Gatwick Airport Northern Runway Project

Response to Rule 17 Letter - Future Baseline Sensitivity Analysis

Book 10

VERSION: 1.0

DATE: JUNE 2024

Application Document Ref: 10.40

PINS Reference Number: TR020005

APFP Regulations 5(2)(q) **Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009**

Table of Contents

Appendices

1 Executive Summary

1.1 Overview

1.1.1 The Examining Authority (ExA) asked, in their Rule 17 letter of 9 May 2024, for the Joint Local Authorities (JLAs) to propose alternative forecasts to be used as a sensitivity analysis. This was submitted by the JLAs at Deadline 4 in their **Rule 17 Response** [REP4-049]. The alternative forecasts submitted to the ExA were prepared for the JLA by York Aviation (York or YA). They have proposed a range of forecasts and two scenarios to be studied – the York Low Case and the York High Case:

- The York Low case proposes a 56.8 mppa future baseline and a 74.8 mppa with-Project case in 2047;
- the York High case proposes a 60.5 mppa future baseline and an 80.2 mppa with-Project case in 2047.

1.1.2 These represent a difference (between the future baseline and with project scenarios) of 18.0 mppa in the York Low case and 19.7 mppa in the York High case (compared with a difference of 13 mppa in GAL's equivalent forecasts as part of the DCO Application). These headline figures need to be understood in the context of the assumptions that underpin them.

1.1.3 As shown in Figure 1.1.1 below, it is a characteristic of YA's figures that they substantially suppress the future baseline, whilst (in the case of the High scenario) maintaining GAL's headline forecast of total NRP throughput. The result in both scenarios is a significantly bigger gap or delta between the future baseline and the NRP forecasts. For reasons explained in this document, GAL does not consider these scenarios are realistic.

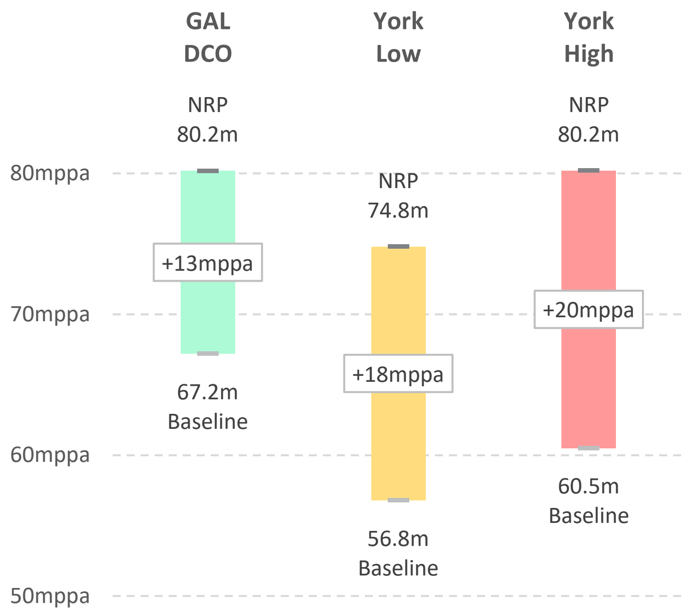


Figure 1.1.1 YA passenger forecasts for High and Low cases compared to GAL forecasts

1.1.4 York disagree with the amount of peak spreading forecast by GAL in the future baseline. In their High and Low scenarios, York assume no increase in peak spreading in the future baseline.

1.1.5 The York scenarios, and particularly the High scenario, which maintains GAL's headline throughput for the NRP of 80.2mpppa, do so therefore by assuming that Gatwick can achieve more traffic in the busy day and the summer season than GAL has forecast. GAL does not agree.

1.1.6 The Applicant believes that the amount of with-project traffic (the NRP case) which YA forecast in both their Low and High cases will be lower than assumed for two reasons:

a) the YA NRP busy day throughput is not achievable with the proposed Project infrastructure, nor realistic in view of the constraints of the proposed Noise Envelope; and

b) in contrast to its assumptions for the baseline, York appear to assume that every slot added by NRP is perfectly peak spread at a ratio of 1, i.e. that every slot is assumed to operate all year round, which GAL considers unrealistic.

1.1.7 The Applicant recognises that, whilst these differences are important, the purpose of the Rule 17 request was to undertake a sensitivity test of the NRP application to check the robustness of its environmental and economic assessments, in circumstances where GAL's future baseline estimates were alleged to be too high. Whilst GAL does not consider York's High and Low cases are plausible, it has nevertheless complied with the Rule 17 request and undertaken sensitivity assessments using York's figures, on an entirely without prejudice basis.

1.1.8 In the event that the ExA was to agree with GAL about the drawbacks of the York baseline and NRP parameters, the sensitivity assessments of the York scenarios may not be as useful as the ExA intended. To guard against this, GAL has proposed a further sensitivity test using what it believes to be more credible (albeit still unlikely) assumptions – although it is important to stress that GAL stands by its DCO forecasts, which it considers to be robust and that any sensitivity assessment undertaken is presented without prejudice to GAL's case.

1.1.9 The graphic below illustrates the approach to GAL's sensitivity case. It rejects the York assumption that there can be no peak spreading in the future base line but moderates the extent of GAL's DCO forecast peak spreading and uses a more modest assumption, to ask the question: "*what if peak spreading in the future baseline was less than forecast in the DCO?".* For the NRP it rejects York's substantial increase in peak season runway throughput but tests a more modest increment on top of the DCO forecasts, to ask the question, "*what if the dual runway operation could achieve some more busy day throughput?".*

1.1.10 Taken together these adjustments would reduce the increase in passengers to c.15mppa.

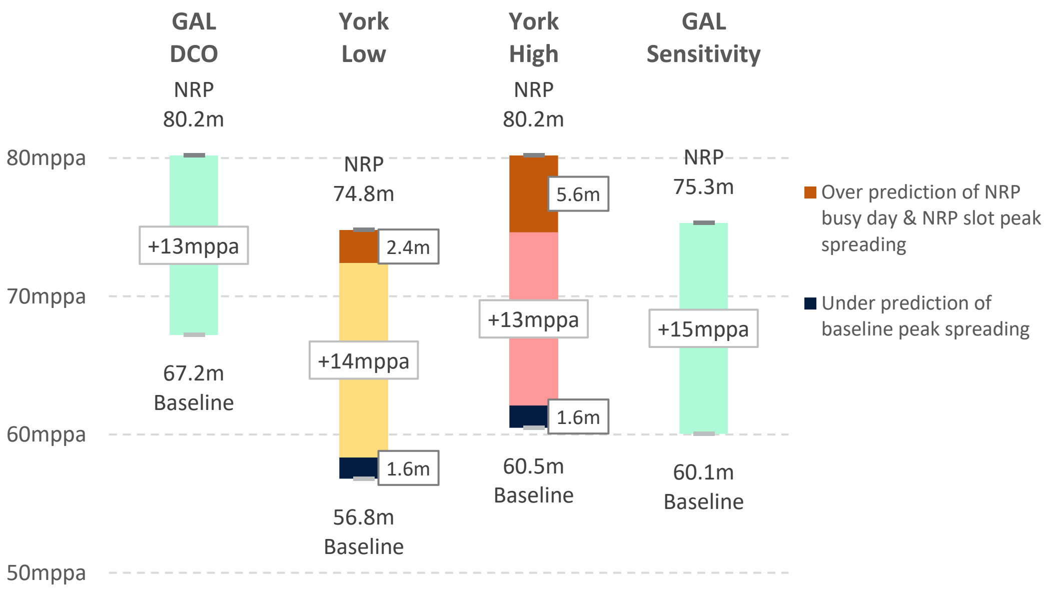


Figure 1.1.2 YA passenger forecasts for High and Low cases compared to GAL forecasts

1.1.11 The high-level outcome if any of the scenarios was endorsed is that the increased delta between the future baseline and NRP forecasts (by comparison to the equivalent DCO application forecasts) equates to a demonstrably greater need for the NRP with correlative increased benefits; however, the incremental impacts of the NRP may also be greater.

1.1.12 Those matters are explored in Section 5 of this document. Sections 2, 3 and 4 introduce the scenarios in more detail.

1.1.13 In high-level summary, the assessments find that the differences in environmental effects between the scenarios are relatively limited. Before summarising the detail, there are some high-level factors which mean that very different environmental outcomes from those identified in the submitted Application's assessment are unlikely. These are principally:

a. The starting position is that relatively few significant environmental effects are identified in the submitted DCO application.

b. Effects arising from the physical construction of the project are unaffected by the sensitivity scenarios.

c. The ES is concerned with effects arising from the addition of the NRP to the airport as it would have been without the NRP. The addition of the NRP does not significantly change the behaviour of the base case.

d. The sensitivity cases do not increase the overall total number of ATMs or passengers at the airport which have already been forecast and assessed in the application. In many topic areas, therefore, the maximum or worst-case impacts have already been assessed.

e. Whilst the sensitivities are designed to open up a bigger delta or change between the base case and the NRP case, the scenarios posed by York Aviation assume a slower rate of growth in passengers and ATMs. The submitted application assumes a faster rate of growth such that 2032 is generally assessed in the DCO application to be the worst-case year. With the York scenarios, 2038 comes out as the worst-case year, for instance, for noise and air quality. By 2038, however, impacts are moderated by improvements in air quality and aircraft noise.

f. The mitigations and controls proposed in the DCO application are assumed to also be in place for the scenarios – including the noise insulation scheme (which is designed to avoid significant effects on health and the quality of life), the current Night Flights regime, and the proposed Noise Envelope. The GAL proposed Noise Envelope steps down in 2038 and the effect of that would be to constrain (and to confirm as unrealistic) York's 2038 summer season throughput.

g. The ATM cap proposed in the application prevents greater impacts than those assessed here – for instance if York is right about increased summer season throughput and GAL is right about peak spreading in the base case.

1.1.14 All of these factors combine to limit the potential for greater effects than those assessed in the application.

1.1.15 The assessment set out in Section 5 do reveal some potential for greater effects, particularly for effects which are linked to the change in throughput in the peak day or the peak season and which arise as result of York's assumptions that more traffic can be achieved in the busy day / busy month / summer season. When examining those changes, however, it is important to remember that there are normally corresponding reductions in effects outside the 92-day summer season (because the overall level of activity has not increased), although these are not generally reported because assessments focus on the worst case.

2 Introduction

2.1 The purpose of this document

2.1.1 In light of a continuing lack of alignment between the Applicant and the JLA on matters to do with capacity and forecasting, the Examining Authority (ExA) asked, in their Rule 17 letter of 9 May 2024, the Joint Local Authorities (JLAs) to propose alternative forecasts to be used as a sensitivity analysis. This was submitted by the JLAs at Deadline 4 in their **Rule 17 Response** [REP4-049]. The alternative forecasts submitted to the ExA were prepared for the JLA by York Aviation (York or YA).

2.1.2 York have proposed a range of forecasts and two scenarios to be studied – the York Low Case and the York High Case. The summary table from that submission is reproduced below (Table 2.1.1) for convenience.

Table 2.1.1 YA passenger forecasts summary, 2047 (Table 2, and para 38)

	DAILY MOVEMENTS			AIRCRAFT SEATS AND LOAD FACTOR				ANNUAL COMMERCIAL MOVEMENTS	MPPA
	Average Day Peak Month	Average Day 92 Day Leq period	Annual Average	YAL Aircraft Size	YAL Load Factor	GAL Aircraft Size	GAL Load Factor		
BASELINE									
12 ADDITIONAL DAILY MOVEMENTS	921	905	793	218	90%			290,000	56.8
						224	92%	290,000	59.6
24 ADDITIONAL DAILY MOVEMENTS	933	917	805	218	90%			294,000	57.7
						224	92%	294,000	60.5
NRP CASE									
366,000 ANNUAL MOVEMENTS	1,131	1,115	1,003	227	90%			366,000	74.8
						227	92%	366,000	76.5
386,000 ANNUAL MOVEMENTS	1,189	1,164	1,052	227	90%			384,000	78.4
						227	92%	384,000	80.2

38. There are clearly many permutations that could be tested but we consider that it would be reasonable to test the difference between our most pessimistic cases and also between our most optimistic cases for consistency of assumptions regarding aircraft size and load factor, i.e.:

- between a Baseline Case at 56.8 mppa and an NRP Case at 74.8 mppa;
- between a Baseline Case at 60.5 mppa and an NRP Case at 80.2 mppa.

2.1.3 As shown in Figure 2.1.1 below, it is a characteristic of YA's figures that they substantially suppress the future baseline, whilst (in the case of the High scenario) maintaining GAL's headline forecast of total NRP throughput. The result in both scenarios is a significantly bigger gap or delta between the future baseline and the NRP forecasts.

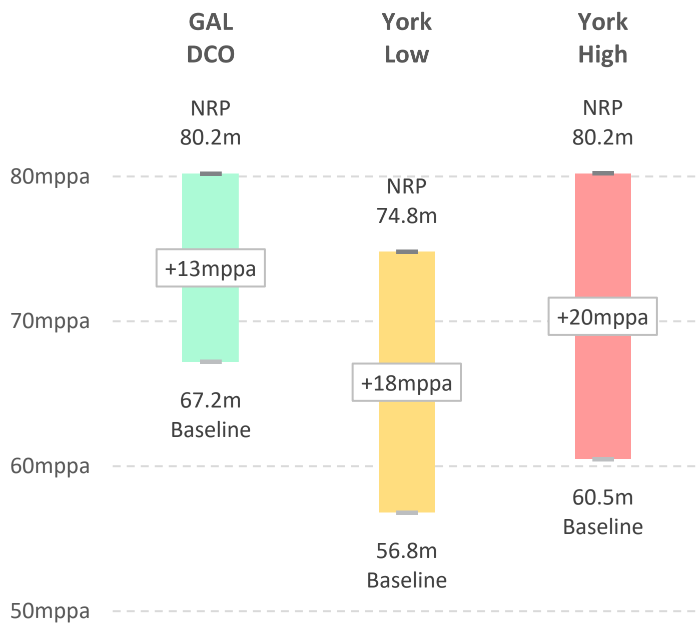


Figure 2.1.1 YA passenger forecasts for High and Low cases compared to GAL forecasts

2.1.4 The high-level outcome if either scenario was endorsed is that the increased delta between the future baseline and NRP forecasts (by comparison to the equivalent DCO Application forecasts) equates to a demonstrably greater need for the NRP with correlative increased benefits; however, the incremental impacts of the NRP may also be greater.

2.1.5 Notably, no greater level of overall throughput at the airport following the implementation of the NRP is postulated (by comparison with the ATM and passenger levels forecast in the DCO Application), although the character of the throughput and, particularly its annual profile, is different.

2.1.6 In order to assist the ExA in understanding what different environmental effects would arise in the event that the JLAs' forecasts were correct, the ExA has asked the Applicant to conduct environmental analysis of the JLAs' forecasts and report the findings at Deadline 5. The results of this exercise are reported in Section 5 of this document.

2.1.7 The Applicant has agreed to do this entirely without prejudice to the case set out in its DCO Application, which it considers continues to represent a realistic and robust view of how the airport would grow, both in the absence of the Project and existing planning caps (the future baseline) and with the benefit of a dual runway operation (the with-Project or NRP case).

2.1.8 To undertake the environmental analysis effectively it has been necessary to understand certain characteristics of the scenarios drawn by YA, i.e. the assumptions which underpin their forecasts, including assumptions on runway capacity, busy day capability and peak spreading assumptions, as well as the interim steps in their forecasts (at 2032 and 2038), all of which determine environmental effects.

2.1.9 Accordingly, following receipt of the JLA's **Rule 17 Response** [REP4-049] at Deadline 4, GAL sought to distil the characteristics of the revised YA scenarios in a set of slides and asked for confirmation that GAL's understanding was broadly correct. This was confirmed by YA on 21 May. GAL also asked further confirmation about detailed aspects of YA's scenarios, particularly relating to busy day movements and the split between short and long haul movements. That information was also provided by YA and has informed GAL's analysis.

2.1.10 To assist the ExA, the detail of those exchanges and the information provided by YA through those exchanges is set out in **Appendix A**. That information has been brought together in an updated set of slides, which was then used to instruct GAL's environmental team to undertake the sensitivity analysis. That slide deck forms **Appendix B**.

2.1.11 York has proposed two ranges of airport growth for the purposes of sensitivity assessment– the York Low Case and the York High Case:

- The York Low case proposes a 56.8 mppa future baseline and a 74.8 mppa with-Project case in 2047,
- the York High case proposes a 60.5 mppa future baseline and an 80.2 mppa with-Project case in 2047.

2.1.12 These represent a difference of 18.0 mppa in the York Low case and 19.7 mppa in the York High case (compared with the difference of 13 mppa in GAL's equivalent DCO forecasts in the submitted application). These headline figures need to be understood in the context of the assumptions that underpin them.

2.1.13 Figure 2.1.1 4 is repeated below (as Figure 2.1.2) for ease of reference. It illustrates the York cases, against GAL's DCO case:

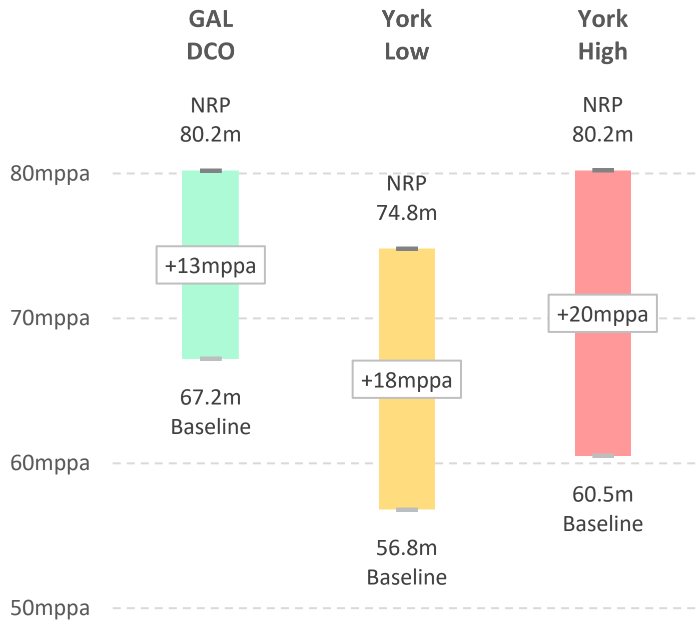


Figure 2.1.2 YA passenger forecasts for High and Low cases compared to GAL DCO forecasts

2.1.14 Particular assumptions made by York to derive their ranges include no peak spreading in the baseline case but an increased ATM throughput in the busy day and busy season in the NRP case.

2.1.15 In undertaking the sensitivity analysis, it has become apparent to GAL that there are difficulties with these and other key assumptions made by YA, which GAL considers to be not just wrong in their view of forecast growth but flawed and physically incapable of being realised, to the extent that the Applicant believes that no weight could be given to any outcomes arising from their consideration within this examination process. The reasons for believing this are set out in detail in Section 3.

2.1.16 Nonetheless, the Applicant has, as requested by the ExA, taken YA's scenarios at face value and has, within the constraints of the time available, analysed the resulting implications that they would have for each of the environmental topics which would be affected. The results of this analysis are reported in Section 5.

2.1.17 GAL had understood that the primary issue for the ExA was a question of whether the benefits and effects of the NRP would be significantly different if the future baseline was lower than the Applicant forecast in the DCO Application and that was the basis of the Rule 17 request. GAL had not expected the YA sensitivities also to challenge the assumptions for runway throughput in the NRP case.

2.1.18 GAL does not accept either end of York's changes – the exclusion of baseline peak spreading growth or the increased peak period throughput. Therefore, and to avoid the exercise requested by the ExA being completely nugatory, the Applicant has proposed its own sensitivity test, still without prejudice to the basis of its existing application. GAL's sensitivity test has the following characteristics:

- It rejects the York assumption that there can be no peak spreading in the future baseline but moderates the extent of GAL's DCO forecast peak spreading and uses a more modest assumption, to ask the question: "*what if peak spreading in the future baseline was less than forecast in the DCO?".*
- For the NRP it rejects York's substantial increase in peak season runway throughput but tests a more modest increment on top of the DCO forecasts, to ask the question, "*what if the dual runway operation could achieve some more busy day throughput?".*

2.1.19 This results in three sensitivity cases, to be assessed for their effects by comparison with the effects reported in the DCO application as shown in Figure 2.1.3:

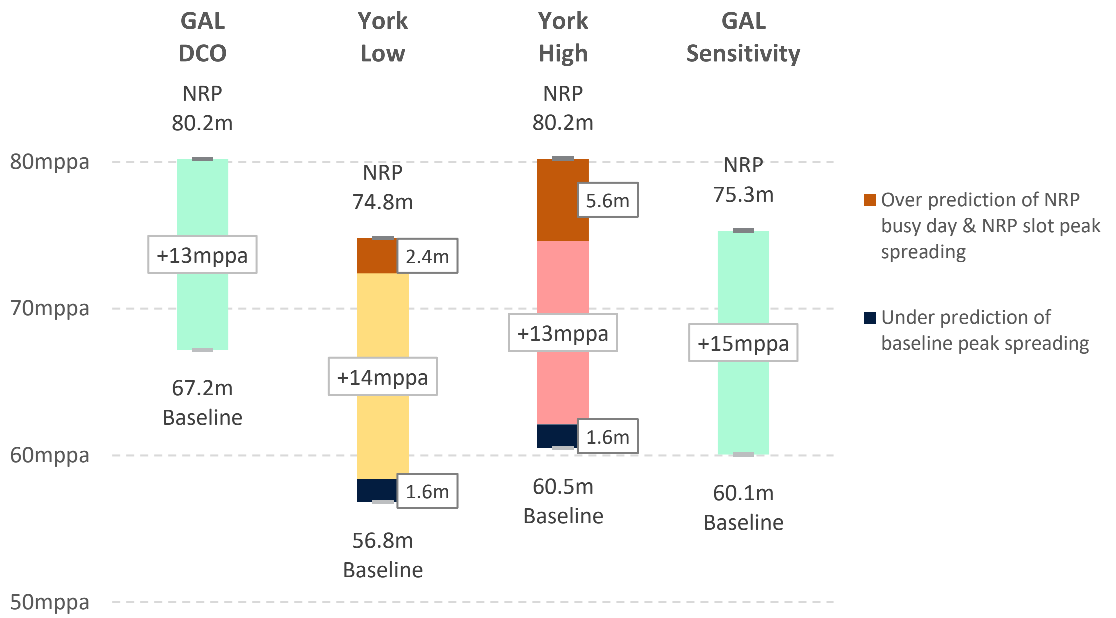


Figure 2.1.3 YA passenger forecasts for High and Low cases compared to GAL forecasts[1]

[1] The under prediction of baseline peak spreading is calculated using YA's forecasts combined with the GAL sensitivity test of 1.13 for the peak spreading ratio (i.e. the average day in August is 13% busier than the annual average). The over prediction of the NRP busy day is calculated by capping the NRP throughput at GAL's maximum daily throughput of 1,134 ATMs. The over prediction of assuming all incremental traffic operates every day (ratio 1.00) is adjusted to reflect a modest seasonality of 1.04 (so for every 100 peak slots added, a year round utilisation of 96 is achieved)

2.1.20 The headline assumptions and numbers for all three sensitivity tests (York High, York Low and the GAL Sensitivity) are reported in Sections 3 and 4 and the likely implications for the assessed effects of the relevant environmental topics of all three are reported in Section 5. The outcome is that there are relatively small changes only in the effects of the NRP under each scenario from those set out in the submitted application.

2.1.21 Section 6 considers how these results could affect the economic benefits reported in the DCO application and Section 7 reflects on implications of the exercise.

3 York Aviation Forecasts proposed for sensitivity testing

3.1 The York Aviation forecasts

3.1.1 This section focuses on the forecasts provided by YA, how these differ from the Applicant's DCO forecasts and whether the YA forecasts are deliverable with the project infrastructure or in keeping with the evidence already before the examination.

3.2 High and Low cases

3.2.1 In their **Rule 17 Response** [REP4-049] submitted at Deadline 4, YA have described a range of possible future baseline forecasts and a range of possible with-project forecasts. YA then proposed two sensitivity tests to be analysed, the York Low Case and the York High Case which draw on this range of forecast outcomes to represent their view of the upper and lower end of potential outcomes:

- The York Low case proposes a 56.8 mppa future baseline and a 74.8 mppa with-Project case in 2047,
- the York High case proposes a 60.5 mppa future baseline and an 80.2 mppa with-Project case in 2047.

3.2.2 YA also supplied, at the Applicant's request, the same figures for the 2032 and 2038 design years (See Table 3.2.1 below).

Table 3.2.1 YA passenger forecasts for High and Low cases compared to GAL forecasts

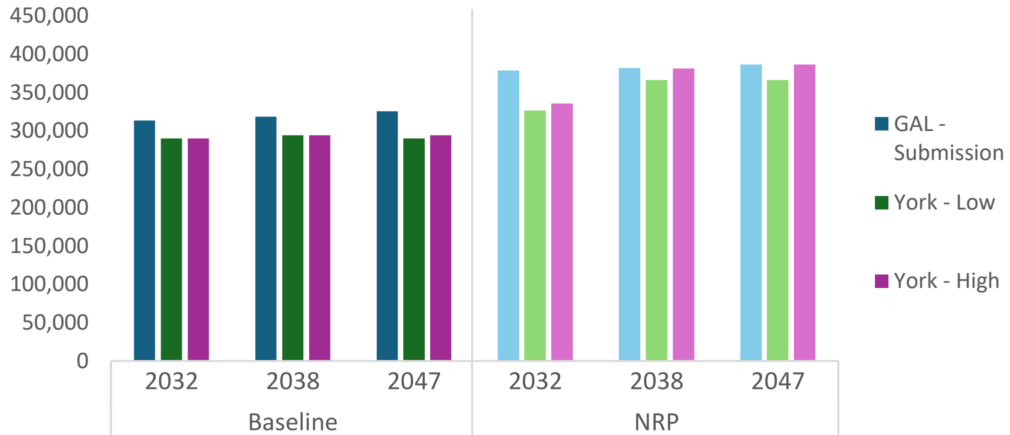
	2032			2038			2047		
	Baseline	NRP	Gap	Baseline	NRP	Gap	Baseline	NRP	Gap
GAL Submission	**59.4**	**72.3**	12.9	**62.4**	**75.6**	13.2	**67.2**	**80.2**	13.0
York Low	**53.5**	**61.0**	7.5	**55.4**	**71.0**	15.6	**56.8**	**74.8**	18.0
York High	**55.5**	**64.2**	8.7	**57.5**	**75.6**	18.1	**60.5**	**80.2**	19.7

3.2.3 The environmental analysis requested by the ExA needs to draw on a number of different aspects of these forecasts to determine the consequent differences which would arise to the existing environmental assessment. Some topics (such as Transport) rely on the busy day predictions, some (particularly Noise) on the summer 92 day L_{eq} period predictions and others (such as Air Quality) on the total annual air traffic movements or passenger movements.

3.2.4 Each of these characteristics is set out and considered below.

3.3 Annual air traffic movements

3.3.1 York have provided GAL with their assumptions regarding annual runway movements. These figures have been compared to the equivalent in GAL's DCO submission. The relevant figures are provided in Figure 3.3.1 following.



	2032 (Baseline)	2038 (Baseline)	2047 (Baseline)	2032 (NRP)	2038 (NRP)	2047 (NRP)
GAL - Submission	313,358	318,478	325,504	378,145	381,771	385,975
York - Low	290,000	294,000	290,000	326,000	366,000	366,000
York - High	290,000	294,000	294,000	335,000	381,000	386,000

Figure 3.3.1 Comparison of stated annual ATMs – taken from YA email dated 15 May

3.3.2 **The baseline**: it can be seen that the YA scenarios assume similar numbers for annual ATMs in both their baseline scenarios, which are about 10% lower than the GAL forecast figures.

3.3.3 **The NRP case**: the YA NRP figures grow more slowly than the GAL DCO forecasts but in the High case reach the same number as the GAL forecast in 2047 while the Low case is 5% lower.

3.3.4 **Commentary**: As well as the total annual numbers, it is important to understand the busy day and monthly traffic patterns and the resulting implications for demand and capacity capabilities. To do this, assumptions about peak spreading which underpin these metrics also need to be understood.

3.4 Peak Spreading

3.4.1 This is one of the key points of difference between GAL and YA and therefore critical for the sensitivity case. YA provided their assumptions on annual peak spreading in YA's **Rule 17 Response** [REP4-049] for both the future baseline and the NRP cases.

3.4.2 The Applicant is concerned that YA's assumptions for peak spreading are extreme. In their baseline assumptions **no** peak spreading is assumed, but in their NRP forecast every new slot is assumed to be perfectly peak spread (i.e. flat throughout the year). Neither of these is realistic but the baseline peak spreading assumption has the greater impact.

3.4.3 **The baseline**: As shown in Figure 3.4.1 below, YA assume that there is **no change at all** in annual peak spreading in the future baseline case from the 2019 levels, even by 2047 in either their High or Low case. This maintains the August air traffic to annual average air traffic ratio at 1:16 (meaning that August is 16% busier than the year-round average) compared to GAL's DCO 2047 forecast that peak spreading would take the ratio to 1.06. The consequence of assuming no growth from peak spreading is a lower annual passenger throughput in both YA future baseline cases.

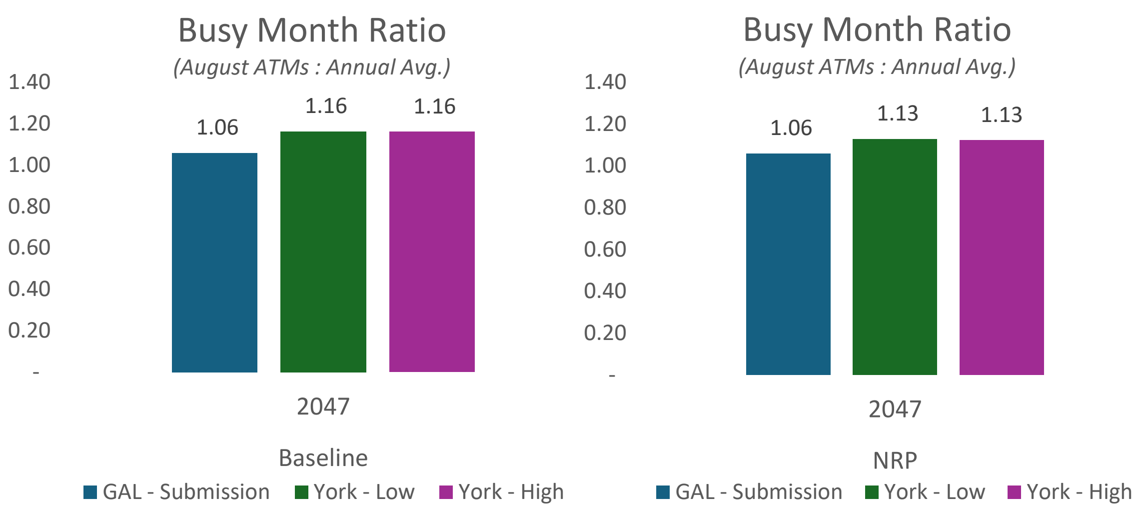


Figure 3.4.1: YA annual peak spreading assumptions compared to GAL's DCO forecast

3.4.4 **The NRP case**: To achieve their peak spreading assumptions of 1.13 in the NRP case whilst holding this ratio at 1.16 in the baseline case, YA have had to assume that every movement added by NRP is perfectly peak spread at a ratio of 1.00, or in other words all new slots operate every day of the year. This is an extreme and improbable assumption. A more credible but still very flat assumption would be a maximum ratio of 1.04.

