revenues seen in 2020 and 2021 was temporary and would substantially reduce from 2022 onwards.
- HAL disagreed with the application of a management stretch target, which it considered to be without regulatory precedent. It also argued that our choice of a 2% target was unsubstantiated, a view also taken by airlines. More broadly, HAL argued that our choice of a 2% target 'banked' the benefits of its proposed capital plan despite the CAA disallowing the plan.

In its RBP Update 2, HAL has forecast total commercial and cargo revenues to be £4,042 million in nominal terms. This is equivalent to £3,667 million in 2020 prices.

Our consideration of the issues

Retail

We considered the following areas when determining our revised forecasts for retail revenues:

- On **tax changes**, we consider that our top-down analysis remains the most appropriate method for transparently reflecting the range of possible impacts from the two tax changes. We now use a higher elasticity to account for the impact of the tax changes, based on analysis of data HAL has shared, which suggests that revenues at VAT-impacted retailers have reduced by more than implied by our original elasticity assumption. We also add a 'secondary effect' (downward adjustment), accepting HAL's view that the introduction of VAT on some products will require HAL to accept lower margins from affected retailers.

  We have also reviewed HAL's bottom-up approach and find that it includes several inconsistencies and, in our view, poorly substantiated assumptions. As such, we conclude that it would be inappropriate to adopt HAL's figures and have not relied on its bottom-up analysis for our revised forecasts.
- We note that revenues at non-VAT impacted retailers (such as bookshops and food and beverage outlets) has increased, partially compensating the loss from VAT-impacted retailers. We do not explicitly account for this, considering it best captured through the management stretch target.
- In its RBP Update 2, HAL proposed a new overlay to **'bridge' from the forecast implied by its modelling approach to its detailed bottom-up forecast for 2022 (labelled the Q6 to H7 bridge)**. HAL argues this takes account of changes in retailer margins, the impact of closing Terminal 4, and various other smaller changes. We are unable to support including this overlay as HAL's justification does not meet our first criterion for inclusion of step change adjustments, i.e. we consider there is no clear need for it.
- HAL has also proposed a new **Terminal 4 reopening** overlay, to reflect its view that retail sales will ramp up slowly when Terminal 4 is first reopened. Again, we do not support this overlay as the size of the proposed adjustment, a 75% reduction in per passenger revenue, has been presented without evidence.

We forecast a total of £2,236 million (£1,916 million in 2020 prices) of retail and bureaux revenues over H7, 28% larger than HAL's forecast in RBP Update 2.

Surface access

We considered the following areas when determining total surface access revenues:

- For **mode share**, we have used HAL's most up-to-date survey data on mode share, which provide estimated mode shares up to 2021. During H7, we assume that mode share returns from 2021 levels towards 2019 levels in line with the recovery in passenger volumes, and apply overlays to account for the introduction of Crossrail, and the imposition of the terminal drop-off charge.
- We accept HAL's evidence that **average transaction values for car parking and car rental services** have increased by 15%, and we tie the return to pre-pandemic levels to the recovery in passenger volumes.
- For **track access revenues**, we have updated our modelling of track access income to reflect the gradual ramping up of Crossrail services to six trains per hour, which we had not previously accounted for. We have also separated track access and Terminal 5 Piccadilly agreement income in response to evidence submitted from HAL.
- For **Heathrow Express** revenues, we have applied two overlays. The first accounts for the reduction in the real price of Heathrow Express ticket prices due to the decision to freeze their nominal value during the pandemic. The second controls for the planned price response of HAL in response to the introduction of Crossrail.
- For the **terminal drop-off charge,** we have addressed an error in our approach to now reflect the fact that VAT is chargeable, and addressed an error in both HAL's and our approach, so that only drop-off trips are liable for the charge. Additionally, we have updated our assumption on average vehicle occupancy from 1.5 to 1.7, in light of evidence submitted by HAL.

We forecast a total of £836 million (£717 million in 2020 prices) of surface access revenues over H7, 26% larger than HAL's forecast in RBP Update 2.

Cargo

During the COVID-19 pandemic, many passenger aircraft were repurposed to carry only cargo, often labelled 'preighter' flights. HAL has provided new evidence showing that the increase in cargo revenue during 2020 and 2021 was largely due to the preighter phenomenon, suggesting that revenue will decline quickly once passenger movements recover, and more cargo can be carried within the bellyhold of passenger aircraft.

In response to the evidence provided by HAL, we develop an alternate bottom-up approach to forecast cargo revenues, linking the number of freighter and preighter movements to the recovery in passenger volumes.

We forecast a total of £130 million (£114 million in 2020 prices) of cargo revenues over H7, 4% lower than HAL's forecast in RBP Update 2.

Management stretch

We remain of the view that it is appropriate to explicitly include a management stretch target. We apply this management stretch only to the controllable categories of commercial revenue.

To further substantiate the management stretch target, we have performed econometric analysis to better understand how much of HAL's historic ability to drive revenue generation can be explained by factors other than our revenue drivers, capital expenditure, or one-off factors (e.g., Brexit related depreciation in GBP).

We acknowledge the significant limitations – notably data availability – with the analysis undertaken and so do not consider that substantial weight can or should be placed on our results for the purposes of setting a management stretch target. We have instead used the analysis in a confirmatory manner and as one of a number of possible sources of qualitative and quantitative evidence to inform a decision on this issue.

We tested whether the data is more consistent with a 1% or 2% management stretch target and conclude that the analysis does not provide conclusive evidence in favour of or against a 2% management stretch target or a lower target as proposed by HAL for H7. However, we consider the analysis, together with other sources of evidence, is supportive of the CAA setting a management stretch target, in particular, given the approach that CEPA has taken to index commercial and cargo revenues to forecasts of CPI not RPI inflation.[4]

Our view is that the management stretch should account for all drivers of commercial revenue that have not been recognised by the modelling approach used in our forecasts. With this in mind, we acknowledge that choosing an appropriate management stretch target requires consideration of several overlapping issues and ultimately is a judgement that the CAA must make in the context of the overall price control.

We believe the CAA should consider the following factors when determining its choice of management stretch target:

- The extent to which the CAA provides a capex allowance to drive further revenue growth.
- The extent to which historic macroeconomic trends driving revenue growth can be expected to continue.
- The extent to which HAL is exposed to known headwinds not explicitly accounted for in our forecasts.
- The extent to which management action can help mitigate headwinds, and the extent to which such mitigations are already captured elsewhere in our forecasts.
- The extent to which management action can drive new revenue growth, and the extent to which HAL may be exposed to further unknown headwinds.
- The relative novelty of a management stretch target as a regulatory concept in the context of Heathrow's single till price control.

We suggest that these factors, taken in the round, might suggest a degree of caution is necessary in setting any management stretch target for H7, particularly given the imperfect evidence base to inform a decision and the continued uncertainty around the macroeconomic environment over the next price control period.

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, the following key areas will require the judgement of CAA as regulator:

- **Retail price elasticity:** In our mid-case, we adopt a retail price elasticity of -1.6.
- **Management stretch:** In our mid-case, we adopt a management stretch of 1%.

In our final forecasts, under our mid-case, we forecast a total of £5,025 million in nominal terms (£4,311 million in 2020 prices) of commercial and cargo revenues during H7. This is 24% (£989 million) higher than HAL's nominal forecast at RBP Update 2.

[4] In contrast, HAL maintain the use of RPI to index its commercial revenue forecasts in its RBP Update 2, which assume that it is able to maintain revenues constant in RPI real terms.

This implies that if CPI is considered a better measure for inflation and basis for indexation of commercial revenues, as CEPA has adopted in our commercial revenue forecasts, that HAL can also be considered to implicitly apply a management stretch equal to the wedge between RPI and CPI, which has previously been estimated to be 1%. See OBR (2015) Revised assumption for the long-run wedge between RPI and CPI inflation. Available at obr.uk

Table E.1 and Table E.2 present a breakdown of these revenues across H7 and revenue categories in nominal terms.

Table E.1: CEPA commercial revenue final forecasts, using CAA mid pax projections (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Retail and Bureaux	317	405	465	515	535	**2,236**
Bureaux			[Included in above category]			
Surface Access	129	154	172	187	194	**836**
Service	46	56	63	69	71	**306**
Rail	82	96	122	137	142	**579**
Property	131	139	139	140	141	**689**
Other	1	2	2	2	2	**8**
Intercompany	-	-	-	-	-	**-**
Terminal drop-off charge	40	42	52	54	53	**241**
Red Terminal	303	389	448	498	520	**-**
Total commercial revenues	**745**	**894**	**1,015**	**1,103**	**1,137**	**4,895**
Total per passenger (£)	**13.58**	**13.28**	**13.47**	**13.62**	**13.93**	**13.59**
Difference from HAL RBP U2	155	203	199	218	214	**989**

Source: CEPA analysis

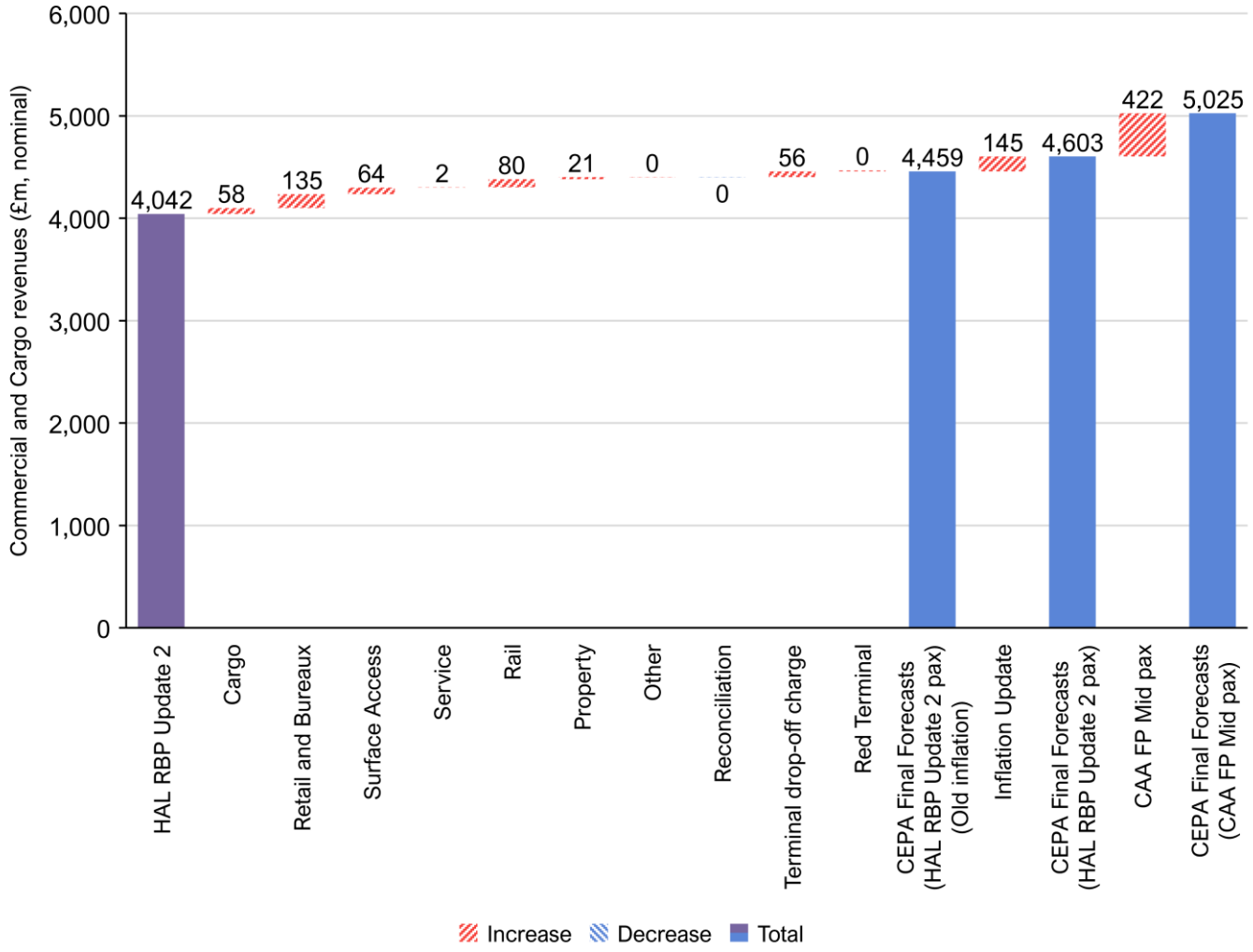
Table E.2: CEPA cargo revenue final forecasts, using CAA mid pax projections (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Cargo	50	32	21	14	14	**130**
Difference from HAL RBP U2	7	-1	-1	-6	-6	**-6**

Source: CEPA analysis

Figure E.1 below demonstrates the items that drive the difference between our and HAL's commercial and cargo revenue forecast, including the effect of different passenger forecasts and updated inflation assumptions. **Ignoring the effects of inflation and a more optimistic CAA passenger forecast, our forecasts are 10% higher than HAL's.** The main difference between our forecasts continues to be retail, where we consider HAL's estimate of the impact of removing VAT-free for international travellers to be overstated. We also find big differences in our rail forecasts, where HAL had not properly accounted for revenues from the Piccadilly Line.

Figure E.1: Total H7 commercial and cargo revenues: CEPA Updated Forecasts vs. HAL RBP Update 2 (£ million, nominal)



Source: CEPA analysis, HAL RBP Update

Overall, we consider our conclusions a balanced set of final forecasts that capture both the pressures that HAL has identified in its RBP Update 2 and what we consider to be opportunities for revenue generation. Nevertheless, there remain several areas of forecasting uncertainty, particularly around the impact of the removal of VAT-free, and opportunities to drive future revenue growth.

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

- **Under our low case, we forecast a total of £4,362 million (£3,737 million in 2020 prices) of commercial and cargo revenues during H7.** Here, we assume a retail price elasticity of -1.72, in line with the assumption proposed by HAL.
- **Under our high case, we forecast a total of £5,296 million (£4,548 million in 2020 prices) of commercial and cargo revenues during H7**. Here, we adopt a management stretch target of 2%, and assume a retail price elasticity of -1.4, roughly midway between our previous elasticity assumption and our mid-case elasticity assumption.

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.[5]

In this report, we present our final forecasts for commercial and cargo revenues. We review the representations made by HAL and other stakeholders in response to our initial forecasts and any additional evidence provided in subsequent engagement. Taylor Airey's assessment of issues related to opex is presented in an accompanying report.

The H7 price review is being undertaken in a context of considerable forecasting uncertainty. The removal of VAT tax free for passengers travelling to non-EU destinations may have long-term consequences for HAL's ability to generate commercial revenues. Additionally, 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 passenger base during H7 even as governments worldwide continue to reduce travel restrictions. The additional information provided by HAL and other stakeholders has reduced the uncertainty surrounding our forecasts; however, the COVID-19 pandemic continues to impose forecasting uncertainty above that seen in previous price reviews. As a result, key areas will require the judgement of CAA as regulator.

In reviewing HAL's commercial revenue 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 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. We have also followed a similar methodology as HAL to better understand where the key differences between our forecasts lie, and we have directly assessed the overlays and adjustments that HAL itself has identified as impacting its business during H7 (relative to a starting 2019 'baseline' of commercial revenues).

In our initial proposals, we presented our forecasts 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 revenues* scenario that reflects more conservative assumptions around HAL's ability to generate revenues and a *high revenues* scenario that reflects more stretching assumptions.

The remainder of this report is structured as follows:

- In **Section 2**, we present a high-level summary of our commercial and cargo revenue forecasts for the CAA's initial proposals.
- In **Sections 3-9**, we present our updated view on each of the major commercial revenue categories. 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 and final forecasts. **In line with the approach that we took at initial proposals, we present our initial forecasts using HAL's mid passenger scenario from its RBP Update 2. This allows for a like-for-like comparison between our initial proposals and HAL's RBP Update 1. We then present our final forecasts under each category assuming HAL passenger forecasts from its RBP Update 2. This allows for a like-for-like comparison between our final proposals and HAL's RBP Update 2.**

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

- **Section 3**: Retail and bureaux revenues
- **Section 4**: Surface access revenues
- **Section 5**: Property revenues
- **Section 6**: Other non-aeronautical revenues
- **Section 7**: Cargo revenues
- **Section 8**: Management stretch
- **Section 9**: Capital investments

- In **Section 10**, we present our overall final forecasts of commercial and cargo revenues over H7, and the results of our forecasts under our other scenarios. **Our final forecasts are presented assuming CAA's updated passenger forecasts, to demonstrate the total impact of our revised assumptions in comparison to HAL's forecasts in its RBP Update 2.**

2. SUMMARY OF OUR INITIAL FORECASTS

2.1. OUR APPROACH

In our initial forecasts, we sought to take account of the high degree of forecasting uncertainty brought by the COVID-19 pandemic, by following a similar top-down methodology as HAL – namely a "base-step-trend" approach as depicted in Figure 2.1.

Figure 2.1: Modelling approach for commercial revenues

BASE	For each revenue category, take historical commercial revenues from 2019 as a base year
	(If necessary) apply efficiency adjustments to the base year to reflect our view of efficient revenues
	Apply other one-off adjustments to the base year to reflect our view of efficient commercial revenues (e.g. step-changes in revenue generation experienced prior to the H7 price control)
TREND	Apply a price adjustment to the efficient baseline to reflect expected inflation and real price effects over the H7 period (2022-2026)
	Perform a volume adjustment to account for projected changes in revenue drivers (e.g. passenger volumes, terminal space), using elasticities between drivers and revenues
STEP	Apply overlays to account for headwinds and tailwinds
	Apply overlays to account for factors not addressed by volume drivers
	Apply management stretch adjustment to reflect long-term trend in HAL management's ability to drive commercial revenues over and above passenger growth (or other revenue drivers)

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 the commercial revenues it generated in 2019 was consistent with what would be generated by an efficient airport. We also reviewed evidence provided by airlines and from studies commissioned by the CAA assessing the efficiency of HAL's revenue generation. As the evidence across all these pieces were broadly consistent, we did not undertake any additional benchmarking.
- **Trend:** For the choice of revenue 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 revenue drivers were logical and comprehensive. We also explored how well HAL's choice of elasticities explained actual revenues for the years 2020 and 2021, adjusting as necessary. In some instances, we developed bottom-up elasticity estimates through an assessment of how much each revenue stream was driven by changes in passenger volumes.
- **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. 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 ability to generate revenues; 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 we tested 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.

Despite the circumstances presented by the pandemic, we still sought to challenge HAL to identify the areas of forecasting uncertainty, and areas in which HAL could challenge themselves 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 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 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 commercial revenues using HAL's projections of passenger volumes from its mid scenario, while Table 2.2 presents our initial forecasts of cargo revenues. Over the H7 period, we forecast commercial and cargo revenues to be £4,792.2 million in nominal terms, compared with HAL's forecast of £3,699.9 million. Even when controlling for our different passenger forecasts and the removal of the minimal capex overlay, there was a 22.8% revenue gap between HAL's RBP Update 1 and our initial forecasts.[6]

Table 2.1: CEPA commercial revenue initial forecasts, using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Retail and Bureaux	244.2	345.1	419.6	467.6	498.4	**1,974.9**
Bureaux	[Included in above category]					
Surface Access	98.7	131.1	143.5	162.1	172.3	**707.7**
Service	36.6	47.1	55.0	60.4	64.0	**263.0**
Rail	78.6	101.8	107.7	118.5	125.5	**532.1**
Property	122.8	131.3	139.2	144.8	150.6	**688.7**
Other	0.7	1.0	1.3	1.4	1.5	**5.9**
Intercompany	0.0	0.0	0.0	0.0	0.0	**0.0**
Terminal drop-off charge	57.7	70.7	78.3	96.6	95.2	**398.5**
Red Terminal	17.4	7.1	0.0	0.0	0.0	**24.5**
Total	**656.7**	**835.1**	**944.5**	**1,051.3**	**1,107.6**	**4,595.3**
Total per passenger (£)	**15.80**	**14.86**	**14.39**	**14.94**	**15.38**	**15.03**
Difference with HAL forecast (without minimal capex overlay)	157.3	191.8	184.3	212.0	226.5	**971.9**

Source: CEPA analysis, HAL RBP Update 1

Table 2.2: CEPA cargo revenue initial forecasts, using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Cargo	62.0	45.1	33.9	28.6	27.3	**196.9**
Difference with HAL forecast	44.6	29.5	19.3	14.2	12.8	**120.4**

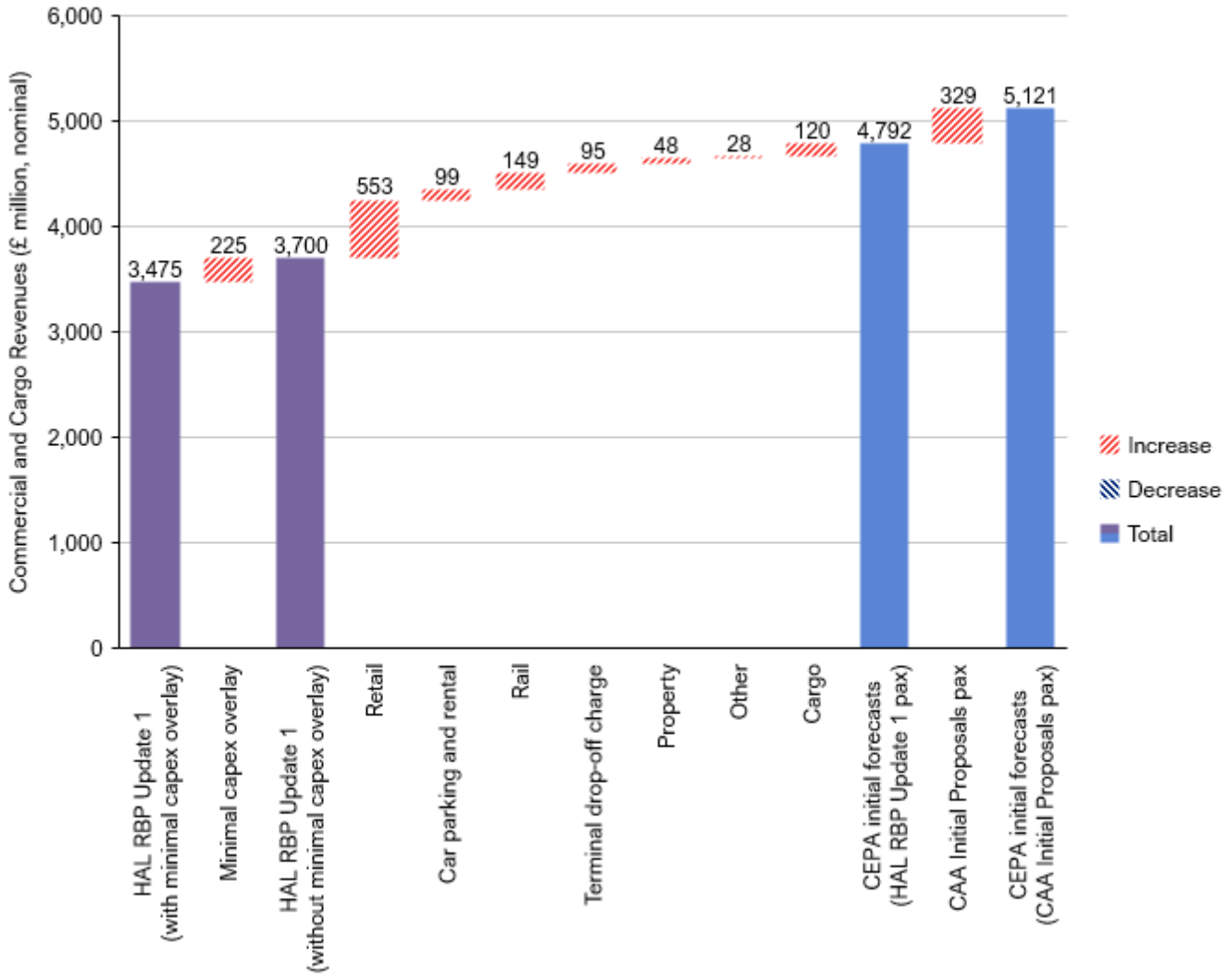
Source: CEPA analysis, HAL RBP Update 1

[6] HAL's forecast included a downward overlay in its 'low capex' scenario, of -£225 million in nominal terms. This 'minimal capex' overlay was HAL's estimate of how much lower it expected its commercial revenues to be relative to its base forecast if the CAA did not grant an allowance for its commercial capex proposals. Including this minimal capex overlay would reduce HAL's H7 commercial revenue and cargo forecast to £3,474.9 million.

The difference between our initial forecasts and HAL's RBP Update 1 is demonstrated in Figure 2.2. The three largest drivers of the revenue gap were:

- Differing assumptions on the effect of the removal of the retail export scheme, which allowed airside retailers to not levy VAT for passengers travelling to non-EEA destinations, on **retail revenues**.
- The use of **2% management stretch target**, to account for unobserved drivers of commercial revenues.[7]
- Differing assumptions on the impact of the COVID-19 pandemic on **rail revenues**.

Figure 2.2: Total H7 commercial and cargo revenues: CEPA initial revenue forecasts vs. HAL RBP Update 1 (£ million, nominal)

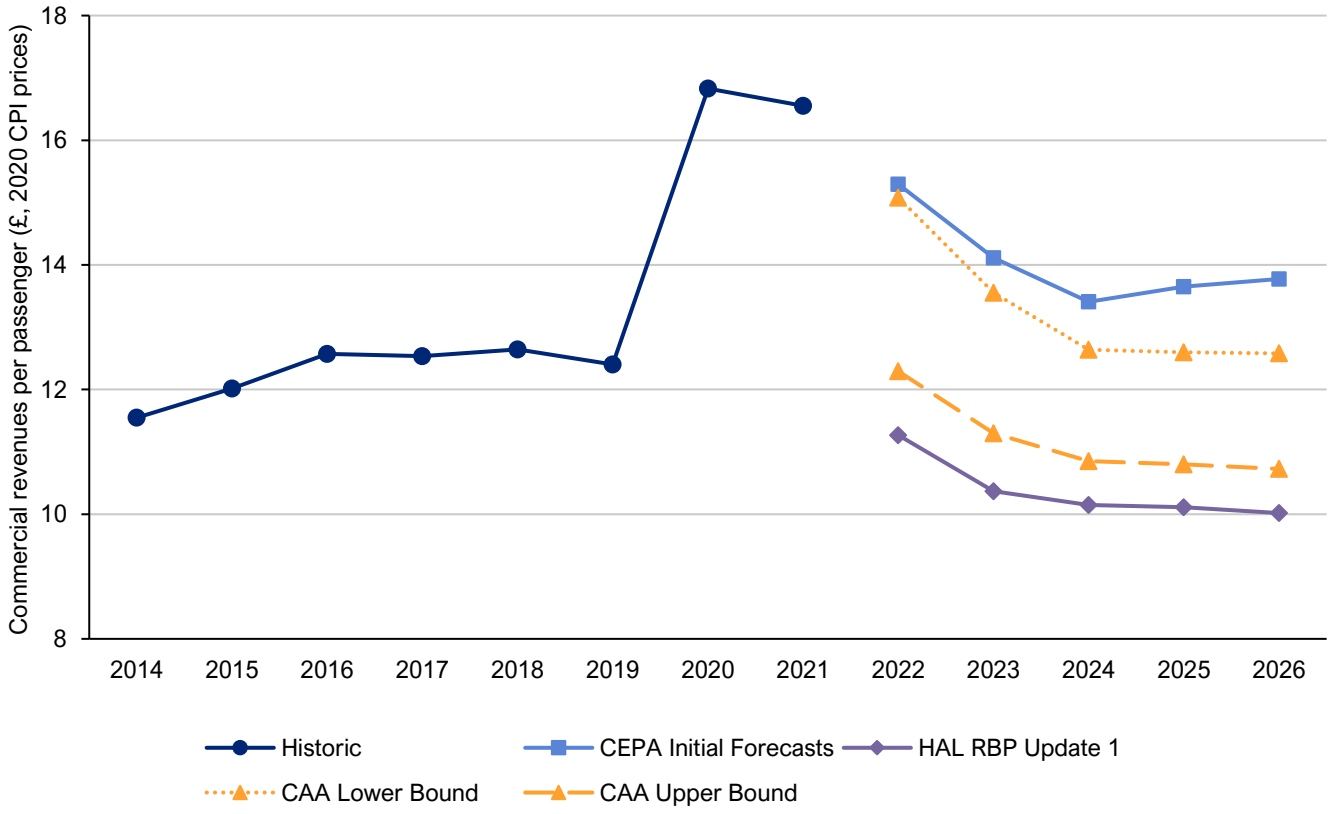


Source: CEPA analysis, HAL RBP Update 1

As demonstrated in Figure 2.3, there was roughly a £4 per passenger difference between our initial forecasts and HAL's proposals in its RBP Update 1.

[7] The management challenge or management stretch reflects a view on the year-on-year improvement in Heathrow management's ability to increase revenue over and above passenger growth (or other revenue drivers). See Section 8 for more details.

Figure 2.3: Commercial revenues per passenger excluding cargo (£, 2020 CPI prices): CEPA, HAL and CAA



Source: CEPA analysis, HAL RBP Update 1

3. RETAIL AND BUREAUX

Retail covers the concession income received by HAL from the various retail units selling goods or providing services at the airport. Such retail outlets cover food & beverage, world duty free, left luggage services, luxury retail outlets, VAT refund, etc. Bureaux covers concession income from units providing currency exchange services.

3.1. OUR INITIAL FORECASTS

Retail

In our initial forecasts:

- We **agreed** with HAL that passenger volumes were the most appropriate driver of retail revenues and accepted their estimate of 0.97 as the volume elasticity.
- HAL had applied various negative overlays to their retail forecasts to account for tax changes (most notably a removal of VAT relief on spending at airside retail outlets) and to account for changes in the passenger mix away from higher spending passengers.[8] We concluded that HAL had overestimated the impact of these headwinds on its retail revenues and so, we used an alternate approach to estimate the size of the overlays:
    - For the tax changes, we used a top-down elasticity-based approach to estimate the impact. Using publicly available estimates of retail income with respect to price, we modelled the impact of the various tax changes on retail concession income. For most categories of retail concession income, the tax changes meant prices increased by 20% (i.e. the rate of VAT). However, for alcohol and tobacco sales to passengers travelling to destinations in the EEA, the tax changes implied a price reduction as excise duties were removed.
    - For changes in the passenger mix, we broke down retail revenue by geographic market before projecting each geographic market separately. Using HAL's assumed passenger mix, we found that our overlay broadly matched HAL's for the first two years of H7, but then the assumed passenger mix would have a positive effect on retail income for the subsequent three years.
- We applied a management stretch target of 2% per annum above CPI-driven growth in revenues. This was our estimate of HAL management's ability to drive revenue generation over and above forecast levels accounted for through our volume drivers and overlays.

This resulted in a difference over the H7 period of £555.8 million in nominal terms, before accounting for differences in passenger forecasts.

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[8] The tax changes are two-fold. For passengers travelling to non-UK and non-EEA destinations, VAT is now payable on all purchases where VAT would typically be payable, i.e. most goods other than food, beverages and books (VAT has always been payable for passengers travelling to UK and EEA destinations). For passengers travelling to EEA destinations, excise duty on alcohol and tobacco purchases is no longer payable.

Bureaux

For bureaux, HAL had applied a negative overlay of 70% to account for a reduction in income from the currency exchange concession.

- We agreed that there has been a long-term decline in the currency exchange business, with a noticeable decline over 2015-2019, and that this decline was expected to continue.
- HAL had provided limited explanation of how they had estimated the 70% overlay. Therefore we began with HAL's estimated 40% reduction in walk-in revenues between 2014 and 2019, combined with the expiration of fixed payment protections and a continuation of the long-term decline in revenues. Our resultant forecast was broadly similar to HAL's forecast.

Table 3.1 below shows the difference between HAL's retail and bureaux revenue forecasts and our initial forecasts, before accounting for differences in passenger volumes.

Table 3.1: HAL and CEPA retail and bureaux revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	173.3	246.7	303.8	337.6	360.5	**1,421.9**
CEPA Initial Forecasts	244.2	345.1	419.6	467.6	498.4	**1,974.9**
Difference	70.9	98.4	115.8	130.0	138.0	**553.0**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

✂ - Retail and Bureaux figures combined in publishable version of report

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

HAL

HAL's response to the consultation raised the following issues:

- HAL disagreed with our use of a top-down elasticity-based approach to calculating the overlay related to tax changes, preferring the use of its bottom-up analysis. It also critiqued the assumptions feeding into our top-down analysis, providing some alternate top-down estimates to validate its bottom-up analysis.
    - HAL disagreed with our use of a single top-down elasticity figure to estimate the impact of the tax changes, which it states can only account for primary impacts (i.e. changes in passengers spending as a result of the tax changes) and not for secondary impacts (concessionaires renegotiating their leases or being replaced by lower yielding stores).

      HAL challenged the assumption that followed from this that it would be able to retain the margins it levies on its concessionaires following the tax change, or that lower margins would lead to more sales (resulting in a neutral impact on HAL). HAL stated that it has already received requests from "*nearly all*" tax-impacted concessionaires for lower margins, and provided a forecast for margin changes and a change of store mix.
    - HAL also disagreed with the elasticity value we used, of -1.25. It argued that if using elasticities, then it would be more appropriate to have specific values for each type of retail outlet, to reflect differences in price elasticities. It proposed two specific values, one for specialist stores and one for World Duty Free.
- HAL objected to the source data we used to break down 2019 retail income by geographic market, arguing that the use of survey data alongside annual statements is less robust than the actuals data provided.

- HAL added two new overlays as part of its bottom-up approach: a Q6 to H7 'bridge' and an overlay to account for Terminal 4 reopening.

Additionally, HAL disagreed with a management challenge being applied to retail, claiming that it is included in its elasticity. We discuss the management stretch in Section 8.

Airlines

Airlines raised concerns that the impact of the retail changes overall (including the VAT change) could be overstated but recognised that there was likely to be a trade-off between margins and volumes. PA Nyras (PA), in its advice to the airline operators committee at Heathrow and the London (Heathrow) Airport Consultative Committee (AOC/LACC), also stated that if Heathrow Airport manages to repeat historic outperformances, it could deliver a £10-11 million increase in revenues in 2022 alone.[9] Finally, airlines noted that HAL's own data suggested retail revenue per passenger was unchanged 2021 relative to 2019.[10]

3.3. Our assessment of the issues

3.3.1. Overlay relating to tax changes

Top-down analysis

We consider that our top-down analysis remains the most appropriate method for transparently reflecting the range of possible impacts from the two tax changes. We discuss HAL's bottom-up analysis in more detail below but, in general, we consider that its approach is less practicable given the lack of available detail and what we consider to be inconsistencies within its approach.

More generally, modelling the tax changes on a bottom-up basis is considerably more complex than our favoured top-down approach, without necessarily being more accurate or insightful. A robust bottom-up approach will require making a series of assumptions for various parameters at a granular level (e.g. around passenger behaviour in response to price changes, concessionaire behaviour in response to changes in profitability, opportunities from future concessionaires, etc.), and requires good quality evidence to support those granular assumptions. Many of these parameters are highly uncertain, making it challenging to develop appropriate assumptions that can be independently validated or assured. We have found that the quality of evidence available to us does not allow for robust bottom-up analysis, without having to resort to making a series of unsubstantiated assumptions.

We note HAL's concern with our use of a single elasticity for all store types. We do not consider HAL's attempts to separate out different categories of spend and apply separate elasticities to be more robust. Price elasticities for different categories of spend and for different geographic markets are highly uncertain and, therefore, carrying out the calculation to this level of detail suggests a level of precision that is not, in reality, possible in our opinion. Our use of a single elasticity value is not intended to suggest that this value is precisely true for all retailers, rather it is an average designed to represent the affected retailers as a whole. Using a single elasticity estimate allows us to reflect the uncertainty surrounding the price elasticity within a single assumption, rather than across several assumptions.

Our elasticity assumption at initial forecasts stage made use of the mid-point of the OBR's two estimates, which in turn was based on a range of studies. For these final forecasts, we have further calibrated this assumption using real-world data now available for 2021. In our calibration we consider outturn changes in spend per passenger between 2019 and 2021, making use of data provided by HAL. This includes for 2019 and 2021 the numbers for luxury sales across all regions, the full passenger mix between these regions, and the changes in spending across

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

[10] AOC/LACC (2021) CAP2265 response, p.6.

different categories of retailer.[11] This calibration results in an elasticity of -1.6, higher than our previous elasticity assumption of -1.25 but slightly lower than HAL's proposed overall elasticity of -1.72.[12] We consider this a conservative view of the impact of the tax changes, given that some of the observed changes in consumer behaviour may be due to temporary pandemic related effects rather than a permanent effect as a result of the tax change.