3.4.5 **Commentary:** as the examination is aware, the parties disagree about the ability of Gatwick (in the base case) to continue what is an established trend of peak spreading at the airport. This document is probably not the best place to rehearse that disagreement, but the ExA is referred to GAL's previous submissions, which included evidence to the effect that:

- In the period 2014-2019 Gatwick achieved ATM growth of 6% pa (i.e across the year) but ATMs grew at 14% pa outside the summer season.[2] By making zero allowance for peak spreading in the baseline, YA assume that trend will simply stop, which is not credible.

- In more recent years when Gatwick was even more constrained in the summer period (2016-19) 5% growth in winter ATMs was achieved without any uplift in the peak period. This resulted in an additional 29 winter daily ATMs in this relatively short period. Whilst ATM demand was constrained in the peak, it was still able to grow in the off-peak reflecting the overall market growth.

- In the same period aircraft loading factors grew faster in the off-peak than the peak, but were still lower, with further capacity for growth.[3]

- Newly released slot capacity was allocated to year round carrier operations – indeed that is a characteristic favoured by the slot allocation rules.[4] Whilst the release of new slots going forward will be limited, new slots declared in 2024 and slots returned and re-released should have these characteristics, but they have not been recognised by YA.

- Slot trades and slot swaps are more common and characteristically are being used to trade up to year round services.[5] It is not reasonable to refuse to recognise this established trend.

- GAL has twice explained that this trend is not unique to Gatwick but is being replicated elsewhere given the constraints in the market and the opening up of year round destinations, so that for example Ryanair at Stansted and Dublin has a peak to year round ratio of 1.07[6], whilst other airports with a mix of low cost and long haul traffic achieve similar ratios. However, this has elicited no response or acceptance.

- GAL has produced detailed evidence of the seasonal pricing it has introduced to incentivise off-peak traffic.[7] York acknowledge this at their **Rule 17 Response** [REP4-049], paragraph 20: "*We do accept that, on the margin, price incentivisation may allow for some extension of the operating season for services that currently only operate at peak periods but we have not separately calculated this as it is likely to have a relatively*

[2] REP4-022 paragraphs 2.3.1- 2.3.5
[3] REP4-022 paragraph 2.4.4
[4] REP3-079 paragraph 6.1.29
[5] REP4-022 paragraphs 2.3.9-2.3.10
[6] REP4-022 paragraph 2.1.13.
[7] REP4-037 Actions 7 and 8.

marginal impact within the range of outcomes set out below." To be fair a more generous recognition would have been appropriate.

Acknowledged or not, however, York make zero allowance for it – it is not captured "*within the range of outcomes set out below*" because zero peak spreading is allowed for in any scenario in the future baseline. Again, that is not fair or reasonable.

3.4.6 Under the baseline case, further peak spreading should be expected reflecting these factors and the fact that demand is still forecast to continue growing year-round (i.e. passenger growth will not only occur in August). Gatwick demonstrated strong de-peaking trends in the years leading up to 2019 and slot swaps and ongoing allocation will support further growth of year round services. GAL has already conservatively forecast that the rate of peak spreading will slow (See the **Technical Note on the Future Baseline** [REP1-047] at Section 1.5).

3.5 Runway throughput: busy day

3.5.1 In the NRP scenarios, whilst YA maintain that the annual ATM numbers will be the same as GAL's forecast of 386k ATMs (York High case) or close (York Low case) (see Figure 6 above), they simultaneously assume a significantly reduced level of annual peak spreading compared to that forecast in the DCO Application. The consequence of that needs to be understood.

3.5.2 The same total annual passenger throughput could only be achieved by YA assuming a significantly greater level of traffic throughput in the summer months than the GAL forecast proposes. In very simple terms, if the increased movements cannot appear in the winter, they must (mathematically) appear in the summer.

3.5.3 This is illustrated in the graph in Figure 3.5.1 where the YA NRP forecasts are shown to significantly exceed the GAL NRP case forecast in the summer months but trail GAL's forecasts for the rest of the year.

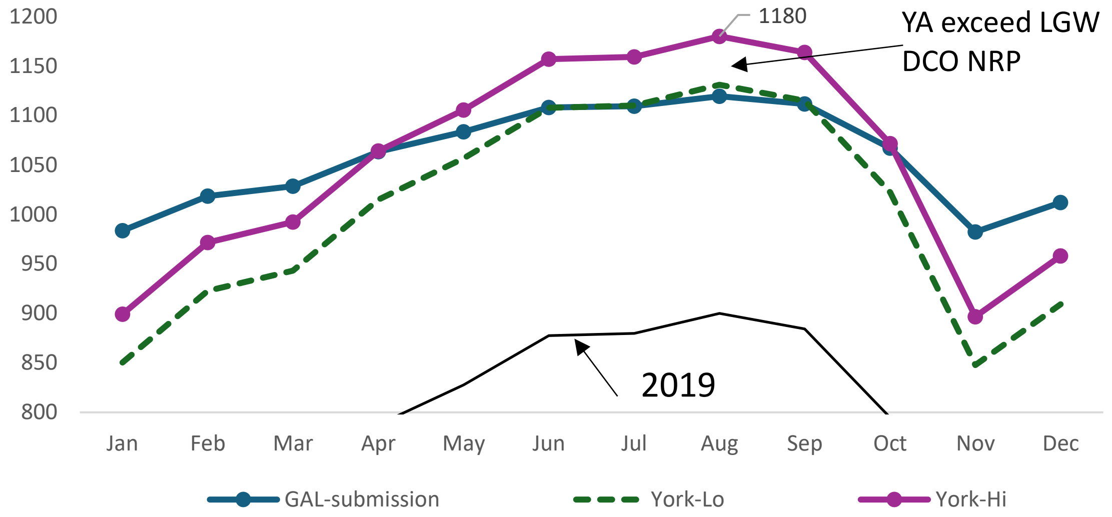


Figure 3.5.1: Monthly traffic profiles in 2047 NRP cases compared (average daily ATMs)

3.5.4 As has been noted in the preceding paragraphs and confirmed in 3.5.2 below, YA's forecasts for the NRP case busy day differs markedly from the GAL forecasts, although their future baseline busy day assumptions are very similar. These figures are expanded on in **Appendix A**, Slide #s 2-3 and 5-6.

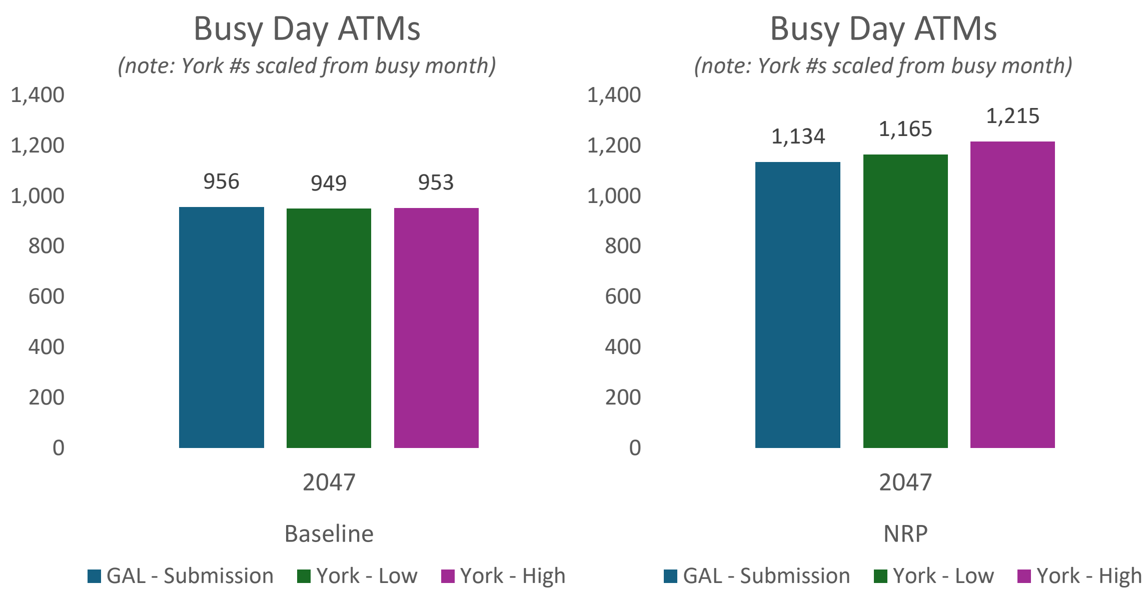


Figure 3.5.2: Busy day comparisons for 2047 (Daily ATMs, Baseline (left), NRP (right))

3.5.5 The delta which YA is asserting between the future baseline and NRP cases, therefore, relies on a number of assertions and assumptions but one of them is that Gatwick can achieve a substantially greater number of flights on the busy day than GAL believes is physically possible at the airport following the implementation of the NRP. Busy day assumptions are key because they drive

ATM numbers across the year (depending on assumptions about peak spreading).

3.5.6 GAL's forecast for the 2047 NRP busy day is 1,134 ATMs[8]. YA provided August ATMs which have been scaled by GAL to create the busy day numbers based on historical ratios. These were subsequently confirmed as appropriate by York (in York's email of 21 May, see **Appendix A**). This results in the YA 2047 NRP busy day having **81** more movements in their High case (1215 vs 1134) than GAL's forecast and **31** more movements in their Low case.

Table 3.5.1 Variations in busy day forecasts

	Busy Day ATMs	Variance (vs Submission)
GAL Submission, NRP	1,134	n/a
York Low, NRP	1,165	+31
York High, NRP	1,215	+81

3.5.7 The annual implications are also clear. The additional busy day demand assumed by YA results in an additional 278 movements every day of the year, allowing YA to suggest an incremental 92k annual movements (278 x 365) between their baseline and NRP scenarios in their High case.

3.5.8 If these additional busy day movements are applied through the daytime period following the expected daily demand pattern, this equates to peak runway throughput rates of **74** and **71** movements per hour respectively in the YA High and Low cases compared to **69** movements per hour in the GAL DCO forecast.

3.5.9 This is shown in Figure 3.5.3 below where the additional 81 daily movements assumed by the York High forecast (yellow line) and the 31 additional daily movements assumed by the York Low forecast (brown dotted line) are compared to the submitted GAL forecast (green line).

[8] 10.7 Capacity and Operations Summary Paper Appendix: Airfield Capacity Study, [REP1-054], Para 3.1.4. Table 2 (Refers to 2038 which is comparable to 2047)

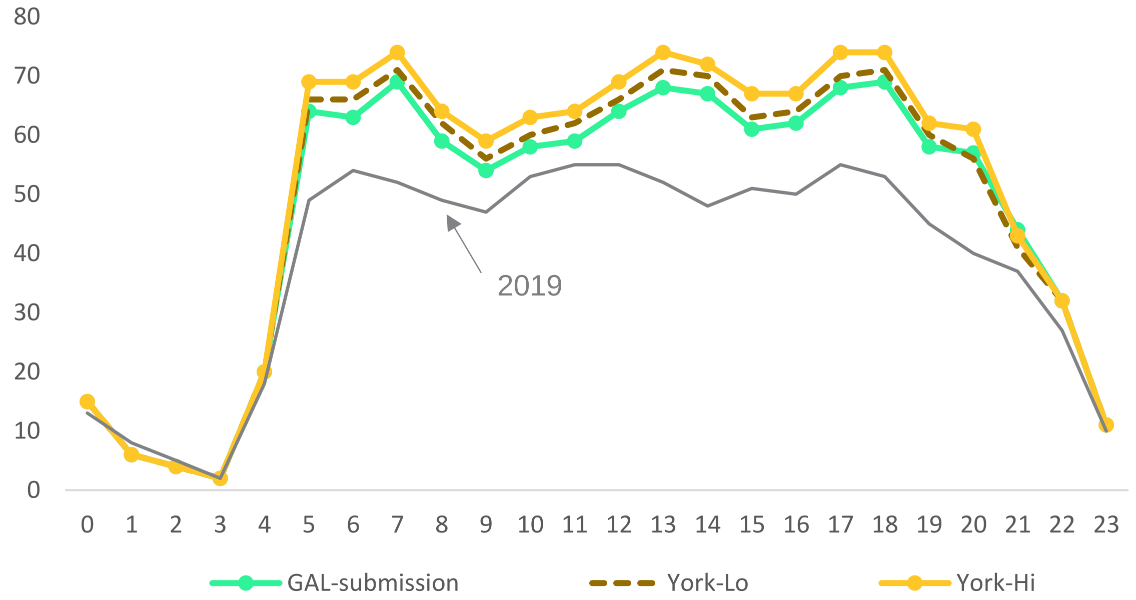


Figure 3.5.3: Northern Runway forecast – 2047 busy day comparison (ATMs by hour, UTC)

3.5.10 The distribution shown across the day in the YA scenarios uses the same profile as the GAL busy day schedule in core hours, because of the need for runway throughput rates to drop below the maximum after the morning peak.[9]

3.5.11 The hours with reduced scheduled demand (lower than 69 mph) must be maintained for the following reasons:

- 0700 has a poor departure SID[10] balance resulting in decreased capacity.
- 0800 provides resilience from external factors delaying first wave flights.
- Between 0900 to 1100 UTC the runway capacity is lower due to the high number of widebody aircraft reducing the runway capacity. Increases in demand at this time would have a significant impact on runway holding times.
- Post 2000 there is low demand for departures and a higher number of arrivals, increase in arrival holding after this point risks flights being pushed into the night period.

3.5.12 If a flatter profile was to be assumed, then a constant 68-69 ATMs per hour would be required to achieve York's NRP High case of 1,215 daily ATMs. This illustrative profile is shown in the following Figure 3.5.4 (York-High case).

[9] York has criticised any suggestion that a different profile can be achieved *"airlines are not willing to adjust their flight timings to take up the remaining spare slots"*, [REP4-052] para 20.
[10] SID refers to the departure routings

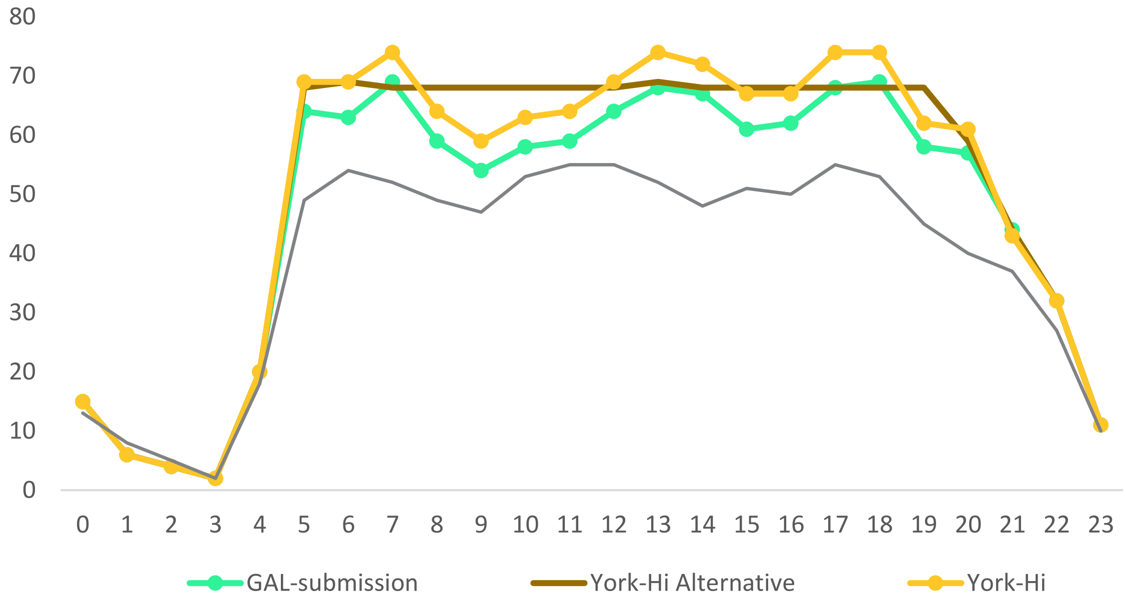


Figure 3.5.4 Northern Runway forecast – 2047 busy day comparison (ATMs by hour, UTC)

3.5.13 This approach results in the troughs 'in-filling' to a greater extent than the peak hours, for example the 0900 hour increases from 54 ATMs (GAL submission) to 68 ATMs (+14) whilst peak hours such as the 1700 & 1800 hours would remain at 68 ATMs (+0).

3.5.14 This profile is not realistic because of the rationale set out in 3.5.11:

- The long haul mix in certain hours (e.g. 0800-0900) limits the NRP capabilities (i.e. 69 ATMs per hour is not physically possible when wide body aircraft are operating at scale)
- York have commented that the quieter hours would be more challenging to fill (for example mid-afternoon), compared to peak hours (for example, based aircraft departure slots)
- Such a flat profile would not reflect the demand patterns exhibited at Gatwick today which would be expected to broadly continue since they reflect the underlying demand characteristics of airlines.

3.5.15 To summarise, the additional movements in the busy day proposed by YA add to the forecast peak runway throughput, pushing peak hour movements up to between 71 and 74 movement per hour (mph). The feasibility and consequences of doing this are discussed below.

3.5.16 In addition to increasing the peak hour runway throughput, YA's forecasts also significantly increase busy day passenger numbers. Taking YA's NRP stated assumption of 227 seats per plane at a load factor of ~95% (to reflect a peak day), the 81 additional flights in the York High case would create more than **17,000** additional passengers per day to be processed by the airport above that which the application has assumed and over **6,500** more in their Low case.

3.5.17 There are several reasons why the busy day figures proposed by YA for the airport in dual runway operations are unachievable. These are explained in the following paragraphs which show why the Applicant believes that little or no weight should be attached to any environmental analysis that relies upon the busy day figures provided by YA.

3.5.18 The three principal reasons for believing these levels of busy day rate to be unachievable are:

- The capacity of the runway;
- The capacity of the stands; and
- The capacity of the terminals.

3.6 Runway Capacity

3.6.1 The runway capacities required by YA's High and Low cases of 74 mph or 71 mph are more than can be achieved with the proposed dual runway infrastructure, which GAL has tested and shown to have a capacity of c. 69 mph[11]. GAL has confirmed and demonstrated this mismatch by attempting to run fast time simulation modelling using the runway throughput rates implied by the YA busy day profile.

3.6.2 In the YA High scenario, the majority of the model runs failed to complete due to grid lock of the taxiway system from delays to departing aircraft. The only run which did complete showed more than 30 minutes departure holding time and 19 minutes on arrivals; results are shown in Figure 13.6.1.

3.6.3 In the YA Low scenario, the simulation was able to run; however departure holding times reached almost 19 minutes and were significantly higher than those experienced in 2018; arrival holding reached 11 minutes. The results over 10 runs are shown in Figure 3.6.1.

[11] See paragraphs 3.4.1 and 5.2.4 of the Capacity and Operations Summary Paper Appendix: Airfield Capacity Study [REP1-054]

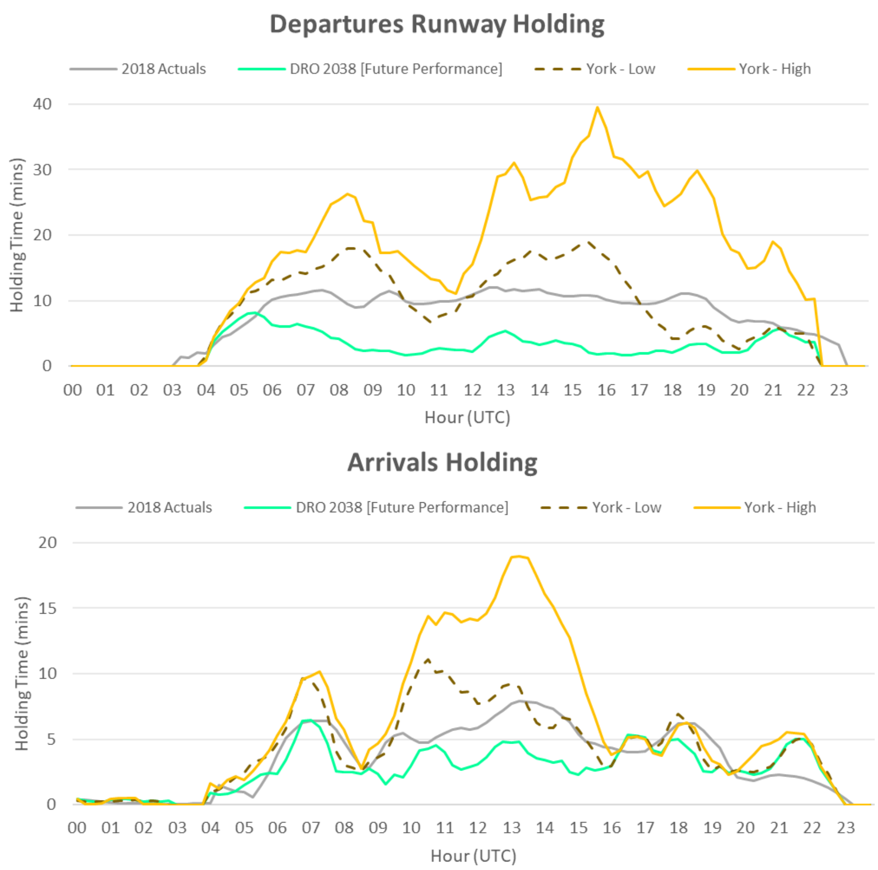


Figure 3.6.1 Airfield simulation results comparing holding times generated by GAL & YA NRP ATMs

3.6.4 YA has been critical of the Applicant's proposals in both the future baseline case and the NRP case on this very point and expressed doubts that the levels of holding reported in the Applicant's forecasts (the green lines in Figure 3.6.1) are sustainable, meaning that the peak hour runway throughput of 69 mph assumed by GAL may not be achievable (although we note the slight softening of this position in paragraph 32 of their **Rule 17 Response** [REP4-049]).

3.6.5 Nonetheless, it is obvious both from the data shown in Figure 12 and from YA's own clearly stated position, that the runway holding times produced by trying to achieve more than 69 mph in a dual runway scenario are unacceptable. GAL would not schedule capacity on that basis.

3.6.6 It follows that any scenario that relies on the assumption that significantly more than 69 mph can be achieved in a dual runway operation is unrealistic and the YA scenarios and any inferences drawn from them must be considered in this context (noting that the YA High case, which requires 74 movements per hour, is significantly more unrealistic than the Low case, which requires 71 movements per hour).

3.7 Stand Capacity

3.7.1 Both the High and Low YA NRP scenarios increase the number of movements in the first wave (for the reasons already explained), of which the majority of demand is expected to be departures. The growth in first wave departures results in a higher number of aircraft parked overnight at the airport. These are termed 'based aircraft'.

3.7.2 The peak stand requirement at London Gatwick is between 0400 to 0430 UTC. The number of aircraft parking positions proposed through the NRP is adequate to provide for the GAL forecasted first wave; but any additional first wave departures would result in an increase in aircraft parking requirements. The Low scenario is expected to require an increase in the number of based aircraft by 4 aircraft and in the high scenario by 9 aircraft.

3.7.3 In addition to the increase in based aircraft there is also expected to be an increase in the number of Code E aircraft on the ground at once. At a minimum an additional Code E parking position would also be required.

3.7.4 The increased number of based aircraft and Code E aircraft operating in the York Aviation's Low and High scenario result in the following additional aircraft parking requirements at a minimum:

Table 3.7.1 Additional aircraft stands required by York Low and High forecasts

Stand Size	York Aviation - Low	York Aviation - High
Code C	+4	+9
Code E	+1	+1

3.7.5 There is no area within the proposed development which could accommodate the additional aircraft parking positions required to meet the demand for either the Low or High NRP scenario proposed by York Aviation.

3.7.6 These could only be created by a radical change to the Gatwick masterplan involving growth outside of the existing airport boundary.

3.8 Terminal Capacity

3.8.1 The YA Low scenario results in a circa 3% uplift in passengers throughout the core period busy day and the High scenario results in a circa 8% uplift, or 6,500 and 17,000 passengers respectively across the full busy day. This additional passenger demand would result in the need for the following additional terminal facilities:

Table 3.8.1 Additional terminal processing facilities required by the York Low and High forecasts

Terminal Facility	York Aviation - Low	York Aviation - High
Check-in	+15 input points	+41 input points
Security	+2 additional lanes	+2 additional lanes
Immigration	+2 processing points	+6 processing points
Arrival Baggage	+2 belts	+2 belts

3.8.2 The DCO maximises opportunities to make use of the existing terminal footprint to provide additional infrastructure to deliver the forecasted passenger demand from the GAL schedule. Scope to add further infrastructure within the existing terminal footprint is minimal, hence any additional infrastructure requirements, as a result of the additional passenger demand, would likely require additional terminal footprint. This is particularly true in the case of security and arrival reclaim.

3.8.3 The additional terminal footprint required to deliver these facilities is not part of the proposed development.

3.8.4 It follows that any scenario that relies on the assumption that this additional passenger processing capacity is available is, again, unrealistic.

3.9 Noise Envelope

3.9.1 It is also relevant that the YA High case is not compatible with the noise envelope that the Applicant has proposed for the project. The increased number of flights assumed by the YA High case in the summer season would generate a larger noise footprint (and therefore a larger noise envelope) than that proposed in the DCO.

3.9.2 The Noise Envelope is based on the 92-day summer season average mode contours. As shown in Table 3.2.1, York assume slower growth in the NRP case to 2032. However, by 2038, annual throughput is comparable in YA's High case with the forecasts in the DCO. Traffic in the YA High case 92-day summer season would be higher than the DCO submission figures.

3.9.3 A Noise Envelope calculated on the same basis as that used in the DCO (see [APP-177]) would, therefore, be greater in 2038 with YA's forecast and the step down in the size of the Noise Envelope to which GAL has committed would not be achievable.

3.9.4 Even if YA was right that there is significantly more capacity achievable in the summer season than GAL believes, GAL does not intend to increase its 2038 noise envelope and is content to be restricted to the noise envelope and noise footprint that it has assessed for 2038.

3.9.5 It follows that YA's High Case summer season flight numbers in 2038 and beyond could not be achieved without breaching the terms of any DCO granted consistently with GAL's forecasts.

3.9.6 But in addition, for the reasons set out above, there are good reasons to believe that YA's assumed peak period throughputs in both their Low and High cases cannot be physically accommodated by the proposed project infrastructure. For these reasons, the York scenarios and any effects that flow from them should not be considered further in this process.

3.10 Conclusions

3.10.1 For the reasons set out above, York's sensitivity scenarios are not achievable and the gap or delta which they forecast between the baseline and the NRP cases is therefore exaggerated. As requested by the ExA, however, the environmental effects of the York High and Low cases are reported in Section 5, without prejudice to GAL's submissions.

3.10.2 In order to make the sensitivity exercise more meaningful and helpful to the examination, it is appropriate to make better informed assumptions on peak spreading and the achievable busy day throughput. The Applicant therefore proposes an alternative sensitivity test which is explored in Section 4.

4 GAL proposed sensitivity test

4.1 Introduction

4.1.1 In its DCO submission, GAL forecast throughput of 67.2 mppa in the future baseline at 2047 and 80.2 mppa with the benefit of the NRP (see Figure 2.1.1).

4.1.2 To assist with the exercise of sensitivity testing, the Applicant is aware of the ExA's desire to understand the effect of significantly different assumptions of future peak spreading and has therefore generated a sensitivity scenario which adopts far more conservative assumptions in both the future baseline and the NRP case than in the DCO submission. This has the effect of significantly reducing the annual passenger throughput, in both cases by approximately 7 mppa.

4.1.3 At the same time the Applicant recognises that it may be helpful to test the theory of the YA assertion that has now been raised that it might be possible to achieve more movements in a dual runway operation than GAL has suggested in its submission. The Applicant has therefore increased its NRP busy day assumption from that used in the DCO application in this sensitivity test to discover what might be expected to happen in the event that this occurred.

4.1.4 This has been done incrementally across the design years, providing 20 additional busy day movements in 2047. This amount may well be more than the project infrastructure can practically deliver for the reasons already stated but it is done here purely to assist an understanding of the environmental effects that would arise if this increase were possible and to give the ExA comfort that this has been considered, whilst at the same time avoiding the more extreme and undeliverable levels proposed by the YA sensitivity tests[12].

4.1.5 The inclusion of these additional movements widens the passenger gap between the baseline and the NRP case from 13 mppa to c.15 mppa.

[12] If the Applicant's original peak spreading assumptions are correct, i.e. that a flatter yearly profile is achieved in future years which reaches a ratio of 1.06, such additional peak period movements would not be possible in this scenario because they would be prevented by the ATM cap of 386,000 ATMs proposed by the Applicant. However, if annual peak spreading in the NRP case falls below 1.06 some increase in busy day throughput becomes theoretically possible without breaching the ATM cap, hence the inclusion in this sensitivity test.

4.2 Headline figures for GAL sensitivity

4.2.1 The following Table 4.2.1 lists the principal differences between the DCO submission, the YA Low and High scenarios and this GAL proposed sensitivity test.

Table 4.2.1 Characteristics of the sensitivity tests

	2047 Future Baseline			2047 NRP		
	Busy Day ATMs	Peak Spread	Annual Passengers	Busy Day ATMs	Peak Spread	Annual Passengers
DCO submission	956	1.06	67.2m	1,134	1.06	80.2m
GAL sensitivity	948	1.13	60.1m	1,154	1.12	75.3m
YA Low	949	1.16	56.8m	1,166	1.13	74.8m
YA High	953	1.16	60.5m	1,215	1.12	80.2m

4.2.2 Figure 4.2.1 below illustrates the headline differences between the GAL DCO submission case and this GAL sensitivity test case, the most obvious being the significantly lower baseline growth assumption, driven by the conservative assumptions on baseline peak spreading.

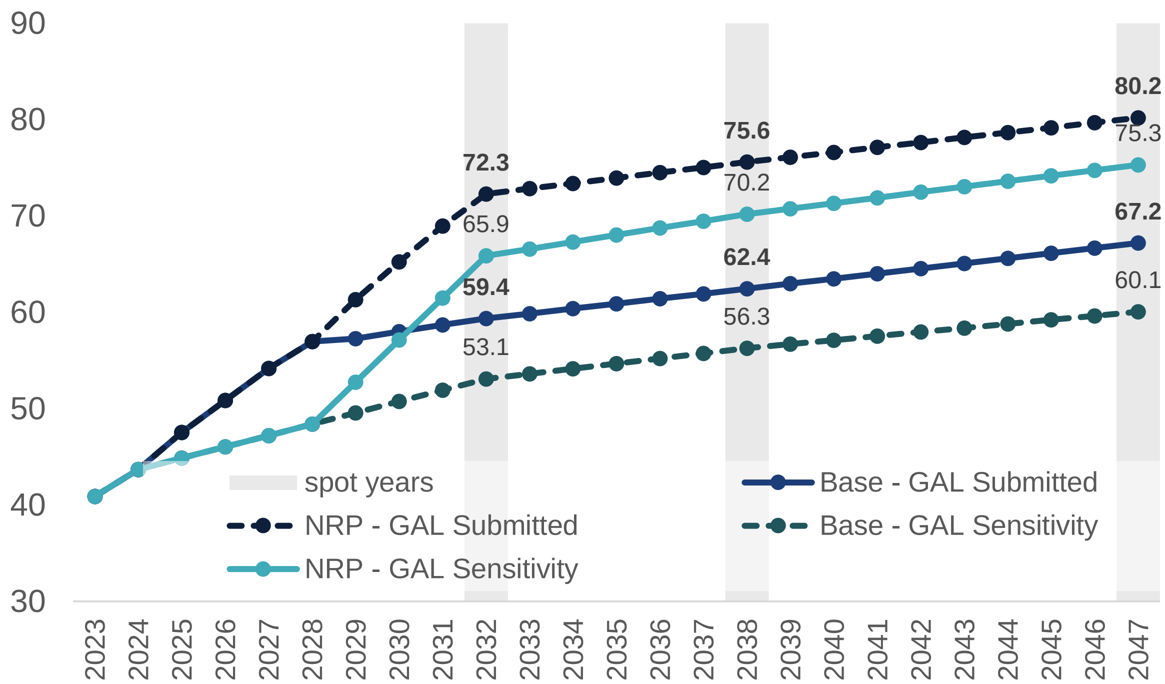


Figure 4.2.1 Gatwick Annual Passengers, GAL Submission and Sensitivity (millions)

4.3 Aircraft size and load factor

4.3.1 The Applicant has retained the same average aircraft sizing as the DCO submission at 224 seats in the baseline and 227 seats in the NRP case. General agreement has been reached with YA regarding rates of fleet transition. Even in YA's Low case the difference assumed in aircraft size in 2047 from the DCO Application was under 3%, which over a 20+ year time frame is considered minor.

4.3.2 However, in the GAL sensitivity test, the load factor assumptions have been reduced to 90% from the 92% and 91.6% used in the DCO Application baseline and NRP cases respectively. This represents a more conservative view than the DCO, for the purposes of sensitivity.

4.4 Peak spreading

4.4.1 The Applicant has outlined at paragraph 3.4.5 above at length why it considers its current submission assumptions on peak spreading are credible. In order to assist this sensitivity test exercise, however, the Applicant considers the YA assumptions made on this (see Figure 3.4.1 above) – that no change at all in peak spreading in the future baseline case is to be expected over the next 23 years – is too extreme to be credible.

4.4.2 To provide a more appropriate figure whilst still seeking to fulfil the purpose of the requested sensitivity test, the Applicant has proposed the use of what it considers to be the lowest possible (but still meaningful) figure for peak spreading in the future baseline.

4.4.3 Accordingly, for this sensitivity test, the Applicant has assumed that peak spreading ratio between August and year-round throughput in the baseline improves to only 1.13 from the 2019 position of 1.16. This is much less than the DCO submission assumption of 1.06 and drives much of the drop in the baseline passenger assumptions from 67.2 mppa in 2047 to 60.1 mppa.

4.4.4 The diagram below, shows the assumed changes over the period to 2047 and the drivers that can be relied upon to at least deliver the improvement to the sensitivity test ratio of 1.13.

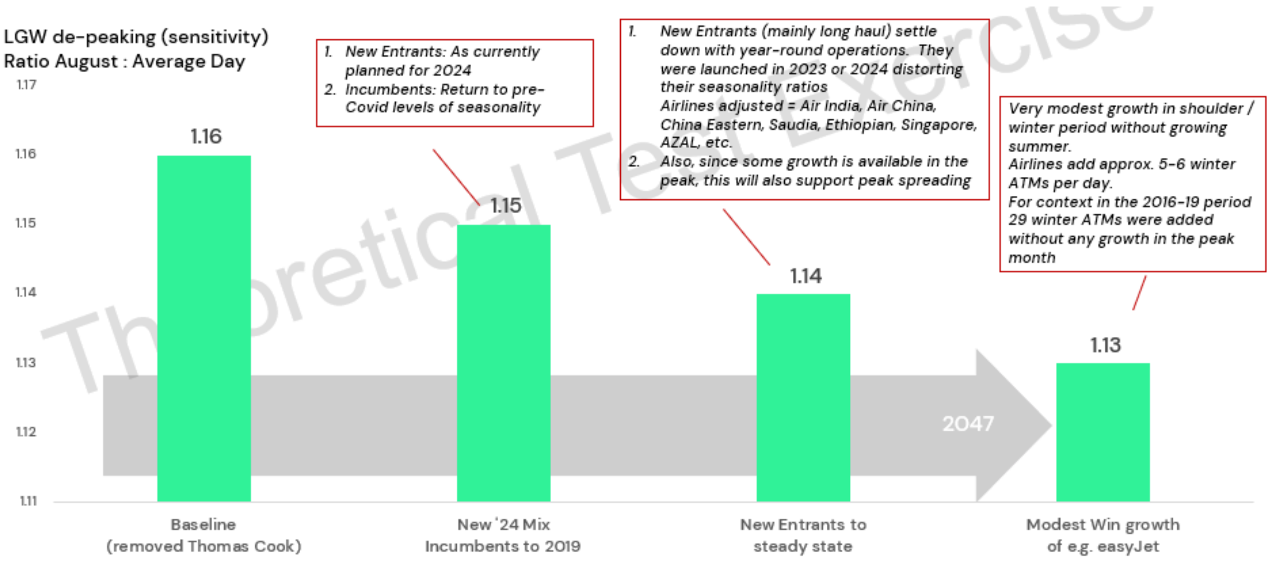


Figure 4.4.1 Gatwick, Peak Spreading Example (GAL Sensitivity, baseline)

4.4.5 Having selected the figure of 1.13 for the lowest credible baseline peak spreading assumption, it is important to understand that the degree of achievable peak spreading in the **NRP** case can only be c. 0.01 better than this at 1.12. This is for two reasons:

- because, as previously discussed in paragraph 3.4.4, the most optimistic but credible assumption on the peak spreading characteristics of the slots added by the NRP is a ratio of c. 1.04.
- whatever peak spreading assumption is used for the increment of flights enabled by the new NRP capacity, the existing slot pool (the future baseline traffic) is three times the increment from the NRP. That existing slot pool is fixed at a peak spread ratio of 1.13 and there is no reason why it should change its behaviour.

4.4.6 To explain this further, when the NRP slots which have this 1.04 ratio are added to the existing slot pool (which has a ratio of 1.13) the overall total slot pool improves to only 1.12 and no further. This is illustrated in Figure 4.4.2 below.

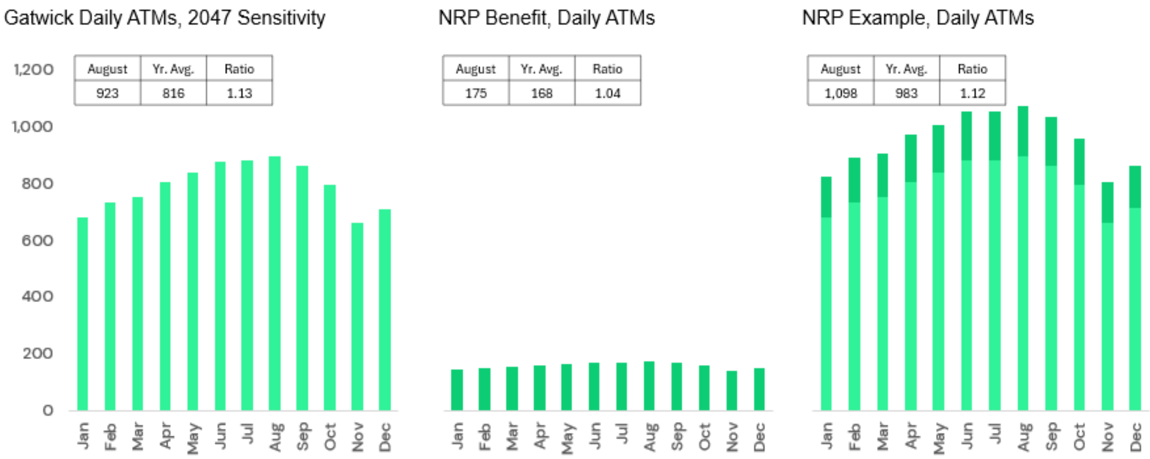


Figure 4.4.2 Gatwick, Peak Spreading impact of NRP, Example

4.4.7 This is consistent with York's case to the examination (at paragraph 26 of their **Response to Additional Documents Submitted at Deadline 3 – Case for the Scheme and Related Matters** [REP4-052]) where they explain their case that peak spreading can only happen on newly released slots and not on existing slots. This is understood to be the reason why York allow no peak spreading in the future baseline in their High and Low scenarios[13].

4.4.8 This is a principal reason why the gap between the future baseline and the NRP cases cannot in practice be very different from that forecast in the DCO. Assumptions used in the baseline need to be consistently applied in the NRP case. Even if a very optimistic assumption is made for peak spreading the new NRP traffic, heroic assumptions have to be made for peak day and peak season throughput if the pre-existing future baseline traffic does not peak spread and a bigger growth increment than the 13mppa forecast in the DCO is to be claimed.

4.4.9 The assumptions described above would limit the NRP case passenger numbers in 2047, assuming the busy day remained unchanged for this sensitivity, to 73 mppa giving a 13 mppa gap between baseline and NRP cases as in the submission case.

4.4.10 Whilst GAL stands by its peak spreading assumptions, for the purposes of testing the what-if scenario of a lower future baseline, GAL has assumed that the peak spreading ratio between August and year round throughput improves to only 1.13 from the 2019 position of 1.16.

[13] It should be noted that the DCO submission baseline and this, the Applicant's proposed sensitivity test baseline, do add movements in the peak day, supporting the Applicant's conclusion that at least a degree of peak spreading improvement should be shown in the baseline by 2047

4.4.11 The Applicant originally considered this as the basis of this counterfactual sensitivity, but in the spirit of helping the ExA understand what the potential impact would be if it was both theoretically and practically possible to also have a greater number of movements in the busy day, the Applicant has developed the GAL sensitivity scenario applying new busy day assumptions in the NRP case as set out below to inform this.

4.5 Busy Day

4.5.1 For the purposes of this sensitivity test, and to produce the maximum gap between the future baseline case and the NRP case, the Applicant has considered how to modify the busy day assumptions in the **future baseline case**. This has reduced the assumed busy day throughput in 2047 from 956 ATMs in the DCO Application to 948 ATMs (See Table 5 above).

4.5.2 This is comparable to that assumed by YA in their Low case (949 ATMs interpolated from their August average figure) and lower than that in the YA High case (960 ATMs). This is a very low assumption and there is good reason to believe that this will be exceeded in reality. The assumption is made here only to assist the sensitivity test process by testing the lowest possible future baseline traffic figure.

4.5.3 The assumed figure of 948 ATMs is only 9 ATMs higher than was achieved in 2017. In 2017 the declared capacity for the core hours was 869 ATMs which corresponded to a demand figure of 854 ATMs. Since then, GAL has increased its core hours capacity (0500-2159) declaration in 2024 by 13 daily slots to 882 ATMs, making the core hour (0500-2159) demand assumption of 856 ATMs assumed for this sensitivity test easily deliverable. It is likely that further slot declarations will become possible over time with improvements in technology, better use of the new Rapid Exit Taxiway and other measures.

4.5.4 There is, therefore, every reason to believe that the future baseline busy day will be busier than this sensitivity test assumes, meaning that the annual passengers in the baseline of 60.1 mppa in 2047 are very likely to be higher than assumed in this sensitivity test, and the gap to the NRP case consequently smaller than stated.

4.5.5 For the busy day assumptions for the **NRP case** the Applicant has considered the question of whether there could be, as YA suggest, some increase beyond the assumed busy day presented in the DCO submission figures.

4.5.6 Whilst the Applicant has set out in Section 3 of this document why YA's assumptions on this are overstated and undeliverable (a further 31-81 additional daily movements), nonetheless it was felt important to assist the ExA with understanding the effect of being able to increase the busy day more modestly.

4.5.7 Accordingly, GAL has added incrementally 20 more movements to the NRP busy day assumptions made in the DCO Application. This amount may well be more than the project infrastructure can practically deliver for the reasons already stated but it is done here to understand the environmental effects if this were possible and to give the ExA comfort that this has been considered by the test.

4.5.8 The effect of doing this is to add two million more passengers per annum to the 2047 NRP case and widen the gap between baseline and NRP case in 2047 to 15 mppa. This is the case that this sensitivity test considers.

4.5.9 **To summarise:** this sensitivity test has sought to assist the ExA by creating a significantly lower future baseline case passenger throughput than the DCO submission assumed (moving from 67.2 mppa to 60.1 mppa). In doing so, the NRP forecast would also reduce (because the future baseline traffic is such a big component of the overall expanded airport throughput). But, in the interests of creating a sensitivity scenario, which enlarges the delta between the future baseline and NRP cases, GAL has added 2 mppa to the NRP throughput above that assumed in the DCO Application, to create a delta of 15 mppa.

4.6 Conclusion

4.6.1 The Applicant believes that this alternative sensitivity test represents a better sensitivity case to enable the ExA to understand the effects of a lower baseline on consequent environmental effects.

4.6.2 This scenario is tested alongside the York High and Low cases in the following section.

5 Environmental Review

5.1 Overview

5.1.1 In this section, the principal topic areas which may be affected by the revised forecast assumptions are considered in turn.

5.1.2 The specialist authors have considered how the conclusions of impact drawn in the submitted Environmental Statement would be affected by the different growth ranges and profiles proposed in the York High and Low scenarios and in GAL's alternative sensitivity scenario. Each author has adopted and explained the methodology they have used to undertake a proportionate assessment and reach conclusions to assist with the ExA's understanding of this analysis.

5.1.3 For the avoidance of doubt, the scope of this assessment includes all ES topics which may be affected by the operation (rather than the construction) of the airport. ES topics not included relate to Geology & Ground Conditions plus Agricultural Land and Recreation. Climate Change was also scoped out in view of the very limited effects that any sensitivity could have, but not Greenhouse Gas, which is assessed. This Section also considers matters relevant to Habitat Regulations and the Transport Assessment, whilst the next Section considers economic matters.

5.1.4 Each topic area starts with a summary and then sets out its approach and results in more detail.

5.2 Air Quality

5.2.1 The sensitivity analysis considers the variations in future aviation projections and their impact on the assessment of air quality. The assessment of air quality relies on traffic and aircraft data derived from annual air traffic and passenger movements.

5.2.2 The assessment of air quality screened the three scenarios (York High, York Low and GAL sensitivity) to determine if the total volume (passenger or aircraft numbers) or project change would be greater compared to the data used in the ES.

5.2.3 The data for the GAL sensitivity, York High and Low cases represent a greater project change compared to the ES assessment, as a result of lowering future baseline numbers in 2038 and 2047.

5.2.4 The total volume of passengers and aircraft at the airport are no higher in the sensitivity tests compared to the ES therefore only the project change is relevant to air quality as the maximum effects have already been assessed. This is an important consideration for overall determination of effects to air quality following the criteria within the ANPS, many of which are related to the future total concentrations. As such there would be no changes to conclusions in relation to no new air quality management areas being required and no delay to compliance with limit values.

5.2.5 The York High case represents the largest project change, therefore the air quality assessment has focused on this scenario.

5.2.6 The results of the assessment show that the predicted project change impacts with the York High scenario would be negligible at all receptors, except for receptor H_113 Gatwick Ambulance station where a slight adverse impact is identified. Compared to the ES results there are no new significant impacts anticipated for NO_2, PM_{10} or $PM_{2.5}$, and the maximum concentrations predicted in the ES do not change, meaning there are no new exceedances of the air quality standards.

Key data, assumptions and limitations

5.2.7 The assessment of air quality is semi-quantitative, factoring ES results to calculate an updated future baseline and project change. It does not provide a detailed emissions or dispersion modelling assessment and assumes no other factors change (e.g. speed, traffic composition, highway geometry). The results of the assessment of air quality for human health demonstrate that a further detailed assessment is not required.

5.2.8 The following conservative assumptions have been made in the assessment:

- The worst-case ES receptors have been identified, based on those with the highest concentration and greatest project change.
- The assessment assumes that the greatest reduction in the future baseline traffic data applies at all road links.
- The assumptions and limitations used in the traffic updates will apply here (as noted in Section 5.10 of this report), as these data were used in the air quality update.
- The assessment assumes that the reduction in ATMs directly translates as proportionate emission reductions and applies this at all relevant aviation sources.

- The assessment does not consider the effects of pollutant drop-off over distance from the source to the receptors identified which would reduce the impact at the receptor.

5.2.9 In addition, the conservative assumptions built into **ES Chapter 13: Air Quality** [APP-038] are considered to be relevant. These include background pollutant concentrations being frozen at 2030, road traffic emissions for London roads frozen at 2030 and no improvements in aircraft emissions being accounted for in the ES modelling. The introduction of cleaner vehicles in the fleet and increased uptake of electric vehicles will be required to ensure that the Government's commitments to net zero are met.

5.2.10 **ES Chapter 13: Air Quality** [APP-038] used EFT version 11. The proportions of electric vehicles have also been revised since EFT version 11 was released, therefore the update of electric vehicles in the air quality assessment can be assumed to be conservative. Further information is set out at **Appendix F** of the **Supporting Air Quality Technical Notes to the SoCGs** [REP1-050].

Analysis

All Scenarios: Screening

5.2.11 The Air Traffic Movements (ATMs) and passenger numbers were reviewed for the future year assessment scenarios (2032, 2038 and 2047). Appendix B of this document presents a summary of the ATMs and passengers for the future year assessment years for all scenarios considered.

5.2.12 The ATMs and passenger numbers in the York High, York Low and GAL sensitivity scenarios were compared to the data used in **ES Chapter 13: Air Quality** [APP-038] submitted as part of the DCO Application, to determine whether there would be any material changes to conclusions of those presented. The following statements were used to screen out assessment scenarios from further assessment:

a. The total volume of ATMs and passenger numbers are no higher compared to the ES; and

b. The project change ATMs or passenger numbers are greater compared to the ES.

5.2.13 For all assessment scenarios (2032, 2038, 2047) presented, the total volume of ATMs and passenger numbers are no higher in York High, York Low and GAL sensitivity scenarios compared to the ES. Therefore, the scenarios assessed as part of the ES are considered to represent a conservative assessment of the absolute values (total concentrations).

5.2.14 For the 2032 assessment years, slower growth means that the project change is lower in all sensitivity tests compared to those presented in the ES. Therefore, the 2032 ES scenario assessed is considered to represent a conservative assessment of project change.

5.2.15 For the 2038 and 2047 assessment scenarios the GAL sensitivity, York High and Low project changes are greater than the project change assessed in the ES. Of the three scenarios, the York High scenario represents the greater (worst-case) project change driven by the lower future baseline ATM and passenger numbers.

5.2.16 On this basis, further assessments of air quality in the following sections are focused on the 2038 assessment, York High case. 2038 is considered to represent a conservative assessment because by 2047, the background pollutant concentrations, vehicle emissions and aircraft emissions would be expected to reduce in accordance with national policy and efforts to reduce emissions. Therefore, the change in emissions as a result of the project would be expected to be less in 2047 than as presented for 2038.

5.2.17 The Applicant has provided further justification that 2038 provides a conservative assessment at paragraphs 13.10.163 to 13.10.168 of **ES Chapter 13: Air Quality** [APP-038] and at Section 3 of Appendix D of the **Supporting Air Quality Technical Notes to the SoCGs** [REP1-050].

5.2.18 For the 2038 assessment year, in comparison to the ES future baseline, the York High case future baseline ATMs are 7.5% lower and the passenger numbers are 7.9% lower.

GAL sensitivity

5.2.19 As noted above the GAL sensitivity test represents a smaller project change compared to the York High scenario. As such effects would be less than the change resulting from the York High scenario which has therefore been used to assess a worst case for air quality.

York Low

5.2.20 As noted above the York Low test represents a smaller project change compared to the York High scenario. As such effects would be less than the change resulting from the York High scenario which has therefore been used to assess a worst case for air quality.

York High: Assessment for Air Quality – Human Receptors

5.2.21 As defined in the screening above, this section focuses on the 2038 assessment year for the York High case. The York High case presents the worst-case project change driven by the lower predicted future baseline. The air quality assessment focuses on an adjusted future baseline to determine a revised project change for the York High case.

5.2.22 This is considered suitable because for air quality the significance of effect is determined by the total concentrations and the change as a result of the Project as shown in the Table 13.5.3 of **ES Chapter 13: Air Quality** [APP-038].

Traffic Data

5.2.23 The traffic consultants have provided analysis on the differences between the ES and York High case for the 2038 assessment year. Table 5.2.1, Figure 5.2.1 and Figure 5.2.2 provide a summary of the reduction in traffic flows between the ES and York High future baseline. Across the majority of the study area, the York High future baseline traffic flows are less than 0.5% lower than the ES future baseline.

5.2.24 The greatest reduction on any road link is 7.9% for the York High future baseline. The greatest reductions in future baseline traffic flows are predicted in close proximity to the airport on London Road, Airport Way and the M23.

Table 5.2.1 Reduction in total flows between ES and York-High future baselines

Statistics	Reduction in total flows between ES and York-High future baselines
Average- Total Flow	-0.3%
Average- Airport Related Flows	-5.7%
Greatest change	-7.9%

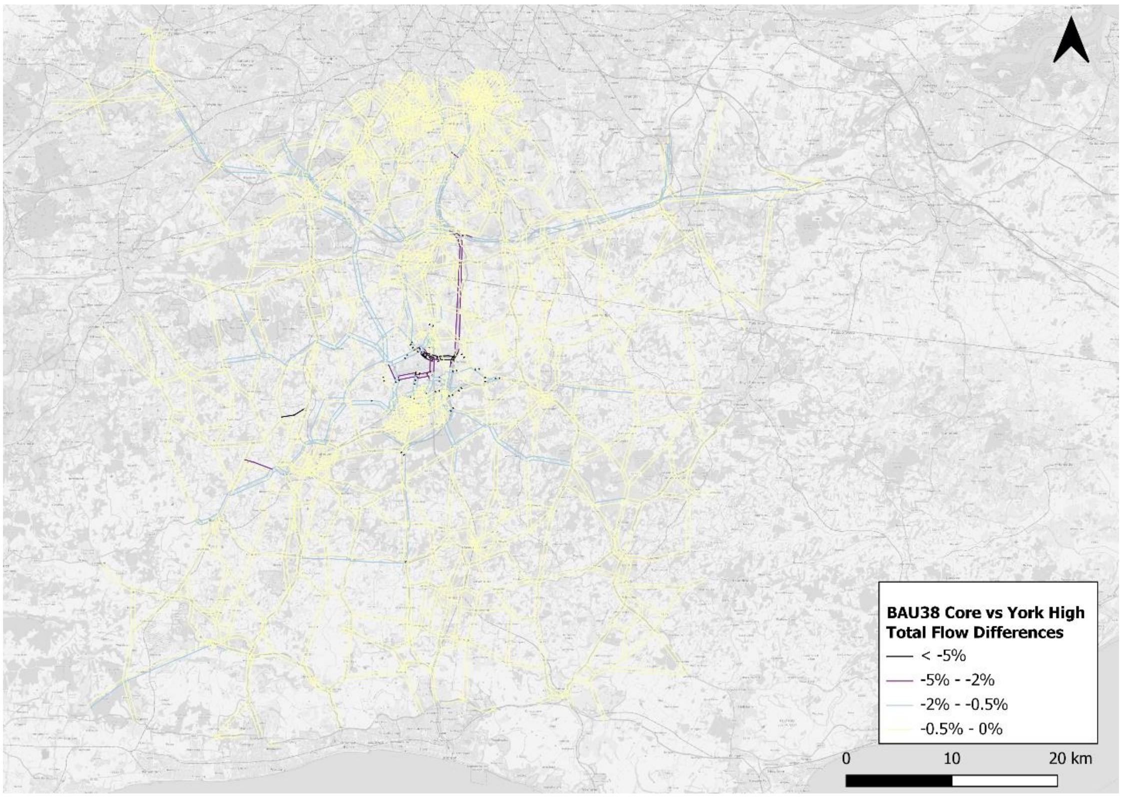


Figure 5.2.1 Reduction in total flows between ES and York High Baselines, Wider Study Area

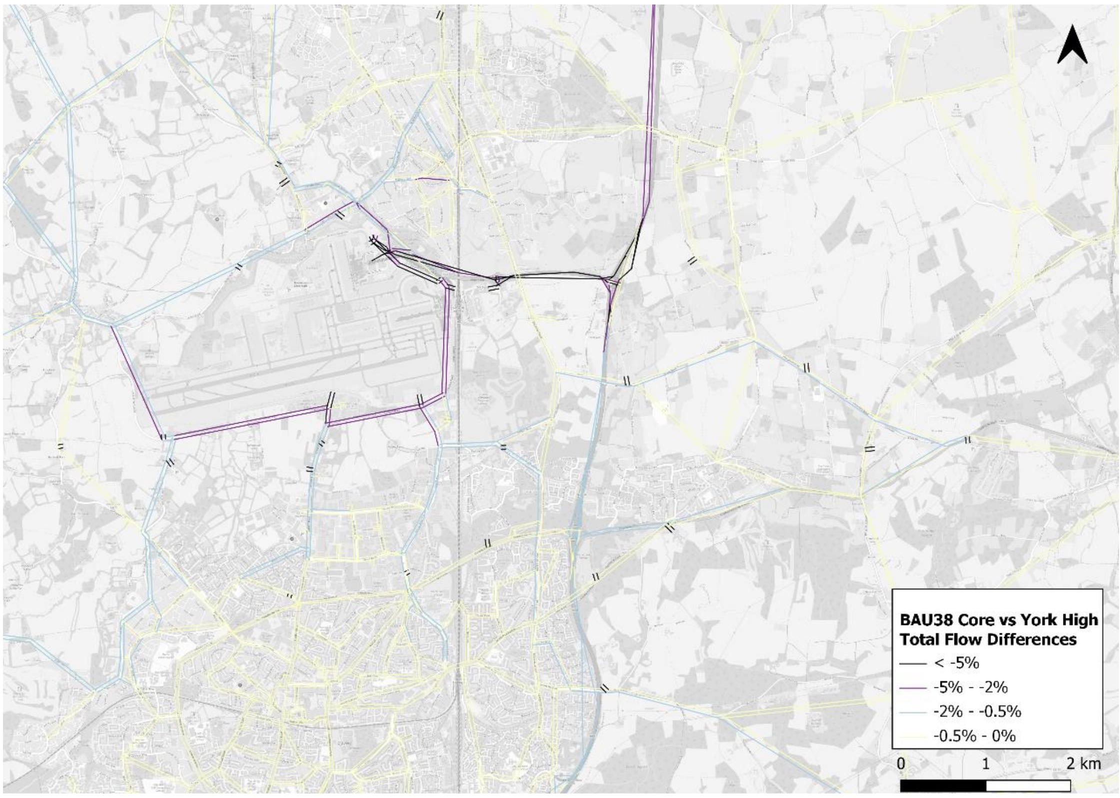


Figure 5.2.2 Reduction in total flows between ES and York High Baselines, Airport Area

Headroom Assessment

5.2.25 The significance of effects reported in the **ES Chapter 13: Air Quality** [APP-038] are calculated following the EPUK/IAQM guidance, where impact descriptors are based on a matrix of the total pollutant concentration, and magnitude of incremental change in pollutant concentrations, as a proportion of the air quality standards.

5.2.26 To understand the impact of the York High case on the significance of effects, the modelled receptors with the highest predicted and greatest change in pollutant concentrations, reported in the **ES Chapter 13: Air Quality** [APP-038], have been identified for the pollutants of concern; namely nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). **Error! Reference source not found.**.2 p resents the values for human receptors within the 11 km by 10 km domain centred on the airport given that greatest change between the ES future baseline and York High future baseline is within the vicinity of the airport.

5.2.27 For the receptor location identified with the greatest predicted change (magnitude), where there were multiple receptors with the same level of change, the receptor with the highest predicted concentration was reported, as the total concentration is also a consideration in determining the significance of effects in the matrix included in the EPUK/IAQM guidance.

5.2.28 The maximum predicted project change for NO_2 was 1.3 µg/m^3 at R_595. For PM_{10}, the maximum predicted project change was 0.4 µg/m^3 at EHO_75 and for $PM_{2.5}$ the maximum predicted project change was 0.2 µg/m^3 at CD_77. The locations identified are at receptors close to the airport, located in and around Horley. At receptors with exceedances of 12 µg/m^3, the maximum corresponding $PM_{2.5}$ project change was 0.1 µg/m^3.

5.2.29 In order for the predicted project change to correspond to a significant effect at the receptors identified for maximum project change, following the EPUK/IAQM guidance, the change for NO_2 or PM_{10} would need to be 4.2 µg/m^3 and the change for $PM_{2.5}$ would need to be 0.7 µg/m^3. This corresponds to over a threefold project change increase for NO_2 and $PM_{2.5}$ and a tenfold project change increase for PM_{10}.

5.2.30 The maximum concentrations within the 11 km by 10 km domain centred on the airport are located at H_113 Gatwick Ambulance Station, R_538 at Tinsley Lane Crawley and R_442 Worth Park Avenue Crawley. The concentrations are predicted to be below the annual average NO_2 and PM_{10} and $PM_{2.5}$ quality standards. At these receptors, the change for NO_2 would need to be 2.2 µg/m^3, the change for PM_{10} would need to be 4.2 µg/m^3 and the change for $PM_{2.5}$ would need to be 0.5 µg/m^3 to correspond to a significant effect, following the EPUK/IAQM guidance.

Table 5.2.2 Results for 2038 operational scenario, focused on receptors within 10 km x 11 km domain centred on the airport, Human Receptors

Pollutant	Type	Receptor ID	Without Project (µg/m^3)	With Project (µg/m^3)	Change (µg/m^3)
NO_2	Highest concentration	H_113 Gatwick Ambulance Station	31.0	31.5	0.5
	Greatest change	R_595 Vernon Woodroyd Gardens (Horley)	20.3	21.6	1.3
PM_{10}	Highest concentration	R_538 Tinsley Lane (Horley)	16.8	16.9	0.1
	Greatest change	EHO_75 Balcombe (Horley)	14.8	15.2	0.4
$PM_{2.5}$	Highest concentration	R_442 A2220 Worth Park Avenue (Crawley)	11.1	11.1	<0.1
	Greatest change	CD_77 Peeks Brooke Lane (Horley)	10.2	10.4	0.2

Revised Project Change

5.2.31 This section estimates the revised project change in the York High case. The assessment looks at the impact of the adjusted future baseline on the aviation and transport components, separately and combined to determine a revised project change for the York High case.

5.2.32 An adjusted project change has been calculated using the York High case applying the following methodology for the receptors identified:

1. The percentage contribution from aviation and/or transport source component(s) of the total concentration was extracted from the modelling data.
2. The concentration associated with aviation or transport was reduced in line with projections for the York High future baseline.
    a. Aviation sources were reduced by 7.5% in line with the reduction in ATMs.
    b. Road sources were reduced by 7.9% in line with the greatest reduction in traffic data.
3. A York High future baseline was recalculated using the reduced aviation and/or transport source component.
4. An adjusted project change was estimated for the York High case using the recalculated York High future baseline.

5.2.33 The following sections present an adjusted project change for the York High case, reviewing the impact from aviation sources, transport sources and the combined impact from both aviation and transport sources.

Aviation

5.2.34 The receptors selected for this exercise were the modelled human receptors with the greatest predicted NO_x contribution, for each aviation source category (broken down for the different modes in the Landing – Take Off cycle and other airport sources). **Error! Reference source not found.** presents human r eceptors with the greatest contribution of oxides of nitrogen (NO_x) from each aviation source, derived from modelling data in the ES for the 2038 'With Project' assessment scenario. The adjustment calculations were for all aviation source categories at each receptor.

5.2.35 Given the contribution from Engine Testing and Landing source categories is equal or below 0.1% multiple receptors were identified with a 0.1% contribution. In these cases, the receptor with the greatest change and highest concentration was identified in Table 5.2.3.

5.2.36 The assessment of aviation emissions focuses on NO_x, which is the pollutant of greatest impact from aviation sources. Given that the aviation sources comprise less than a maximum of 5% of PM_{10} and $PM_{2.5}$ emissions, a material change in impact due to aviation emissions is not anticipated for these pollutants.