Nevertheless, we also recognise that this elasticity assumption is a key area of uncertainty. Therefore, we propose varying this assumption under our low and high revenues scenarios. For our low revenues scenario, we use HAL's proposed overall elasticity of -1.72, while we use an elasticity of -1.4 for the high revenues scenario.

Secondary and tertiary effects

We consider that there is merit to HAL's argument that our price elasticity approach does not fully account for the effect of tax changes on HAL's retail concession income. Our top-down elasticity-based approach estimated the changes in demand (and thus overall retail revenue) that results from the tax changes (the 'primary effect'). We had previously assumed that this elasticity-based approach also accounted for secondary effects, i.e. the reduction in margin that HAL can recover from concessionaires. However, having considered HAL's representations, we consider that a separate allowance needs to be made for secondary effects. We continue to maintain that 'tertiary effects', i.e. knock-on effects from lower advertising spend, are accounted for in our overlay.

The basis for including a separate allowance for secondary effects is as follows:

- HAL's concession contracts are largely based on HAL earning a proportion of total retail revenue from each store (HAL's margin). This margin differs by the type of retail outlet.
- If we assume HAL's margin remains unchanged as a result of the tax changes, we are also implicitly assuming that when VAT is introduced to certain product lines, the resultant reduction in demand and reduction in revenue is felt equally by the concessionaire and by HAL.
- However, it is reasonable to assume that as a proportion of each concessionaire's cost base is fixed, the reduction in revenue would have a disproportionately larger impact on its profitability, which the concessionaire would seek to compensate by renegotiating the margin given to HAL.

HAL has stated that the contract renegotiations taken place so far suggest that its average margin for luxury retailers will reduce from ✂✂✂ to ✂✂✂ (a ✂✂✂ percentage point reduction).[13] HAL also states that contract renegotiations with World Duty Free has reduced the effective margin it receives from an average of ✂✂✂ to ✂✂✂ (a ✂✂✂ percentage point reduction).[14] We use the average of these two datapoints to estimate the impact of margin reduction across HAL's retail concessions.

Review of HAL's bottom-up analysis

HAL's bottom-up analysis broadly consists of a series of independent events that HAL considers result from the tax changes and will affect its retail concession income. As each event is considered independent of one another, HAL is assuming that the impact of each event is additional. These are summarised in Table 3.2 – some of these events apply to all retail concession income while other impacts only apply to a specific subset of HAL's income.

The approach taken to calculating the effect of each event on retail concession income and the source data used, differs by event – as demonstrated in Table 3.2. This inconsistent approach both creates a risk of double counting and a risk that certain key impacts have been missed. In some cases, this has been easy to identify (e.g. the inclusion of an overlay to reflect the opening of Hainan Duty Free in our view double counts the impact of reduced

[11] We asked for similar data for other retail categories, which was not provided.

[12] HAL (2021) CAP2265 response, Table 14.

[13] HAL (2021) CAP2265 response, p.204.

[14] HAL (2022) CAA-H7-619 CR17 Bottom Up VAT Retail Calculations (spreadsheet).

luxury spending), though in other cases it has been challenging to conclusively determine any gaps or instances of double counting. We have also found what we consider to be several material errors in the analysis that, when corrected, change the estimated values by several orders of magnitude. Some of HAL's calculations also rely on a series of assumptions that are not well evidenced.

For us to be able to give account to HAL's bottom-up analysis we must be able to independently assure HAL's approach and assumptions. Given the above, and the findings in the table below, we have not been able to do that in any meaningful way and so, we have not been able to place any substantial weight on their analysis. As discussed previously, we also have concerns with the approach in principle and conceptually. Therefore, we remain confident that a top-down approach is more appropriate for this area.

Table 3.2: Summary of HAL's bottom-up retail analysis

Event	HAL's approach and CEPA commentary
Spend behaviour – luxury spending £✂ million or ✂ reduction relative to 2019 revenues	• In this area, HAL considers the reduction in concession income from luxury shops compared to 2019, by considering the impact of the VAT change on conversion rates (i.e. the proportion of passengers that choose to purchase an item) and average transaction values (i.e. the average revenue received per sale). • Its approach is to calculate an impact on revenues as a percentage of 2019 revenues and multiply this by the margin it received from luxury shops in 2019 (of ✂✂). On a region-by-region basis, HAL calculates the change in revenues between 2019 and 2021, correcting it for the reduction in passenger volumes due to the pandemic. For those regions which experienced an increase in average transaction values, it further adjusts the 2021 baseline to assume this increase is only a temporary post-pandemic 'revenge spending' effect that will disappear by 2022. We have three substantive issues with this calculation: • The assumption around the increase in average transaction values being temporary (i.e. that the increase is only 'revenge spending') is a strong assumption that has not substantiated by any evidence by HAL, and no consideration has been given as to why it appears in some regions and not others. • There is an implicit assumption that any reduction in conversion rate is due to the tax changes rather than partially due to other factors (e.g. COVID-19). Again, this is a strong assumption that is not necessarily supported by the data or supporting evidence. For example, some of the biggest reductions in the conversion rate has been in the Europe region, which is least exposed to the tax changes. • There is an arithmetic error in HAL's calculation of the change in conversion rate between 2019 and 2021. Correcting for this leads to a substantial *increase* in the estimated impact of the tax changes on passenger spending.
Spend behaviour – WDF £✂million or ✂ reduction relative to 2019 revenues **EEA Opportunity** £✂ million or ✂ increase relative to 2019 revenues	• HAL also separately estimates the change in income from the World Duty Free concession compared to 2019, due to increased tobacco and alcohol sales to EEA passengers (as a result of the removal in excise duty) and lower sales of other products (as a result of the VAT change). • In its approach, HAL has adopted a different calculation to the one used to calculate the impact on luxury concession income. For each World Duty Free product category, it has estimated a reduction in concessionaire revenue by firstly calculating an index showing the change in relative importance of that product category, multiplying by the proportion of total sales made up by revenue from that product category, and then multiplying by annual revenue from that product category in 2019. Fundamentally, the calculation adopted by HAL is not supported by any clear logic or economic intuition, which makes it difficult to determine whether the overall quantum is reasonable. The resulting figures are also not particularly intuitive. For example, using this calculation, HAL estimates that the VAT change will lead to an increase in sales of sunglasses and jewellery and watches, and reductions in sales of beauty products. It is not obvious why price increases (due to VAT being payable) would lead to more sales in certain product categories.

Event	HAL's approach and CEPA commentary
	More generally, it is unclear why HAL has chosen to adopt a very different approach to calculating the impact on spend behaviour for luxury concession income compared to World Duty Free concession income.
Shop mix £✂ million or ✂ reduction relative to 2019 revenues	• HAL also argues that the VAT impact would affect the profit margins of some concessionaire retailers such that some luxury retailers will exit and be replaced by lower yielding retailers. This will have a knock-on effect on HAL revenues from retail concessions. • HAL's original analysis for estimating the impact of changes in the shop mix as per its CAP2265 response has been superseded by updated calculations, which result in a slightly lower value of £✂✂ million (vs £✂✂ million). • The updated analysis uses a series of assumptions to determine the profitability of individual luxury retailers and the likelihood of the retailer existing. The assumptions include gross margins, average payroll costs, and the level of margin reduction a retailer would tolerate before exiting the retail unit. This analysis seems to double count the impact of the tax changes on retail concession income, by calculating the spend behaviour impact separately from the retailer exit impact. It also does not consider what revenue might be earned by new stores taking the units emptied by the exiting retailers. More generally, it is not clear why other categories of retail outlets are excluded from the analysis of both passenger spend behaviour and retailer response, such as luxury accessories.
Concession fee £✂ million or ✂ reduction relative to 2019 revenues	• In its CAP2665 response, HAL also includes an estimate of the impact of retailers affected by the tax changes negotiating a lower margin to partially compensate for the reduction in revenues (i.e. the secondary effects of the VAT changes discussed in the previous section). • HAL's calculations estimate this for two types of concessionaires only – the World Duty Free concession which has recently been renegotiated, and luxury retailers. For the World Duty Free concession, HAL's estimates its effective margin to reduce from ✂✂✂ to ✂✂✂. For luxury retailers, HAL estimates its margin to change from ✂✂✂ to ✂✂✂.[15] As discussed in the previous section, we accept that the tax changes may require HAL to lower its margins to ensure its concessionaires continue to meet acceptable levels of profitability.
Conversion impact of Hainan Duty free £✂ million or ✂ reduction relative to 2019 revenues	• HAL considers that the introduction of duty-free shopping in Hainan, China, combined with the removal of VAT free shopping in the UK, will lead to an additional reduction in spending at Heathrow by passengers travelling to China. • To account for this, HAL has included a further ✂ reduction in the conversion rate of beauty and luxury spending by China-destination passengers, to the ✂ already seen to date. This is based on survey data reflecting the "share of respondents planning to return to Hainan for their Duty Free shopping". HAL's use of the 62% figure relies on several strong assumptions that in our view undermines the credibility of the overall analysis. Firstly, it assumes that the respondents (who are shoppers at Hainan Duty Free) are the same shoppers that would have otherwise travelled to the UK and shopped at Heathrow, or that the findings are equally applicable to those who travel to the UK for shopping. It also assumes that those planning to return to Hainan for their future shopping would opt to transfer all of their spend to Hainan. Finally, it assumes that the impact is entirely felt through changes in the conversion rate, rather than through changes in passenger volumes or through changes in the average transaction value. If any change is felt through changes in passenger volumes or average transaction values, this would lead to a double counting of the effect.

[15] These figures differ from the figures stated in HAL's CAP 2665 response (paragraph 5.2.18), which suggest a change in margin from ✂ in 2019 to ✂. The figures also differ from the labelling within the spreadsheet provided to us by HAL, which suggest a change in margin from ✂ in to ✂.

Event	HAL's approach and CEPA commentary
Conversion impact of awareness £✂million or ✂ reduction relative to 2019 revenues	• Finally, HAL assumes that the impact on spending in luxury shops will increase over time as more passengers become aware of the removal of VAT free. This is based on HAL's profiler survey data which suggests awareness of the tax change is around 20%. • HAL uses this survey data to assume that awareness will increase to 40% by 2023 and 60% by 2024, which will in turn affect conversion rates. HAL assumes that the increase in awareness from 20% to 40% will reduce conversion rates by 10% relative to 2019, and the increase in awareness from 40% to 60% will reduce conversion rates by a further 5% relative to 2019. We consider the evidence supporting HAL's analysis to be weak, and inconsistent with its overall narrative of passengers being highly price sensitive, particularly with luxury spending. The assumptions around the impact of the changes in awareness on conversion rates are also arbitrary, making it difficult to assess their appropriateness.

Source: CEPA analysis of HAL bottom-up calculations as provided in CAA-H7-619 CR17 Bottom Up VAT Retail Calculations

Other changes

HAL has provided updated data on the value of alcohol and tobacco sales to EEA passengers, which has allowed us to refine our assumptions around the opportunity from the removal of excise duty. This results in a lower estimate of the opportunity when compared with our initial forecasts.

Overall impact of changes

In Table 3.3, we compare HAL's overlays in its RBP Update 1 and RBP Update 2, with our implied overlays to all retail revenues (excl. Bureaux) after accounting for changes to passenger mix. We previously estimated that the tax changes would result in HAL receiving between 12% and 13.3% less revenue. We have now revised that estimate to between 17.3% and 18.4%.

Table 3.3: Comparison of overlay to retail due to tax changes and passenger mix changes

	2022	2023	2024	2025	2026
HAL RBP Update 1	-36.9%	-35.9%	-34.7%	-33.8%	-32.9%
HAL RBP Update 2	-21.7%	-24.2%	-24.8%	-24.2%	-25.8%
CEPA Initial Forecasts	-12.0%	-12.7%	-13.2%	-13.3%	-13.2%
CEPA Revised Forecasts	**-17.6%**	**-17.3%**	**-17.8%**	**-18.3%**	**-18.4%**

Sources: CEPA analysis, CEPA analysis of HAL RBP Updates 1 and 2

In Table 3.4, we show data provided by HAL on how its income per passenger has changed between 2019 and October 2021, split by retail concession. As the 2021 data is only from a single month, and as retail spending varies from month to month depending on the passenger mix, we cannot draw definitive conclusions from the table. Nevertheless, the table shows that overall income per passenger has fallen by only ✂✂ in nominal terms, and shows that HAL has been able to partially mitigate reductions in luxury spending by driving greater revenue generation in other areas (e.g. food and beverage and bookshops). This suggests that our proposed overlay is appropriately conservative, and it also suggests that including a management stretch target to account for the mitigation potential is also appropriate.

Table 3.4: Comparison of changes in income per passenger between 2019 and October 2021, by concession type

Income per passenger (£, nominal)	2019	Oct 2021	% Difference
World Duty Free	✂	✂	✂
Specialist shops (including luxury retail)	✂	✂	✂
Food and beverage	✂	✂	✂
Bookshops	✂	✂	✂

Income per passenger (£, nominal)	2019	Oct 2021	% Difference
Advertising	✂	✂	✂
VAT refund	✂	✂	✂
Total Income Per Passenger	✂	✂	✂

Sources: HAL analysis in CAA-H7-619 CR17 Bottom Up VAT Retail Calculations

3.3.2. Passenger mix

HAL disagreed with our approach of "*triangulating between different publicly available reports on passenger spend profiles*" and reiterated its approach from its first update (but updated for its latest passenger mix forecasts). HAL's main comments on the approach presented in our initial forecasts were:

- It was concerned about our use of survey data, highlighting that it would prefer its sales data or for us to use both survey and sales data.
- It considered our approach of triangulation between passenger profile reports and HAL statutory/regulatory reports to be opaque.

Our original approach was guided by the data we had access to within HAL's RBP Update 1 document and HAL's statutory and regulatory accounts. Following clarification with HAL around the various source of data, we have made the following changes to our approach:

- Using actual 2019 retail sales per passenger, split across the eight passenger 'markets'. At initial forecasts stage we only had access to total commercial revenue income per passenger (across these categories), and so our analysis included an implicit assumption that the split of retail income was equal to the split of commercial revenue as a whole. We now have data on the retail sales per passenger – this represents the sales value to the retailer rather than the revenue that is passed to HAL, so implicitly assumes a constant margin across the regions and so is not 'perfect' but removes one layer of assumption compared to our previous approach.
- Use of 2019 passenger split between the eight passenger markets. At initial proposals stage, we did not have access to the data HAL has provided in its Final Proposals (Table 20) and so we made use of the values from its Regulatory Accounts.[16] We have therefore updated our analysis to use the 2019 passenger split as presented in HAL's RBP Update 2.

The airlines were in support of the overarching elements of our approach.

3.3.3. Additional overlay to reflect bridge from Q6 to H7

Once the change in passenger mix since 2019 has been accounted for, HAL also proposes a new overlay which is a "bridge" between 2019 and H7, taking into account concession fee changes and store closures. It suggests a 4.09% overlay for both passenger mix and bureaux for this.[17] HAL's evidence for this calculation makes clear that it is used as a correction factor to account for differences between the 2022 value that results from HAL's bottom-up approach and the value seen in HAL's internal business plans. It remains important to consider whether any adjustment meets the three criteria we introduced at initial proposals, i.e.: is there a need for an adjustment, is the adjustment additional to what can be accounted for in an existing area of the analysis, and is there a reasonable way to calculate an efficient adjustment to apply to HAL.

The three reasons given for this adjustment are:

[16] HAL (2019) Regulatory Accounts, p.6. As these categories do not match the eight passenger markets used in HAL's Initial Proposals, we had to make some assumptions to split passenger volumes between categories.

[17] HAL (2021) CAP2265 response, p.217.

- ***"Openings & Closures of Retail Units over the past 2 years.*** *For example the replacement of Dixon's (a high ATV tech hardware retailer) with inMotion (a low ATV tech accessory and consumable retailer).*
- ***Terminal Consolidation from 4 Terminals into 3****. The retailer mix in Terminal 4 was geared to the more favourable passenger mix we had of affluent passengers predominantly from Middle East and Asia. We have replaced this Terminal with passengers in Terminal 2 and 5 that are lower Spend per Passenger generating Terminals.*
- ***Contract Margin Changes & Adjustments*** *to reflect the actual changes in contract margin terms we have agreed during 2020 & 2021"*[18]

Neither the opening and closures of retail units nor the changes in margins are outside of HAL management's control. To the extent that these are driven by headwinds such as the tax changes, we have accounted for this in our revised top-down assessment. Allowing for these effects again would, in our view, be double counting.

The impact of terminal consolidation is also unlikely to be material given Terminal 4 is expected to reopen in Summer 2022. We are also not convinced that the differences in retailer mix between Terminals 2 and 5 relative to Terminal 4 are substantial enough to warrant an overlay. As a result, the proposed Q6 to H7 bridge does not meet our first criterion for assessing the inclusion of overlays; we consider there is no clear need for it.

3.3.4. Additional overlay to reflect Terminal 4 reopening

HAL has raised a concern that per-passenger spending will be low at Terminal 4 in the immediate period after reopening, due to a reluctance of retailers to re-open when passenger volumes are low. The proposed overlay is HAL's estimate of the level of cannibalisation that may occur should passengers travel through Terminal 4 (with a partial retail offer) instead of the other terminals.

While it is possible there may be some impact, HAL has presented a 75% reduction in income per passenger without evidence.[19] With HAL also stating that its retail proposition at Terminal 4 is 'better' than at the other airports, we would be surprised to see such a low level of average revenue per passenger (even after accounting for sales relief). HAL has not set out its evidence and calculations, and so we have been unable to verify that such an adjustment is required.

3.3.5. Bureaux

HAL has not raised any specific concern about our approach to the bureaux forecast, and our approach as explained in our initial forecasts report includes appropriate step changes and is fully transparent about its assumptions.

Airlines raised a concern about our application of the 0.97 elasticity to bureaux income despite HAL not assuming any elasticity in this area. We consider that it is appropriate to apply the elasticity to bureaux income as it an area that can be reasonably expected to differ with the number of passengers, in the same way as with other retail.

We have not been provided with or discovered any new evidence in this area and so we maintain confidence in our initial forecasts in this area. These initial forecasts included some assumptions – for example the 10% annual reduction in walk-up transactions – which have not been challenged.