5.2.37 The results show that the predicted project change in impacts with the York High Scenario would be negligible at all receptors, except for receptor H_113 Gatwick Ambulance station where a slight adverse impact is identified. No significant impacts are anticipated for NO_2.

Transport

5.2.38 Table 5.2.4 presents a revised NO_2 project change for the York High case by calculating an adjusted York High Future Baseline.

5.2.39 The results show that the predicted project change impacts with the York High case would be negligible at all receptors. No significant impacts are anticipated for NO_2.

Combined Impact

5.2.40 Table 5.2.5 presents the combined impact of aviation and traffic source change for NO_2, PM_{10} and $PM_{2.5}$. The table considers the receptors with the highest predicted concentration and greatest change in pollutant concentrations within the 11 km by 10 km domain centred on the airport as presented in Table 5.2.5.

5.2.41 The results show that the predicted project change impacts with the York High case would be negligible at all receptors, except for receptor H_113 Gatwick Ambulance station where a slight adverse impact is identified. No significant impacts are anticipated for NO_2, PM_{10} or $PM_{2.5}$.

Table 5.2.3 Human receptors with the greatest source contributions from Aviation source types, predicted ES results and revised results for the York High Scenario, With Project, 2038

Source category (selection criteria)	Receptor ID	% Aviation Source category (NO_x)	% Total Aviation Sources (NO_x)	DM Total NO_2 (µg/m^3)	DS Total NO_2 (µg/m^3)	Project Change (µg/m^3)	DM Aviation NO_2 (µg/m^3)	DM Total NO_2 (µg/m^3) - York High*	Project Change (µg/m^3) - York High	ES Impact	York – High Impact
Approach	EHO_48, Balcombe Road	1	22.5	16.7	16.8	0.1	3.8	16.4	0.4	Negligible	Negligible
APU	H_113, Gatwick Ambulance Station	18.6	47.7	31.0	31.5	0.5	14.8	29.9	1.6	Negligible	Slight adverse
Engine Testing	R_177, Povey Cross Road	0.1	28.8	16.7	17.8	1.1	4.8	16.3	1.5	Negligible	Negligible
Hold	R_838, Fox Hill Norwood Hill	6.5	28.3	10.9	11.5	0.6	3.1	10.7	0.8	Negligible	Negligible
Initial Climb	E_244, Charlwood House Day Nursery Crawley	11.7	36.7	14.9	15.7	0.8	5.5	14.5	1.2	Negligible	Negligible
Landing	R_177, Povey Cross Road	0.1	28.8	16.7	17.8	1.1	4.8	16.3	1.5	Negligible	Negligible
Take Off	CD_88/89/90, Charlwood Road	25.9	43.6	15.8	16	0.2	6.9	15.3	0.7	Negligible	Negligible
Taxi In	CD_46, Povey Cross Road	4.3	30.4	13.9	15	1.1	4.2	13.6	1.4	Negligible	Negligible
Taxi Out	H_113, Gatwick Ambulance Station	9.3	47.7	31.0	31.5	0.5	14.8	29.9	1.6	Negligible	Slight adverse

Source category (selection criteria)	Receptor ID	% Aviation Source category (NO_x)	% Total Aviation Sources (NO_x)	DM Total NO_2 (µg/m^3)	DS Total NO_2 (µg/m^3)	Project Change (µg/m^3)	DM Aviation NO_2 (µg/m^3)	DM Total NO_2 (µg/m^3) - York High*	Project Change (µg/m^3) - York High	ES Impact	York – High Impact
Reverse Thrust	E_244, Charlwood House Day Nursery Crawley	4.1	36.7	14.9	15.7	0.8	5.5	14.5	1.2	Negligible	Negligible
GSE	H_113, Gatwick Ambulance Station	2.3	47.7	31.0	31.5	0.5	14.8	29.9	1.6	Negligible	Slight adverse
* Aviation reduction of 8.2% (ATMs)											

Table 5.2.4 Human receptors for key roads, predicted ES results and revised results for the York High Scenario, With Project, 2038

Receptor ID	Key Adjacent Road	% Total Road Sources (NO_x)	DM Total NO_2 (µg/m^3)	DS Total NO_2 (µg/m^3)	Project Change (µg/m^3)	DM Road NO_2 (µg/m^3)	DM Total NO_2 (µg/m^3) - York High*	Project Change (µg/m^3) - York High	ES Impact	York-High Impact
R_595	A23 London Road	12.6	20.3	21.6	1.3	2.6	20.1	1.5	Negligible	Negligible
R_480	A23 London Road	9.5	26.2	26.7	0.5	2.5	26.2	0.5	Negligible	Negligible
R_616	A23 Brighton Road	37.6	21.4	22	0.6	8.0	21.4	0.6	Negligible	Negligible
R_556	A23 Brighton Road	25.3	17	17.6	0.6	4.3	17.0	0.6	Negligible	Negligible
R_328	M23 Gatwick Interchange	32.0	14.5	15	0.5	4.6	14.5	0.5	Negligible	Negligible
R_321	M23 (Between J9 – J10)	52.6	19.2	19.5	0.3	10.1	19.2	0.3	Negligible	Negligible
R_336	M23 (Between J9 – J10)	36.5	14.7	14.9	0.2	5.4	14.7	0.2	Negligible	Negligible
R_348	M23 Crawley Interchange	34.1	13.9	14.1	0.2	4.7	13.9	0.2	Negligible	Negligible
R_538	Hazelwick Roundabout (Rd_2284)	43.3	22.1	22.4	0.3	9.6	22.1	0.3	Negligible	Negligible
R_666	Povey Cross Road	14.0	15.9	16.9	1	2.2	15.9	1.0	Negligible	Negligible
R_707	Charlwood Road	10.0	15.9	16.7	0.8	1.6	15.9	0.8	Negligible	Negligible

* Road reduction of 7.9% (lowest across network)

Table 5.2.5 Human receptors with the highest concentrations and greatest change in the ES, predicted ES results and revised results for the York High Scenario, With Project, 2038

Pollutant	Type	Receptor ID	% Total Aviation Sources (NO_x)	% Total Road Sources (NO_x)	DM Total NO_2 (µg/m^3)	DS Total NO_2 (µg/m^3)	Project Change (µg/m^3)	DM Aviation (µg/m^3)	DM Road (µg/m^3)	DM Total NO_2 (µg/m^3) - York High*	Project Change (µg/m^3) - York High	ES Impact	York-High Impact
NO_2	Highest Concentration	H_113 Gatwick Ambulance Station	47.7	11.5	31.0	31.5	0.5	14.8	3.6	29.6	1.9	Negligible	Slight Adverse
	Greatest Change	R_595 Vernon Woodroyd Gardens (Horley)	34.6	12.6	20.3	21.6	1.3	7.0	2.6	19.6	2.0	Negligible	Negligible
PM_{10}	Highest Concentration	R_538 Tinsley Lane (Horley)	0.1	19.1	16.8	16.9	0.1	0.0	3.2	16.5	0.4	Negligible	Negligible
	Greatest Change	EHO_75 Balcombe (Horley)	0.8	10.4	14.8	15.2	0.4	0.1	1.5	14.7	0.5	Negligible	Negligible
$PM_{2.5}$	Highest Concentration	R_442 A2220 Worth Park Avenue (Crawley)	0.1	10.9	11.1	11.1	<0.1	0.0	1.2	11.0	0.1	Negligible	Negligible
	Greatest Change	CD_77 Peeks Brooke Lane (Horley)	0.4	6.6	10.2	10.4	0.2	0.0	0.7	10.1	0.3	Negligible	Negligible

*Aviation reduction of 8.2% (ATMs) and Road reduction of 7.9% (lowest across network)

Assessment for Air Quality – Ecological Receptors

5.2.42 The GAL sensitivity test has been qualitatively reviewed and the effects are discussed in Section 5.3.

5.3 Ecology and HRA

5.3.1 Changes in traffic flows/aircraft movements and related emissions that would be associated with the York Aviation scenarios need to be considered in the context of specific ecological receptors, in respect of which work is ongoing. However, assessment work to date has considered the GAL sensitivity test and the potential for the changes in passenger numbers associated with that to alter the conclusions in **ES Chapter 9 Ecology and Nature Conservation** [APP-034].

5.3.2 In summary, the change in passenger numbers between the submitted core scenario and the GAL sensitivity scenario is small enough that it is highly unlikely to be detectable with any reliability by the traffic and air quality models that would be used to generate emissions data at ecology receptors. As such, there would be no material difference in the conclusion of **ES Chapter 9: Ecology and Nature Conservation** [APP-034] and associated appendices of no significant effect with respect to changes in air quality in the GAL sensitivity scenario.

Key data, assumptions and limitations

5.3.3 The assessment of effects from changes in air quality on ecological receptors is determined by the magnitude of the difference between the with and without project scenarios. As such, data used in the analysis below are drawn from Section 4, in particular the change in passenger numbers between the submitted core scenario and the GAL sensitivity testing.

5.3.4 The analysis is based on the qualitative scaling of changes in passenger numbers between the two scenarios and a consideration of those changes in the context of the limitations of models used to predict emissions data at ecology receptors. As such, it is not quantitative but does illustrate the potential for such changes to be detectible within traffic and air quality models.

Analysis

5.3.5 The GAL sensitivity test for 2032 shows the change in passenger numbers is lower than assessed in the ES. Therefore, the assessment presented in section 9 of **ES Chapter 9 Ecology and Nature Conservation** [APP-034] and **ES Appendix 9.9.1 Habitats Regulations Assessment Report (HRAR)** [REP3-043, REP3-045] with respect to changes in air quality and corresponding impacts on ecology receptors would be a worst case and no additional effects would be predicted.

5.3.6 The GAL sensitivity testing shows an increase in the difference between the with and without NRP scenarios of circa 13.9 million passengers in the 2038 assessment year, compared to a difference of 13.2 million assessed in the submitted core Environmental Statement (ES) scenario, a difference of 0.7 million passengers or a 5.6% increased Given the small increase in passenger numbers compared to the submitted core scenario, it is anticipated that increases in AADT flows near to ecology receptors (including European designated sites assessed in the HRAR) would also be correspondingly small. As such, it is highly unlikely that such an increase would materially change the conclusions reached within ES Chapter 9 nor the HRAR, i.e. no significant effect/adverse effect on the integrity with the changes in AADT too small to reliably detect/model.

5.3.7 The conclusion of no material change in the assessment in the GAL sensitivity test from that reported in Chapter 9 and the HRAR in respect of the core NRP scenario is supported by the conservatism built into the modelling that has been undertaken to support the submitted core scenario. The GAL suite of transport models used to provide forecast traffic flows for environmental assessment are described in **Transport Assessment Annex B - Strategic Transport Modelling Report** [APP-260]. They are developed in line with the Department for Transport's Transport Analysis Guidance (TAG) which sets out the approach to developing transports models to support the appraisal and assessment of schemes. This includes the relevant acceptable tolerances of the models to observed conditions. The models were developed to assess average weekday June conditions on the wider network and the assessment has taken a busy June day airport traffic for the basis of assessment. In the context of the assessment of airport traffic volumes associated with different aviation forecasts, it is important to consider the general variability of traffic flows on the network. In the context of the M25, M3 and A3, June weekday daily two-way traffic levels can vary by +/- 5% (using June 2016 weekday behaviour). On this basis, changes in traffic flows of circa 5% between scenarios, are within the variability embedded in the transport modelling approach.

5.3.8 In addition, the conservative assumptions built into **ES Chapter 13: Air Quality** [APP-038] are relevant. These include background pollutant concentrations being frozen at 2030, road traffic emissions for London roads frozen at 2030 and no improvements in aircraft emissions being accounted for in the ES modelling. The introduction of cleaner vehicles in the fleet and increased uptake of electric vehicles will be required to ensure that the Government's commitments to net zero are met. **ES Chapter 13: Air Quality** [APP-038] used EFT version 11. The proportions of electric vehicles have also been revised since EFT version 11 was released in EFT version 12, therefore the uptake of electric vehicles in the air quality assessment in the ES can be assumed to be conservative. Further information is set out at **Appendix F** of **the Supporting Air Quality Technical Notes to the SoCGs** [REP1-050]. The relevant graph from Appendix F is copied below at Figure 5.3.1. This shows the EV values increasing significantly compared to the values used in the ES.

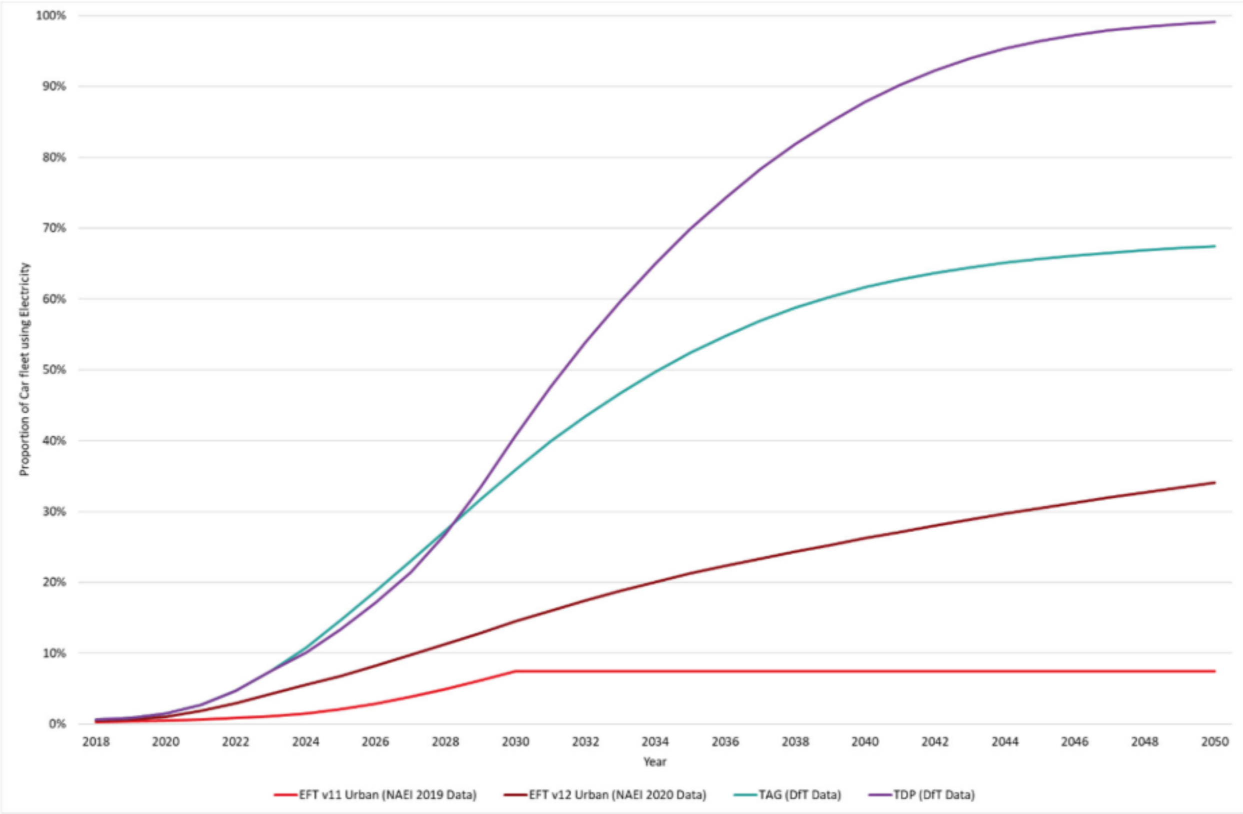


Figure 5.3.1 Predicted proportion of cars using electricity from different source data (EFT v11, EFTv12, TAG and TDP)

5.3.9 In addition, when considering the potential for effects from small increases in AADT flows (as might reasonably be expected from a 5.6% increase in passenger numbers in the GAL sensitivity scenario compared to the submitted core scenario), it is also relevant to consider that the relative proportion of nitrogen deposition at any given location that is derived from road traffic is small. Taking Mole Gap to Reigate Escarpment SAC as an example, the combined road effect is 10.4% of the total nitrogen deposition (www.apis.ac.uk/). If the road effect were zero, the lower critical load for the site of 5kgN.ha^{-1}.yr^{-1} for dry heaths would still be exceeded by a factor of two (total is currently 11.2 kgN.ha^{-1}.yr^{-1}).

5.3.10 Further, the JNCC Nitrogen Futures report (Dragositis *et al*. 2020) indicated that, under a Business as Usual scenario, there is expected to be a 14% reduction in nitrogen deposition by 2030. It shows that other factors are significantly more important and that and a ‘small’ change in emissions is not likely to affect the ability to meet the lower critical load. As such, the small change in emissions that might occur between the GAL sensitivity scenario and that assessed in the ES/HRAR is likely to be masked by the more substantial changes associated with general background reductions in nitrogen deposition. This means that such small changes are unlikely to alter when habitat achieves its critical load/level.

5.3.11 Therefore, given the conservatism built into the modelling used in the submitted core scenario, it is highly unlikely that the small change in AADT that could reasonably be associated with the increased passenger numbers in the GAL sensitivity scenario, when compared to the core scenario, would be distinguishable from those of the core scenario.

5.4 Greenhouse Gases

5.4.1 This sensitivity analysis considers the impact of variations in future ATM and passenger projections and their impact on the assessment of greenhouse gases.

5.4.2 In summary, the assessment has considered the scale of change in ATMs and Passenger numbers between with-Project and without-Project for the GAL scenario and has compared these to equivalent changes for the three alternative scenarios under consideration (GAL-Sensitivity, York Low and York High). The assessment considers these total changes across the 5-year periods of the Fifth and Sixth carbon budgets, as used within the ES.

5.4.3 It concludes that the magnitude of change is smaller across all alternative scenarios within the Fifth Carbon Budget period 2028-32.

5.4.4 It concludes that the magnitude of change is smaller for one of the three scenarios assessed (York Low) across the Sixth Carbon Budget period 2033-37. For the remaining scenarios (GAL Sensitivity and York High) the magnitude of change in ATMs and Passenger numbers is between 1 and 3% higher than the GAL Submission scenario presented in the ES.

5.4.5 The impact of the aggregate change in emissions (i.e. construction, ABAGO, surface access and aviation) as a result of the Project under the GAL Sensitivity, and the York High, scenarios will increase from the equivalent figure of 0.604% of the 6th Carbon Budget (under the NRP core case assessment) to **0.621%** under the York High scenario, and **0.618%** under the GAL Sensitivity scenario.

5.4.6 In the additional scenarios, the total emissions generated as a result of the airport are no greater than the total emissions for the scenario presented in the ES.

5.4.7 The sensitivity assessment set out below concludes that there is no change to the conclusion of minor adverse, not significant, under the alternative scenarios considered.

Key data, assumptions and limitations

5.4.8 Four scenarios have been considered – each of which contains a Do-Minimum and Do-Something scenario:

- GAL Submission (representing the analysis within the ES Chapter 16)
- GAL Sensitivity Scenario

- York Low Scenario
- York High Scenario

5.4.9 This sensitivity analysis compares the second, third and fourth scenarios listed to the scenario presented in the ES (first scenario listed above).

5.4.10 The following assumptions have been made within the sensitivity analysis:

- Four scenarios exist, each of which are represented by differing ATM and passenger values for the modelling years of 2032, 2038, and 2047. ATMs and Passenger numbers are assumed to scale linearly between these dates;
- Fleet mix, and changes to fleet mix, remain the same under all scenarios;
- Aircraft and destination proportions remain the same under all scenarios;
- Emissions from APU use and engine testing are approximately linear to overall GHG emissions from the sum of LTO and CCD emissions;
- Assumptions relating to Jet Zero remain unchanged across all scenarios.
- Non-aircraft emissions from ABAGO, surface access, and construction increase by the same proportion under each alternative scenario as the increase in ATMs/passengers.

Analysis

5.4.11 For each Project scenario the total ATMs and total Passenger estimates have been aggregated across each Carbon Budget period. These were then compared to the DCO submission to understand whether the scale of change was larger or smaller than that assessed in the DCO submission.

5.4.12 The comparison of scenarios to the main DCO submission is summarised below:

Table 5.4.1 Magnitude of aggregate change in PAX (DS – DM) across 5-year Carbon Budget period compared to GAL submission

	Fifth Carbon Budget Period (2028-32)	Sixth Carbon Budget Period (2033-37)
Scenario	**5-year net change in ATMs**	**5-year net change in ATMs**
GAL Submission	171,447	320,200
GAL Sensitivity	158,472	324,798
York Low	90,000	270,000
York High	112,500	330,000
Scenario	**% change in ATMs compared to GAL Submission**	**% change in ATMs compared to GAL Submission**
GAL Submission	100.0%	100.0%
GAL Sensitivity	92.4%	101.4%
York Low	52.5%	84.3%
York High	65.6%	103.1%

Table 05.4.2 Magnitude of aggregate change in PAX (DS – DM) across 5-year Carbon Budget period compared to GAL submission

	Fifth Carbon Budget Period (2028-32)	Sixth Carbon Budget Period (2033-37)
Scenario	**5-year net change in PAX (mn)**	**5-year net change in PAX (mn)**
GAL Submission	34.5	65.2
GAL Sensitivity	32.0	66.8
York Low	18.8	57.8
York High	21.8	67.0
Scenario	**% change in PAX (mn) compared to GAL Submission**	**% change in PAX (mn) compared to GAL Submission**
GAL Submission	100.0%	100.0%
GAL Sensitivity	92.7%	102.4%
York Low	54.4%	88.6%
York High	63.1%	102.8%

Table 5.4.0.1

5.4.13 Across the scenarios the aggregate increase in each budget period is less than that for the DCO submission, with the exception of the GAL Sensitivity and York High scenarios within the Sixth Carbon Budget period.

5.4.14 Where the aggregate increase is less than for the DCO submission it can be assumed that overall net increase in GHG emissions from the Project is lower than for the DCO submission – on which basis it can be concluded that there is no material change to the conclusion of minor adverse, not significant impact for these scenarios.

5.4.15 For the GAL Sensitivity and York High scenarios the scale of increase in aggregate additional GHG emissions within the Sixth carbon budget will be slightly greater than for the DCO submission. The difference in the scale of this increase (between 1% and 3% in the Sixth carbon budget period) has been applied to the overall contribution of 0.604% identified as arising from the Project in the DCO submission. On this basis:

- Within the ES the impact arising from the Project for the Sixth Carbon Budget period was **0.604%.**
- The Project impact is estimated to increase to **0.618%** for the Sixth Carbon Budget period under the GAL Sensitivity scenario.
- The Project impact is estimated to increase to **0.621%** for the Sixth Carbon Budget period under the York High scenario.

5.4.16 On this basis, given the relatively small change in overall contribution to the UK carbon budgets, and in the context of the wider mitigation that will be achieved through the Jet Zero Framework, the conclusion is that under all alternative scenarios the impact arising from GHG emissions remains minor adverse, not significant.

5.5 Health and Wellbeing

5.5.1 The sensitivity analysis has considered the public health implications of the other assessments within this document. The effects have been compared with those set out in the **ES Chapter 18: Health and Wellbeing** [APP-043].

5.5.2 Overall, the absolute effects (e.g. on emissions that affect health) tend to be about the same or lower in the sensitivity analyses, reflecting similar or fewer passengers and flights in a given assessment year. The relative change due to the project is greater in some assessment years, and at some times of year, but slower growth assumed through 2032 means that the changes arise in the context of the absolute levels being the same or lower or of being in years that are more likely to benefit from technologies that are less polluting.

5.5.3 As a general point, 2032 was the worst-case for several adverse effects in the ES assessment, including air quality and noise. The effects of the sensitivity tests are generally to reduce effects in this year (i.e. improving the position for public health). The later 2038 and 2047 years have greater relative changes (ie slightly worst position for public health) but are in the context of these years already being less worse-case than the 2032 year effects that were judged not to be significant.

5.5.4 Whilst further analysis may provide additional detail and reduce the margin of error, the evidence available indicates that no new or materially different significant effects would arise for public health under any of the sensitivity cases.

Key data, assumptions and limitations

5.5.5 Assumptions and limitations listed in other Section 5 assessments of this document have informed this analysis but are not repeated here.

5.5.6 Mitigation, design and enhancement measures would operate in a similar way, including those that avoid, limit, reduced or manage effects, as well as those that enhance beneficial effects. Often such measures are not tied to specific passenger and ATM volumes or rates of change at a given time to manage change, so it is assumed these would operate and be effective irrespective of variation in aviation growth parameters. Such measures include the general principles of the noise insulation scheme (noting that its boundaries linked to noise contours may be affected), night noise restrictions, surface access strategy, employment skills and benefits strategy; as well as the physical presence of measures such as the highway improvements and noise barriers.

5.5.7 Other general trends such as pollution reducing technological advancements and government polices to encourage their adoption are assumed to continue to apply.

Analysis

York-Low and York-High

5.5.8 The health analysis has been informed by other environmental review sections of this sensitivity analysis. The sensitivity analysis is most relevant to the following issues discussed in **ES Chapter 18: Health and Wellbeing** [APP-043]:

- health and wellbeing effects from changes to air quality;
- health and wellbeing effects from changes in noise exposure;
- health and wellbeing effects from changes in transport nature and flow rate;
- health and wellbeing effects from changes in socio-economic factors; and
- health and wellbeing effects from changes to local healthcare capacity.

5.5.9 Other issues discussed in **ES Chapter 18: Health and Wellbeing** [APP-043] have been reviewed and are not considered to have the potential for new or materially different effects as a result of the York Low and York High or GAL sensitivity cases. This reflects that they are less driven by underlying aviation forecasts.

5.5.10 In relation to the issues listed above, it is the operational effects linked to passenger numbers and ATMs that are relevant. For example, construction related effects are not affected.

General points

5.5.11 All the scenarios predict two future scenarios, one without the Project (Do Minimum scenario) and one with the Project (With Project scenario).

5.5.12 There are two ways the change between the GAL Cases and York Cases can be measured. Either the absolute levels of effects experienced in each assessment year, or the relative change due to the Project in each assessment year (i.e. the difference between the Do Minimum scenario and the With Project scenario). Both the absolute level and relative change are relevant in understanding if the York Low and York High sensitivity cases materially affect the health assessment conclusions. Consideration is also given to the alternative GAL sensitivity scenario.

5.5.13 In all assessment years (2032, 2038 and 2047) the absolute annual levels of effect in both the York Low Case and York High Case are expected to be less than or essentially equal to the GAL submission case. The absolute annual adverse effect levels associated with ATMs and passenger numbers are therefore within the bounds of what has been assessed in **ES Chapter 18: Health and Wellbeing** [APP-043]. The exception is in the peak months of 2038 and 2047 when the York Low Case and York High Case are higher than the GAL submission case (albeit they are lower in the off-peak months). For the York Low Case the differences are marginal. For the York High Case the differences are greater and may suggest some absolute adverse effects could be greater during these periods of the year. This point is particularly relevant to noise related health effects and is considered further.

5.5.14 The relative change due to the Project (the 'With Project Scenario' minus the 'Do Minimum Scenario') is set out in Appendix B of this document, including a summary of the ATMs and passengers for the future year assessment years for all scenarios considered.

5.5.15 The relative change trends set out in Appendix B can be placed into the context of the **ES Chapter 18: Health and Wellbeing** [APP-043] assessment, where 2032 is a worst-case assessment year, including for air quality and noise.

5.5.16 The effects of the alternative York scenarios are broadly to reduce effects in the year the ES expected many of the worst adverse effects.

Specific points

5.5.17 In the time available it has not been possible to model quantitative health outcomes for the sensitivity tests. A qualitative analysis based on findings of the other environmental assessments within this Sensitivity Analysis is however considered to provide a reasonable evidenced based professional judgment as to the likely public health implications.

Health and Wellbeing Effects from Changes to Air Quality

5.5.18 For York Low and York High Cases the air quality analysis in Section 5.2 confirms that the absolute effects are lower than assessed in the ES, consistent with a generally reduced public health effect. The relative change due to the Project under these scenarios is lower in 2032 (the ES worst-case assessment year) making the ES assessment conservative for that year. The York Low and York High scenarios have their greatest air quality effects in 2038 in terms of the relative change due to the Project. The analysis in Section 5.2 confirms that the changes in NO_2, PM_{10} and $PM_{2.5}$ remain very small. These results indicate there would be no change to the ES Health and Wellbeing chapter conclusions that there would be a low magnitude of change to high sensitivity receptors, producing a minor adverse (not significant population health effect). This conclusion takes into account non-threshold effects and continues to reflect that, whilst any reduction in air quality may be considered detrimental to some degree for public health, i.e. not negligible, the change due to the Project, even under the York High and York Low cases, is unlikely to be significant for population health in EIA Regulation terms.

Health and Wellbeing Effects from Changes in Noise Exposure

5.5.19 There are air noise (and associated ground noise) and surface access transport noise implications as a result of the sensitivity cases. The focus of this discussion is on air noise, as explained in section 5.8 the surface access noise has also been considered and the changes are small. The air noise impacts are assessed in the busier summer season and take account of issues such as the seasonal spreading of flights. The changes predominantly relate to day time effects. Night-time disturbance effects are of particular interest for health. However, the York Low and York High Cases have a much more limited influence in the night-time period due to the operation of the Night Flight Restrictions. Public health implications during the night-time period are therefore unlikely to materially differ from those stated in the ES Health and Wellbeing Chapter. The remainder of this discussion focuses on the day time period, albeit regard has been given to night-time effects in the conclusions reached.

5.5.20 In 2032 the York Low and York High Cases both have slower uptake of new aviation capacity giving lower noise levels and impacts. The worst-case noise position of the ES, which relates to effects in 2032, is therefore slightly less (better for public health) in both absolute effect and relative change terms. However, the potential effect of the York Cases would be to reduce the size of the noise contours in 2032 that set the original noise envelope and noise insulation scheme boundary. Potentially fewer people would therefore benefit from the noise insulation scheme if the York Cases were used. From a public health perspective, whilst this would be unlikely to change the significance conclusions, it could provide less protection to the population, including vulnerable groups.

5.5.21 By 2038 the York Low and York High Cases predict higher peak summer month ATMs, particularly the York High scenario. This difference bucks the trend of generally lower absolute effects and suggests that both absolute and relative change effects could be higher than reported in the ES. It is however relevant that the changes are small in noise terms and that the 2038 assessment in the ES was already a less worst-case position than the 2032 assessment. As noted in section 3.9, GAL does not intend to increase its 2038 noise envelope and is content to be restricted to the noise envelope and noise footprint that it has assessed for that year. As with the ES assessment the noise impact in public health terms is responded to with proposed controls and the noise insulation scheme. These would continue to operate in similar ways, particularly in reducing effects at properties that would otherwise be predicted to exceed the SOAEL. A similar situation to 2038 occurs for 2047 and the same points apply.

5.5.22 Even if more people were exposed above the SOAEL under the York Cases, this would continue to be a small number and the noise insulation scheme would continue to operate to reduce those effects indoors, such that a significant population health effect would be unlikely. As set out in the ES, it continues to be the case that the minor adverse (not significant) noise conclusion reflects that, whilst any increase in aviation (both air noise and ground noise) and surface access noise may be considered detrimental to some degree for public health, i.e. not negligible; the change due to the Project, even under the York High and York Low cases, is unlikely to be significant for population health in EIA Regulation terms.

Health and Wellbeing Effects from Changes in Transport Nature and Flow Rate

5.5.23 For the York Low and York High Cases compared to the ES severance, driver delay, pedestrian and cyclist delay, pedestrian and cyclist amenity and accidents and safety have been reviewed in Section 5.10. No new or materially different conclusions are expected, and consequently the public health implications would be unchanged from those reported in the ES. Whilst there would be busier periods associated with the summer peaks, the highway improvements would continue to mitigate effects. The potential for some crowding effects on public rail transport, particularly under the York High scenario, are noted. However, the degree of increase in crowding on peak hours of peak days is not considered to be on a scale that would disincentivise use of these services to an extent that would affect public health, including through behavioural change in multimodal travel affecting physical activity.

Health and Wellbeing Effects from Changes in Socio-economic Factors

5.5.24 The beneficial effects on employment due to the Project are affected by the underlying aviation forecasts. As noted in Section 5.9, the York Low and York High cases initially result in less employment in 2029 and 2032, but more employment than the ES predictions in 2038 and 2047. For the ES Health and Wellbeing assessment the significant beneficial effects were driven by the measures that were included in the **Employment, Skills and Business Strategy** [APP-198] to target access to the job opportunities to local vulnerable groups. Those measures would continue under all scenarios, so the expectation of achieving moderate beneficial (significant) effects remains unchanged.

Health and Wellbeing Effects from Changes to Local Healthcare Capacity

5.5.25 Local healthcare capacity is discussed in the ES Health and Wellbeing assessment, including due to the influence of additional passenger numbers. The chapter discusses how the role of the assessment is to provide information to support routine NHS service planning. This reflects that the great majority of any passengers who might fall ill whilst at the airport would have NHS entitlements that are funded by general taxation. First responders at the airport support triaging of any medical incidents to reduce inappropriate A&E attendances. Such first responder services would change at a scale reasonably proportionate to any change in passenger numbers, whatever the relative rate of change over the assessment years. As noted, the general picture of both the York Low and York High cases are of the same or lower annual passenger numbers compared to the scenario assessed in the ES, indicating generally less potential to increase pressure on the NHS, albeit with some seasonal peaks that may be slightly higher. The onsite first responders would be appropriate mitigation for such peaks. Consequently, the variation in passenger numbers under the York Low and York High scenarios would not change the conclusion that, whilst a slight increase in NHS demand may be considered detrimental to some degree for public health, i.e. not negligible, the change due to the Project, even under the York High and York Low cases, is unlikely to be significant for population health in EIA Regulation terms.

Health and wellbeing conclusion

5.5.26 The evidence available indicates that no new or materially different significant effects would arise for public health under any of the sensitivity cases.

York High

5.5.27 The York High case is associated with the greatest increases in relative change due to the Project that could affect population health. These effects occur in 2038 and 2047, with effects in 2032 lower compared to the assessment in the ES. The public health implications of the 2038 and 2047 adverse changes, i.e. more emissions, disturbance and service pressures, have been reviewed. Whilst the adverse effects in these years would be worse for public health than assessed in the ES, compared to the situation without the Project in those years, the scale of these differences are small. These relative differences from the ES submission scenario are in the context of generally similar effects in absolute annual terms, as 75.6 million passengers per annum are still reached in 2038 and 80.2 million passengers per annum are still reached in 2047 (both with very similar numbers of ATMs).

5.5.28 The issue most likely to affect the public health conclusions is that the York High summer peaks in 2038 and 2047 give rise to greater absolute effects than assessed in the ES. During these times both the relative change and absolute change are greater than the scenario on which the ES was based. Careful consideration has therefore been given to these shorter peak periods of activity. Informed by the other assessments in this report it is likely that there would be greater (worse) public health outcomes, however these would not be so great a difference from the ES submission scenario as to give rise to materially different conclusions on the significance of the effects.

5.5.29 Taking into account mitigation that would operate under all scenarios it is judged that the population level exposures would remain very low, and the health baseline change implications remain slight. The additional change associated with the York High case represents a minor incremental addition to the risk factors for the physical and mental health outcomes that are discussed in **ES Chapter 18: Health and Wellbeing** [APP-043]. The changes to population health, including for vulnerable groups, even if greater than expected under the ES submission scenario, are not considered to be of a scale that would give rise to significant public health effects.

5.5.30 In reaching this conclusion weight has been given in particular to the package of noise management and mitigation measures that would continue to limit and reduce absolute and relative changes in noise exposures, even under the York High case. That the York High effects arise in the later assessment years of 2038 and 2047 is also noted and taken into account. This is relevant because these are periods after the worst-case of 2032 assessed for noise and air quality in the

DCO Application scenario. In 2038 and 2047 the expectation is of more widespread adoption of technologies that are less polluting.

York Low

5.5.31 The York Low case is more similar to the ES submission scenario. Under this scenario there are generally lower absolute effects as 75.6 million passengers per annum is not reached in 2038 and 80.2 million passengers per annum are not reached in 2047 (both with correspondingly fewer ATMs). There remain some peak summer period effects that are greater in absolute and relative terms than the ES submission scenario, however the changes are much more marginal.

5.5.32 The position is of slightly greater population health effects, which is driven by the relative change being slightly greater when comparing the Do Minimum and With Project scenarios under the York Low case compared to the ES submission case. In 2032, the worst-case year in the ES for air quality and noise, the York Low case effects are less than the ES submission case, both for relative and absolute change terms. The slightly greater (worse) for public health effects in 2038 and 2047 under the York Low case are not considered to materially affect the conclusions of **ES Chapter 18: Health and Wellbeing** [APP-043]. The additional change associated with the York Low case represents a very minor incremental addition to the risk factors for the physical and mental health outcomes discussed in the ES assessment. Mitigation would still operate to avoid or reduce effects, so the incremental change due to the York Low case would not be expected to give rise to significant public health effects.

GAL Sensitivity

5.5.33 The GAL sensitivity case considers a scenario of lower absolute change (i.e. lower growth being achieved in 2032, 2038 and 2047) but with a more constant rate of relative change (i.e. relative change that is similar to the GAL Submission ES scenario, noting the delta increases slightly in 2038, from 13.2 to 13.9 mppa, and 2047, from 13.0 to 15.2 mppa). For public health this would represent a similar position to the **ES Chapter 18: Health and Wellbeing** [APP-043] assessment, albeit in the context of lower absolute levels of effect. In the GAL sensitivity case the peak summer effects are also more similar to the GAL Submission ES scenario than the York High and York Low cases, albeit slightly above the GAL Submission ES scenario. Consequently, the trend of similar absolute and similar relative effects continues during the summer peak. Under the GAL sensitivity case there would be no new or materially different effects for population health, including vulnerable groups, to those report in the ES.

5.6 Historic Environment

5.6.1 Effects on the significance of heritage assets arising from changes in air noise, ground noise and traffic noise are reported within **ES Chapter 7: Historic Environment** [APP-032]. For the design period 2030-2032, Minor adverse effects were identified with regard to three designated heritage assets as a result of increases in ground noise, also Negligible adverse effects on other designated heritage assets at Charlwood; these effects are not considered to be significant. No increase in these effects was considered likely for subsequent design years. No adverse effects were identified with regard to any heritage assets as a result of changes in air noise or traffic noise for any of the assessed design years.

5.6.2 The assessment of noise changes in relation to the York Low and York High scenarios is set out below in Section 5.8, along with the assessment of noise changes in relation to the GAL Sensitivity scenario.

5.6.3 With regard to air noise, for the York Low and York High scenarios, in the early years after opening (characterised by 2032) the slower uptake of new capacity assumed in these scenarios would give slightly lower summer daytime air noise levels. In the later years, summer daytime air noise impacts would be slightly higher in these scenarios because they assume less seasonal peak spreading and greater increases over a lower baseline in the summer.

5.6.4 Although the noise changes for the York Low and York High scenarios have not been modelled, an estimate of changes in relation to the GAL Submission ES case has been undertaken (see Section 5.8 below for further details on this). The conclusion is that changes to the noise contours would be very minor. The same would apply to the noise change footprints established for the assessment of the effects of air noise change on heritage assets. On this basis no new air noise effects would arise in respect of heritage assets. Ground noise would show similar trends to air noise, including slightly lower noise impacts in 2032 for the York-Low and York-High scenarios. On this basis no new ground noise effects would arise in respect of heritage assets.

5.6.5 With regard to traffic noise, the York Low and York High scenarios would lead to greater increases in traffic flows on 5 main road links in the area of the road alterations than in the GAL ES submission. However, the increases in flows are small and would create very slight increases in the noise increases that arise from the Project. On this basis no new traffic noise effects would arise in respect of heritage assets.

5.6.6 The air noise contour areas for the GAL sensitivity test with the Project follow the GAL Submission ES case closely. On this basis no new air noise effects would arise in respect of heritage assets. Similarly, as with the York Low and High scenarios, no new traffic noise effects would arise as a result of the GAL Sensitivity in respect of heritage assets.

5.7 Landscape, Townscape and Visual Resources

Summary

5.7.1 Effects on the perception of tranquillity within national designated landscapes as a result of an 18% increase (rounded up to 20% in the ES) in daily overflying aircraft in the peak summer season at less than 7,000 feet above ground level are reported within **ES Chapter 8: Landscape, Townscape and Visual Resources** [APP-033] as Minor to Negligible adverse based on the GAL Submission ES scenario. The GAL Sensitivity scenario would result in a 22% increase in overflights over the future baseline. This is a 2% increase over the assessment in the ES, with effects on the perception of tranquillity likely to range from Minor to Moderate adverse. This scenario would result in three more overflights in 2032, six more overflights in 2038 and nine more overflights in 2047 compared to the GAL Submission ES scenario. The analysis is in the summer season and is spread over all flight paths including departures and arrivals. There would be fewer overflights at other times of year than assessed in the ES.

5.7.2 The York Low scenario would result in an increase of up to 23% in overflights over the future baseline, which is a 3% increase over the assessment in the ES, with effects on the perception of tranquillity likely to range from Minor to Moderate adverse. The scenario would result in 86 less overflights in 2032, two more overflights in 2038 and two less overflights in 2047 compared to the GAL Submission ES scenario.

5.7.3 The York High scenario would result in an increase of up to 27% in overflights over the future baseline, which is a 7% increase over the assessment in the ES, with effects on the perception of tranquillity likely to be Moderate adverse. The scenario would result in 77 less overflights in 2032, 44 additional overflights in 2038 and 48 additional overflights in 2047 compared to the GAL Submission ES scenario. The increased magnitude of seasonal impact has the potential to place some effects at the threshold of what is considered to be significant for very high sensitivity receptors. The focus of effects is likely to remain within the High Weald National Landscape with a small concentration on the fringes of the Surrey Hills National Landscape, as identified within ES Chapter 8.

5.7.4 Minor adverse effects identified in the ES are located predominantly within the High Weald National Landscape with a small concentration on the fringes of the Surrey Hills National Landscape. Effects within the wider tranquillity study area, including the South Downs, Kent Downs and majority of the Surrey Hills National Landscapes are generally Negligible adverse.

Key data, assumptions and limitations

5.7.5 In the time available it has not been possible to model the distribution of the number of overflights in the GAL Sensitivity, York Low and York High scenarios across the tranquillity study area. Further data and modelling would be required to enable a comparison between the GAL-Submission ES scenario illustrated in the overflight heat maps of **ES Figures 8.6.3 to 8.6.7** [REP2-006, REP2-007, REP2-008] and Table 8.9.1 which shows the specific increase in daily overflights at 10 representative locations within nationally designated landscapes.

Analysis

5.7.6 A preliminary analysis of effects on the perception of tranquillity has been based on the table of data within the Noise and Vibration section of this report which shows the increase in overflights in the summer season due to the Project over a 24 hour average summer day in 2032, 2038 and 2047. The data is based on the predicted number of overflights in the future baseline situation and the increase due to the Project. At other times of the year, the effect of the sensitivity cases would be less overflights.

Table 5.7.1 Increase in Summer Season 24hr Overflights with Project

Case	2032	2038	2047
GAL Submission ES	18% (942 to 1114)	18% (950 to 1121)	18% (955-1125)
GAL – Sensitivity	22% (918 to 1117)	22% (923 to 1127)	22% (927 to 1134)
York-Lo	13% (912 to 1028)	23% (912 to 1123)	23% (912 to 1123)
York-Hi	12% (924 to 1037)	26% (924 to 1165)	27% (924 to 1173)

5.7.7 In the York sensitivity cases, the baseline is generally lower, leading to greater increases due to the Project in the latter years.

5.7.8 The data within the table is based on the total daily number of ATMs across all arrival and departure routes and would not be experienced by an individual in a single location within the study area. The York scenarios predict a lower increase in overflights in 2032 due to the slower ramp up of flights as a result of the Project. The increases in overflights become higher than the GAL scenarios in 2038 and 2047. The drawn-out increase in overflights within the York scenarios has the potential to soften the perception of change compared to a more rapid increase in the GAL scenarios.

GAL Sensitivity

5.7.9 Table 5.7.1 indicates that the GAL Submission ES scenario maximum increase in overflights is 18%, rounded up to a maximum of 20% for the purposes of the assessment within the ES. The GAL Sensitivity scenario would have a lower future baseline situation and a slightly higher number of overflights as a result of the Project in all assessment years. The consistent increase in overflights over the future baseline would be 22% in all assessment years. Based on **ES Appendix 8.4.1: Landscape Townscape and Visual Impact Assessment Methodology** [APP-109], the GAL Submission ES scenario generally results in a negligible magnitude of impact (*where the increase in number of daily overflights is discernible to people*) and a Minor adverse level of effect (*a slight reduction in the perception of tranquillity*) for high and very high sensitivity receptors. These effects are not considered significant in **ES Chapter 8: Landscape, Townscape and Visual Resources** [APP-033]. Effects on the perception of tranquillity as a result of a further 3% increase as a result of the GAL Sensitivity scenario, compared to the GAL Submission ES scenario, are likely to remain at Minor adverse however, the magnitude of impact is likely to be in a range of negligible to low with a level of effect approaching Moderate adverse *(an immediately identifiable reduction in the perception of levels of tranquillity*). These effects are not considered significant, in terms of the methodology in **ES Appendix 8.4.1** [APP-109].

York Low

5.7.10 The York Low scenario has a lower future baseline situation than both the GAL scenarios throughout the assessment years. The number of overflights as a result of the Project is significantly lower than the GAL Submission ES scenario in 2032, becoming slightly higher in 2038 and slightly lower in 2047. The number of overflights as a result of the Project is significantly lower than the GAL Sensitivity scenario in 2032, remaining lower in 2038 and becoming higher in 2047. The York-Low scenario has a lower increase in overflights in 2032 than the GAL scenarios of 13%, increasing to 23% in 2032 and 2047. Effects on the perception of tranquillity as a result of a 3% increase, compared to the GAL Submission ES and a further 1% increase, compared to the GAL Sensitivity scenario, are likely to remain at Minor adverse however, the magnitude of impact is likely to be in a range of negligible to low with a level of effect approaching Moderate adverse *(an immediately identifiable reduction in the perception of levels of tranquillity*). These effects are not considered significant, in terms of the methodology in **ES Appendix 8.4.1** [APP-109].

York High

5.7.11 The York High scenario also has a lower future baseline situation than the GAL Submission ES scenario throughout the assessment years. The York High scenario has a lower increase in overflights over the future baseline in 2032 of 12%, increasing to 26% in 2032 and further increasing to 27% in 2047. Effects on the perception of tranquillity as a result of a 7% increase in overflights, compared to the GAL Submission ES scenario, has the potential to result in a low magnitude of impact (*minor change to sense of tranquillity due to proposed disturbance*) and a Moderate adverse effect *(an immediately identifiable reduction in the perception of levels of tranquillity*) for high and very high sensitivity receptors. The magnitude of impact has the potential to affect the perception of tranquillity at the threshold of what is considered to be significant for very high sensitivity receptors, in terms of the methodology within **ES Appendix 8.4.1** [APP-109]. However, further data and modelling would be required to create new overflight heat maps and the specific increase in daily overflights at 10 representative locations in **ES Table 8.9.1** [APP-033] to test these preliminary assumptions and accurately establish the likely level of effects on tranquillity.

5.8 Noise and Vibration

Summary

5.8.1 The noise impacts of the Project relate to the change in noise and hence changes to future baseline as well as with Project ATM forecasts are considered. The mitigation, however, including the **Noise Insulation Scheme** [REP4-017] and the **Noise Envelope** [APP-177] also relate to the absolute noise levels with the Project.

5.8.2 Air noise impacts are assessed in the busier summer season. In the later years air noise impacts would be slightly higher in the York sensitivity tests because they assume less seasonal peak spreading, with more peak season traffic and greater increases over a lower baseline in the summer. However, in the early years after opening (characterised by 2032) the slower uptake of new capacity assumed by York would give slightly lower noise levels and impacts. Because the Noise Insulation Scheme and the Noise Envelope (first period) are determined by noise contours in the noisiest year (2032 in the GAL submission) these are likely to be slightly smaller contours in the York sensitivity tests. Noise impacts at night would be more similar than day because all forecasts are limited by the Night Flight Restrictions but, similarly to day time, the highest noise levels that are predicted in the early years after opening at night would be slightly lower.

5.8.3 Road traffic is assessed using annual average weekday traffic flows. Flows on five main road links in the area of the road alterations show greater increases in the York sensitivity tests than the ES submission. The effect is slightly larger in 2038 than in 2032. The greater increases in flows are small and would create very slight increases in the noise increases that arise from the Project. On the basis of this analysis of traffic flows the differences in traffic noise impacts for all the sensitivity tests would be slight compared to the ES, no new noise effects would arise and no changes in noise mitigation would be required.

Aircraft Noise

5.8.4 Air noise impacts are assessed in the busier summer season. In the time available it has not been possible to model air noise for the sensitivity tests. Instead, the differences in the primary day and night L_{eq} noise levels have been estimated from the L_{eq} summer season average daily ATMs for each sensitivity case compared to the GAL Submission ES case. This assumes the fleets are the same for each comparison made. The analysis has then taken the ES worst case slower transition fleet noise contour areas in each year (base and NRP) and factored them up or down for the noise difference due to the different ATM forecasts in each sensitive case using a CAA ERCD rule of thumb (L_{eq} contour area varies by 20% for each 1dB change) to estimate contour areas for each sensitivity case (base and NRP). Whilst approximate, this method gives an estimate of how the noise contours would vary. This would need to be confirmed by CAA ERCD noise modelling.

5.8.5 Figure 5.8.1 shows the estimated daytime LOAEL contour areas for each sensitivity case in 2032, 2038 and 2047. This figure is equivalent to ES Diagram 14.9.2 but the scale has been more than doubled to highlight the differences.

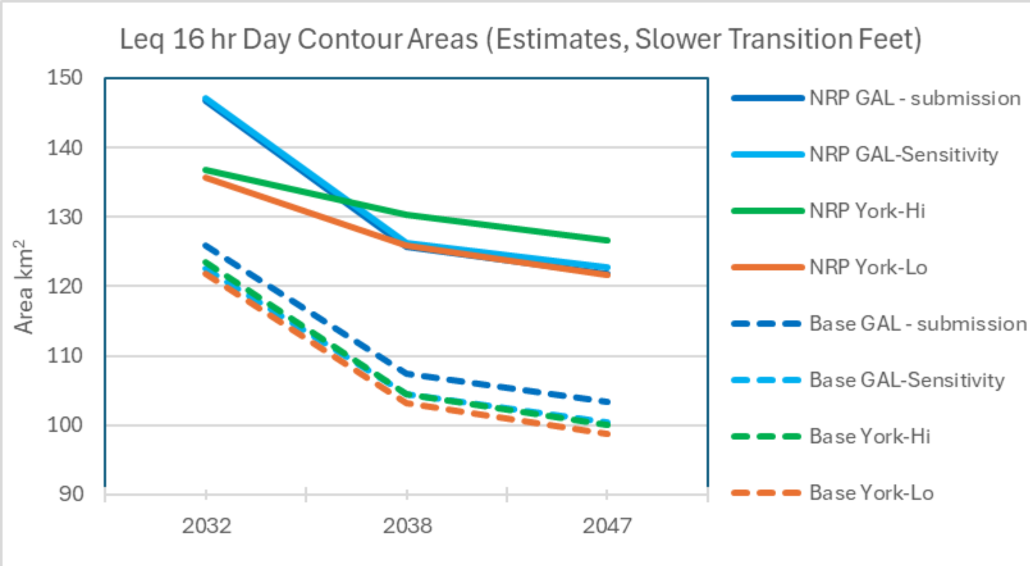


Figure 5.8.1 Air Noise Daytime LOAEL Contour Area (km^2) Estimates

5.8.6 The noise contour areas for GAL sensitivity test with the Project follow the GAL Submission ES case closely and are almost indistinguishable from them in this diagram.

5.8.7 In 2032 the York Low and High With Project sensitivity tests forecast lower ATMs with smaller noise contours. This would imply the initial daytime Noise Envelope contour area limit could be reduced, by about 7%.

5.8.8 In 2038 the York High sensitivity test forecasts higher ATMs with noise contours about 4% larger in the summer season. This would imply slightly higher noise levels affecting slightly more people. The second period Noise Envelope limit could still be reduced from 2032 but would need to be higher than in the GAL submission. In 2038 The York Low sensitivity case is very similar to the ES Submission.

5.8.9 From 2038 to 2047 the York High sensitivity test contour areas reduce slightly, as in the GAL Submission ES case, so that both forecast the opportunity to reduce the Noise Envelope limit further between 2038 to 2047 through the review process, noting these forecasts for some 23 years from now are less certain.

5.8.10 The impact of the Project is determined by the difference between noise levels with the Project and those without it in the same base year. For a noise sensitive receptor where the pattern of overflights is unchanged by the Project the increase in day L_{eq} is about 0.8dB in all years in the GAL Submission ES case.

5.8.11 For the York sensitivity tests this difference is smaller in 2032 (0.6dB), but larger in 2038 and 2047 (1.0 to 1.1dB). Whilst these differences of 0.2dB less to 0.3dB more increase show as differences in contour areas it is unlikely they would be noticeable to individuals experiencing the noise.

5.8.12 The ES predicted significant air noise effects at 80 properties mostly to the west of the airport where noise increases of greater than 1dB above the SOAEL, or 3dB above the LOAEL, are predicted in 2032. In the York sensitivity cases these impacts would occur later, and could be slightly greater, but because most of the noise increase in these areas is due to the movement of some departures north by 200m, more so than by the increases in ATMs, the increase may be quite subtle. Modelling would be required to assess this.

5.8.13 Modelling would also be required to assess the effect on the Noise Insulation Inner and Outer Zones which could be smaller because the largest noise contours in the York Sensitivity (i.e. in or around 2032 which is the noisiest year with the largest contours) cases are smaller.

5.8.14 Figure 5.8.2 shows the estimated night-time LOAEL noise contour areas for each sensitivity case in 2032, 2038 and 2047.

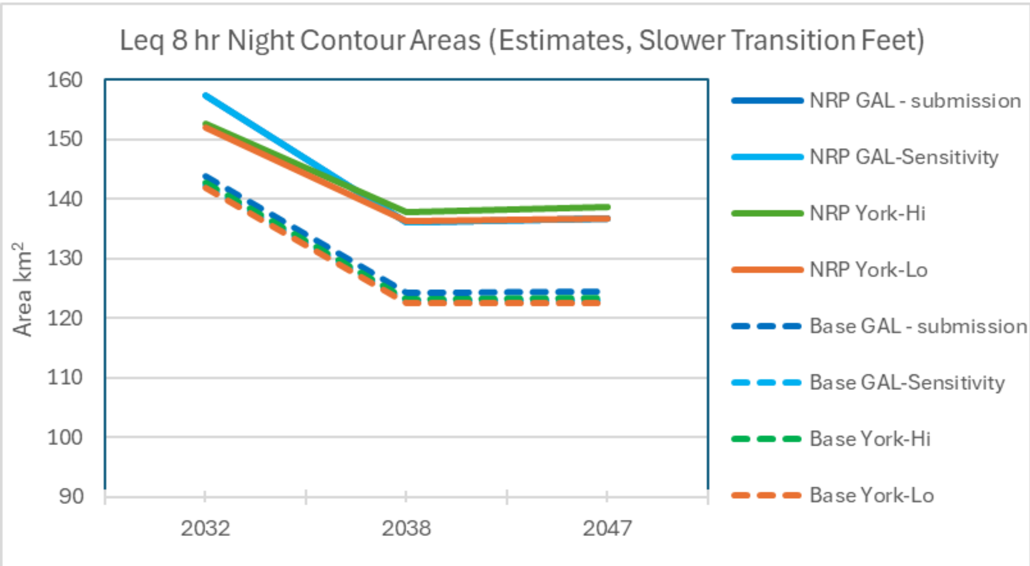


Figure 5.8.2 Air Noise Night-time LOAEL Contour Area (km²) Estimates

5.8.15 The differences with the sensitivity tests for the night-time are rather more subtle than daytime because there is little scope to vary the ATM forecasts because of the movement limits in the Night Flight Restrictions. The GAL Sensitivity contours areas are the same as the GAL Submission and cannot be distinguished from them in the figure above. As for daytime, the York sensitivity tests suggest lower impacts in 2032, but overall the impacts of the Project would likely be very similar at night in the sensitivity tests. The Noise Insulation Scheme Inner Zone is determined by the night-time $L_{eq\ 8\ hr}$ 55dB contour in 2032 (which is larger and fully encompasses the $L_{eq\ 16\ hr}$ 63dB daytime SOAEL contour), and would be slightly smaller in the York sensitivity tests because it is based on the largest contour that arises in 2032

5.8.16 This noise analysis addresses noise in the summer season (16 June to 15 September). Because the York sensitivity tests assume less seasonal spreading than the ES Submission, they affect non-summer noise changes less. This means noise changes in the winter or annually would be smaller in the York Sensitivity tests that in the ES Submission.

5.8.17 This noise analysis assumes the worst case slower transition fleet. For the Central Case fleet transition that is also reported in the ES, or the Updated Central Case fleet as assessed in **5.1 ES Addendum - Updated Central Case Aircraft Fleet Report** [REP4-004] similar differences in noise effects, between the York sensitivity cases and the ES submission, would be expected, over slightly lower future baselines.

5.8.18 This analysis has focused on air noise. Ground noise would show similar trends, including slightly lower noise impacts in 2032.

5.8.19 Table 5.8.1 summarizes the increases in overflights due to the Project in each case, over the 24 hour average summer day period used in the landscape, tranquillity and heritage impact assessments. The increases are shown as percentages, with the baseline and Project total daily ATMs across all routes, arrivals and departures, shown in brackets.

Table 5.8.1 Increase in Summer Season 24hr Overflights with Project

Case	2032	2038	2047
GAL Submission ES	18% (942 to 1114)	18% (950 to 1121)	18% (955-1125)
GAL – Sensitivity	22% (918 to 1117)	22% (923 to 1127)	22% (927 to 1134)
York Low	13% (912 to 1028)	23% (912 to 1123)	23% (912 to 1123)
York High	12% (924 to 1037)	26% (924 to 1165)	27% (924 to 1173)

5.8.20 The ES rounded 18% up to 20% for all overflight mapping.

5.8.21 In the York sensitivity cases, the baseline is generally lower, leading to greater increases due to the Project in the latter years. There is a lower increase in 2032 because for the slower ramp up of ATMs with the Project in these sensitivity cases. There are higher increases in 2038 and 2047, but these are over lower baselines and lead to total numbers very similar (within 4%) to the ES submission.

Road Traffic Noise

5.8.22 Road traffic is assessed using annual average weekday traffic flows. In the time available it has not been possible to model road traffic noise for the sensitivity tests. Instead, to allow the changes in road traffic noise to be considered in the area most affect by traffic noise from the Project, the changes in annual average weekday traffic flows with the Project compared to the Business as Usual (BAU) baseline have been analysed on a sample of road links in the highways scheme area. Levels of road traffic noise are relatively insensitive to changes in road traffic flow. For example, an increase in flow of 25% would increase traffic noise levels by about 1dB, assuming all other factors remain the same. The following 5 road links were studied because they are adjacent to noise sensitive receptors:

- M23 East of South Terminal roundabout
- Airport Way West of South Terminal roundabout
- A23 London Road past Riverside Garden Park
- A23 Brighton Road East of Longbridge roundabout
- A217 North of Longbridge roundabout.

5.8.23 The road traffic noise assessment in **ES Chapter 14: Noise and Vibration** [APP-039] follows the DMRB methodology that requires assessment of changes in traffic noise in the year of opening, 2032, and 15 years later, 2047. The sensitivity analysis was undertaken for the year of opening, 2032 because this is the year in which greatest noise impacts were found in the ES and for which mitigation is developed so that no significant traffic noise effects were reported. In the ES 2038 was assessed qualitatively but it is analysed also here, because the sensitivity tests have greater changes in flows in 2038.

5.8.24 For each road link the change in traffic flow due to the Project for the sensitive case was compared to the change in flow in the DCO submission, as summarised in Table 5.8.2.

Table 5.8.2 Increase in Road Traffic Flow with Project Compared to BAU

Road Link	GAL ES Submission	York Low	York High
2032			
A217 North of Longbridge Roundabout	4%	3%	3%
A23 Brighton Road	-3%	-3%	-3%
A23 London Road past park	-5%	-6%	-6%
Airport Way west of ST Roundabout	15%	10%	11%
M23 East of ST Roundabout	18%	13%	13%
2038			
A217 North of Longbridge Roundabout	5%	6%	6%
A23 Brighton Road	-1%	-1%	-1%
A23 London Road past park	-5%	-3%	-3%
Airport Way west of ST Roundabout	18%	22%	24%
M23 East of ST Roundabout	20%	25%	27%

5.8.25 The percentages of change on flow for the York Low and York High sensitivity tests are similar to the ES. The changes are larger in 2038 when the sensitivity tests show greater changes than the ES by between 0 and 7 percentage points. The largest difference between the York High sensitivity test and the ES is on the A23 East of the South terminal Roundabout, where the ES change of 20% increases to 27%. The changes in traffic noise brought about by these two changes in traffic flow are 0.8dB and 1.1dB respectively assuming no other factors change (e.g. speed, traffic composition, highway geometry etc). So, on this basis the greatest difference that might be seen in the York High sensitivity test would be +0.3dB on this road. On the other roads the effect would be smaller. It is important to note that this analysis only considers the effect of different traffic flows, not other factors including the speed reduction, and the two noise barriers that reduce noise with the Project. To understand the differences due to the sensitivity tests, traffic noise modelling would be required. Nonetheless, on the basis of this analysis of traffic flows the differences in traffic noise impacts for all the sensitivity tests would be slight compared to the ES, no new noise effects would arise and no changes in noise mitigation would be required.

5.9 Socio-Economics

Introduction and summary

5.9.1 ICF has estimated the baseline direct (on-site) employment and direct employment due to the NRP associated with the YA traffic forecasts and the GAL sensitivity scenario. Indirect and induced jobs associated with YA traffic forecasts have not been recalculated, but proportionate changes are likely to be similar to those for the direct jobs.

5.9.2 **ES Chapter 17: Socio-economic** [APP-042] identified significant effects on:

- Direct employment related to Construction and business activity (LSA, FEMA and LMA) in the initial construction period (2024 – 2029)
- Direct employment related to Construction and business activity (LSA, FEMA and LMA) after the first full year of opening (2030 – 2032)
- Indirect, induced and catalytic employment (FEMA and LMA) in the first full year of operations (2029)
- Direct operational employment (LSA) related to Business and commercial activity during operations (2032)
- Indirect, induced and catalytic employment (LSA, FEMA and LMA) during operations (2032)
- Availability of labour (LSA, FEMA) during operations (2032)
- Direct operational employment (LSA) during the design year (2038)
- Indirect, induced and catalytic employment (LSA, FEMA and LMA) during the design year (2038)
- Availability of labour (LSA and FEMA) during the design year (2038)
- Direct operational employment (LSA) in the long term (2047)
- Indirect, induced and catalytic employment (LSA, FEMA and LMA) in the long term (2047)

- Availability of labour (LSA and FEMA) in the long term (2047)

5.9.3 The extent to which the assessment of these effects is likely to be changed by the YA forecasts and the GAL Sensitivity Scenario is set out below.