3.4. OUR REVISED FORECASTS

Table 3.5 below show our revised retail and bureaux revenue forecasts in nominal terms over the H7 period and compares these with our initial forecasts and HAL's RBP Updates 1 and 2. The most substantial changes to our forecasts are in retail revenues which primarily reflect our updated elasticity assumption from the VAT change and

[18] HAL (2022) CAA-H7-546 CAA IP bilateral Deep Dive- Commercial Retail, Slide 16.

[19] HAL (2022) CAA-H7-546 CAA IP bilateral Deep Dive- Commercial Retail, Slide 15.

our inclusion of a secondary effect on HAL's retail concession income. As discussed above, we have retained the same approach to bureaux income as we applied for our initial forecasts.

Retail and Bureaux

Table 3.5: Retail and Bureaux revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	173.3	246.7	303.8	337.6	360.5	**1,421.9**
HAL RBP Update 2	241.3	308.7	370.8	406.5	422.6	**1,750.0**
CEPA Initial Forecasts	244.2	345.1	419.6	467.6	498.4	**1,974.9**
CEPA Revised Forecasts	264.4	350.7	417.9	454.7	480.6	**1,968.3**
Difference from HAL RBP U2	23.1	42.0	47.1	48.2	58.0	**218.3**
Difference from CEPA IF	20.2	5.6	-1.7	-12.8	-17.9	**-6.6**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.
✂ - Retail and Bureaux figures combined in publishable version of report

4. SURFACE ACCESS

In this section, we review our surface access revenue forecasts in light of the responses to the CAA's consultation and further evidence provided by stakeholders. Surface access revenues can broadly be split into three categories:

- **Core surface access**, which covers revenue from HAL's car parking and car rental services,
- **Rail**, which covers revenues from Heathrow Express, revenue from Piccadilly line services to Terminal 5 as governed by an agreement with TfL, and track access revenue from TfL rail services to Heathrow using track owned by HAL, and
- The recently introduced **terminal drop-off charge**.

4.1. OUR INITIAL FORECASTS

Mode shares

Both HAL's and our surface access revenue forecasts are driven by assumptions around mode share; in other words, assumptions around the mode of transport used by passengers travelling to and from Heathrow Airport. The mode share assumptions drive forecasts of car parking and car rental revenues, rail revenues from Heathrow Express, and revenue from the terminal drop off charge.

In our initial forecasts, we broadly agreed with (our understanding of) HAL's methodology for forecasting mode shares. As we did not have access to the underlying calculations, our understanding of HAL's methodology was based on the narrative provided by HAL in its RBP Update 1 document and in other material shared with the CAA. We attempted to replicate the calculations based on the data provided by HAL in its RBP and our understanding of the methodology. Following the publication of the CAA's initial proposals, we also shared our underlying calculations with HAL to allow them to challenge any specific assumptions.

Broadly, our approach to estimating mode shares was as follows:

- We assumed that HAL's 2020 mode share assumptions in its RBP Update 1 were largely based on actual survey data. We also assumed the changes in mode share between 2019 and 2020 were reflective of the impact of the COVID-19 pandemic. In 2020, more passengers were travelling to and from the airport using private transport modes and fewer passengers were using public transport.
- In line with HAL's assumptions, we assumed that mode shares would gradually return from where they were in 2020 to pre-pandemic levels (i.e. 2019 levels) by 2024.
- Finally, we made one-off adjustments to the resultant mode shares to account for the impact of the terminal drop-off charge and the introduction of Crossrail services, using the assumptions provided by HAL in its RBP Update 1 document.

The results of our approach, and the comparison with HAL's assumptions, can be seen by comparing Table 4.1 and Table 4.2. Although our respective mode share forecasts for the later years of H7 are broadly similar, the difference in earlier years is much greater.

Table 4.1: HAL mode share assumption

	2022	2023	2024	2025	2026
Cark Parking	5.9%	6.7%	7.1%	7.1%	7.1%
Private drop-off	24.7%	18.7%	16.1%	16.1%	16.1%
Taxi	31.2%	27.9%	27.4%	27.4%	27.4%
Bus / Coach	9.5%	10.4%	11.5%	11.5%	11.5%
Tube	18.3%	17.5%	18.2%	18.2%	18.2%

	2022	2023	2024	2025	2026
Car Rental	1.9%	1.8%	1.8%	1.8%	1.8%
Heathrow Express	6.1%	6.1%	7.0%	7.0%	7.0%
TfL Rail / Crossrail	1.3%	9.9%	9.8%	9.8%	9.8%
Other	1.2%	1.1%	1.1%	1.1%	1.1%

Source: HAL RBP Update 1

Table 4.2: CEPA mode share assumptions

	2022	2023	2024	2025	2026
Cark Parking	9.2%	8.2%	7.2%	7.3%	7.3%
Private drop-off	18.9%	17.5%	16.0%	15.9%	15.9%
Taxi	29.2%	28.3%	27.4%	27.2%	27.2%
Bus / Coach	11.1%	11.3%	11.5%	11.5%	11.5%
Tube	20.0%	19.1%	18.3%	18.4%	18.4%
Car Rental	2.2%	2.0%	1.9%	1.9%	1.9%
Heathrow Express	6.9%	7.0%	7.0%	7.1%	7.1%
TfL Rail / Crossrail	1.2%	5.5%	9.8%	9.8%	9.8%
Other	1.2%	1.1%	1.1%	1.1%	1.1%

Source: CEPA Initial Forecasts

Core surface access (car parking and car rental)

In our initial forecasts, we estimated future car parking and car rental revenues using an elasticity of 1.0 with respect to parking and rental passengers, using the mode share forecasts from Table 4.2 above.

We also imposed an overlay of -6.8% in 2022, and -1.8% in 2023 following HAL's approach, to account for the anticipated effect of the COVID-19 pandemic on average transaction values for car parking and rental services. HAL considered that while more passengers were using Heathrow's car parking and car rental services, the income received per transaction was lower as proportionately more of these passengers were travelling for leisure rather than business.[20] Finally, we assumed revenue would grow in line with CPI, and applied an additional 2% management stretch to the forecasts.

Table 4.3 presents our initial forecasts for core surface access revenues in comparison to HAL's view at RBP Update 1. The difference between our forecasts is driven by the differences in mode share forecasts, and the application of our 2% management stretch target.

Table 4.3: HAL and CEPA core surface access revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	66.1	103.6	134.4	148.3	156.3	**608.6**
CEPA Initial Forecasts	98.7	131.1	143.5	162.1	172.3	**707.7**
Difference	32.6	27.5	9.1	13.8	16.0	**99.1**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

[20] Business passengers typically use higher yielding car parking products relative to leisure passengers.

Rail (Heathrow Express and other rail revenues)

In our initial forecasts, we estimated Heathrow Express revenues using an elasticity of 1.0 with respect to the number of Heathrow Express passengers, using the mode share forecasts from Table 4.2 above. We then applied a -13% overlay from 2023 onwards to account for a reduction in yield following the introduction of Crossrail services, accepting HAL's argument that reducing ticket prices was an efficient response to maintain market share. However, we rejected a proposed -10% overlay from HAL, in which they posited that they would reduce prices by 10% on average to maintain market share during the COVID-19 pandemic. It was unclear to us whether this was an efficient response to maintaining revenues during the COVID-19 pandemic, nor was it clear whether this change had been reflected in HAL's mode share estimates.

For track access revenues, we assumed the agreement that governed these revenues was inelastic to passenger volumes. We also applied no specific overlays to track access revenues.

Finally, we assumed overall rail revenues would grow in line with CPI and applied an additional 2% management stretch to the forecasts.

Table 4.4 presents our initial forecasts of rail revenues, in comparison to HAL's view at RBP Update 1. The difference between our forecasts is driven by differences in mode share forecasts, the rejection of the -10% COVID-19 overlay for Heathrow Express, and the application of our 2% management stretch target.

Table 4.4: HAL and CEPA rail revenue forecasts, using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	48.9	67.6	81.6	90.0	94.9	**383.0**
CEPA Initial Forecasts	78.6	101.8	107.7	118.5	125.5	**532.1**
Difference	29.6	34.3	26.1	28.5	30.6	**149.0**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

Terminal drop-off charge

In our initial forecasts, we attempted to recreate HAL's analysis using their own assumptions where stated, and publicly available assumptions where HAL's assumptions were not stated. In our approach for calculating terminal drop-off charge revenues, we assumed:

- The terminal drop-off charge will be introduced in Q3 2021, charging £5 (nominal) until 2024, and £6 (nominal) thereafter,
- Exemption rates, compliance, and penalty charges, would be in line with HAL's assumptions,
- Average vehicle occupancy would be 1.5, using public data from a 2014 Jacobs report,[21] and
- The proportion of journeys that would be captured by the drop-off charge would be in line with our mode share estimates for private drop-off and taxi trips.

We did not apply a 2% management stretch to the terminal drop-off charge revenues, nor did we assume revenues would increase in line with CPI, as the primary drivers of revenues, namely price and demand, were already accounted for in the model.

[21] Jacobs (2014) Appraisal Framework Module 4. Surface Access: Heathrow Airport North West Runway. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/371829/4-surface-access--lhr-nwr.pdf.

Table 4.5 presents our initial forecasts of terminal drop-off charge revenues, in comparison to HAL's view at RBP Update 1. At our initial forecasts stage, it was unclear exactly what drove the difference between forecasts, though differences in mode share assumptions were one of the factors.

Table 4.5: HAL and CEPA terminal drop off charge revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	50.2	53.4	57.8	71.7	70.6	**303.6**
CEPA Initial Forecasts	57.7	70.7	78.3	96.6	95.2	**398.5**
Difference	7.5	17.3	20.5	24.9	24.6	**94.9**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

4.2. RESPONSES TO CAA'S CONSULTATION ON ITS INITIAL PROPOSALS

Mode shares

In engagement following the CAA's consultation, HAL provided further detail on their approach to estimating future mode shares. The analysis has been updated from the approach taken in RBP Update 1:

- HAL incorporate the most recent survey data on mode shares, which is provided up to August 2021 inclusive.
- HAL update the assumption around recovery of mode share amidst the COVID-19 pandemic. At RBP Update 1, HAL assumed that mode share will recover to pre-pandemic levels by January 2024.[22] In RBP Update 2, HAL assume that mode share will recover to pre-pandemic levels in line with recovery in overall passenger demand.[23]
- HAL adjust the timing of the impact of the introduction of Crossrail on mode share. In RBP Update 1, HAL aligned the full impacts of Crossrail on mode share to match the planned full opening of Crossrail, in June 2023.[24] In RBP Update 2, they align the full impact of Crossrail with the introduction of the next phase of the Crossrail project, which is now expected to take place in June 2022.[25]
- HAL propose an additional 'manual parking' overlay, to reconcile car parking mode share estimates from HAL's profiler surveys with observed car parking transaction data.[26] This is assumed to be implemented from September 2021 to the end of 2022.

The updated mode share overlay assumptions at RBP Update 2 are presented in Table 4.6.

Table 4.6: HAL updated mode share overlays

	Crossrail	Terminal drop off charge	Manual Parking
Period of application	Jun 2022 onwards	Dec 2021 onwards	Sep 2021 to Dec 2022
Car Parking	-0.1%	0.2%	2.2%
Private drop-off	-1.2%	-0.5%	-0.5%

[22] HAL (2021) RBP Update 1, Chapter 5.5, p.14.

[23] HAL (2021) CAP2265 response, p.254.

[24] HAL (2021) RBP Update 1, Chapter 5.5, p.15.

[25] HAL (2021) CAP2265 response, p.252.

[26] HAL (2022) 10022022CAA IP bilateral Deep Dive- Commercial Surface Access, CAA-H7-550, Slide 4.

	Crossrail	Terminal drop off charge	Manual Parking
Taxi	-2.4%	-0.9%	-0.8%
Bus / Coach	-0.9%	0.2%	-0.3%
Tube	-2.0%	0.5%	-0.4%
Car Rental	-0.2%	0.1%	0.0%
Heathrow Express	-1.7%	0.2%	-0.2%
TfL Rail / Crossrail	8.6%	0.2%	0.0%
Other	0.0%	0.0%	0.0%

Source: HAL RBP Update 2

The resulting mode shares used by HAL in RBP Update 2 is presented in Table 4.7. Compared to RBP Update 1, the largest changes are observed in 2022, due to the revised assumption regarding the timing of the impact of Crossrail, and due to the addition of the manual parking overlay. Throughout H7, mode share levels return to pre-pandemic levels slower than in RBP Update 1, due to the alignment of mode share recovery to that of passenger demand.

Table 4.7: HAL updated mode share

	2022	2023	2024	2025	2026
Car Parking	7.7%	6.1%	6.6%	6.9%	7.0%
Private drop-off	21.9%	19.7%	18.0%	17.1%	16.8%
Taxi	29.0%	28.4%	27.9%	27.7%	27.6%
Bus / Coach	9.2%	10.1%	10.7%	11.1%	11.2%
Tube	16.8%	17.2%	17.7%	17.9%	18.0%
Car Rental	1.8%	1.8%	1.8%	1.8%	1.8%
Heathrow Express	5.8%	6.0%	6.5%	6.7%	6.8%
TfL Rail / Crossrail	7.0%	9.9%	9.8%	9.8%	9.8%
Other	0.9%	0.9%	1.0%	1.0%	1.0%

Source: HAL RBP Update 2

Core surface access

HAL also updated its assumptions around average transaction values for car parking and car rental services, to reflect that outturn data shows they have increased rather than reduced as previously expected. Average transaction values in 2021 were ✂ higher than they were in 2019, which HAL considers is due to Heathrow's car rental facilities being a hub for nearby residents, with car rental firms consolidating their operations in the local area.[27]

HAL, therefore, now include a positive overlay to core surface access revenues of 8.66% in 2022 and 3.44% in 2023. They assume that this effect diminishes by 2024, as shown in Table 4.8 below.

Table 4.8: HAL proposed overlay to car parking and car rental income

	2022	2023	2024	2025	2026
HAL RBP Update 1	-6.8%	-1.8%	-	-	-

[27] HAL (2021) CAP2265 response, p.253.

	2022	2023	2024	2025	2026
HAL RBP Update 2	8.7%	3.4%	-	-	-

Source: HAL RBP Updates 1 and 2

Rail

In response to our initial forecasts, HAL made several changes to its rail revenue forecasts:

- It separated out track access revenue from other rail revenues, confirming that in 2019 track access revenue was £7.0 million in 2018 RPI prices (£7.2 million nominal).[28] It also modelled the impact of more Crossrail services on track access income, with the number of services expected to increase from two trains per hour (by TfL rail) to four trains per hour in 2023 and six trains per hour from 2024 onwards.[29] This means HAL expects track access revenue to increase proportionately to the number of Crossrail services (before accounting for RPI indexation).[30]
- It has updated its proposed COVID-19 overlay to Heathrow Express revenues, reflecting its decision to keep the average price of tickets sold broadly constant in nominal terms up to 2022. According to HAL's calculations, this implies a -6.4% overlay to HAL's 2019 Heathrow Express revenues for the H7 period.

Table 4.9: HAL's approach to calculating COVID-19 overlay to Heathrow Express revenues

	2019	2020	2021	2022
HEx yield (nominal)	✂	✂	✂	✂
HEx yield (2018 RPI prices)	✂	✂	✂	✂
Implied overlay in real terms	-	-1.60%	-7.00%	-6.40%

Source: HAL analysis in CAA-H7-550 – 10022022CAA IP bilateral Deep Dive- Commercial Surface Access, Slide 7

- HAL has clarified that its proposed overlay to Heathrow Express revenues to reflect the yield impact from the introduction to Crossrail is ✂✂. Its proposed -13% overlay to all rail revenues presented in RBP Update 1 is an adjusted figure to account for the proportion of rail revenue being unrelated to Heathrow Express income (e.g. revenues from track access charges). In its updated modelling, where track access income is separated out from other rail income, HAL's proposed overlay is as shown in the table below:

Table 4.10: HAL's overlay for the Crossrail impact

	2022	2023	2024	2025	2026
Crossrail impact to HEx yields	✂	✂	✂	✂	✂
Overlay for all rail revenues	0.00%	-16.2%	-15.3%	-15.3%	-15.3%

Source: HAL (2021) CAP2265 response, Table 39, p.250

HAL's blended overlay, when accounting for all three effects is as per the table below. This proposed overlay for 2024 to 2026 is marginally lower than proposed by HAL in RBP Update 1, but higher in 2023. The increased overlay in 2023 is due to HAL bringing forward the date its proposed reduction in Heathrow Express ticket prices, to align with Crossrail's updated opening date.

[28] HAL (2021) CAP2265 response, p.250.

[29] In its RBP Update 1, HAL had applied pandemic and Crossrail related overlays related to Heathrow Express to all rail revenue. We concluded that this was inappropriate as it applied headwinds affecting Heathrow Express revenue only, to all revenue, However, HAL has clarified that its proposed overlays in RBP Update 1 had been adjusted to account for the proportion of rail revenue that related to track access.

[30] Heathrow (2021) CAP2265 response, Table 37, p.250.

Table 4.11: HAL proposed overlay to all rail revenue

	2022	2023	2024	2025	2026
HAL RBP Update 1	-10.0%	-10.0%	-21.7%	-21.7%	-21.7%
HAL RBP Update 2	-6.1%	-21.0%	-19.9%	-19.9%	-19.9%

Source: HAL RBP Updates 1 and 2

Terminal drop-off charge

HAL identified an error in our modelling of the terminal drop-off charge, and identified a further error in its own modelling in RBP Update 1:

- Our modelling did not account for VAT, which would be chargeable on the terminal drop-off charge. This means that our initial forecasts overestimated revenues by 20%.
- HAL's modelling did not account for the fact that only departing passengers would be liable for the terminal drop-off charge as arrival passengers leaving the airport via taxi or private car are already required to use short stay car parks.

HAL also provided evidence supporting their assumption that the average passengers per vehicle is 1.7, rather than 1.5 as we had assumed in our initial forecasts, citing data from CAA passenger surveys.[31]

The effect of these changes means that HAL's estimate of income from the terminal drop-off charge is roughly half their estimate from RBP Update 1.

Table 4.12: HAL forecasts for the terminal drop-off charge under RBP Update 1 (mid case) and RBP Update 2 (£ million, nominal)

	2022	2023	2024	2025	2026	H7 total
HAL RBP Update 1	50.2	53.4	57.8	71.7	70.6	**303.6**
HAL RBP Update 2	24.4	28.2	6.5	37.8	37.2	**164.2**

Source: CEPA analysis of HAL RBP Updates 1 and 2.