NRP jobs

5.9.4 The direct jobs estimated by ICF in the DCO submission, those estimated by ICF in response to York Aviation's scenarios and the GAL Sensitivity are shown below.

Table 5.9.1 Baseline jobs

	2029	2032	2038	2047
DCO Submission	27,609	28,077	28,770	29,721
GAL Sensitivity	24,130	25,490	26,319	26,964
York Low	24,493	26,062	26,292	25,877
York High	25,107	27,036	27,288	27,563

Table 5.9.2 Total jobs with the NRP

	2029	2032	2038	2047
DCO Submission	28,596	31,199	31,985	32,822
GAL Sensitivity	25,151	29,252	30,661	32,057
York Low	24,832	27,381	31,242	31,842
York High	25,576	28,817	33,266	34,140

Table 5.9.3 NRP Increment

	2029	2032	2038	2047
DCO Submission	987	3,122	3,215	3,101
GAL Sensitivity	1,021	3,762	4,342	5,093
York Low	339	1,319	4,950	5,965
York High	469	1,781	5,978	6,577

5.9.5 Direct (on-site) employment is calculated by ICF based on air traffic movement and passenger forecasts; therefore, the York Aviation alternative scenarios affect the incremental operational employment estimates arising from the NRP.

York Low and York High

5.9.6 The York Aviation forecasts imply a slower initial increase in employment numbers (i.e. in 2029 and 2032); however, both the high and low scenarios project direct employment above the GAL forecasts for 2038 and 2047. Applying the York figures would suggest a minor beneficial effect compared to the moderate beneficial effect resulting from the original GAL forecasts in 2029 and 2032 due to slower growth in the York Aviation forecasts. However, for the 2038 and 2047 assessment years the overall impact remains assessed as major beneficial, and the actual employment impacts are higher.

5.9.7 Indirect (supply chain) and induced (wage spending) employment is also affected by the alternative scenarios, however, only two effects at the LSA spatial level would be altered: in 2032, the low scenario would produce a minor beneficial, rather than a moderate beneficial effect, while in 2047 the high scenario would produce a major beneficial, rather than a minor beneficial effect.

5.9.8 Regarding the labour market, the only change would be in 2032, where the low scenario results in a minor beneficial, rather than moderate beneficial, impact on the labour market in the LSA due to a lower potential reduction in unemployment.

GAL sensitivity

5.9.9 The incremental operational employment estimates implied by the GAL sensitivity are higher than the original GAL forecasts but lower than both the York high and low scenarios in overall terms. They are also profiled to increase more rapidly in the earlier assessment years than the York scenarios (i.e. more in line with the original GAL forecasts). Accordingly, the GAL sensitivity incremental employment increase is higher than both the York high and York low scenarios for 2029 and 2032, but this reverses for 2038 and 2047 when the GAL sensitivity is lower than the York low scenario.

5.9.10 In assessment terms, at the Local Study Area level the effect would be moderate beneficial in 2029 and remains as major beneficial in 2032. For the 2038 and 2047 assessment years the overall impact remains assessed as major beneficial, with the actual employment impacts being higher than the original GAL forecasts but lower than the York low scenario. The impacts on indirect and induced employment, and labour availability, would remain the same as the assessment for the original GAL forecasts.

5.10 Traffic and Transport

5.10.1 **ES Chapter 12: Traffic and Transport** [REP3-016] assessed a number of potential environmental effects relating to traffic and transport. More recent guidance from the Institute of Environmental Management and Assessment (IEMA) on the Environmental Assessment of Traffic and Movement (2023) was published in June 2023 and at the Examining Authority's (ExA's) request an updated assessment was provided in **The Impact of Latest IEMA Guidance (2023) on the Assessment of Effects Related to Traffic and Transport** [AS-119]. A separate environmental review has now been undertaken for the post-Covid sensitivity test modelling which is being submitted at Deadline 5.

5.10.2 The assessment in **ES Chapter 12: Traffic and Transport** [REP3-016] is informed by the analysis presented in the **Transport Assessment** [REP3-058] and **Transport Assessment Annex B: Strategic Transport Modelling Report** [APP-260]. The latter provides detailed information on the operational performance of the transport networks, which is used to determine the magnitude of impact arising from the Project on different networks and in different locations. In **ES Chapter 12: Traffic and Transport** [REP3-016] the magnitude of impact information is then combined with the receptor sensitivity to determine the degree of environmental effect for each aspect of the Traffic and Transport topic, and to determine whether those effects are significant.

5.10.3 The commentary in this section discusses whether and how the three sensitivity tests might produce different outcomes from those reported in **ES Chapter 12: Traffic and Transport** [REP3-016]. In doing so, it considers the potential changes to magnitudes of impact on the highway network (including in relation to severance and driver delay) and on the rail network (in relation to passenger loading on rail services). Throughout this review, receptor sensitivity is assumed to remain as determined in **ES Chapter 12: Traffic and Transport** [REP3-016] and therefore any potential change in outcomes attributable to the sensitivity tests would arise from changes to those magnitudes of impact.

5.10.4 The assessment of the potential implications related to traffic and public transport provides a high-level largely qualitative review based on the changes from the core scenario and professional judgement with reference to the assessment presented in **ES Chapter 12: Traffic and Transport** [REP3-016]. By considering the sensitivity tests in the context of the core scenario, the approach is considered to be conservative, because the more recent post-Covid modelling tests (**Accounting for Covid-19 in Transport Modelling** [AS-121] and **Post Covid VISSIM Sensitivity Tests for 2032 and 2047** [REP3-108]) suggest that the volume of future travel demand would be lower than was assumed in the core modelling.

5.10.5 The reduction in demand in the post-Covid modelling tests is broadly similar to the uplift indicated in the York High sensitivity test, which suggests that under post-Covid conditions that sensitivity test would be unlikely to produce magnitudes of impact materially different to those identified in the **Transport Assessment** [REP3-058] for the core (pre-Covid) scenario; other sensitivity tests considered here would show even smaller differences.

5.10.6 The environmental review of the sensitivity analysis for Traffic and Transport has only been undertaken for the assessment year of 2047, when the transport networks are likely to be busiest and the Project would have the greatest effects.

5.10.7 The sensitivity analysis for different future baseline and with Project scenarios primarily considers the effects of the Project on a busy June day, as is the case for the assessment reported in the **Transport Assessment** [REP3-058] and **ES Chapter 12: Traffic and Transport** [REP3-016]. It is based on the core modelling scenario used for the Application; it does not consider the post-Covid modelling that was reported in **Accounting for Covid-19 in Transport Modelling** [AS-121] or **Post Covid VISSIM Sensitivity Tests for 2032 and 2047** [REP3-108].

5.10.8 For all scenarios, the assumed passenger throughput on the June busy day with the Project would be higher in 2047 than that used for the core assessment in the Application, even though in some cases the annual passenger throughput may be lower than in the core assessment. The sensitivity analysis has therefore factored travel demand information from the core assessment in order to support a high-level commentary on the likely implications of each sensitivity scenario.

5.10.9 In the York Low scenario the difference in passenger throughput between the future baseline and with Project cases on the June busy day would increase by around 3% compared to that assessed in the core scenario. While this would lead to a corresponding increase in traffic flows, the majority of the increase would be on the Strategic Road Network (SRN). The change would not alter the conclusions of **ES Chapter 12: Traffic and Transport** [REP3-016] in relation to effects on severance, non-motorised user amenity and delay or those related to safety. The additional traffic demand would not be expected to change the conclusions related to driver delay, based on the operation of the highway network. Increases in rail-borne demand implied by the York-Lo scenario would only lead to small changes in the occupancy of rail services and although it implies an additional volume of passengers passing through Gatwick Airport station, overall it would not lead to increased degrees of effect in relation to crowding on rail services and at the station.

5.10.10 The York High scenario would increase the difference between future baseline and with Project cases by around 7% across the day and up to 10% in the morning and evening peak periods, compared to that in the core scenario. This change would not alter the effects related to severance, non-motorised user amenity and delay or safety which were presented in **ES Chapter 12: Traffic and Transport** [REP3-016]. In relation to driver delay, locations on the SRN which were previously identified as experiencing medium or high impacts resulting from the Project would continue to do so. Elsewhere on the SRN where a low magnitude of impact was previously identified this could increase to a medium impact and potentially to a worse effect on driver delay, but it is likely that the overall effect related to driver delay across the network would remain minor adverse, as identified in **ES Chapter 12: Traffic and Transport** [REP3-016]. On the rail network, the York High scenario would increase seated load factors by a small amount which is not expected to change the position assessed for the core scenario. Increases in the number of passengers passing through Gatwick Airport station could lead to a higher proportion of users experiencing a change in the Level of Service at platform and/or concourse level, which could increase the effect on crowding in the station from negligible to minor adverse, but this would not be considered a significant effect.

5.10.11 The GAL Sensitivity would increase the difference between future baseline and with Project cases by 1% to 2% compared to that in the core scenario. This would lead to correspondingly small changes in traffic flows, and would not change the effects assessed for severance, non-motorised user amenity and delay or safety that were reported in **ES Chapter 12: Traffic and Transport** [REP3-016]. The increase in rail passenger numbers would also be small and would not alter the conclusions reached in **ES Chapter 12: Traffic and Transport** [REP3-016] in relation to crowding on rail services or at Gatwick Airport station.

5.10.12 In relation to traffic and transport the sensitivity analysis therefore concludes that none of the sensitivity test scenarios are likely to give rise to new or different significant effects compared to those identified in **ES Chapter 12: Traffic and Transport** [REP3-016].

Key data, assumptions and limitations

5.10.13 The environmental assessment for the Traffic and Transport topic primarily relies on peak period data for a June busy day. The sensitivity test scenarios have been reviewed to understand the scale of change in travel demand that they imply for the June busy day, with and without the Project, compared to the core assessment presented in **ES Chapter 12: Traffic and Transport** [REP3-016].

5.10.14 The highway peak hours examined in **ES Chapter 12: Traffic and Transport** [REP3-016] were:

- AM Peak 1 (AM1) – 07:00 to 08:00;
- AM Peak 2 (AM2) – 08:00 to 09:00;
- Interpeak (IP) – average hour between 09:00 and 16:00; and
- PM Peak (PM) – average hour between 16:00 and 18:00.

5.10.15 In the time available it has not been possible to undertake full strategic transport modelling analysis for the sensitivity scenarios and instead the assessment considers factored traffic and public transport flows for the June peak day, based on those from the core strategic modelling in the Application and contained in **ES Chapter 12: Traffic and Transport** [REP3-016].

5.10.16 The forecast hourly ATM profiles on the busy day for the York Low, York High and GAL Sensitivity scenarios are shown in Figure 5.10.1 and 5.10.2.

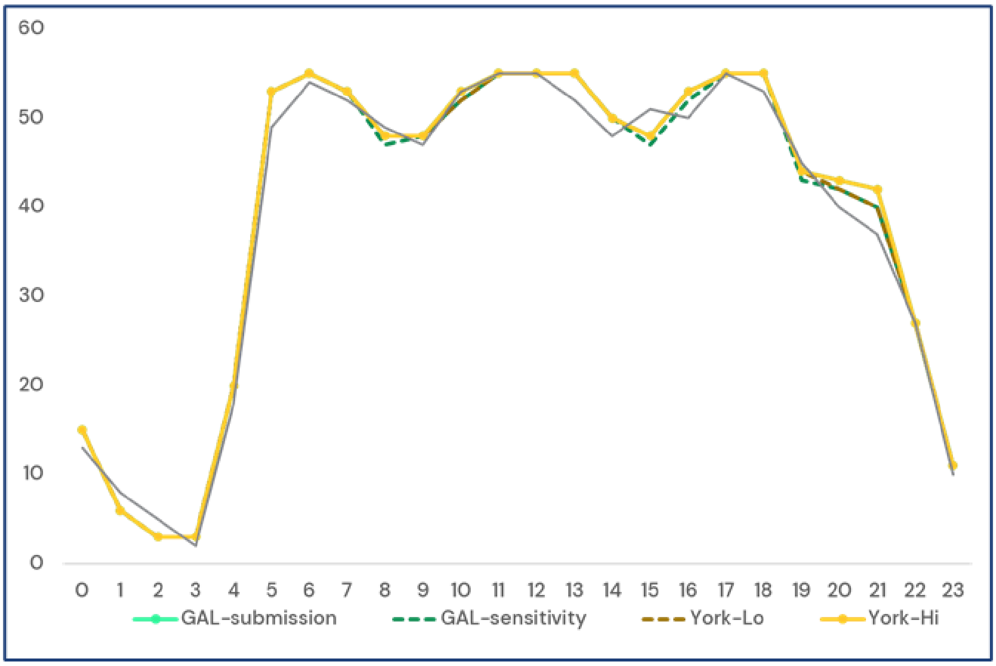


Figure 5.10.1 GAL Sensitivity ATM profile, 2047 future baseline busy day

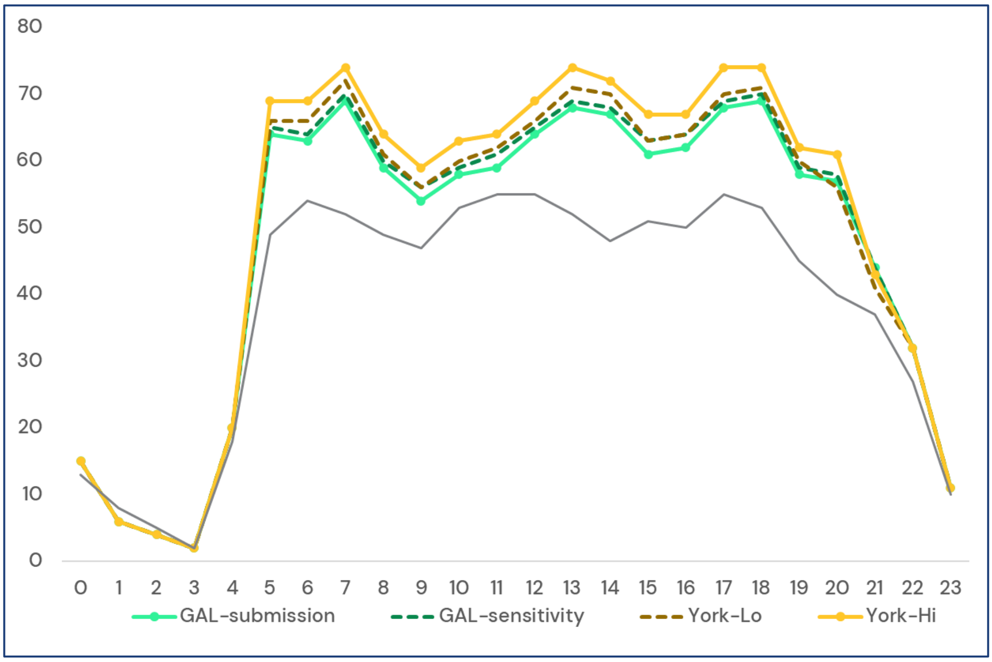


Figure 5.10.2 GAL Sensitivity ATM profile, 2047 with Project busy day

5.10.17 Hourly landside trip profiles have been inferred for the sensitivity scenarios, by using the airside passenger trip profiles provided for a peak day. These allow for the time offset between arriving at the Airport and the departure flight time, or between landing and leaving the Airport. These have been converted to a June busy day by using an updated conversion factor based on the seasonality profile for the sensitivity scenarios.

5.10.18 Table 5.10.1 shows the percentage changes in the June busy day future baseline and with Project passenger demand for each of the sensitivity scenarios when compared to the core scenario used in the Application.

Table 5.10.1 Percentage change in landside passenger numbers compared to Application (all modes), June busy day

Hour starting	York Low			York High	GAL-Sensitivity				
	2047 FB	2047 WP	Net change (FB to WP)	2047 FB	2047 WP	Net change (FB to WP)	2047 FB	2047 WP	Net change (FB to WP)
01:00	0%	0%	**0%**	0%	0%	**0%**	0%	0%	**0%**
02:00	0%	0%	**0%**	0%	0%	**0%**	0%	0%	**0%**
03:00	0%	0%	**0%**	0%	0%	**0%**	0%	0%	**0%**
04:00	0%	3%	**3%**	0%	7%	**7%**	0%	1%	**1%**
05:00	0%	3%	**3%**	0%	8%	**8%**	0%	1%	**1%**
06:00	0%	4%	**4%**	0%	8%	**8%**	0%	1%	**1%**
07:00	-1%	3%	**4%**	-1%	8%	**9%**	-1%	2%	**1%**
08:00	0%	3%	**3%**	0%	8%	**8%**	0%	2%	**2%**
09:00	-1%	4%	**5%**	-1%	9%	**10%**	-1%	2%	**1%**
10:00	-1%	3%	**4%**	-1%	9%	**10%**	-1%	2%	**1%**
11:00	0%	3%	**3%**	0%	9%	**9%**	0%	2%	**2%**
12:00	-1%	3%	**4%**	-1%	9%	**9%**	-1%	2%	**1%**
13:00	0%	3%	**3%**	0%	9%	**9%**	0%	2%	**2%**
14:00	-1%	3%	**4%**	0%	9%	**9%**	-1%	2%	**1%**
15:00	-1%	3%	**4%**	0%	10%	**10%**	-1%	3%	**2%**
16:00	0%	3%	**3%**	0%	8%	**8%**	0%	2%	**2%**
17:00	-1%	3%	**4%**	0%	7%	**7%**	-1%	2%	**1%**
18:00	-2%	3%	**6%**	-1%	9%	**10%**	-2%	3%	**1%**
19:00	-1%	2%	**3%**	-1%	6%	**7%**	-1%	2%	**1%**
20:00	-1%	2%	**3%**	0%	5%	**5%**	-1%	1%	**0%**
21:00	-2%	3%	**5%**	-2%	6%	**8%**	-2%	2%	**0%**
22:00	-3%	0%	**3%**	-3%	4%	**6%**	-3%	2%	**-1%**
23:00	-2%	0%	**2%**	0%	0%	**0%**	-5%	0%	**-5%**
00:00	0%	0%	**0%**	0%	0%	**0%**	0%	0%	**0%**
Average hourly	**-1%**	**2%**	**3%**	**0%**	**6%**	**7%**	**-1%**	**2%**	**1%**

5.10.19 Figure 5.10.1 shows that the future baseline throughout the day for each scenario is the same or slightly lower than the core scenario, with reductions of up to 3% in any hour in the York scenarios and 5% in the GAL-sensitivity scenario.

5.10.20 For the York Low scenario, the net change in flows between the future baseline and with Project cases increases by between 3% and 6%, with the hourly average being 3%. For the York High scenario, the net change in flows increases by between 5% and 10%, with the hourly average being 7%. The GAL Sensitivity scenario shows net changes in flows between future baseline and with Project cases which are no more than 2% greater than those in the core scenario in the Application.

5.10.21 To inform other topics for which traffic data is an input to the assessment, annual airport-related traffic flows have been factored based on the difference in the annual passenger throughput and employee numbers in the sensitivity scenarios compared to the core modelling.

Analysis

York Low

5.10.22 As set out in **Error! Reference source not found.**, the York-Low sensitivity test i s expected to result in a net hourly change of between +3% and +6% in airport-related demand compared to that assessed in **ES Chapter 12: Traffic and Transport** [REP3-016], albeit with lower absolute volumes of traffic.

5.10.23 A qualitative review of this on the Traffic and Transport topics is contained in Table 5.10.2.

Table 5.10.2 Review of likely Traffic and Transport effects, York-Low scenario

Topic	Traffic and Transport review for York-Low scenario
Severance	The assessment of severance is based on percentage change in traffic with the Project compared to the future baseline. As set out in Table 12.4.5 of **ES Chapter 12: Traffic and Transport** [REP3-016], the magnitude of impact for severance is 30-60% for low, 60% to 90% for medium and more than 90% for high. Tables 138 to 141 of **Transport Assessment Annex B: Strategic Transport Modelling Report** [APP-260] provide highway trip totals associated with Airport employees and passengers for the core

	scenario for the busy June day peak periods. They indicate total highway demand related to airport passengers of approximately 6,450 pcu[14] in the AM1 peak hour and 4,430 pcu in the PM peak hour. **Error! Reference source not found.** shows that the York Low s cenario would increase the change in airport passenger demand (between future baseline and with Project scenarios) by 4% in the AM1 and PM peak hours. Applying that factor to the figures above suggests this would equate to an additional 260 pcu and 155 pcu in total in the AM1 and PM peak hours respectively. Diagram 12.3.3 of the **Transport Assessment** [REP3-058] shows the distribution of airport traffic on the highway network in 2047. Based on that distribution, up to 75% of the additional demand in the York-Low scenario would be on the SRN, where pedestrians and cyclists are not present and therefore severance is not a consideration. The remaining 25% of additional demand would be spread across the local road network. Typically, no more than 7% of airport traffic would use any one route on the local road network and therefore the uplift implied by the York Low scenario would equate to no more than an additional 10 to 20 pcu in total on a particular local road. This is considered unlikely to alter the magnitude of impact determined for the core scenario, which is based on the degree of change in total traffic flow and is therefore unlikely to produce new or different significant effects compared to those already identified in **ES Chapter 12: Traffic and Transport** [REP3-016].
Driver delay	The expected change in highway demand associated with the Airport in the York Low scenario is expected to be relatively small at individual locations on the local road network, as explained above. The expected additional demand on the SRN would amount to approximately 130 pcu in total on the M23 north of the Airport and 65 pcu in total on the M23 south of the Airport in the AM1 peak hour,

[14] Passenger car unit

	with equivalent figures of 75 and 40 pcu in the PM peak hour. Bearing in mind that the Project highway works are shown to be operating satisfactorily in the 2047 with Project scenario (Sections 12 and 13 of the **Transport Assessment** [REP3-058], and also under post-Covid conditions as described in **Accounting for Covid-19 in Transport Modelling** [AS-121] and **Post Covid VISSIM Sensitivity Tests for 2032 and 2047** [REP3-108]), this additional demand is unlikely to require further mitigation. Considering the nature of the SRN and the locations already identified as experiencing medium or high magnitudes of impact in 2047 (see section 12.8 of **Transport Assessment Annex B: Strategic Transport Modelling Report** [APP-260] and Diagram 12.9.25 of **ES Chapter 12: Traffic and Transport** [REP3-016], the additional demand in each direction would not be expected to lead to new or different significant effects in relation to driver delay.
Pedestrian and cyclist delay Pedestrian and cyclist amenity	The surface access improvement works as part of the Project will reduce pedestrian and cyclist delay in the immediate vicinity of the Airport. The increases in traffic flows in the York Low scenario, compared to those in the core modelling for the Application, are not expected to have a material effect on traffic composition or to affect pedestrian and cyclist amenity. No new or different significant effects are expected for pedestrian and cyclist delay or amenity.
Accidents and safety Hazardous loads	Traffic flow changes for the York Low scenario are not expected to be significant on links, compared to those in the core modelling for the Application, and there are no changes to the Project in terms of surface access infrastructure. No new or different significant effects are expected for accidents and safety or hazardous loads.
Effects on public transport amenity - Crowding on rail services - Crowding in station	<u>Crowding on rail services</u> Tables 9.6.9 and 9.6.10 of the **Transport Assessment** [REP3-058] provides a summary of the seated load factor assessment for future baseline and with Project. A factor has been applied to the with Project line loadings to consider the effects of the York Low scenario on rail crowding. Error! Reference source not found. and Table 5

	.10.4**Error! Reference source not found.** show the change to the seated load factor compared to the core modelling in the Application. This shows that the York Low scenario would increase seated load factors by up to 0.03. This change is not significant and would not alter the conclusions of the assessment in **ES Chapter 12: Traffic and Transport** [REP3-016]. For sections where the seated load factor is exceeded, the net increase in passengers in the York Low scenario is not expected to have a material change to standing capacity. Crowding in station A similar approach has been undertaken to understand the increase in demand at Gatwick Airport Station. The results show that the York Low scenario would add 3% to 4% to the difference in demand between the future baseline and with Project cases. Table 5.10.5 shows the change in station entries and exits which this implies. The uplift is equivalent to around 280 and 350 additional passengers in the AM and PM peak hours respectively, or around 5-6 people per minute. This suggests that the York Low scenario could lead to a slightly greater proportion of station users experiencing a change in Level of Service at platform and/or concourse levels than was assessed in **ES Chapter 12: Traffic and Transport** [REP3-016], which concluded that the overall effect related to crowding in the station would be negligible adverse. However, based on the qualitative review of this scenario, it is considered unlikely that the York Low scenario would result in an increased degree of effect on station crowding, and therefore the York Low scenario would not lead to new or different significant effects.

Table 5.10.3 Northbound seated load factor, 2047 with Project, York Low scenario

Hour	DCO Application – 2047 With Project					York Low Percentage Increase				
	Three Bridges to	Gatwick to East	East Croydon to	Clapham Junction to	East Croydon to	Three Bridges to	Gatwick to East	East Croydon to	Clapham Junction to	East Croydon to
06:00	0.74	0.81	0.43	0.38	1.36	0	0.01	0.01	0	0.01
07:00	0.80	1.00	1.10	0.98	1.45	0	0.01	0.01	0	0
08:00	0.92	1.14	1.26	1.12	1.66	0	0.01	0.01	0	0
09:00	0.68	1.28	1.18	0.91	1.81	0	0.03	0.02	0.01	0.02
10:00	0.43	0.81	0.74	0.57	1.14	0	0.02	0.01	0.01	0.01

Table 5.10.4 Southbound seated load factor, 2047 with Project, York Low scenario

Hour	DCO Application – 2047 With Project					York Low Percentage Increase				
	Victoria to Clapham	Clapham Junction to	London Bridge to	East Croydon to	Gatwick to Three	Victoria to Clapham	Clapham Junction to	London Bridge to	East Croydon to	Gatwick to Three
15:00	0.45	0.63	0.92	0.69	0.38	0.01	0.02	0.01	0.02	0
16:00	0.93	1.08	1.28	0.91	0.60	0	0.01	0.01	0.01	0
17:00	1.14	1.33	1.56	1.11	0.74	0.01	0.01	0.01	0.01	0
18:00	1.05	1.16	2.11	1.27	1.03	0	0.01	0	0.01	0
19:00	0.80	0.89	1.62	0.98	0.79	0	0	0	0.01	0

Table 5.10.5 Gatwick Airport station entries and exits, 2047 with project, York-Lo scenario

Peak period	Direction	DCO Application – 2047 with Project	York Low – 2047 with Project	Change
AM peak	Entries	4,679	4,819	+140
	Exits	4,672	4,812	+140
PM peak	Entries	4,031	4,191	+161

	Exits	4,874	5,069	+195

5.10.24 Based on the review set out in 5.10.5 no new or different significant effects are expected on Traffic and Transport as a result of the York Low scenario.

York High

5.10.25 Table 5.10.1 shows that the York High scenario is expected to result in a net hourly change of between +5% and +10% in airport-related demand on a busy June day compared to that assessed in **ES Chapter 12: Traffic and Transport** [REP3-016].

5.10.26 A qualitative review of York High on the Traffic and Transport topics is set out in Table 5.10.7.

Table 5.10.6 Review of likely Traffic and Transport effects for York High scenario

Topic	Traffic and Transport review for York High scenario
Severance	The assessment of severance is based on the percentage change in traffic with the Project compared to the future baseline. As set out in Table 12.4.5 of **ES Chapter 12: Traffic and Transport** [REP3-016], the magnitude of impact for severance is 30-60% for low, 60% to 90% for medium and more than 90% for high. Tables 138 to 141 of **Transport Assessment Annex B: Strategic Transport Modelling Report** [APP-260] provide highway trip totals associated with Airport employees and passengers for the core scenario for the busy June day peak periods. They indicate total highway demand related to airport passengers of approximately 6,450 pcu[15] in the AM1 peak hour and 4,430 pcu in the PM peak hour. Table 5.10.1 shows that the York High scenario would increase the change in airport passenger demand (between future baseline and with Project scenarios) by 9% and 8% in the AM1 and PM peak hours respectively. Applying that factor to the figures above suggests this would equate to an additional 580 pcu and 330 pcu in total in the AM1 and PM peak hours respectively.

[15] Passenger car unit

	Diagram 12.3.3 of the **Transport Assessment** [REP3-058] shows the distribution of airport traffic on the highway network in 2047. Based on that distribution, up to 75% of the additional demand in the York High scenario would be on the SRN, where pedestrians and cyclists are not present and therefore severance is not a consideration. The remaining 25% of additional demand would be spread across the local road network. Typically, no more than 7% of airport traffic uses any one route on the local road network and therefore the uplift implied by the York High scenario would equate to no more than an additional 25 to 40 pcu in total on a particular local road. This is considered unlikely to alter the magnitude of impact determined for the core scenario based on the degree of change in total traffic flow and therefore unlikely to produce new or different significant effects compared to those already identified in **ES Chapter 12: Traffic and Transport** [REP3-016].
Driver delay	The expected change in highway demand associated with the Airport in the York High scenario is expected to be relatively small at individual locations on the local road network, as explained above and therefore is not expected to produce new or different significant effects related to driver delay on the local road network. The expected additional demand on the SRN would amount to approximately 300 pcu in total on the M23 north of the Airport and 150 pcu in total on the M23 south of the Airport in the AM1 peak hour, with equivalent figures of around 170 pcu and 80 pcu in total in the PM peak hour. Bearing in mind that the Project highway works are shown to be operating satisfactorily in the 2047 with Project scenario (Sections 12 and 13 of the **Transport Assessment** [REP3-058], and under post-Covid conditions as described in **Accounting for Covid-19 in Transport Modelling** [AS-121] and **Post Covid VISSIM Sensitivity Tests for 2032 and 2047** [REP3-108]), this additional demand is unlikely to require further mitigation. The assessment for the core scenario in **ES Chapter 12: Traffic and Transport** [REP3-016] concluded that the overall effect of the Project on driver delay in 2047 would be minor adverse at junctions

<table>
<tr><td></td><td>where medium and high magnitudes of impact were identified (see section 12.8 of Transport Assessment Annex B: Strategic Transport Modelling Report [APP-260] and Diagram 12.9.25 of ES Chapter 12: Traffic and Transport [REP3-016]. At key locations such as Junctions 9 and 8 (for M25), which were already identified as experiencing medium to high impacts in Transport Assessment Annex B: Strategic Transport Modelling Report [APP-260] and were considered accordingly in Table 12.9.27 of ES Chapter 12: Traffic and Transport [REP3-016], the additional demand in each direction on the M23 would not be expected to lead to different magnitudes of impact. At other locations on the SRN where a low impact was identified in Transport Assessment Annex B: Strategic Transport Modelling Report [APP-260], there could be potential for an increase to a medium magnitude of impact, which could in some cases lead to a worse effect at that particular location than was reported for the core scenario, However, it is likely that the overall effect related to driver delay across the network would remain minor adverse and therefore there would not, overall, be new or different significant effects in relation to driver delay.</td></tr>
<tr><td>Pedestrian and cyclist delay</td><td rowspan="2">The surface access improvement works as part of the Project will reduce pedestrian and cyclist delay in the immediate vicinity of the Airport. The increases in traffic flows in the York High scenario, compared to those in the core modelling for the Application, are largely expected to be on the SRN where there are no or limited pedestrian and cyclist movements. In addition, the thresholds for determining the degree of effect related to pedestrian and cyclist delay and amenity are relatively broad and the overall change of up to 10% in traffic flows (York High scenario compared to core scenario) is unlikely to present new or different significant effects for pedestrian and cyclist delay or amenity.</td></tr>
<tr><td>Pedestrian and cyclist amenity</td></tr>
<tr><td>Accidents and safety</td><td rowspan="2">Traffic flow changes for the York High scenario are not expected to be significant on links, compared to those in the core modelling for the Application, and there are no changes to the Project in terms of</td></tr>
<tr><td>Hazardous loads</td></tr>
</table>

	surface access infrastructure. No new or different significant effects are expected for accidents and safety or hazardous loads.
Effects on public transport amenity - Crowding on rail services - Crowding in station	Crowding on rail services A factor has been applied to the with Project line loadings from the core modelling to consider the effects of the York High scenario on rail crowding. Tables 5.10.7 and 5.10.8 show the change to the seated load factor that would result from the York High scenario compared to the Application. This shows that the York High scenario would increase seated load factors by up to 0.04 in the northbound direction in the morning periods, and up to 0.03 in the southbound direction in the evening periods. This change is not significant and would not alter the conclusions of the assessment in **ES Chapter 12: Traffic and Transport** [REP3-016]. For sections where the seated load factor is exceeded, the net increase in passengers in the York-Hi scenario is not expected to have a material change to standing capacity. Crowding in station A similar approach has been undertaken to understand the increase in demand at Gatwick Airport Station. The results show that the York High scenario would add 8% to 9% to the difference in demand between the future baseline and with Project cases. Table 5.10.9 shows the change in station entries and exits which this implies. The uplift is equivalent to around 750 and 620 additional passengers in the AM and PM peak hours respectively, or around 10-12 people per minute. This suggests that the York High scenario could lead to a greater proportion of station users experiencing a change in Level of Service at platform and/or concourse levels than was assessed in **ES Chapter 12: Traffic and Transport** [REP3-016], which concluded that the overall effect related to crowding in the station would be negligible adverse. Based on the qualitative review of this scenario, the York High scenario could potentially increase the effect of the Project to minor adverse, although this would still not be considered a significant effect.