Airline responses

PA in its advice to the AOC/LACC, made the following comments in relation to our initial forecasts:

- They suggested that, for core surface access revenues, we apply an elasticity of 0.9 rather than 1.0, to reflect HAL's ability to drive up yields during the pandemic, where demand for car parking and car rental has increased.
- They disagreed with our mode share forecasts and considered that HAL's mode share forecasts more closely reflected the impact of the pandemic.
- They broadly agreed with our overall conclusions with respect to rail revenues. However, they suggested we also consider the impact of further delays to the opening of Crossrail, a ramping up effect of passenger growth rather than an immediate effect, and the impact on track access revenue from the running of additional Crossrail services.
- They agreed with our estimates of the terminal drop off charge revenue.

The AOC/LACC separately made representations on the terminal drop off charge, which they considered was being underestimated by HAL in its RBP Update 2 proposals. The AOC/LACC used assumptions provided by HAL in various engagement sessions, to produce a high-level estimate of terminal drop-off charge revenue for 2022,

[31] HAL (2021) CAP2265 response, p.255.

estimating it at £43 million in nominal terms.[32] This sits in contrast to HAL's revised estimate of £24.4 million in nominal terms.

4.3. Our assessment of the issues

Mode shares

We have evaluated the evidence presented by HAL in RBP Update 2, including the modelling approach provided to us. We have also considered the thoughts presented by airlines and their advisers. We conclude that there is broad agreement that the pandemic has led to passengers moving away from public transport towards private transport modes. What remains uncertain is the size of the effect, whether mode shares eventually revert to their pre-pandemic levels, and the pace at which they do so.

We present the following assessment of the four key updates to HAL's approach to modelling forecast mode share:

- **We agree with and accept HAL's use of the most up-to-date survey data on mode share.** We agree with assuming 2021 mode shares represent the 'peak-pandemic' effect, and calibrating mode share forecasts from the 2021 position.
- **We agree with HAL's decision to realign the recovery in mode share to pre-pandemic levels to the recovery of passenger demand and we implement this approach in our modelling.** However, the calculations presented by HAL include some small errors that we have corrected for in our modelling.[33]
- We agree with the principle set by HAL of aligning the impacts of Crossrail to current plans from TfL. However, we do not agree that the full effects of Crossrail will be experienced in June 2022, when the first phase of Crossrail is introduced. This phase will have little to no tangible impact on Heathrow Express, as passengers travelling using Crossrail services to Paddington will still be required to change trains at the station to access onward services to Heathrow, where they will have equal access to both Crossrail and Heathrow Express services.[34]

  HAL's argument that "[From H1 2022] passengers will not arrive at Paddington with the equal choice between Heathrow Express and TfL Rail, as they do today, but already have a ticket and will be directed to continue their journey using Crossrail trains"[35] is incorrect. Passengers are already able to buy a single ticket to and from Heathrow covering TfL rail, tube, and other rail services, which will remain unchanged following Crossrail's opening in June 2022.[36]

  We instead believe that the impacts of Crossrail on mode share should be phased in according to the last two phases of Crossrail, which are expected in the Autumn of 2022, when through services are introduced

[32] Email from AOC/LACC to CAA dated 21 March 2022.

[33] The main calculation error relates to how mode shares have been linked to the recovery in passenger volumes. HAL's calculation involves the use of a 'recovery factor', which is a percentage value intended to represent how much passenger volumes in a particular month have recovered from peak-pandemic levels. This recovery factor has been incorrectly estimated, as it implicitly assumes that peak-pandemic passenger volumes are zero passengers rather than the outturn number of passengers during the peak-pandemic months (defined elsewhere in its analysis as March 2021 to August 2021).

[34] In June 2022, the Elizabeth Line will be launched between Paddington and Abbey Wood, in east London. This has no direct impact on Heathrow, situated west of London.

[35] HAL (2021) CAP2265 response, pp.252-253.

[36] See https://www.heathrow.com/transport-and-directions/by-rail-or-train/tfl-rail.

from Abbey Wood to Heathrow, and May 2023, when through services are introduced from Shenfield.[37, 38] For simplicity, **we assume that 50% of the Crossrail impact will be felt from Autumn 2022, and 100% of the impact from May 2023.**

- **We accept and apply HAL's manual parking adjustment, though we assume that this affects the pandemic-level of mode share, and thus the recovery path throughout H7.** We agree with the decision to use outturn data over profiler surveys, and so decide to apply the adjustment. However, HAL have not explained why they remove this adjustment from 2023 onwards. Instead, we use the manual parking overlay to adjust the 2021 mode share, which in turn affects the path of recovery from pandemic to pre-pandemic levels in line with passenger recovery. The result of this change is to create a smoother mode share profile over H7.

In light of the above arguments, we have revised our mode share forecasts, as presented in Table 4.13.

Table 4.13: Final Forecasts mode share forecasts, using HAL RBP Update 2 passenger scenario.

	2022	2023	2024	2025	2026
Car Parking	7.6%	7.3%	7.2%	7.1%	7.1%
Private drop-off	20.9%	18.3%	16.9%	16.1%	16.1%
Taxi	29.9%	28.1%	27.4%	27.3%	27.3%
Bus / Coach	10.6%	10.7%	11.2%	11.5%	11.5%
Tube	18.4%	17.7%	17.9%	18.3%	18.3%
Car Rental	1.9%	1.8%	1.8%	1.8%	1.8%
Heathrow Express	7.3%	6.7%	6.8%	7.0%	7.0%
TfL Rail / Crossrail	2.5%	8.5%	9.9%	9.8%	9.8%
Other	0.9%	1.0%	1.0%	1.1%	1.1%

Source: CEPA analysis

Core surface access

We welcome HAL's updated analysis of the impact of the pandemic on average transaction values for car parking and car rental services. However, we note the inconsistency in how quickly HAL expects this impact to reduce to zero – while HAL expects the pandemic's effects on mode share to recover gradually in line with the passenger recovery, HAL expects the impact on average transaction values to decay more quickly.

Although HAL has provided some explanation for this inconsistency, we do not find it compelling. They consider the increase is due to several reasons:

- During the pandemic, passengers have been using the higher-yielding short-term car park for longer durations. As passenger volumes recover, there will be greater use of the lower yielding car parks that are more exposed to competition from non-Heathrow providers.

[37] In Autumn 2022, the Elizabeth Line will merge with TfL Rail, forming one connected route from Heathrow to Abbey Wood. This will allow passengers on the Elizabeth Line to travel to Heathrow without disembarking at Paddington station. In May 2023, the Elizabeth Line will merge with Class 345 train services from Shenfield, further expanding the passenger base who can travel to Heathrow without disembarking at Paddington station. See https://www.crossrail.co.uk/project/our-plan-to-complete-the-elizabeth-line/phased-opening.

[38] This view is also shared by the independent project representative reviewing the Crossrail project, who states *"Meaningful Elizabeth Line revenue benefits will only be realised once Stages 5B and 5C are opened."* See page 20 in https://content.tfl.gov.uk/project-representative-periodic-report-and-crossrail-response-period-8-2021.pdf.

- During the pandemic, minimum guarantees have protected car rental facilities. HAL also claim that car rental firms have consolidated their operations in the local area into Heathrow's facilities, and that this will reverse relatively soon.

As PA notes in its advice to the AOC/LACC, the increased demand for car parking and car rental services, both because of the pandemic and the introduction of the terminal drop off charge, provides HAL an opportunity to increase yields. While a consolidation of car rental facilities may partially explain the higher average transaction values, we have not seen any evidence to suggest that this explains all of the difference, or that this effect would decay more quickly than other pandemic related effects. Similarly, we do not see anything within HAL's explanation of the pandemic-related impact on car parking to suggest the effect would decay more quickly than the recovery in passenger volumes.

In our revised forecasts, therefore, we assume that the ✂ increase in average transaction values reduces over time in line with the recovery in passenger volumes, as shown in Table 4.14.

Table 4.14: HAL proposed overlay to car parking and car rental income

	2022	2023	2024	2025	2026
HAL RBP Update 1	-6.8%	-1.8%	-	-	-
HAL RBP Update 2	8.7%	3.4%	-	-	-
CEPA Initial Forecasts	-6.8%	-1.8%	-	-	-
CEPA Revised Forecasts (HAL RBP U2 pax forecasts)	**8.6%**	**5.6%**	**3.2%**	**2.2%**	**1.6%**

Source: CEPA analysis

The impact of these changes is shown in Table 4.16 at the end of this section. HAL's forecasts at RBP Update 2 are larger than at RBP Update 1, and our revised estimates are larger than our initial forecasts. This is due to the upwards revision of the car parking and car rental income overlay.

Rail

We have updated our modelling of track access income to reflect the gradual ramping up of Crossrail services to six trains per hour, which we had not previously accounted for, and to reflect HAL's actual track access income in 2019, which was £7.0 million in 2018 RPI prices (£7.2 million nominal). We had previously assumed that track access income was approximately £22.1 million (nominal); HAL has since confirmed that the difference relates to income from the Terminal 5 Piccadilly Line agreement with TfL, which had not been accounted for in its modelling. We also understand that track access charges are indexed to RPI and have updated our modelling to reflect this. And finally, we have updated our modelling to not apply a management stretch assumption to this revenue line as HAL management have limited ability to control such revenues.

The Terminal 5 Piccadilly line agreement is a revenue sharing arrangement between HAL and TfL, where HAL receives a proportion of farebox revenue from Piccadilly line services running to Heathrow. HAL has provided us with the contract schedule detailing the formula that governs the revenue sharing arrangement and a model to calculate the revenues based on the formula. We follow the same calculations as per HAL's model but replace the passenger mode share and RPI inputs with our own assumptions.

For Heathrow Express revenues, we consider the two overlays separately:

- **COVID-19 yield overlay** – We note that HAL has aimed to maintain average yield constant in nominal terms since 2019. In our initial forecasts, we expressed concern that the size of the proposed overlay had not been substantiated and it was unclear whether the implied price reduction had been reflected in the mode share forecasts. For HAL's revised overlay, we are much more confident that this is implicitly reflected in the mode share assumptions, as the effect would be captured in in the 2021 outturn mode shares used as the starting assumptions. As such, we accept the need for an overlay and accept HAL's overall approach to calculating the size of the overlay. However, we estimate the size of the real reduction in yield using our preferred measure of inflation, CPI. The effect of this is shown in the table below.

- **Crossrail yield overlay** – HAL's proposed -18% overlay is based on some analysis prepared by Laser Strategy in 2017 looking at the optimal response to the introduction of Crossrail services at different price points under different service patterns. The analysis found that the revenue maximising strategy assuming a six train per hour Crossrail service priced at £12 per journey, would be to reduce Heathrow Express ticket prices by 18%.[39] Although the analysis is old, we find the conclusions compelling and consider that they are unlikely to have changed materially between 2017 and today. HAL has also confirmed that this price reduction is reflected in the mode share assumptions they use. As a result, we accept HAL's proposals for a -18% overlay to Heathrow Express revenue, and accept HAL's proposals to bring forward that overlay to 2023.

We summarise our proposed overlays in the table below.

Table 4.15: CEPA and HAL's proposed overlay to rail revenue

	2022	2023	2024	2025	2026
Crossrail overlay to track access income	-	100.0%	200.0%	200.0%	200.0%
Overlay to Piccadilly line income	-77.2%	-33.2%	-0.8%	12.0%	13.3%
COVID-19 overlay to Heathrow Express	-8.8%	-8.8%	-8.8%	-8.8%	-8.8%
Crossrail overlay to Heathrow Express	✂	✂	✂	✂	✂
Blended overlay to all rail revenue	**-6.4%**	**-13.1%**	**-5.6%**	**-7.9%**	**-9.6%**
HAL RBP Update 2	**-6.1%**	**-21.0%**	**-19.9%**	**-19.9%**	**-19.9%**

Source: CEPA analysis

The impact of these changes is shown in Table 4.17. Between our initial and final forecasts, we have revised downward our rail revenue forecasts by £47.1 million. Our final forecasts are £85.8 million larger than HAL's forecasts at RBP Update 2.

Terminal drop-off charge

We have updated our forecast of the terminal drop-off charge in response to the representations made by HAL and airlines:

- We reduce our estimates of revenues by 20% to reflect VAT being chargeable.
- We update our assumption on average vehicle occupancy from 1.5 to 1.7, as we consider the evidence provided by HAL to be more recent and directly applicable.
- We update our assumptions of the number of passenger trips liable for the charge to reflect that only drop-off trips would be liable for the charge and not pick-up trips.

The impact of the three changes plus our update to the mode share and passenger forecasts is as shown in Table 4.18. Our revised estimates continue to be higher than those proposed by HAL, while our 2022 figure broadly sits in-between the estimates provided by HAL and by the AOC/LACC.

4.4. Our revised forecasts

Table 4.16, Table 4.17 and Table 4.18 show our final forecasts for car parking and car rental revenues, rail revenues, and terminal drop-off charge revenues respectively. The main change between our initial forecasts and revised forecasts relates to our updating of terminal drop-off charge assumptions to reflect the fact that only drop-off car journeys will be liable for the charge and to account for VAT being payable. Our forecasts of car parking and

[39] HAL (2022), CAA-H7-550 - 10022022CAA IP bilateral Deep Dive- Commercial Surface Access, Slide 8.

car rental revenues have increased due to the more recent data from HAL showing average transaction values increasing, while our forecasts of rail revenues have decreased due to the several smaller modelling changes.

Core surface access

Table 4.16: Core surface access revenue forecasts using HAL passenger scenarios (£ million nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	66.1	103.6	134.4	148.3	156.3	**608.6**
HAL RBP Update 2	104.2	108.9	134.8	152.3	163.9	**664.1**
CEPA Initial Forecasts	98.7	131.1	143.5	162.1	172.3	**707.7**
CEPA Revised Forecasts	110.2	138.0	159.4	171.3	180.4	**759.3**
Difference from HAL RBP U2	6.0	29.2	24.6	19.0	16.5	**95.2**
Difference from CEPA IF	11.5	6.9	15.9	9.2	8.0	**51.6**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

Rail

Table 4.17: Rail revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	48.9	67.6	81.6	90.0	94.9	**383.0**
HAL RBP Update 2	54.8	62.9	82.6	93.8	101.1	**395.2**
CEPA Initial Forecasts	78.6	101.8	107.7	118.5	125.5	**532.1**
CEPA Revised Forecasts	62.9	74.8	104.4	117.0	125.8	**485.0**
Difference from HAL RBP U2	8.2	11.9	21.8	23.2	24.7	**89.7**
Difference from CEPA IF	-15.6	-27.0	-3.3	-1.5	0.4	**-47.1**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

Terminal drop-off charge

Table 4.18: Terminal drop-off revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	50.2	53.4	57.8	71.7	70.6	**303.6**
HAL RBP Update 2	24.4	28.2	36.5	37.8	37.2	**164.2**
CEPA Initial Forecasts	57.7	70.7	78.3	96.6	95.2	**398.5**
CEPA Revised Forecasts	34.3	38.0	48.4	50.3	49.5	**220.5**
Difference from HAL RBP U2	9.9	9.7	11.8	12.6	12.3	**56.3**
Difference from CEPA IF	-23.4	-32.8	-30.0	-46.2	-45.8	**-178.1**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

5. PROPERTY

Property covers the rental income HAL receives for use of its property facilities, primarily from airlines and ground handlers. It also includes income received from jet fuel sales.

5.1. OUR INITIAL FORECASTS

In our initial forecasts, we forecast property revenue using passenger volumes as the volume driver. However, we used an elasticity with respect to passenger volumes of 0.25 rather than HAL's proposal of 0.52, based on a high-level analysis of the proportion of property income that was likely to be passenger driven.

We also used evidence from HAL's June 2021 investor report to assess the appropriateness of HAL's proposed 13% negative overlay to account for the potential impact of COVID-19 on rental revenues. The combined effect of the 13% overlay and the elasticity of 0.25, implied a total reduction in property revenue of 18.9% in 2020, close to the 18.4% reduction reported in HAL's June 2021 investor report. As such, we concluded that the 13% overlay was appropriate in conjunction with our elasticity estimate.

We also applied a management stretch of 2% per annum above CPI-driven growth.

This resulted in a difference over the H7 period of £47.5 million in nominal terms, controlling for the effects of passenger forecasts – see Table 5.1.

Table 5.1: HAL and CEPA property revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	112.3	122.5	131.5	135.4	139.5	**641.2**
CEPA Initial Forecasts	122.8	131.3	139.2	144.8	150.6	**688.7**
Difference	10.5	8.8	7.7	9.4	11.2	**47.5**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

5.2. RESPONSES TO CAA'S CONSULTATION ON ITS INITIAL PROPOSALS

HAL

In response to the consultation and in its RBP Update 2, HAL has updated its approach to move away from the use of an elasticity. This is due to a large proportion of HAL's property revenue being determined by published Guide Prices, which HAL's tenants are consulted upon. These were previously updated each year based on a formula linked to passenger volumes, RPI and the Investment Property Databank (IPD) Annual Property Index. However, for 2020/21, HAL consulted on and subsequently decided to freeze the Guide Prices in nominal terms to maintain a stable price path.[40]

In the absence of this agreement, Guide Prices would have increased in 2020/21 before falling substantially in 2021/22 in account of the reduction in passenger volumes, before increasing again. Any formulaic increases and reductions would be banked until there is a net increase in the formulaic Guide Price.

HAL has also separately applied a downward overlay of 6.4% in 2020 to reflect Terminal 4 remaining closed for the first half of 2022.[41]

[40] HAL (2021) Heathrow Airport – Property Rents 2020/21 and proposal for immediate years following Covid 19 crisis: Decision Document. Available at heathrow.com.

[41] HAL (2021) HAL RBP Update 2 model.

Airlines

The airlines agreed with CEPA's approach including the 0.25 elasticity.

5.3. Our assessment of the issues

We agree with HAL's revised approach to modelling property revenues, for the proportion of income that is driven by the freeze in Guide Prices. However, we also note that property revenue also included income from other activities such as jet fuel sales, which is unrelated to the Guide Prices. HAL has confirmed that approximately 24% of its rental income is not covered by the Guide Prices, mostly perimeter and off-airport accommodation.[42] As these are not passenger driven, we do not assume any elasticity and instead grow these revenues by CPI.

The impact of this change is depicted in Table 5.2. Our property revenue forecasts have increased slightly and remain marginally higher than HAL's forecasts. The net effect from our Initial Forecasts to Final Forecasts is positive due to the use of a more optimistic passenger forecast, offsetting the effects of the Guide Price freeze.

5.4. Our revised forecasts

Table 5.2: Property revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	112.3	122.5	131.5	135.4	139.5	**641.2**
HAL RBP Update 2	125.3	133.8	133.8	133.8	133.8	**660.6**
CEPA Initial Forecasts	122.8	131.3	139.2	144.8	150.6	**688.7**
CEPA Revised Forecasts	130.7	138.7	139.2	139.9	140.5	**689.0**
Difference from HAL RBP U2	5.4	4.9	5.4	6.0	6.7	28.4
Difference from CEPA IF	7.9	7.4	0.1	-4.9	-10.1	0.3

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

[42] HAL (2022) CAA-H7-653 CR49,50,52. Response to query 49 confirmed that approximately £110 million of rental revenue is covered by Guide Prices while a further £35 million is not.

6. OTHER NON-AERONAUTICAL REVENUES

In this section we discuss service revenues which covers revenues from areas such as the Fast Track service and VIP charges,[43] and other revenues.

6.1. OUR INITIAL FORECASTS

Service revenues

For our initial forecasts, there were three main differences with HAL's proposals in its RBP Update 1:

- We assumed revenues were not driven on a one-for-one basis by passenger volumes, so instead of using an elasticity with respect to passenger volumes of 1, we used an elasticity of 0.8.
- We also assumed revenues would increase by CPI rather than RPI.
- Finally, we applied a 2% management challenge adjustment each year from 2020.

This resulted in a difference over the H7 period of £29.7 million in nominal terms, before accounting for differences in passenger forecasts – see Table 6.1.

Table 6.1: HAL and CEPA service revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	29.7	41.3	49.6	54.8	57.8	**233.3**
CEPA Initial Forecasts	36.6	47.1	55.0	60.4	64.0	**263.0**
Difference	6.9	5.8	5.3	5.5	6.2	**29.7**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

Other revenues (including revenue from HM Treasury for red list terminal)

Our forecasts of other revenues largely matched HAL's forecasts. However, as we forecast revenues using CPI rather than RPI, there were some small differences between our initial forecasts and HAL's RBP Update 1 forecasts, as shown in the table below.

Table 6.2: HAL and CEPA other revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	18.8	8.5	1.5	1.5	1.6	**31.8**
CEPA Initial Forecasts	18.2	8.1	1.3	1.4	1.5	**30.4**
Difference	-0.6	-0.4	-0.2	-0.1	-0.1	**-1.4**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

[43] In our initial forecasts, we had assumed that fuel and advertising revenues were captured within HAL's Service revenue category, based on statements made within HAL's original RBP. HAL has since clarified within its response to CAA's CAP2265 consultation that these are captured within property and retail respectively.

6.2. Responses to CAA's consultation on the initial forecasts

HAL reviewed the income that is captured within the service revenue category and considered that a passenger elasticity of 0.8 would be more appropriate than an elasticity of 1. PA Consulting, advising the AOC/LACC, also agreed with our elasticity estimate of 0.8.

Although not explicitly stated within the HAL RBP Update 2 or its response to CAA's consultation, we also note that HAL now assumes no income from HM Treasury for the operation of Terminal 4 as a red list terminal. We have confirmed with HAL that Terminal 4 is no longer expected to operate as a red list terminal during H7, and that HAL no longer expect to receive any funding from HM Treasury during the price control period.[44]

6.3. Our assessment of the issues

We welcome HAL's revised elasticity of service revenue with respective to passenger volumes, which brings their assumption in line with our initial forecasts. As such, we do not propose changing our elasticity assumption.

In line with HAL's revised expectations regarding funding from HM Treasury for the red list terminal, we have removed this overlay from our revised forecasts.

We note HAL continue to assume revenues will increase by RPI rather than CPI and disagree with our management challenge proposal of 2%. We consider the management challenge issue separately within Section 8, and continue to assume revenues will increase by CPI.

The impact of our changes on our service revenue forecasts are presented in Table 6.3. Both HAL and CEPA have increased their forecasts, though the gap between our and HAL's position has narrowed.

The impact of our changes on our other revenue forecasts are presented in Table 6.4. The removal of Red Terminal revenues has led to significantly reduced forecasts for both CEPA and HAL.

6.4. Our revised forecasts

Service revenues

Table 6.3: Service revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	29.7	41.3	49.6	54.8	57.8	**233.3**
HAL RBP Update 2	39.0	47.7	55.2	59.5	62.9	**264.2**
CEPA Initial Forecasts	36.6	47.1	55.0	60.4	64.0	**263.0**
CEPA Revised Forecasts	40.3	50.5	58.1	62.7	66.2	277.8
Difference from HAL RBP U2	1.4	2.8	3.0	3.1	3.3	13.5
Difference from CEPA IF	3.7	3.4	3.1	2.3	2.2	14.8

Sources: CEPA analysis, HAL RBP Updates 1 and 2

Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

[44] HAL (2022). CAA-H7-653 CR49,50,52. Response to query 50.

Other revenues

Table 6.4: Other revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	18.8	8.5	1.5	1.5	1.6	**31.8**
HAL RBP Update 2	1.4	1.5	1.5	1.6	1.6	**7.6**
CEPA Initial Forecasts	18.2	8.1	1.3	1.4	1.5	**30.4**
CEPA Revised Forecasts	1.5	1.6	1.6	1.6	1.7	**8.0**
Difference from HAL RBP U2	0.0	0.1	0.1	0.1	0.1	**0.4**
Difference from CEPA IF	-16.7	-6.5	0.3	0.2	0.2	**-22.5**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

7. CARGO REVENUES

In this section we cover revenues generated from cargo-only flights. Historically, cargo-only flights have been operated with dedicated freighter aircraft. However, during the COVID-19 pandemic, many passenger aircraft were repurposed to carry only cargo, often labelled 'preighter' flights.

7.1. OUR INITIAL FORECASTS

For our initial forecasts, we forecast cargo revenues using an elasticity with respect to passenger volumes, in line with HAL's forecasting approach. By using a negative elasticity, we (and HAL) were implicitly assuming that there was a negative relationship between cargo revenues and passenger volumes.

However, we disagreed with HAL's proposed elasticity of -1, as it significantly understated outturn cargo revenues in 2020 and HAL's own forecast of cargo revenues for 2021. As a result, we calibrated our elasticity estimate using the short-term relationship between passenger volumes and cargo revenues as observed during 2020 and 2021, after accounting for our 2% management stretch assumption, which led to us using an elasticity of -8.5.

This resulted in a difference over the H7 period of £120.4 million in nominal terms, before accounting for differences in passenger forecasts.

Table 7.1: HAL and CEPA cargo revenue forecasts using HAL RBP Update 1 mid passenger scenario (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	17.3	15.6	14.7	14.3	14.5	**76.5**
CEPA Initial Forecasts	62.0	45.1	33.9	28.6	27.3	**196.9**
Difference	44.6	29.5	19.3	14.2	12.8	**120.4**

Sources: CEPA Initial Forecasts, HAL RBP Update 1

7.2. RESPONSES TO CAA'S CONSULTATION ON ITS INITIAL PROPOSALS

HAL

HAL argue in its response to the CAA consultation that a top-down elasticity approach is inappropriate given the short-term factors that affected cargo revenues in 2020 and 2021. HAL states:

> *The use of an elasticity calibrated on four years of actuals is neither robust nor appropriate for forecasting the next five years of cargo revenues. This fails to capture the unique market and contractual circumstance Heathrow operates within, and the unusual growth in cargo-only movements during the pandemic.* [45]

They also argue that the number of cargo-only movements (i.e. flights carrying only cargo) implied by our forecasts were implausible for the following reasons:

- During the pandemic, cargo-only movements have been made possible through the availability of ad-hoc take-off and landing slots, which have become available because of slot alleviation.[46] Once that alleviation ends or is reduced, fewer ad-hoc slots will be available for cargo-only flights.

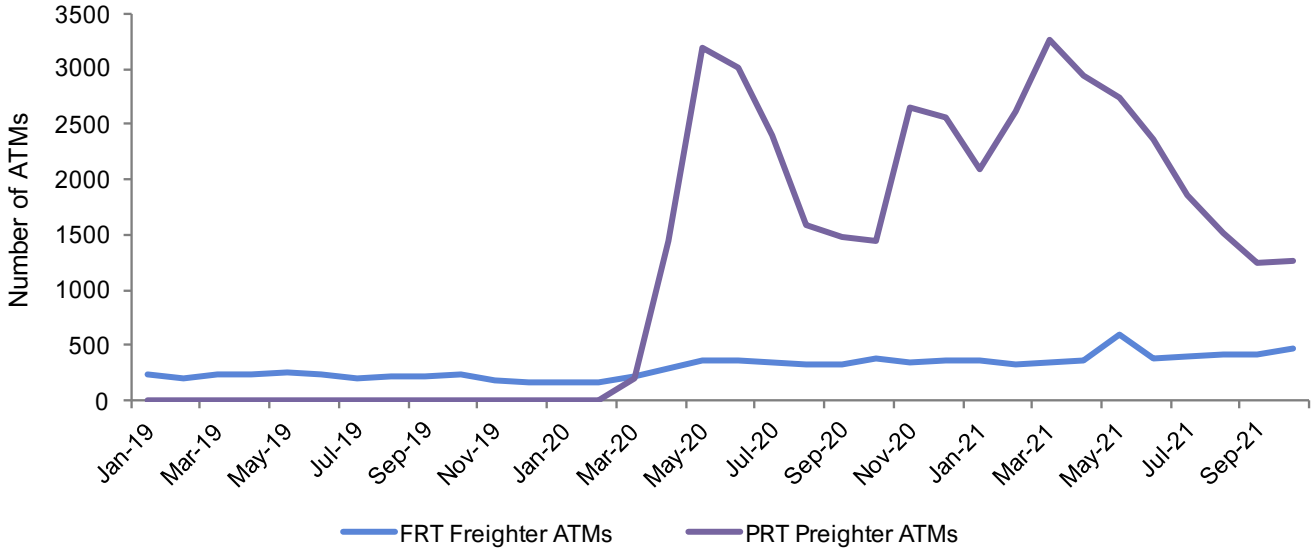
[45] HAL (2021) CAP2265 response, p.244.

[46] Airlines retain the rights to fly at certain times of the day from one year to the next, provided they use that slot at least 80% of the time within a season. These rules were temporarily relaxed during the COVID-19 pandemic, allowing airlines to retain their rights without requiring 80% usage.

- Demand for cargo-only movements will fall once there are more passenger movements, creating capacity for cargo within the bellyhold of passenger aircraft.
- Airlines generally prefer night-time slots for express cargo, which is restricted by the night-flights regime.

HAL has provided new evidence showing that the increase in cargo revenue during 2020 and 2021 was largely due to the preighter phenomenon, as shown in the figure below. The figure shows that prior to the pandemic, almost all cargo-only flights were made on dedicated (freighter) aircraft. When the pandemic started, there was an increase in the number of freighter flights, but there was a more substantial increase in preighter fights, i.e. cargo flights using repurposed passenger aircraft. HAL argues that revenue will decline quickly once passenger movements recover, and more cargo can be carried within the bellyhold of passenger aircraft.

Figure 7.1: Number of cargo-only flights since 2019, split by freighter and preighter



Source: HAL (2021) CAP2265 response, Figure 17
Note: ATM – Air Transport Movements

In the RBP Update 2, HAL has updated its forecast of cargo revenues to reflect the preighter phenomenon using a 'bottom-up' approach, which it considers to be more accurate than the top-down approach used in our initial forecasts. HAL's overall calculation approach is as follows:

$$CargoRevenue_{year} = \left(FreighterMovements_{year} + PreighterMovements_{year}\right) \times HistoricCargoMovementYield$$

For each year in the H7 period, HAL has multiplied its estimate of the number of freighter and preighter movements by HAL's historic yield per cargo-only movement.

HAL's forecast of freighter and preighter movements has been estimated as follows:

- HAL has produced a forecast of the number of passenger movements (i.e. excluding preighter and freighter movements) consistent with its passenger forecasts, and has used historic data to work out how many of these passenger movements are on routes where preighter flights have typically been operated (labelled 'preighter market movements').
- HAL has then worked out the percentage recovery of passenger movements and preighter market movements for the years 2022 to 2026, when compared against 2019 levels.[47]

[47] We find a calculation error in this step as the percentage recovery has been calculated assuming the peak pandemic impact was zero ATMs. This means the size of the recovery is underestimated.

- HAL's next step has been to work out the ratio of (a) freighter movements to passenger movements and (b) preighter movements to passenger movements, both on a pre-pandemic (Jan 2019 – Feb 2020) and mid-pandemic (Mar 2020 – Nov 2021) basis.
- Using the previous two calculation steps, HAL has used the pace of air transport movement recovery to work out the ratio of freighter movements to passenger movements, and the ratio of preighter movements to passenger movements, for the years 2022 to 2026.
- Finally:
    - the ratio of freighter movements to passenger movements has been multiplied by the forecast passenger movements to work out the number of freighter movements, and
    - the ratio of preighter movements to passenger movements has been multiplied by forecast preighter market movements to work out the number of preighter movements.[48]

HAL also maintain a management stretch of 0% per annum above RPI inflation, compared with our assumption of 2% above CPI inflation, noting that CAA had proposed disallowing its capital programme aimed at improving Heathrow's cargo offering.[49]

The resulting cargo revenue forecasts under HAL's RBP Update 2 can be found in Table 7.2; HAL forecast an extra £59.4 million of cargo revenue over H7 when compared to RBP Update 1.

Airlines

Our elasticity estimate was supported by British Airways (BA),[50] and PA, advising the AOC/LACC.[51] The latter argued that our elasticity estimate was more accurate than HAL's estimate, when considering the ability of HAL to generate cargo revenue throughout H7.

7.3. Our assessment of the issues

We welcome the further evidence provided by HAL in support of its position on cargo revenues, and in particular, the additional data around the increase in preighter movements as opposed to freighter movements. We also agree with using a bottom-up approach to calculating future cargo revenues, provided the underpinning data and assumptions are sufficiently robust to support such an approach. Specifically, we recognise that separately forecasting freighter and preighter movements is preferable, given the operation of preighter movements is largely a pandemic only phenomenon. Finally, we agree with the logic of assuming that cargo movements (both freighter and preighter) will reduce as passenger movements recover, which is consistent with the logic in our initial forecasts.

However, we do not agree that the evidence or supporting narrative presented by HAL, shows that our original forecasts were implausible:

- Most of the increase in cargo-only movements has been through more preighter flights rather than more freighter movements. As preighter flights are typically operated by airlines that typically operate passenger flights on those routes, the reduction of slot alleviation is unlikely to have a material effect.

[48] We consider this step also contains a calculation error. The estimated ratio of preighter movements to passenger movements has been multiplied by forecast preighter market movements only, when it should have been multiplied by all passenger movements. This leads to a substantial underestimate of the number of preighter movements.

[49] HAL (2021) CAP2265 response, p.248.

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

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

- Similarly, the growth in preighter and freighter movements during the pandemic suggests there is demand for air freight transport at all times of the day, and not just during the night. HAL has not presented any evidence to suggest that this demand would reduce immediately once the pandemic is over.
- Finally, it is true that as passenger movements recover and capacity becomes available on the bellyhold of aircraft, the demand for cargo-only flights will reduce. However, HAL has not presented any compelling evidence to suggest that this reduction will be immediate or happen more quickly than the pace of passenger recovery. Our original forecasts implicitly assumed that this reduction in demand for cargo-only would match the pace of passenger recovery.

Additionally, the calculations presented by HAL include what we consider to be two significant errors which, when corrected for, substantially increase the forecast of cargo revenues.[52] The resulting estimate is almost 90% higher than our initial forecasts, which we consider to be implausibly high.

As an alternate approach to our top-down elasticity-based method for projecting cargo revenues, and as a cross check against HAL's corrected bottom-up forecast, we have developed a bottom-up method:

- We firstly forecast the number of passenger movements for the H7 period – we take HAL's passenger forecast and assume that the number of passengers per movement gradually recover from the 2020/21 average (of approximately 125) to 2019 levels (~170), in line with the recovery in passenger volumes. We can then divide the number of passengers by the number of passengers per movement, to forecast passenger movements. This approach implicitly assumes that passenger ATMs recover more quickly than passenger volumes.
- We then assume the number of preighter movements and freighter movements reduce from the levels seen in 2020 and 2021, to the levels seen in 2019, in line with the recovery of passenger ATMs. This approach accounts for the fact that as passenger ATMs recover, there is less capacity available for the scheduling of ad-hoc cargo-only flights, whether preighter or freighter.
- We then multiply by the yield estimate provided by HAL to estimate cargo revenues.

These three sets of forecasts are compared in Table 7.2. We do not find HAL's calculation approach very intuitive, and it results in a substantially larger forecast than both our top-down and bottom-up approaches. Consequently, we propose using our bottom-up estimate instead, which results in a broadly similar forecast to our top-down approach (but calculated using a higher passenger forecast).

Table 7.2: Comparison of cargo revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
CEPA Initial Forecasts (top-down)	62.0	45.1	33.9	28.6	27.3	**196.9**
HAL bottom-up forecast, corrected	142.0	96.7	52.4	39.9	38.0	**369.1**
CEPA Revised Forecasts (bottom-up cross-check)	66.3	46.8	32.2	26.6	23.8	**195.6**

Sources: CEPA analysis
Note: CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

7.4. OUR REVISED FORECASTS

Our revised forecasts for cargo revenues are presented in Table 7.3 below. As discussed above, we have adopted the forecasts from our bottom-up cross-check methodology for the purposes of our revised forecasts. Consistent with the objective of HAL's revised forecasting methodology this calculation assumes that cargo movements

[52] See footnotes 47 and 48.

(preighter movements and freighter movements) and, by extension, cargo revenues, will reduce as passenger movements recover from the pandemic.

Table 7.3: Cargo revenue forecasts using HAL passenger scenarios (£ million, nominal)

	2022	2023	2024	2025	2026	H7
HAL RBP Update 1	17.3	15.6	14.7	14.3	14.5	**76.5**
HAL RBP Update 2	42.7	32.7	21.4	19.6	19.4	**135.9**
CEPA Initial Forecasts	62.0	45.1	33.9	28.6	27.3	**196.9**
CEPA Revised Forecasts	66.3	46.8	32.2	26.6	23.8	**195.6**
Difference from HAL RBP U2	23.6	14.0	10.7	7.0	4.3	**59.7**
Difference from CEPA IF	4.3	1.7	-1.8	-2.0	-3.5	**-1.3**

Sources: CEPA analysis, HAL RBP Updates 1 and 2
Note: HAL RBP Update 1 and CEPA Initial Forecasts are calculated using HAL's mid passenger scenario from RBP Update 1. HAL RBP Update 2 and CEPA Revised Forecasts are calculated using HAL's passenger scenario from RBP Update 2.