Table 5.10.7 Northbound seated load factor, 2047 with Project, York High scenario

Hour	DCO Application – 2047 With Project					York-High Increase				
	Three Bridges to Gatwick	Gatwick to East Croydon	East Croydon to Clapham	Clapham Junction to	East Croydon to London	Three Bridges to Gatwick	Gatwick to East Croydon	East Croydon to Clapham	Clapham Junction to	East Croydon to London
06:00	0.74	0.81	0.43	0.38	1.36	0.01	0.01	0.01	0.01	0.01
07:00	0.80	1.00	1.10	0.98	1.45	0	0.01	0.01	0	0.01
08:00	0.92	1.14	1.26	1.12	1.66	0	0.01	0.01	0.01	0.01
09:00	0.68	1.28	1.18	0.91	1.81	0.01	0.04	0.03	0.02	0.03
10:00	0.43	0.81	0.74	0.57	1.14	0	0.03	0.02	0.01	0.02

Table 5.10.8 Southbound seated load factor, 2047 with Project, York High scenario

Hour	DCO Application – 2047 With Project					York-High Increase				
	Victoria to Clapham Junction	Clapham Junction to East Croydon	London Bridge to East Croydon	East Croydon to Gatwick	Gatwick to Three Bridges	Victoria to Clapham Junction	Clapham Junction to East Croydon	London Bridge to East Croydon	East Croydon to Gatwick	Gatwick to Three Bridges
15:00	0.45	0.63	0.92	0.69	0.38	0.02	0.02	0.02	0.03	0
16:00	0.93	1.08	1.28	0.91	0.60	0.01	0.01	0.01	0.02	0
17:00	1.14	1.33	1.56	1.11	0.74	0.01	0.01	0.01	0.02	0
18:00	1.05	1.16	2.11	1.27	1.03	0.01	0.01	0.01	0.01	0
19:00	0.80	0.89	1.62	0.98	0.79	0.01	0.01	0.01	0.01	0

Table 5.10.9 Gatwick Airport station entries and exits, 2047 with Project, York High scenario

Peak period	Direction	DCO Application – 2047 with Project	York-Hi – 2047 with Project	Change
AM peak	Entries	4,679	5,053	+374

	Exits	4,672	5,046	+374
PM peak	Entries	4,031	4,313	+282
	Exits	4,874	5,215	+341

5.10.27 On the basis of the analysis in Table 5.10.6 no new or different significant effects are expected for the York-High scenario by comparison to that reported in the core scenario in the Application.

GAL Sensitivity

5.10.28 For the GAL Sensitivity scenario, the future baseline annual passenger throughput is reduced by 7.1mppa (11%) to 60.1mppa and the with-Project throughput is reduced by 4.9mppa (6%) to 75.3mppa. The net increase in mppa as the result of the Project is therefore slightly higher, at 15.2mppa, than the core scenario in the Application at around 13mppa, but the total passenger throughput with the Project at the Airport is less than that assessed in the Application.

5.10.29 As paragraph 5.10.3 notes, the assessment contained in **ES Chapter 12: Traffic and Transport** [REP3-016] is for a June busy day. Figures 5.10.1 and 5.10.2 show that the busy day profile of ATMs for the GAL Sensitivity scenario is expected to be similar to the core scenario for the future baseline case and have slightly higher numbers of ATMs than the core scenario for the with-Project case. As Table 5.10.1 illustrates, the difference between the future baseline and with Project cases for the GAL Sensitivity scenario is around 1-2% greater than that assessed in **ES Chapter 12: Traffic and Transport** [REP3-016].

5.10.30 The reduction in annual passenger demand in this scenario, with a June busy day that would be no busier than that assessed in the core modelling for the Application, would mean that absolute conditions on the highway and public transport networks, in terms of congestion / crowding and network performance, would be no worse than those shown in the core modelling.

5.10.31 A qualitative review of the GAL Sensitivity scenario on the Traffic and Transport topics is set out in Table 5.10.10.

Table 5.10.10 Review of likely Traffic and Transport effects for GAL-Sensitivity scenario

Topic	Traffic and Transport review for GAL Sensitivity scenario
Severance	The assessment of severance is based on percentage change in traffic with the Project compared to the future baseline. As set out in Table 12.4.5 of **ES Chapter 12: Traffic and Transport** [REP3-016],

	the magnitude of impact for severance is 30-60% for low, 60% to 90% for medium and more than 90% for high. Tables 138 to 141 of **Transport Assessment Annex B: Strategic Transport Modelling Report** [APP-260] provide highway trip totals associated with Airport employees and passengers for the core scenario for the busy June day peak periods. They indicate total highway demand related to airport passengers of approximately 6,450 pcu[16] in the AM1 peak hour and 4,430 pcu in the PM peak hour. Table 5.10.1 shows that the GAL-Sensitivity scenario would increase the change in airport passenger demand (between future baseline and with Project scenarios) by 1% in the AM1 peak hour and 2% in the PM peak hour. Applying that factor to the figures above suggests this would equate to an additional 65 pcu and 90 pcu in total in the AM1 and PM peak hours respectively. Diagram 12.3.3 of the **Transport Assessment** [REP3-058] shows the distribution of airport traffic on the highway network in 2047. Based on that distribution, up to 75% of the additional demand in the GAL Sensitivity scenario would be on the SRN, where pedestrians and cyclists are not present and therefore severance is not a consideration. The remaining 25% of additional demand would be spread across the local road network. Typically, no more than 7% of airport traffic would use any one route on the local road network and therefore the uplift implied by the GAL Sensitivity scenario would equate to less than 10 pcu in total on a particular local road. This would not alter the magnitude of impact determined for the core scenario based on the degree of change in total traffic flow and is therefore unlikely to produce new or different significant effects compared to those already identified in **ES Chapter 12: Traffic and Transport** [REP3-016].
Driver delay	The expected change in highway demand associated with the Airport in the GAL Sensitivity scenario is expected to be relatively

[16] Passenger car unit

	small at individual locations on the local road network, as explained above. The expected additional demand on the SRN would amount to approximately 35 pcu in total on the M23 north of the Airport and 15 pcu in total on the M23 south of the Airport in the AM1 peak hour, with equivalent figures of 45 and 20 pcu in the PM peak hour. Bearing in mind that the Project highway works are shown to be operating satisfactorily in the 2047 with Project scenario (Sections 12 and 13 of the **Transport Assessment** [REP3-058], and under post-Covid conditions as described in **Accounting for Covid-19 in Transport Modelling** [AS-121] and **Post Covid VISSIM Sensitivity Tests for 2032 and 2047** [REP3-108]), this additional demand is unlikely to require further mitigation. The additional demand in each direction would not be expected to lead to new or different significant effects in relation to driver delay.
Pedestrian and cyclist delay Pedestrian and cyclist amenity	The surface access improvement works as part of the Project will reduce pedestrian and cyclist delay in the vicinity of the Airport and traffic flows in the GAL Sensitivity scenario are expected to be similar to those in the core scenario for the June busy day. No new or different significant effects are expected for pedestrian and cyclist delay or amenity.
Accidents and safety Hazardous loads	Traffic flow changes arising the GAL Sensitivity scenario are expected to be similar to those identified for the core scenario and there are no changes to the Project in terms of surface access infrastructure. No new or different significant effects are expected for accidents and safety or hazardous loads.
Effects on public transport amenity - Crowding on rail services - Crowding in station	<u>Crowding on rail services</u> The change in the number of passengers using rail services and Gatwick Airport Station on the June busy day as a result of the Project, in the GAL Sensitivity case, would be no more than 2%. Given that the York Low sensitivity test indicated that seated load factors would increase by no more than 0,03, for an increase of between 3% and 4% in demand, the GAL Sensitivity scenario would

	result in seated load factors changing by less than 0.02. This change is not significant and would not alter the conclusions of the assessment in **ES Chapter 12: Traffic and Transport** [REP3-016]. For sections where the seated load factor is exceeded, the net increase in passengers in the GAL Sensitivity scenario is not expected to have a material change to standing capacity. The GAL Sensitivity scenario would not therefore lead to new or different significant effects related to crowding on rail services. Crowding in station The GAL Sensitivity case would add up to 2% to the difference in demand between the future baseline and with-Project cases. The uplift is equivalent to around 100 additional passengers an hour in the morning peak period and 180 an hour in the evening peak period, or around 2-3 people per minute. This is unlikely to alter the conclusions of the assessment in **ES Chapter 12: Traffic and Transport** [REP3-016] the GAL Sensitivity scenario would not lead to new or different significant effects related to crowding in the station.

5.10.32 On the basis of the analysis in Table 5.10.10, no new or different significant effects are expected as a result of the GAL Sensitivity scenario by comparison to that reported in the core scenario in the Application.

5.11 Water Environment

5.11.1 The increase in peak summer (April to October) passenger numbers in all scenarios would increase peak water use and the wastewater produced by the airport. Gatwick infrastructure would be able to cope with the increase in flows. GAL would liaise with Sutton and East Surrey (SESW) to confirm they could meet the additional water demand. Based on SESW's confirmation of the ability to meet the additional water demand from the Project submitted at Deadline 4 [REP4-024] it is anticipated they could meet this further additional demand. Thames Water would need to undertake an impact assessment to determine the impact on their network and process infrastructure. Given the increase in passengers it is considered that the upgrades required (if any) in Thames Water's infrastructure would not be significantly affected by the additional passengers identified by this sensitivity analysis. As the increases are over the summer months, increased ATMs would not affect de-icer use and therefore water quality.

Key data, assumptions and limitations

5.11.2 The change in baseline assessment would not affect the assessment of impact upon the water environment as the assessment of impact is based on the absolute with-scheme impacts rather than the change against baseline.

5.11.3 The increase in ATMs in the York Aviation High with-Project scenario would occur between April and October. This would therefore not affect de-icer use.

Analysis

York Low

5.11.4 No impacts are anticipated as they are lower than that assessed in the ES.

York High

5.11.5 The increase in with-scheme average day PAX between April and October in 2038 and 2047 would increase demand on water supply and increase wastewater flows during these months. It is noted the total for each twelve-month period would not increase compared to that assessed in the ES.

5.11.6 For both water supply and wastewater the increase is a relatively small proportion of the increase due to the Project compared to baseline and is therefore not anticipated to result in additional impacts to GAL infrastructure.

5.11.7 SESW and Thames Water would need to undertake impact assessments on their own water supply and wastewater infrastructure respectively, to fully assess impacts beyond the airport. However based on their previous submission [REP4-024] it is considered that it would be likely SESW would be able to meet the additional demand in the York-High case. Thames Water are currently progressing an assessment of the impacts from the Project on their wastewater infrastructure. It is considered by GAL that the additional foul flows that would result from the York High scenario would not alter the need for, or timing of, any potential works to be progressed by TW to meet the additional wastewater that would result from the Project.

GAL Sensitivity

5.11.8 No additional impacts are anticipated beyond those reported in the ES.

6 National Economic Assessment

Introduction

6.1.1 A detailed examination of Gatwick's passenger numbers in the Do Nothing ('Baseline') and NRP scenarios from the traffic sensitivity forecasts suggests the following:

- **Baseline Scenario**: Passenger numbers are projected to be lower than those in the DCO Submission traffic forecasts, with 60.5 – 56.8 million passengers per annum (mppa) in the York High and Low sensitivities respectively and 60.1 mppa in the GAL sensitivity by 2047, compared to 67.2 mppa in the DCO main forecasts. This represents a reduction in the range of 10-15%.
- **NRP Scenario**: NRP passenger numbers start off lower than those predicted in the DCO Submission traffic forecasts, but they rise more quickly than Baseline traffic in the later years of the assessment period. This trend is most evident in the York High sensitivity scenario, where passenger numbers match the DCO Submission NRP levels by 2038. The combination of lower Baseline traffic levels and similar long-term NRP traffic levels suggests higher additional passengers (i.e., NRP - Baseline) in the later years of the assessment across all sensitivity scenarios compared to the DCO Submission traffic forecasts.
- **Ramp-Up of Additional Passengers**: There is a slower increase in additional passengers in the early years of the assessment in the York traffic sensitivities. These new forecasts suggest that the NRP capacity does not substantially fill up until 2038, as opposed to 2032 in the DCO Submission forecasts. This suggests a reduction in additional Gatwick passengers of 3-16% across the York sensitivity forecasts in the early years of the assessment period (2029 to 2038).

Benefits to users and providers

6.1.2 The projected trajectory of Baseline and NRP passengers in the assessment is an important factor for estimating the benefits to passengers and providers. These projections influence the number of additional passengers resulting from the proposed scheme and the extent of capacity constraints in the London aviation system. This, in turn, allows a determination of the amount of passengers that could benefit from the intervention and the potential reduction in congestion premiums within air fares that airlines and passengers could experience.

6.1.3 The qualitative assessment of the impact of the new traffic sensitivity forecasts anticipates that benefits to users and providers of aviation services will increase. There are several factors driving this increase in estimated benefits:

- **Higher excess demand**: Lower baseline passenger traffic in the London aviation system, together with the same level of demand, implies a greater level of unmet demand (excess demand) at the London airports. With the sensitivity forecasts, there is a range of 13-20% greater excess demand by 2047 compared to the DCO traffic submission forecasts. This results in higher congestion premiums within estimated airfares, meaning airfares rise due to unmet demand caused by capacity constraints. Consequently, this provides more room for the proposed scheme to reduce air fares. For passengers, both new and existing, this means higher benefits as air fares decrease more significantly due to the scheme. For airlines, while fare reductions will lower revenues from existing passengers, this negative effect would be offset by an increased passenger base generating additional revenue.
- **Higher additionality of passengers**: Lower baseline passenger traffic combined with similar levels of NRP traffic in the latter half of the assessment period suggests a higher number of additional passengers in the London system due to the proposed scheme compared to the DCO submission forecasts. This, in turn, implies more passengers benefiting from fare reductions and higher revenues for airlines and airports from increased passenger traffic. While, in the case of the York sensitivities, a slower ramp-up in additional passengers in the early years of the assessment mitigates this effect from a discounting perspective, the overall impact on user and provider benefits is expected to remain positive given the numbers of additional passengers in these forecasts. In particular, the scheme is expected to deliver 29-43% higher additional passengers during the whole of the appraisal period in the new sensitivity traffic forecasts compared to the DCO submission forecasts. This compares with a decrease of 5-26% in additional passengers in the York sensitivity forecasts in the early years of the assessment period across the London aviation system.

Wider economic benefits (government revenues and benefits from output changes)

6.1.4 Government revenues are primarily estimated based on the number of additional departing passengers, from whom the government could earn increased revenues from Air Passenger Duty. A higher overall number of additional passengers would result in an increase in government revenues.

6.1.5 Benefits from output changes in imperfectly competitive markets are estimated as 10% of business passenger benefits. As mentioned earlier, a higher number of additional passengers combined with greater excess demand increases the benefits experienced by passengers. This, in turn, increases the estimated benefits from this wider economic impact.

Impact on the NPV of the scheme

6.1.6 The NPV of the proposed scheme is calculated by deducting the environmental costs, scheme costs, and road traffic congestion costs from the estimated user and provider benefits, as well as the wider economic benefits (government revenues and benefits from output changes). While the new sensitivity traffic forecasts are expected to have a positive effect on user, provider and wider economic benefits, the Environmental Review indicates minor adverse impacts on environmental emissions, leading to small increases in the monetised environmental costs.

6.1.7 Considering these factors, the NPV of the proposed scheme would not be significantly impacted by the GAL and York traffic sensitivity forecasts. It is anticipated to remain similar to (and in all probability a little higher than) the estimated NPV of £21.6 billion presented in the DCO submission. Obtaining further data and conducting additional modelling would be necessary to provide a more precise estimation of both the direction and magnitude of the change in the scheme's NPV.

7 Conclusion

7.1.1 The principal characteristics of this sensitivity exercise are set out in the Executive Summary and not repeated here.

7.1.2 This document falls into two parts, both of which GAL considers are a helpful consequence of the ExA's Rule 17 request for "*the Applicant to provide a sensitivity analysis based on (the) JLA future baseline figure (or, if a range, then the minimum and maximum of this range) to test the effects of this alternative future baseline upon the effects stated in the application Environmental Statement"*.

7.1.3 Sections 2, 3 and 4 of this document explain and explore the issues raised by the JLAs' two proposed sensitivity tests (the York High and York low cases). This has brought to life some of the issues which have been the subject of extensive submissions so far in the examination. In GAL's opinion the exercise has demonstrated flaws in the JLAs' case as it relates to the future baseline.

7.1.4 GAL had not expected that, in setting out its sensitivity cases, the JLAs would also suggest that the airport with the benefit of the NRP may be able to achieve greater throughput in the peak day, peak month and peak season. Until this point, GAL had understood the JLAs to be concerned primarily about the future baseline forecasts and to suggest that the peak throughput forecast by GAL may not be achievable.

7.1.5 Nevertheless, it has been helpful to know and test the JLAs' case in this respect and to show that it is not realistic or achievable.

7.1.6 These matters have demonstrated in GAL's view that its forecasts are to be preferred but that, in any event, it is not practical to achieve a significantly greater uplift in growth from the NRP than that forecast in the application. In other words, if the future baseline forecast was considered to be too high because the growth in peak spreading is not accepted, that would have a corresponding effect on the forecasts for the airport with the benefit of the NRP (because the future baseline is by far the largest component of total airport throughput). The forecast growth attributed to the NRP of c.13 mppa is shown to be the most realistic outcome.

7.1.7 The second part of this document explores the environmental consequences of the sensitivities. For the reasons referred to above, GAL respectfully commends its Sensitivity case as the most useful for exploring issues of interest to the ExA.

Whilst the entire exercise is undertaken without prejudice to GAL's firm view that none of the sensitivity cases are to be preferred to the forecasts in the DCO, the analysis in this document shows the York forecasts to be extreme and not a sound basis for reaching conclusions affecting a decision in this case. The GAL sensitivity should be more useful, therefore, in testing the margins of potential outcomes.

7.1.8 It is striking, however, that the assessment set out in Section 5 does not identify significantly different environmental outcomes from those reported in the Environmental Statement – even for the York High case (although many consequences of the York High and Low cases are not practically achievable). There are a number of reasons for this and these are summarised in the Executive Summary.

7.1.9 The exercise has also drawn out that any lowering of the future baseline limits the capacity which is understood to be deliverable at Gatwick and brings forward and further strengthens the need for the NRP. It is also likely to mean that the NRP would generate more jobs and higher economic benefits.

7.1.10 The exercise has been useful, therefore, in putting into perspective the fact that the future baseline forecast in the Application is robust but that, if other parties do not agree, the environmental consequences of that disagreement would not be so significant as to affect the planning balance in this case.

Appendix A: Correspondence with York Aviation

From: [redacted]
[redacted]
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test
Date: 21 May 2024 09:28:43
Attachments: image001.png
image002.png

***CYBER AWARE* - Caution, this is an external email. Unless you recognise the sender and know the content is safe, *do not* click links or open attachments**

Jonathan,

I have looked at your slides interpreting the busy day movements from the annual and August average day totals. They appear broadly OK but we do not have the granularity of information available to us to verify the ratio of the busy day to the average day in August so have to take that on trust from yourselves.

In terms of the long haul/short haul split, again we do not have access to the detail of the current operation to be precise but, in broad terms it would be reasonable to assume that compared to a 2019 busy day, 10 of the 12 additional daily movements would be short haul and 2 long haul. A similar ratio would apply to the 24 movement case. For the NRP Case, it would be reasonable to assume proportionately the same proportion of long haul and short haul movements as in your cases.

I hope that this assists.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:

From: Jonathan Deegan [redacted]@gatwickairport.com>

Sent: Monday, May 20, 2024 10:27 PM
To: Louise Congdon [redacted]@yorkaviation.co.uk>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Hi Louise

Given the very short time that we as the Applicant have to respond to the request from the ExA's Rule 17 letter and the bank holiday next week, unless we have your answer to the additional queries by midday tomorrow (Tuesday 21 May) we will have to rely solely on your formal submission to the ExA on this matter in our response. I hope to hear from you tomorrow.

Kind regards,

Jonathan Deegan
NRP Programme Lead
[redacted]

From: Louise Congdon [redacted]@yorkaviation.co.uk>
Sent: Friday, May 17, 2024 2:54 PM
To: Jonathan Deegan [redacted]@gatwickairport.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

---

Jonathan,

I will need to look at this as we did not specifically identify a long haul percentage on the busy day and I need to think it through. I'll get back to you as soon as I can, hopefully before the end of Monday.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:

or taking action in relation of the contents of this information is strictly prohibited and may be unlawful.

York Aviation is committed to the responsible and appropriate handling of personal information. Please find a copy of our privacy notice [redacted]

From: Jonathan Deegan [redacted]@gatwickairport.com>
Sent: Friday, May 17, 2024 2:49 PM
To: Louise Congdon <[redacted]@yorkaviation.co.uk>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Hi Louise

Having studied the info you supplied we have two issues which we need you to clarify before we can begin the sensitivity analysis for the ExA. We have shown these on the attached slides; they are, for both baseline case and NRP case in each of the two scenarios, have we interpreted correctly the busy day number of movements from your August average, and what assumption you make on the busy day about the % long-haul traffic in the day?

It would be useful to have these as soon as possible so that work can begin on the environmental analysis next week.

Thanks in anticipation and have a good weekend.

Kind regards,

Jonathan Deegan
NRP Programme Lead

From: Louise Congdon [redacted]@yorkaviation.co.uk>
Sent: Thursday, May 16, 2024 9:52 AM
To: Jonathan Deegan [redacted]@gatwickairport.com>
Cc: Michael Bedford KC [redacted]@cornerstonebarristers.com>; Lappage, Sallie [redacted]@crawley.gov.uk>; Emyr Thomas [redacted]@sharpepritchard.co.uk>; James Freeman [redacted]@jcfplanning.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

CYBER AWARE - Caution, this is an external email. Unless you recognise the sender and know the content is safe, do not click links or open attachments

---

Jonathan,

That's fine. I will be around all week except for Friday afternoon.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:

From: Jonathan Deegan[redacted]@gatwickairport.com>
Sent: Thursday, May 16, 2024 9:44 AM
To: Louise Congdon [redacted]n@yorkaviation.co.uk>
Cc: Michael Bedford KC[redacted]@cornerstonebarristers.com>; Lappage, Sallie [redacted]@crawley.gov.uk>; Emyr Thomas [redacted]@sharpepritchard.co.uk>; James Freeman <[redacted]@jcfplanning.com>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Thanks Louise

If we do have queries I will send them through asap but it is likely to be early next week. I hope that is convenient?

Kind regards,

Jonathan Deegan
NRP Programme Lead
[redacted]

From: Louise Congdon <[redacted]@yorkaviation.co.uk>
Sent: Wednesday, May 15, 2024 6:06 PM
To: Jonathan Deegan[redacted]@gatwickairport.com>
Cc: Michael Bedford KC[redacted]@cornerstonebarristers.com>; Lappage, Sallie <[redacted]@crawley.gov.uk>; Emyr Thomas [redacted]harpepritchard.co.uk>; James Freeman [redacted]@jcfplanning.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

***CYBER AWARE* - Caution, this is an external email. Unless you recognise the sender and know the content is safe, *do not* click links or open attachments**

Jonathan,

I have now set out the 2032 and 2038 information for the two low cases and the two high cases which we suggest form the basis of the sensitivity tests. I would note that in estimating the 2032 and 2038 values, we have realised that, based on your aircraft size and load factor information 80.2 mppa would be delivered with fewer aircraft movements than the 386,000 stated. We have adjusted the movement total downwards to 384,000 annual movements in the Rule 17 response document, so as not to exceed the passenger forecast. Everything else remains as per the table sent earlier this afternoon.

We have also had to make a couple of other assumptions in order to provide estimates of the number of movements and reasonable passenger volumes for the earlier years:

i. We have taken your top down passenger forecasts from REP1-052 as the realistic upper bound, in line with the view expressed in REP3-123.

ii. It was necessary to consider the capacity that might be deliverable with the NRP in the early years, prior to Charlie Box being in place, which we understand to be 2035 on the construction timeline. Our analysis of the simulation modelling would suggest that the ability to achieve the full movement rate with the NRP is heavily reliant on sequencing aircraft in that area. In the absence of any information regarding the NRP capacity without reliance on Charlie Box, we have assumed that the uplift in daily movements in 2032 would be no greater than half that achievable once Charlie Box is in place.

On this basis, the table below summarises the relevant 2032 and 2038 parameters.

		Average Day Peak Month	Average Day 92 Day Leq period	Annual Average	Aircraft Capacity	Load Factor	Annual Commercial Movements	Mppa
Baseline								
Low Case	2032	921	905	793	210	88%	290,000	53.5
	2038	921	905	793	215	89%	294,000	55.4
High Case	2032	933	917	805	210	90%	290,000	55.5
	2038	933	917	805	215	91%	294,000	57.5
NRP								
Low Case	2032	1,004	1,020	892	213	88%	326,000	61.0
	2038	1,131	1,115	1,003	218	89%	366,000	71.0
High Case	2032	1,045	1,029	917	213	90%	335,000	64.2
	2038	1,172	1,156	1,044	218	91%	381,000	75.6

This information has not been included in the Rule 17 response as it was completed too late to be included.

I should note that, in regarding your top down modelled forecasts as an upper bound for the high case rate of growth, this is without prejudice to the overarching position that additional sensitivity testing of the passenger forecasts in relation to both variant economic and carbon cost projections, and of capacity deliverable at other airports should also be undertaken.

I will be happy to respond to any queries.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:

From: Louise Congdon
Sent: Wednesday, May 15, 2024 3:22 PM
To: Jonathan Deegan [redacted]@gatwickairport.com>
Cc: Michael Bedford KC [redacted]@cornerstonebarristers.com>; Lappage, Sallie [redacted]@crawley.gov.uk>; Emyr Thomas [redacted]@sharpepritchard.co.uk>; James Freeman [redacted]@jcfplanning.com>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Jonathan,

The table below summarises a range of potential alternative Baseline and NRP Cases at 2047.

DAILY MOVEMENTS		AIRCRAFT SEATS AND LOAD FACTOR				ANNUAL COMMERCIAL MOVEMENTS			MPPA
	Average Day Peak Month	Average Day 92 Day Leq period	Annual Average	YAL Aircraft Size	YAL Load Factor	GAL Aircraft Size	GAL Load Factor		
BASELINE									
12 ADDITIONAL				218	90%			290,000	56.8

DAILY MOVEMENTS	921	905	793			224	92%	290,000	59.6
24 ADDITIONAL DAILY MOVEMENTS	933	917	805	218	90%			294,000	57.7
						224	92%	294,000	60.5
NRP CASE									
366,000 ANNUAL MOVEMENTS	1,131	1,115	1,003	227	90%			366,000	74.8
						227	92%	366,000	76.5
386,000 ANNUAL MOVEMENTS	1,180	1,164	1,052	227	90%			386,000	78.4
						227	92%	386,000	80.2

igures have been refined slightly since those I sent to you yesterday to ensure internal consistency.

There are clearly many permutations that could be tested but we consider that it would be reasonable to test the difference between our most pessimistic cases and also between our most optimistic cases for consistency of assumptions regarding aircraft size and load factor, i.e.:

- between a Baseline Case at 56.8 mppa and an NRP Case at 74.8 mppa;
- between a Baseline Case at 60.5 mppa and an NRP Case at 80.2 mppa.

I hope that this assists. We are working up the intermediate years for the two Baseline and NRP cases highlighted for testing and will send across as soon as possible.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:
<< [redacted]

York Aviation is committed to the responsible and appropriate handling of personal information. Please find a copy of our privacy notice [redacted]

From: Jonathan Deegan <[redacted]n@gatwickairport.com>
Sent: Wednesday, May 15, 2024 8:48 AM
To: Louise Congdon [redacted]@yorkaviation.co.uk>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Thanks Louise, understood.

Kind regards,

Jonathan Deegan
NRP Programme Lead
[redacted]

From: Louise Congdon [redacted]@yorkaviation.co.uk>
Sent: Wednesday, May 15, 2024 8:40 AM
To: Jonathan Deegan [redacted]n@gatwickairport.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

***CYBER AWARE* - Caution, this is an external email. Unless you recognise the sender and know the content is safe, *do not* click links or open attachments**

Jonathan,

I can be done but I would not want to delay the Rule 17 response to get them done today nor delay getting 2047 to you. It's not a major task given we are necessarily working fairly broad brush from the information available to us so I will look to provide in any event.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:
[redacted]

York Aviation is the trading name of York Aviation LLP, registered in Cardiff, No. OC307526.
Registered Office: Smithfield House, 92 North Street, Leeds LS2 7PN.

From: Jonathan Deegan [redacted]@gatwickairport.com>
Sent: Wednesday, May 15, 2024 8:34 AM
To: Louise Congdon [redacted]@yorkaviation.co.uk>
Subject: RE: GAL response on proposed without prejudice sensitivity test

Thanks Louise that would be very helpful. I am not sure how much 2032 and 2038 will actually add so if this is too time consuming we may be able to live without them – let me know what you think.

Kind regards,

Jonathan Deegan
NRP Programme Lead
[redacted]

From: Louise Congdon [redacted]@yorkaviation.co.uk>
Sent: Wednesday, May 15, 2024 8:29 AM
To: Jonathan Deegan [redacted]gatwickairport.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

CYBER AWARE - Caution, this is an external email. Unless you recognise the sender and know the content is safe, do not click links or open attachments

Jonathan,

I can certainly set out the ranges we think appropriate for assessment.