8. MANAGEMENT STRETCH

The management challenge or management stretch reflects the year-on-year improvement in Heathrow management's ability to increase revenue over and above passenger growth (or other revenue drivers). While the inclusion of a management stretch target has not explicitly been part of Heathrow's regulatory framework to date, we consider it a necessary addition to our top-down approach to forecasting efficient commercial revenues.

In this section, we review representations made by HAL, its advisors, and airline stakeholders around the appropriateness of including a management stretch target within the commercial revenues forecast, and on the appropriateness of the stretch target set in our initial forecasts.

8.1. OUR INITIAL FORECASTS

At the Initial Proposals stage, we adopted a management stretch of 2% per annum in our initial forecasts. The 2% figure was a mid-point between:

- **HAL RBP Update 1 (1%)**: In HAL's RBP Update 1, it proposed no explicit management stretch. However, it indexed both its commercial revenue and opex forecasts to RPI, in contrast to our use of CPI. This means that, if CPI is considered a better measure for inflation, as adopted in CEPA's forecasts, HAL can be considered to have implicitly applied a management stretch equal to the wedge between RPI and CPI in its forecasts, estimated to be 1%.[53]
- **CEPA iH7 review (3%)**: In our review for the CAA of HAL's proposals for iH7, we observed that HAL's commercial revenues per passenger increased by roughly 3% per annum in real terms, between 2008 and 2017.

In our initial forecasts, we saw this 2% target as a high-level estimate capturing several factors:

- Potential for partial mitigation against the downside step changes presented in our forecasts.
- Returns from recent capital investments aimed at increasing revenue generation.
- Our switch from RPI indexation for future revenues to CPI indexation.

We applied our management stretch target to all commercial revenue income.[54]

8.2. RESPONSES TO CAA'S CONSULTATION ON ITS INITIAL PROPOSALS

HAL

HAL presented two broad arguments for why our management stretch proposals were not appropriate:

- Firstly, they argued that **there was no regulatory precedent for applying a management stretch target to a company at the efficiency frontier**. HAL noted that as Heathrow was at the efficiency frontier, there was no reason to apply a 'catch-up' management stretch target. They also argued that *"there is no regulatory precedent for a management challenge being applied to commercial revenues for a company deemed to already be at the frontier"*.[55] They pointed to advice from Frontier Economics, which considered that the concept of management stretch is less well understood than its opex counterpart, frontier shift. The advice also asserted that commercial revenue is potentially less controllable than opex.

[53] OBR (2015) Revised assumption for the long-run wedge between RPI and CPI inflation. Available at obr.uk.

[54] Except for Other Regulated Charges, which was outside the scope of our analysis.

[55] HAL (2021) CAP2265 response, p.222.

In its response, HAL considered that we had misrepresented its position in its interim H7 proposals, where the management challenge proposal of 1% was a high-level adjustment used to reconcile its elasticity driven retail revenue forecasts with its historic experience of increasing commercial revenues. This adjustment was necessary as HAL's elasticity proposal of 0.8 was based on judgement rather than being analytically derived and, therefore, did not necessarily reflect the historic relationship.

- Secondly, HAL considered that **its historical outperformance of the regulatory settlement was due to reasons that are unlikely to be replicated**. Specifically, HAL argued that the period we had used for our analysis (i.e. 2008 to 2017) did not include more recent years, where it had been more challenging to grow retail revenues on a per passenger basis.

  They also argued that the period used for the analysis included an increase in retail floorspace and car parking spaces, a change in the passenger mix favouring higher spending passengers, and a depreciation in the UK exchange rate, all of which led to increases in commercial revenue. HAL stated that these effects were not expected to be repeated during H7, especially as the CAA had chosen to disallow its capex initiatives aimed at increasing revenue generation. HAL also noted a series of headwinds that will make it challenging to increase commercial revenues during H7, including weak UK GDP growth and consumer confidence, the impact of the removal of airside tax fee, and greater competition from other retail destinations.

More specifically in relation to the analysis underpinning our 2% management stretch proposal, HAL and Frontier Economics argued that our estimate was insufficiently substantiated. They considered that the rationale provided for what the 2% target represents is not backed up by evidence. For example:

- Assuming the 2% captured mitigations from the headwinds introduced during H7 would imply that 66% of the downward retail overlay could be mitigated by Heathrow management.
- HAL noted that there was extremely limited commercial capex during the H7 period and the CAA's initial proposals were to not allow any further expenditure, meaning that the 2% stretch target could not reflect any returns from capex.
- Frontier Economics noted that the management stretch target had been applied to all categories of revenue and no consideration had been given as to whether specific revenue streams were controllable or not. They also argued that the wedge between RPI and CPI should be considered as part of our application of real price effects, rather than being assimilated into the management stretch estimate.

Airlines

PA, in its advice to the AOC/LACC, agreed with HAL and Frontier Economics that the 2% management stretch proposal required further substantiation.

8.3. Our assessment of the issues

Appropriateness of a management stretch target

We have reviewed the representations made by HAL, Frontier Economics, and PA, both in their responses to the CAA consultation and in subsequent engagement. We remain of the view that it is appropriate to explicitly include a management stretch target.

- HAL is relatively unique in that it is price-cap regulated under a single-till model, where commercial revenues form a substantial building block. Very few airport regulatory regimes operate a pure single-till model, and it is rare in non-airport regulatory regimes for unregulated revenues to form a substantial building block for the price cap. As such, the lack of precedent from other regulatory regimes is not, in itself, a compelling argument for not including a stretch target for H7.

- In a competitive environment, competition would be expected to drive management to set stretching revenue targets from market-led activities and this might go beyond specific known factors that can be built into 'bottom-up' revenue forecasts, e.g. reflecting 'unknown unknowns' as well as 'known unknowns' of the revenue growth potential that might arise from ongoing management activities. It is reasonable for a regulator to set similarly stretching revenue targets, in order to set a revenue forecast that is considered a fair bet for both the airport operator and airport users.

- In our initial forecasts, we stated our management stretch target reflected "*the year-on-year improvement in Heathrow management's ability to increase revenue over and above passenger growth (or other revenue drivers)*". Our view is that revenue drivers we have used and the overlays we have included do not fully explain the historic growth in commercial revenues or the potential for future revenue generation opportunities. For example, we would expect retail income to increase over time with increases in disposable income. This is not explicitly accounted for in our revenue drivers, elasticities, or overlays. There is regulatory precedent for this logic; for example, in its 2019 determination of airport charges at Dublin Airport, the Irish Commission for Aviation Regulation used an elasticity with respect to passenger volumes greater than 1, to reflect the effect of increasing disposable income.[56] We believe that these unaccounted factors should be incorporated into our management stretch target.

- Finally, HAL, in its own submissions, recognise that management initiatives can be used to maximise revenue generation opportunities:

> *"We need to ensure we are best placed to be resilient and ready to maximise any opportunities that may present through management initiatives. These can include investment in new facilities and retail units, as well as non-capital projects, such as contract negotiations, marketing and operating cost-driven activities like service improvements and other operational changes."*[57]

HAL has also acknowledged that its forecasts assume that it is able to maintain revenues constant in RPI real terms. However, we use CPI in our forecasts, which we believe to be a better measure for inflation, for the reasons outlined in our Initial Forecasts report and confirmed by Frontier Economics in its advice to HAL. If CPI is indeed a better measure for inflation, HAL can be considered to be implicitly applying a management stretch equal to the wedge between RPI and CPI.

Application of management stretch target to all revenue categories

We accept the argument made by Frontier Economics that not all categories of commercial revenue are controllable to the same extent and, therefore, not all categories of revenue should be subject to a management stretch target. As a result, we do not apply management stretch to the following categories of revenue:

- **Track access** – Track access charging arrangements are governed by the Office of Rail and Road (ORR), which limits HAL's ability to increase charges. Additionally, HAL has limited ability to control the number of services operating on its track.

- **Terminal drop-off charge** – As we have used a bottom-up estimate of the revenues generated from the terminal drop-off charge, we consider we have accounted for all the main ways HAL can drive revenue growth.

[56] Commission for Aviation Regulation (2019) Maximum Level of Airport Charges at Dublin Airport 2020-2024 Draft Determination. Available at aviationreg.ie.

[57] HAL (2021) RBP, Section 7.2.2.4.

- **Terminal 5 Piccadilly Line revenue** – This revenue line is governed by a long-standing agreement with TfL. As prices and marketing are both determined by TfL, and as the agreement is not due to be renegotiated during H7, HAL has limited ability to drive further revenue growth.
- **Property** – While we consider property revenue would typically be controllable, property revenues during H7 will largely be governed by the decision on property Guide Prices. This limits HAL's ability to drive further revenue growth.

Choice of management stretch target

We recognise that the choice of an appropriate management stretch target needs further substantiation before it can be considered robust enough for inclusion within our final forecasts. In our initial forecasts, we saw this as a key area of further engagement with HAL and further analysis.

Through our further engagement, HAL has acknowledged that it expects per passenger revenues to grow in line with RPI, which creates an implied management stretch target equal to the wedge between RPI and CPI (given our forecasts are CPI based). The OBR's view of the long-run wedge between RPI and CPI is 1% and as such, we see this as a reasonable lower bound for our choice of management stretch target.[58]

We have also used econometric analysis to better understand how much of HAL's historic ability to drive revenue generation can be explained by factors other than our revenue drivers, capital expenditure, or one-off factors (e.g. Brexit related depreciation in GBP). The objective of the analysis was to provide a more substantive evidence base underpinning our choice of management stretch target for HAL in H7. The analysis uses data provided by HAL on retail revenues and a range of key revenue drivers, from 2007-2019.[59]

Given a number of limitations with the economic analysis, we have used the findings from our analysis in a confirmatory manner, to determine whether the historical evidence can justify the 2% management stretch target we proposed in our initial forecasts, or whether the evidence is more consistent with a lower target. We do not use our analysis to directly set a management stretch target, due to three key challenges:

- The only data available to use is that provided by HAL, which results in only 13 years' data for one airport. This reduces the reliability of an econometric estimate of the management stretch.
- Many commercial revenue drivers typically increase over time, leading to multicollinearity. Multicollinearity does not bias the estimate of the management stretch, but it does reduce the precision of our estimate.
- Over a short time horizon, it is possible that the time trend estimated captures ongoing efficiencies and catch-up efficiencies. This is partially mitigated by HAL traditionally being at the frontier of commercial revenue generation but nevertheless, reduces the reliability of our management stretch estimate.

The details of our analysis are presented in a separate technical annex.

Overall, we find that the analysis does not provide conclusive evidence in favour of or against a 2% management stretch target or a lower target as proposed by HAL. We therefore we propose a range of possible options for management stretch targets:

- For the **lower bound** of our range, which we have used to inform our **mid case**, we use the target implicit within HAL's proposals, i.e. 1%.
- For the **upper bound** of our range, which we have used to inform our **high case**, we maintain the 2% target proposed in our initial forecasts.

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[58] OBR (2015) Revised assumption for the long-run wedge between RPI and CPI inflation. Available at obr.uk.

[59] Due to limitations in the quality of data our econometric analysis is restricted to retail revenues only. We are, therefore, assuming that HAL management's ability to drive retail revenues is similar to their ability to drive other commercial revenues such as Heathrow Express revenues and services revenues.

Our view is that the management stretch should account for all drivers of commercial revenue that have not been recognised by the modelling approach used in our forecasts. With this in mind, we acknowledge that choosing an appropriate target within the range we have proposed, requires consideration of several overlapping issues and ultimately is a judgement that the CAA must make in the context of the overall price control.

We believe the CAA should consider the following factors when determining its choice of management stretch target:

- **The extent to which historic macroeconomic trends driving HAL's revenue growth can be expected to continue.** Increases in disposable income per passenger provide opportunities for revenue generation, either through more spending, or a shift towards higher yielding products and services. Similarly, reductions in the strength of GBP relative to other currencies provide short-term boosts to retail revenues.

  However, the extent to which historic increases in disposable income can be expected to continue, or the extent to which we envisage GBP to depreciate further, is uncertain. While qualitative and quantitative evidence can help inform this consideration, it ultimately requires a regulatory judgement, including judgements on the prospects for the UK economy which we note are relatively uncertain at this time.

- **The extent to which HAL is exposed to known headwinds not explicitly accounted for in our forecasts.** HAL has identified some specific headwinds that they have not explicitly accounted for in its forecasts, including a slowdown in GDP growth and a broader shift towards online shopping instead of in-person shopping, both of which are expected to affect retail income.

  While we consider the former should be considered by the CAA, we are sceptical around the effect of the latter on HAL. Heathrow Airport's retail proposition operates with a largely captive market and is therefore in our view less exposed to broader retail trends in the same way that high streets are. While a broader shift towards online shopping may affect retail footfall, it does not necessarily follow that the shift would translate into less spending by those who do visit shops. However, we acknowledge that these are relevant factors in forming an overall judgement on the level of management stretch potential in H7.

- **The extent to which management action can help mitigate headwinds, and the extent to which such mitigations are already captured elsewhere in our forecasts.** Our forecasts of commercial revenues include several downward overlays for headwinds related to the pandemic, unfavourable tax changes, and the introduction of competing services such as the Elizabeth Line.

  A choice of management stretch target might consider the extent to which these could be mitigated by HAL's management – in ways that are not captured in our modelling – through a change in strategy, contract negotiations, additional marketing spend, etc. However, it would be important to ensure there is not double counting of initiatives implicitly or explicitly accounted for elsewhere.

- **The extent to which management action can drive new revenue growth, and the extent to which HAL may be exposed to further unknown headwinds.**

  Similar to above, management action could be used to exploit new revenue generation opportunities that may arise during H7. This would need to consider whether, on a fair bet basis, the unknown opportunities that may arise during H7 are likely to outweigh the unknown headwinds.

- **The extent to which the CAA provides a capex allowance to drive further revenue growth.** While it is possible for HAL to invest in some smaller capital projects with short pay-off periods without CAA approval, larger capital projects with longer pay-off periods require a specific CAA allowance.

  We have not captured enhancement capex elsewhere within our commercial revenue forecasts, though we understand that the CAA is considering allowing such projects to proceed through the existing capex governance process. Therefore, if the CAA were to allow said enhancement capex plans, it might simultaneously want to consider applying a more stretching target.

- **A management stretch target is a novel regulatory concept in the context of setting a single till price control.** This might suggest a degree of caution is necessary in setting any target, particularly given the imperfect evidence base and the continued uncertainty of demand for air travel in the UK, a point that was highlighted in Frontier Economics' report for HAL.[60] However, as we discuss above, it is important that this point of principle is not over stated given we consider there is precedent of the objective that any management stretch target is seeking to achieve in this context.

[60] Frontier Economics (2021) H7 IP Commercial Revenue Review: A report prepared for Heathrow.

9. CAPITAL INVESTMENTS

In this section, we review our commercial revenue forecasts in the context of HAL's proposed capital investment programme and the CAA's proposed allowance for capital expenditure (capex).

9.1. OUR INITIAL FORECASTS

In our assessment of HAL's proposals at RBP Update 1, we noted that HAL proposed two capital plans, a Safety Only plan and an Optimal plan. HAL claimed that, absent of the optimal plan investments, there would be a reduction in commercial revenues of £✂✂ million (2018 RPI prices) relative to its base forecast.

We considered at a high-level the potential for commercial revenue benefits to arise from each element of the capital plan but did not comment on the suitability of its plan. We also did not explicitly adjust our forecast to account for the CAA's proposed allowance for capital expenditure, assuming that the effect on revenues from any commercial capex that was allowed by the CAA, would be captured within our management stretch allowance.

9.2. RESPONSES TO CAA'S CONSULTATION ON ITS INITIAL PROPOSALS

In its response to the CAA's initial proposals, HAL noted that the CAA has proposed to disallow all commercial related capital investments in H7 as part of their capital proposals. It also argued that it was an error of process for CEPA to not explicitly account for this decision, considering that we had explicitly banked the benefits of the programme.

In its RBP Update 2, HAL updated its analysis of the impact of its capital plan on commercial revenue generation. It now considered that its revised capital plan would secure £✂✂ million (2018 RPI prices) of revenue that would otherwise be at risk, and has the potential to generate £✂✂ million (2018 RPI prices) incremental revenue in H7.[61]

9.3. OUR ASSESSMENT OF THE ISSUES

We have reviewed the representations made by HAL in relation to its capital plan, and its view that disallowing the capital plan would risk £648 million in commercial revenue over the H7 period. We have also separately engaged with the CAA and its capex advisors on the merits of HAL's commercial capital investment programme.

We understand that the CAA would typically consider investments that are required to maintain existing commercial revenues, within the asset management programme, for which HAL has been given an allowance. As such, we continue to maintain that a downward overlay to account for the CAA's proposed allowance for capital expenditure is not necessary.

We also understand that the CAA is minded to provide HAL with an appropriate allowance for commercial capital projects intended to generate incremental revenue. Such projects will proceed through the existing capex governance process to determine whether they are in the airport user interest. We consider that the best way for the CAA to account for its proposed commercial capex allowance, is through its choice of a management stretch target.

[61] HAL (2021) CAP2665 response, p.232.

10. OVERALL FORECASTS

In this final section, we present the overall forecasts under our mid-case, which uses the CAA's mid passenger forecast scenario and a 1% management stretch target assumption. To contextualise these figures, 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. We also present our forecasts under alternate passenger forecast scenarios, and under two other scenarios that represent more stretching and more conservative assumptions.

10.1. CEPA FINAL FORECAST OF MID-CASE

Table 10.1 below presents our final forecasts of commercial revenues, while Table 10.2 presents our final forecasts of cargo revenues. **Our commercial and cargo revenue forecast is £5,024.9 million in nominal terms over the H7 period and implies average revenues of £13.95 per passenger over H7. In 2020 CPI prices, this equates to £4,311.4 million in total revenues, and average per passenger revenues of £11.97.**

Table 10.1: CEPA commercial revenue final forecasts, using CAA mid pax projections (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Retail and Bureaux	316.7	405.2	464.6	514.5	535.1	**2,236.1**
Bureaux	[Included in above category]					
Surface Access	128.6	154.3	172.2	186.7	194.0	**835.8**
Service	46.1	56.5	63.2	68.9	71.4	**306.1**
Rail	82.0	95.7	122.1	137.0	141.7	**578.6**
Property	130.7	138.7	139.2	139.9	140.5	**689.0**
Other	1.5	1.6	1.6	1.6	1.7	**8.0**
Intercompany	-	-	-	-	-	**-**
Terminal drop-off charge	39.8	42.1	51.8	54.4	52.9	**241.0**
Red Terminal	-	-	-	-	-	**-**
Total commercial revenues	**745.4**	**894.2**	**1,014.8**	**1,103.0**	**1,137.3**	**4,894.7**
Total per passenger (£)	**13.58**	**13.28**	**13.47**	**13.62**	**13.93**	**13.59**
Difference from HAL RBP U2	154.7	202.5	199.5	217.6	214.3	988.6

Source: CEPA analysis

Table 10.2: CEPA cargo revenue final forecasts, using CAA mid pax projections (£ million, nominal)

	2022	2023	2024	2025	2026	H7
Cargo	49.9	32.0	20.9	13.5	13.9	**130.2**
Difference from HAL RBP U2	7.2	-0.7	-0.5	-6.0	-5.6	-5.7

Source: CEPA analysis

Comparison to HAL RBP Update 2

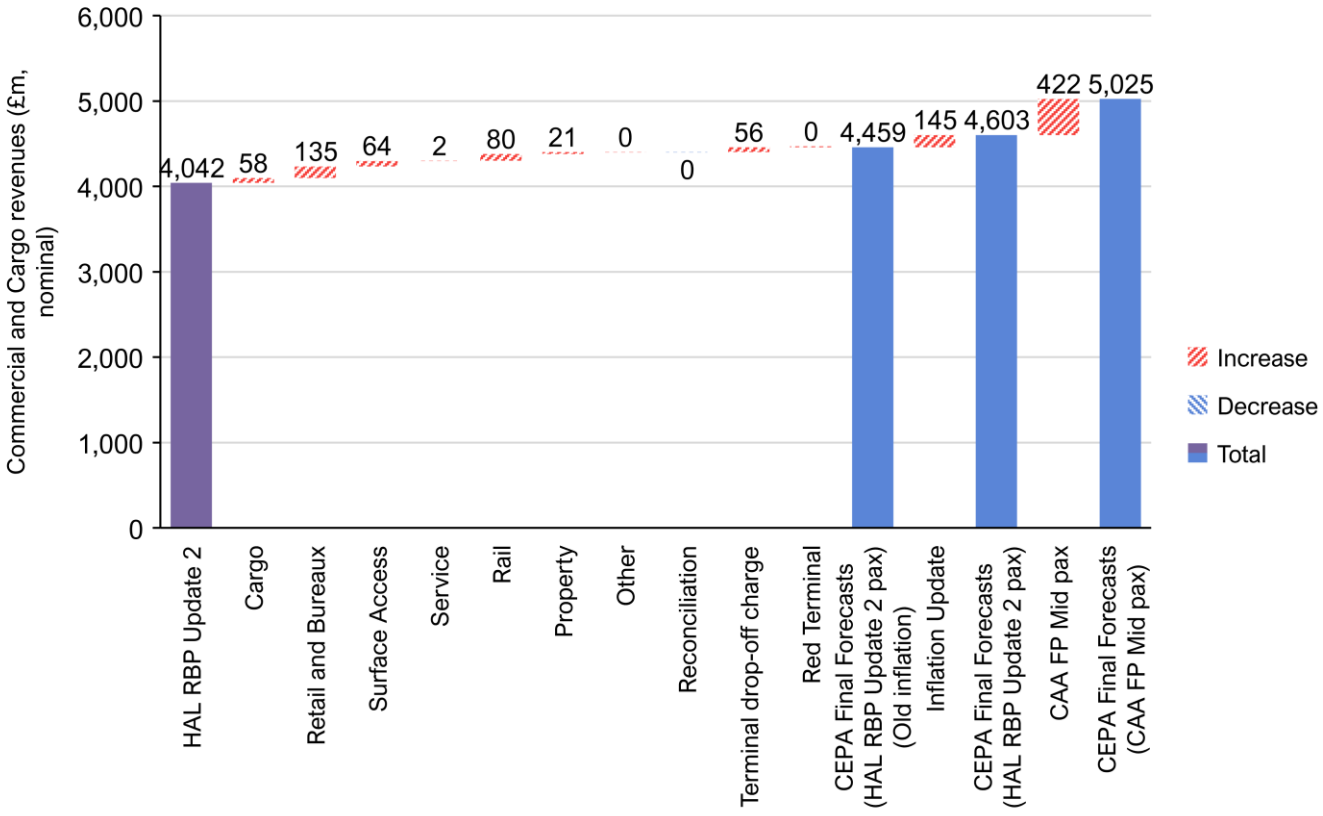
Figure 10.1 shows which items drive the difference between our and HAL's commercial and cargo revenue forecast. The largest drivers of the revenue gap are:

- **Passenger forecasts**: CAA's more optimistic passenger forecasts in comparison to HAL's lead to an increase in forecast revenues of £422 million.

- **Inflation**: The sharp rise in inflation, both present and forecast, leads to a further increase in our nominal forecasts of £145 million.
- **Retail:** Our approach to estimating HAL's retail revenue leads to our forecast being £139 million higher than HAL's forecast. The key driver of this difference is our differing view on the impact of the removal of VAT tax-free on HAL's retail concession income, for which we have used a top-down elasticity-based approach, and HAL has used a bottom-up approach.
- **Rail:** The differences in our approach to forecasting rail revenue constitutes an £80 million increase in our revenues, compared to HAL's. This is due to our revised assumptions around the timing of the impact of Crossrail on Heathrow Express revenues.
- **Cargo:** The differences in our approach to forecasting rail revenue leads to a £58 million increase in forecast revenues, compared to HAL. This is due to our use of a more transparent calculation approach, and the correction of errors in HAL's methodology.

Controlling for the effects of inflation and the revised passenger forecasts, our final forecasts imply a 10.3% revenue gap to HAL's RBP Update 2.

Figure 10.1: Total H7 commercial and cargo revenues: CEPA Updated Forecasts vs. HAL RBP Update 2 (£ million, nominal)



Source: CEPA analysis

Comparison to CEPA initial forecasts

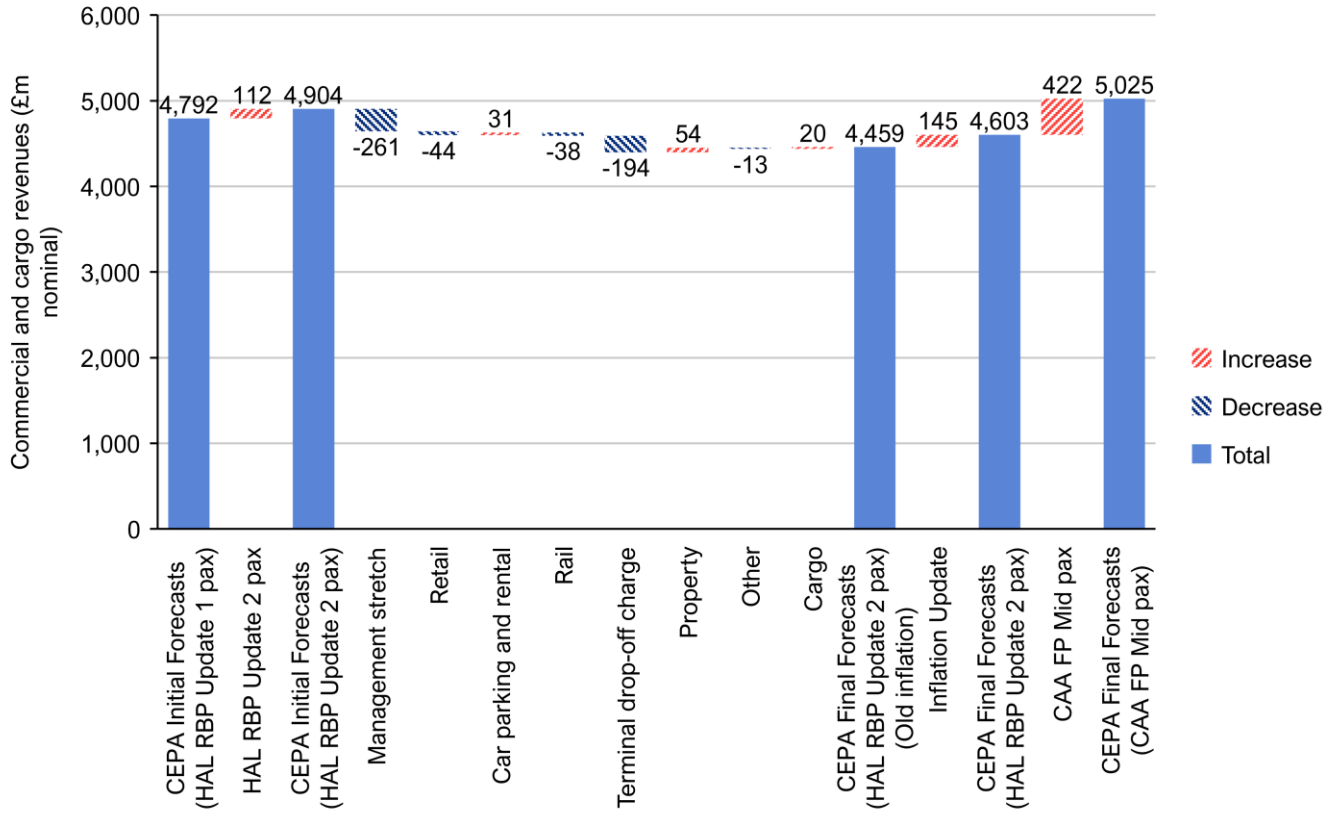
Controlling for the effects of inflation and the revised passenger forecasts, our final forecasts constitute a 9.1% reduction from our initial forecasts.

Figure 10.2 compares our final commercial revenue forecasts with our initial forecasts. **Our final forecast for total nominal commercial revenues over H7 is 4.9% larger than our initial forecasts.** The following items form the biggest change between our final forecasts and initial forecasts:

- **Passenger forecasts**: CAA's more optimistic passenger forecast at Final Proposals in comparison to Initial Proposals increase our forecast by £422 million, reflecting the increased optimism in the aviation industry as the effects COVID-19 pandemic have begun to abate.
- **Inflation**: The sharp rise in inflation, both present and forecast, leads to a further increase in our nominal forecasts of £145 million.
- **Management stretch**: Feedback from HAL and wider stakeholders, as well as our increased evidence base from our econometric analysis of the management stretch, has led us to consider a range of management stretch targets, with 1% as a lower bound and 2% as an upper bound. The reduction of HAL's management stretch target from 2.0% to 1.0% would lead to a reduction in our forecast by £261 million. This demonstrates the sensitivity of our final forecasts to this decision.
- **Terminal drop-off charge**: We have revised downward our terminal drop-off charge forecast by £194 million. This reflects the updated evidence base provided by HAL, leading to a reduction in our assumed passengers per vehicle, application of VAT and the revised assumption on the number of passenger trips liable for the charge.

Controlling for the effects of inflation and the revised passenger forecasts, our final forecasts constitute a 9.1% reduction from our initial forecasts.

Figure 10.2: Total H7 commercial and cargo revenues: CEPA initial proposals vs. CEPA updated forecasts (£ million, nominal)



Source: CEPA analysis

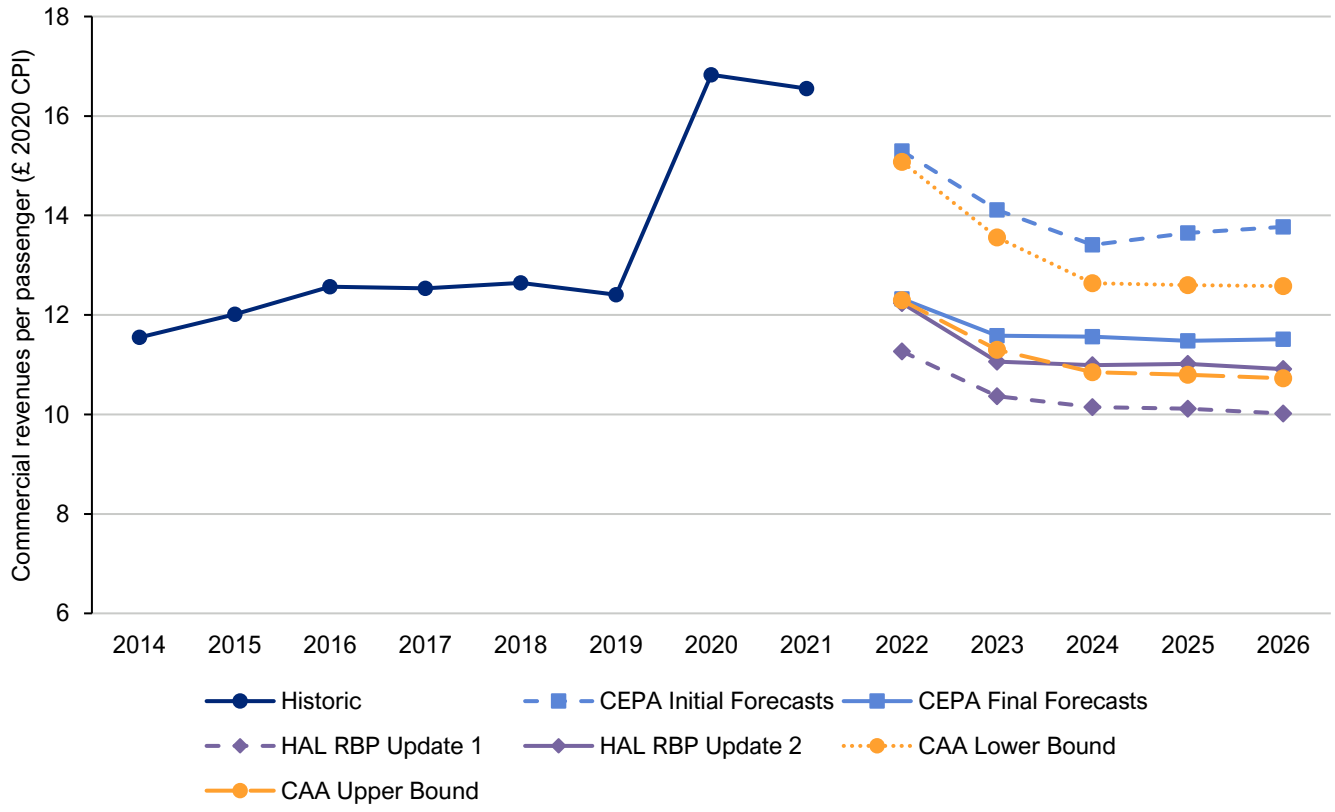
Note: The changes compared to our initial forecasts differ from here when compared to the body text, due to the separation of effects such as the management stretch and updated passenger forecasts.

Comparison to CAA Initial Proposals

Figure 10.3 compares our forecast commercial revenues 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 commercial revenues per passenger of £11.52, a 7.2% reduction from 2019**

This figure shows that CEPA and HAL's forecasts have converged significantly in comparison to the first round, towards the CAAs' Initial Proposal Upper Bound. In 2026, CEPA's final forecast commercial revenue per passenger is 5.5% higher than HAL's RBP Update 2 forecast. This is significantly smaller than the 37.5% gap between HAL's RBP Update 1 forecast and CEPA's initial forecast. This reflects the improved detail of information provided by HAL, which has led to agreement on a number of large issues that drove the revenue gap.

Figure 10.3: Commercial revenues per passenger excluding cargo: CEPA, CAA and HAL (£, 2020 CPI prices)



Source: CEPA analysis, CAA Initial Proposals, HAL RBP Updates 1 and 2

10.2. CEPA 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 10.3 presents the sensitivity of our results to the choice of CAA's passenger scenarios. **Compared to the CAA's mid passenger forecast, total commercial and cargo revenues are £271.3 million (5.4%) higher under the high passenger scenario in nominal terms, and £663.1 million (13.2%) lower under the low passenger scenario in nominal terms.**

Table 10.3: CEPA final forecasts under different passenger forecast scenarios

	2022	2023	2024	2025	2026	H7
Total commercial and cargo revenues (£ million, nominal)						
HAL passenger forecast	710.6	838.9	961.2	1,024.1	1,068.4	**4,603.2**
CAA mid passenger forecast	795.3	926.2	1,035.7	1,116.5	1,151.2	**5,024.9**
CAA high passenger forecast	873.0	1,000.6	1,098.9	1,147.6	1,176.2	**5,296.2**
CAA low passenger forecast	637.4	769.6	903.8	988.8	1,062.3	**4,361.8**
Per passenger commercial and cargo revenues (£, nominal)						
HAL passenger forecast	15.63	14.46	14.21	14.26	14.41	**14.52**
CAA mid passenger forecast	14.49	13.76	13.74	13.78	14.10	**13.95**
CAA high passenger forecast	13.90	13.39	13.48	13.75	14.06	**13.71**
CAA low passenger forecast	17.24	15.29	14.57	14.47	14.50	**14.99**

Source: CEPA analysis

Sensitivity of forecasts to other key assumptions

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

We define our high and low revenues scenarios as follows:

- For our **low commercial and cargo revenues case**:
  - We assume a management stretch target of 1%, as per our mid case scenario.
  - We assume a retail price elasticity of -1.72 instead of -1.6, in line with the assumption proposed by HAL.
- For our **high commercial and cargo revenues case**:
  - We assume a management stretch target of 2%, instead of our mid case assumption of 1%.
  - We assume a retail price elasticity of -1.4 instead of -1.6, roughly midway between our previous elasticity assumption and our mid-case elasticity assumption.

Table 10.4 presents the effect of these scenarios on total commercial and cargo revenues. **Total revenues are £238.4 million (4.7%) higher over H7 under the high revenue scenario in nominal terms, compared to the mid case, while they are £19.6 million (0.4%) lower under the low revenue scenario in nominal terms.**

Table 10.4: Total commercial revenues under alternative management stretch assumptions

	2022	2023	2024	2025	2026	H7
Total commercial and cargo revenues (£ million, nominal)						
High revenue case	816.6	960.2	1,082.9	1,178.3	1,225.3	**5,263.3**
Low revenue case	792.9	922.8	1,031.6	1,111.8	1,146.2	**5,005.3**
Per passenger commercial and cargo revenues (£, nominal)						
High revenue case	14.88	14.26	14.37	14.55	15.01	**14.61**
Low revenue case	14.45	13.70	13.69	13.73	14.04	**13.90**

Source: CEPA analysis

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