In terms of 2032 and 2038, these have not currently been worked through. We can do so but this will not be today or in time for the Rule 17 Response but could follow later in the week.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

[redacted]

From: Jonathan Deegan [redacted]atwickairport.com>
Sent: Tuesday, May 14, 2024 6:56 PM
To: Louise Congdon [redacted]@yorkaviation.co.uk>
Subject: Re: GAL response on proposed without prejudice sensitivity test

Hi Louise

Thinking a little further, if you are presenting ranges it would also be useful to have your view on the maximum gap to be assumed I.e. should we take the bottom end of the baseline range and the top end of the NRP range? I ask because the ExA will want to understand the worst case scenario but I don't want to interpret what you send us in a way you wouldn't agree with nor do with have the time to study a whole range of answers. I hope this makes sense.

Kind regards,

Jonathan Deegan

From: Louise Congdon [redacted]@yorkaviation.co.uk>
Sent: Tuesday, May 14, 2024 6:28:59 PM
To: Jonathan Deegan [redacted]@gatwickairport.com>
Cc: John Rhodes [redacted]@quod.com>
Subject: [EXTERNAL SENDER] RE: GAL response on proposed without prejudice sensitivity test

CYBER AWARE - Caution, this is an external email. Unless you recognise the sender and know the content is safe, do not click links or open attachments

Jonathan,

The team has been working hard on the Rule 17 response and I have shared a draft with the JLAs just now.

Unsurprisingly, we are likely to have a range for both the Baseline and NRP Cases given inevitable uncertainties. Provisionally, we are looking at something along the lines of 56.5-60 mppa for the Baseline and 75-80 mppa for the NRP Case but these may move a little.

I will be able to let you have busy day atm numbers, a/c size and load factor assumptions for the relevant cases once I have sign off from the JLAs to release the information to you. Hopefully as early as possible tomorrow.

Best regards,

Louise

Managing Partner
York Aviation LLP
Atlas House
Old Hall Street
Macclesfield
Cheshire
SK10 2DT

[redacted]

[redacted]

Follow us on:
[redacted] - [redacted]

From: Jonathan Deegan [redacted]@gatwickairport.com>
Sent: Friday, May 10, 2024 6:18 PM
To: Louise Congdon [redacted]@yorkaviation.co.uk>
Cc: John Rhodes [redacted]@quod.com>
Subject: GAL response on proposed without prejudice sensitivity test

Dear Louise,

Thank you for meeting with us on Tuesday and giving your initial feedback on our proposal for a without prejudice sensitivity test of alternative forecasts for the future baseline and the NRP cases.

We understand that your main concerns with the proposed baseline were:

- You disagreed with showing growth in the peak day because you assert there is no capacity to grow
- You wanted to understand which airlines were likely to operate any new flights in the off-peak parts of the busy day
- Since you believe that no growth is possible in the peak day you also believe that no peak spreading is possible (airlines will only put on a year round service if they can have the slots in the peak to make it work)

We have considered these points and replied to them in the accompanying slides, which should be read with the slides we sent on Friday 3 May. These new slides explain why we believe that a 2047 baseline of 60mppa is still the most credible approach for a sensitivity test.

You were good enough to subsequently share your thoughts on the baseline as you see it which showed a range of possible outcomes. Once you have considered our attached material please could you give us your final thoughts on a 2047 baseline figure that you are willing to stand behind and, as requested by the ExA, list those areas on which you disagree with our original analysis. It would be helpful if you could also clarify where you may continue to disagree with our proposed sensitivity test baseline and why. This information should include busy day atm numbers, a/c size and load factor assumptions to assist the sensitivity test.

Obviously, in order to conduct any sensitivity test we will need to assume a with-project number too. You have proposed a minimum of 73mppa for a dual runway case but also questioned whether this should in fact be higher. Please could you state what you think this number should be (or a range if you prefer) and as requested by the ExA explain your reasons for these numbers. Again, this information should include busy day atm numbers, a/c size and load factor assumptions to assist the sensitivity test.

It would be useful if we could have this information by c.o.p Tuesday so that we can report positively to the ExA at Deadline 4 on Wednesday that the basis for the test has been set out by the JLAs in line with the timescales requested by the ExA in their recent letter, and so that we can subsequently conduct the sensitivity test by Deadline 5. I look forward to hearing from you by Tuesday.

Kind regards,

Jonathan Deegan
NRP Programme Lead
[redacted]

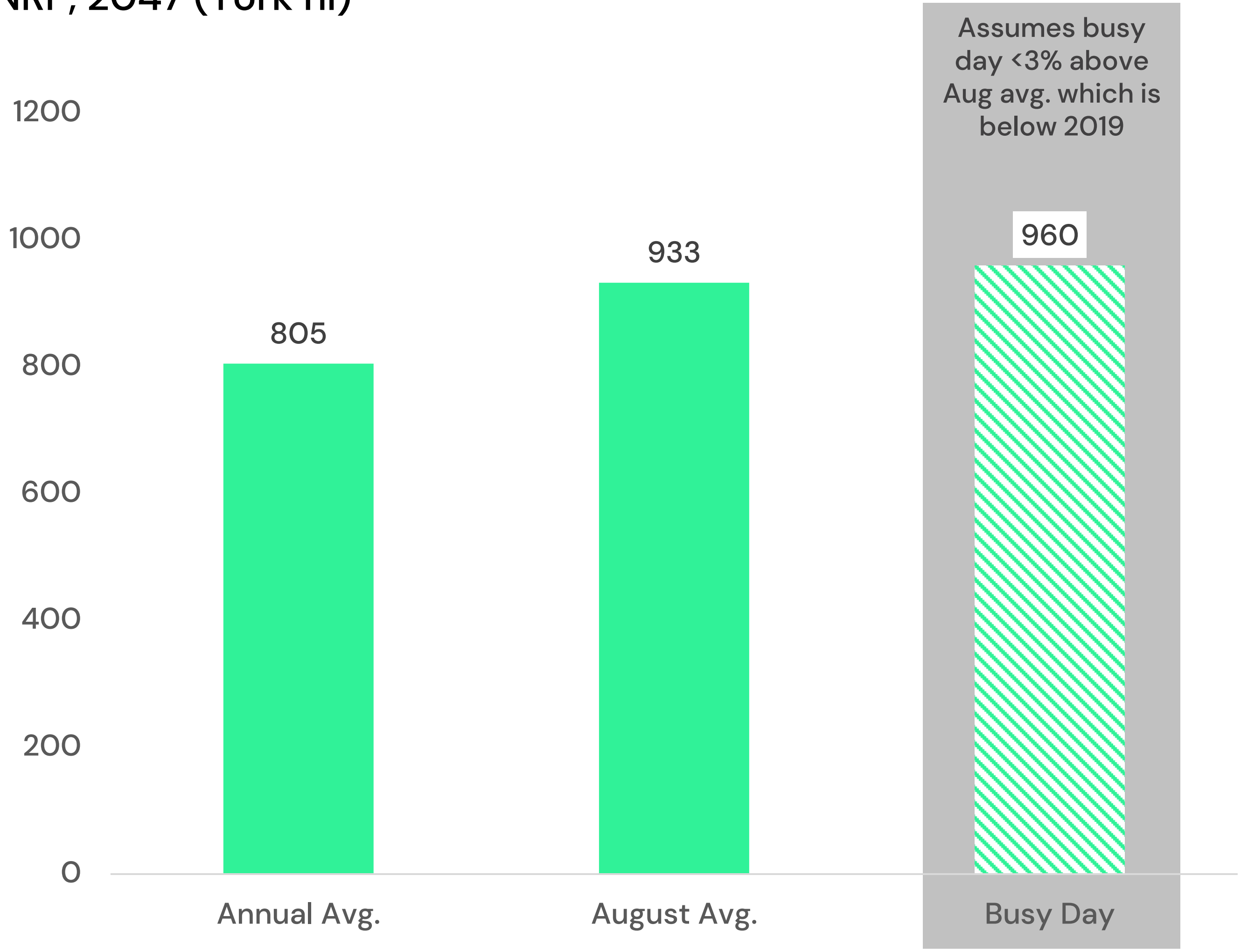
[redacted]
<< OLE Object: Picture (Device Independent Bitmap) >>

[redacted]

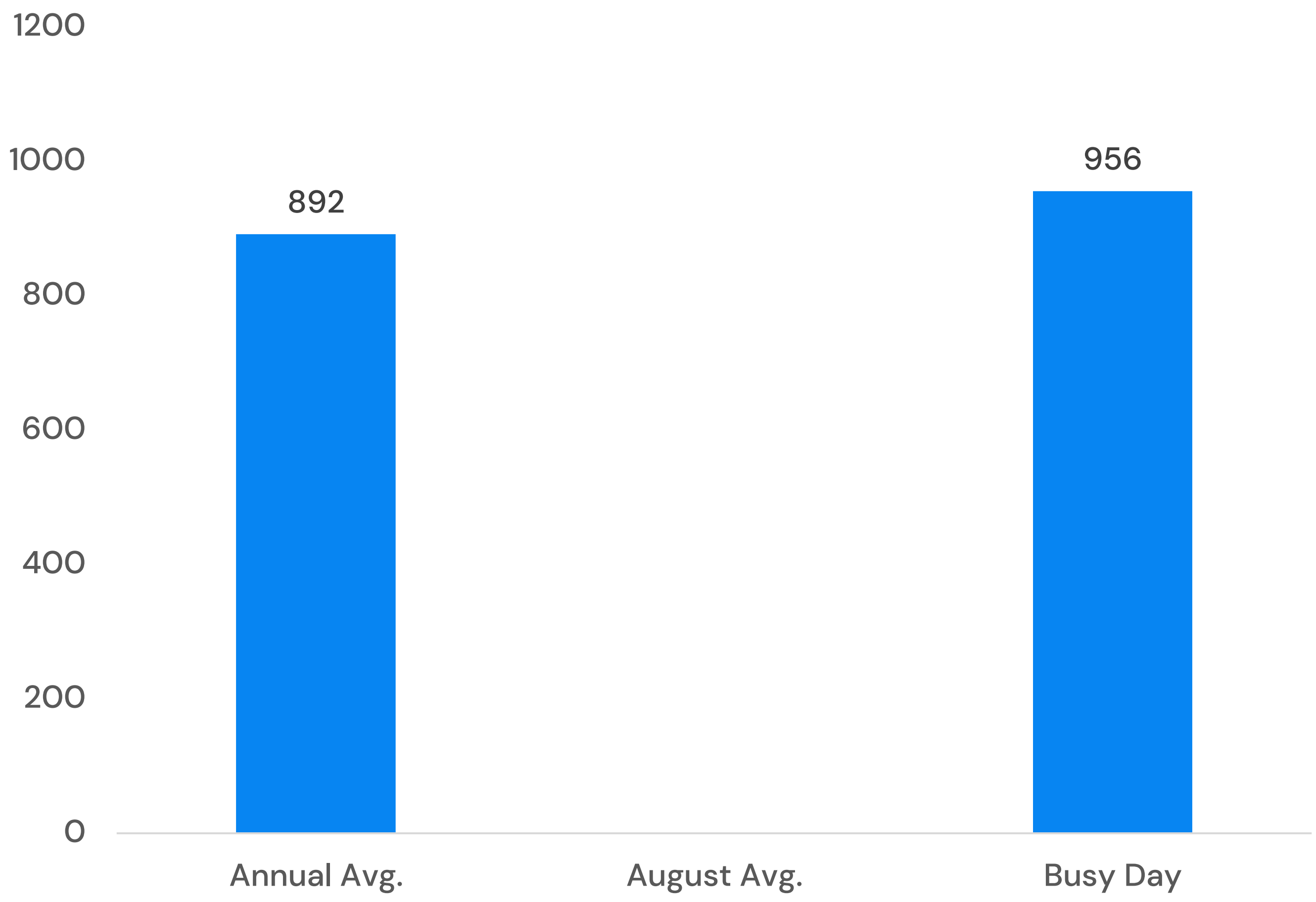
→ York – High

Baseline thru'put: York assume an Aug. monthly ATM avg. of 933 daily ATMs. On a busy day this would represent ~960 ATMs based on current intra month ratios

NRP, 2047 (York hi)



NRP, 2047 (GAL submitted)

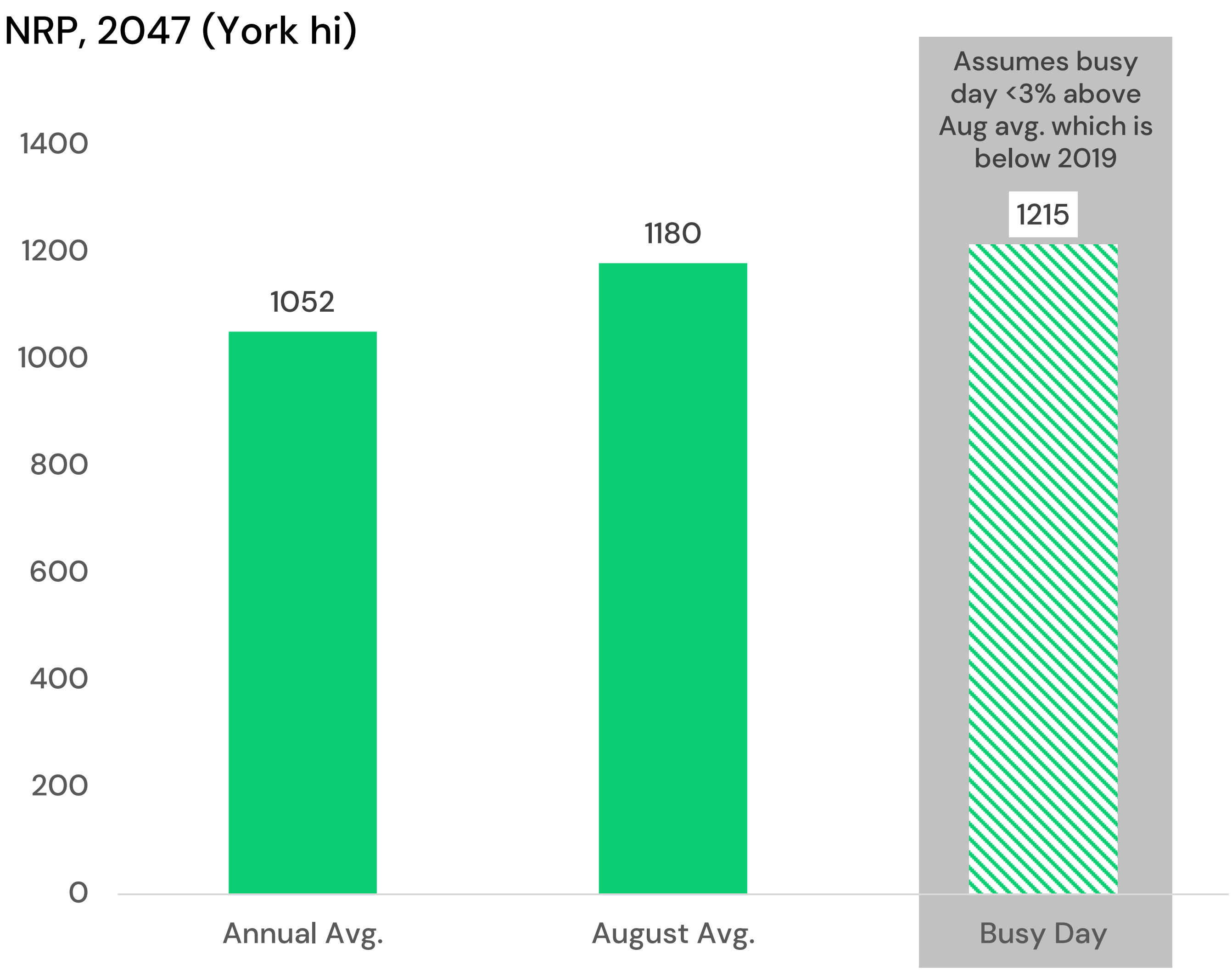


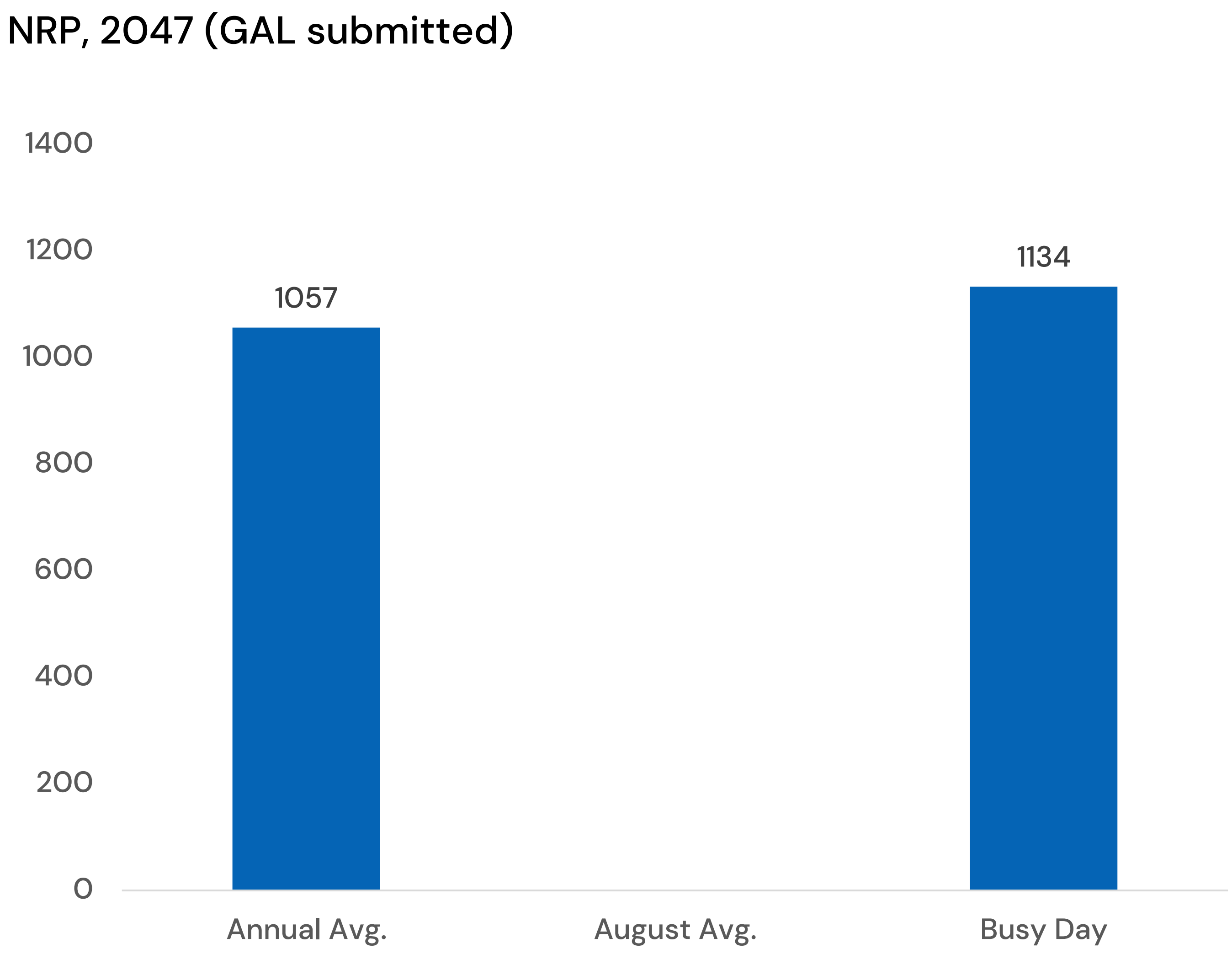
To enable the sensitivity test we would like to clarify:

- Mix of traffic on busy day (e.g. % of long haul ATMs)
- Confirm our interpretation of the implied busy day ATMs

Source: York email, LGW submission

NRP thru'put: York assume an Aug. monthly ATM avg. of 1,180 daily ATMs. On a busy day this would represent >1,200 ATMs based on current intra month ratios





To enable the sensitivity test we would like to clarify:

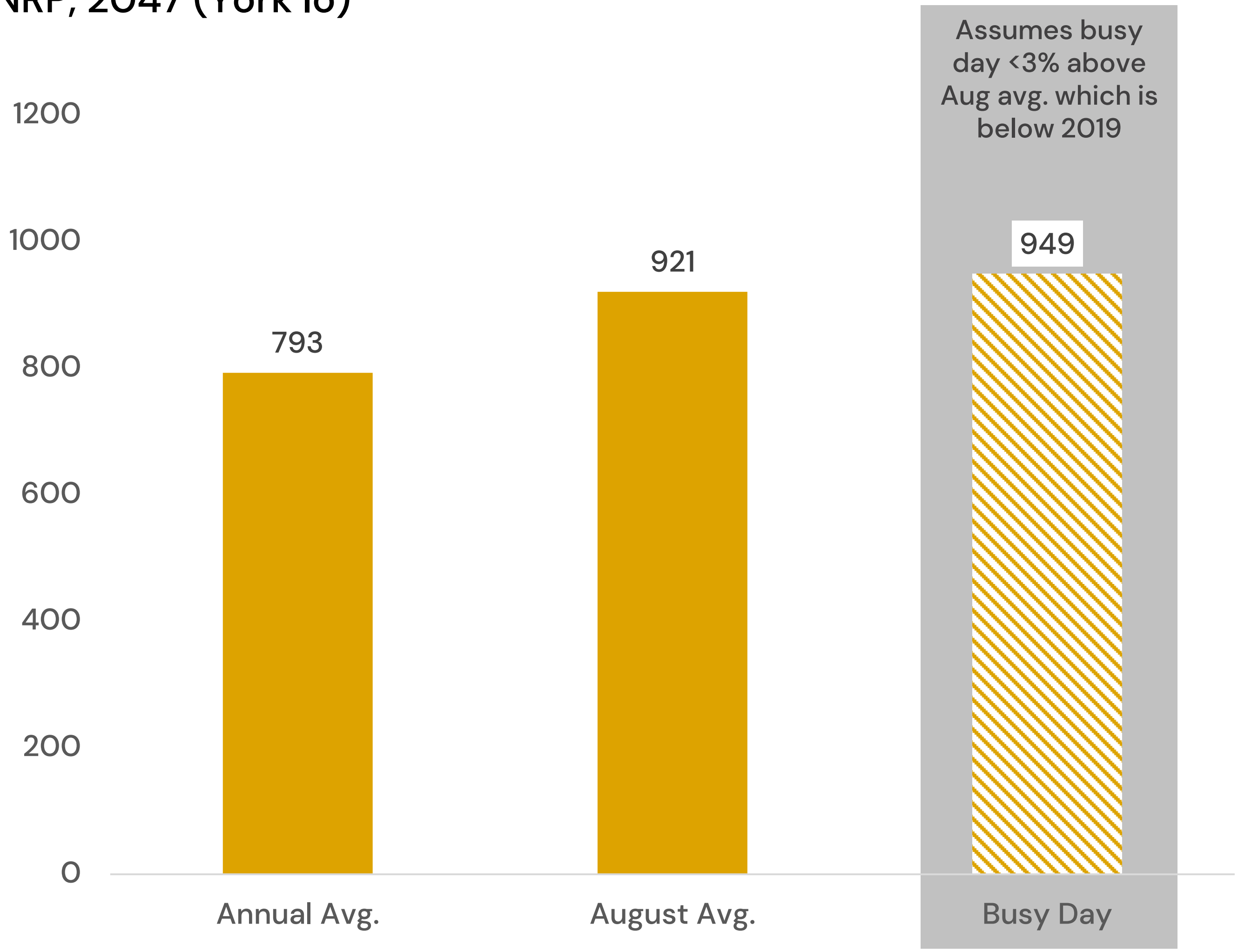
- Mix of traffic on busy day (e.g. % of long haul ATMs)
- Confirm our interpretation of the implied busy day ATMs

Source: York email, LGW submission

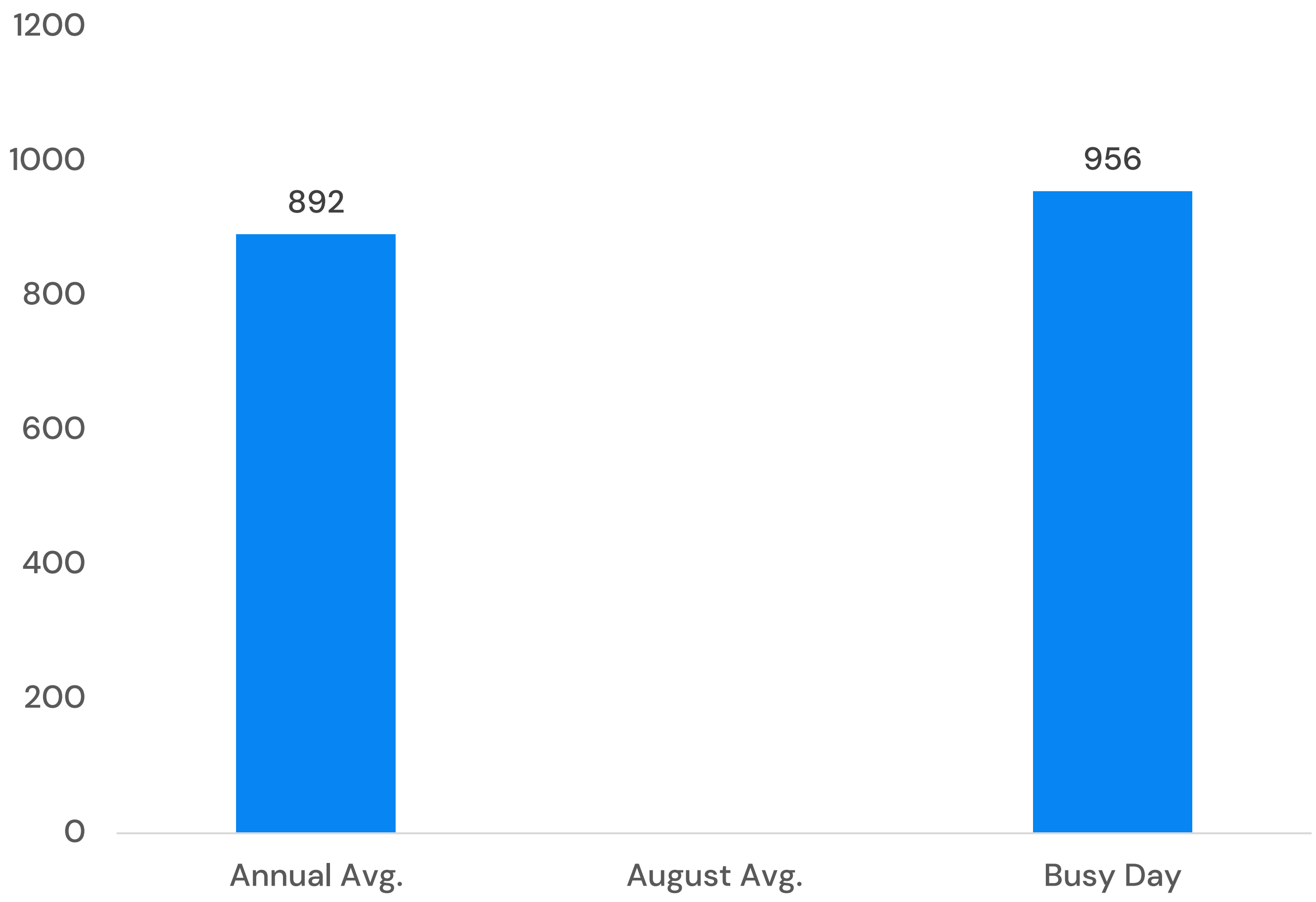
→ York – Low

Baseline thru'put: York assume an Aug. monthly ATM avg. of 921 daily ATMs. On a busy day this would represent ~950 ATMs based on current intra month ratios

NRP, 2047 (York lo)



NRP, 2047 (GAL submitted)



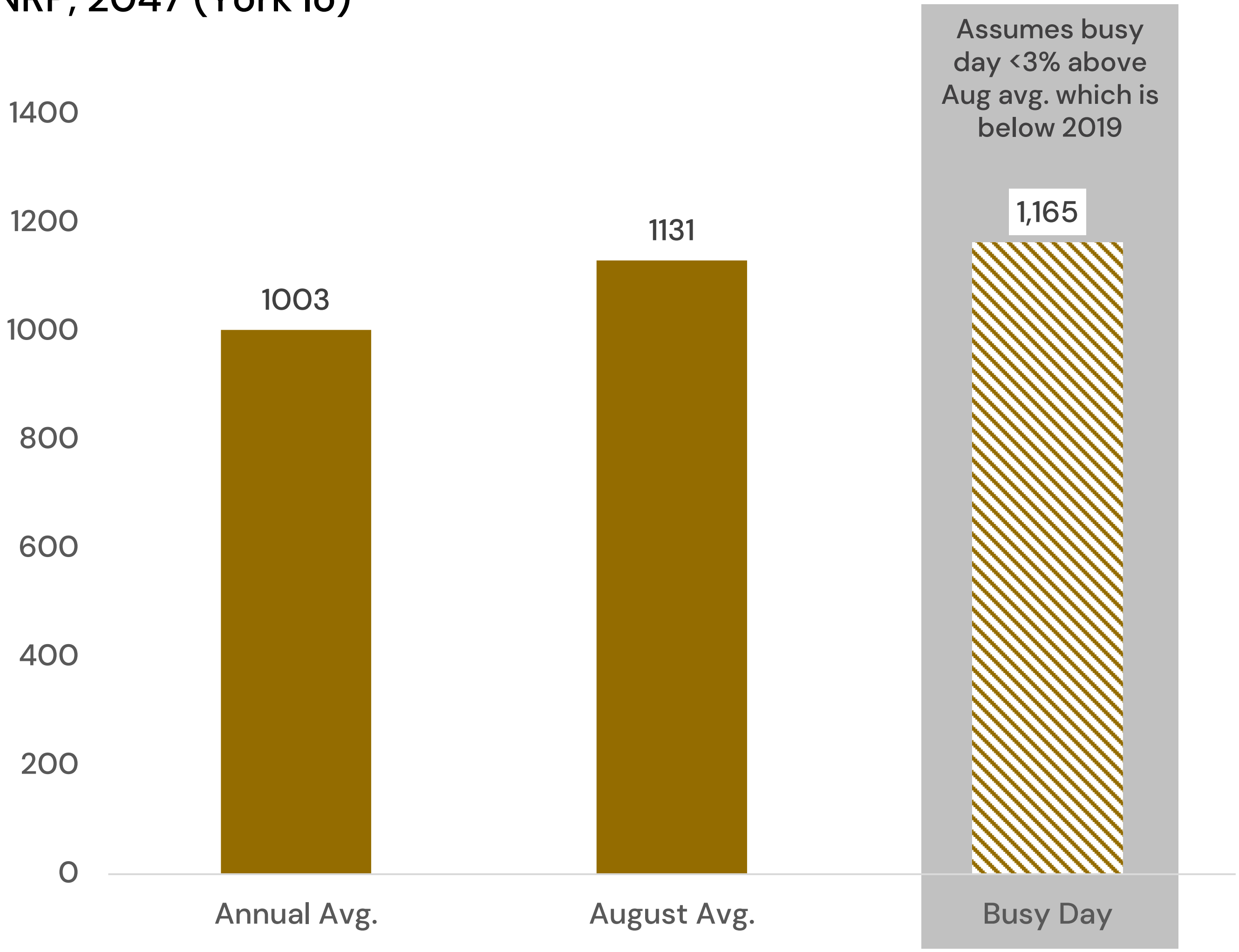
To enable the sensitivity test we would like to clarify:

- Mix of traffic on busy day (e.g. % of long haul ATMs)
- Confirm our interpretation of the implied busy day ATMs

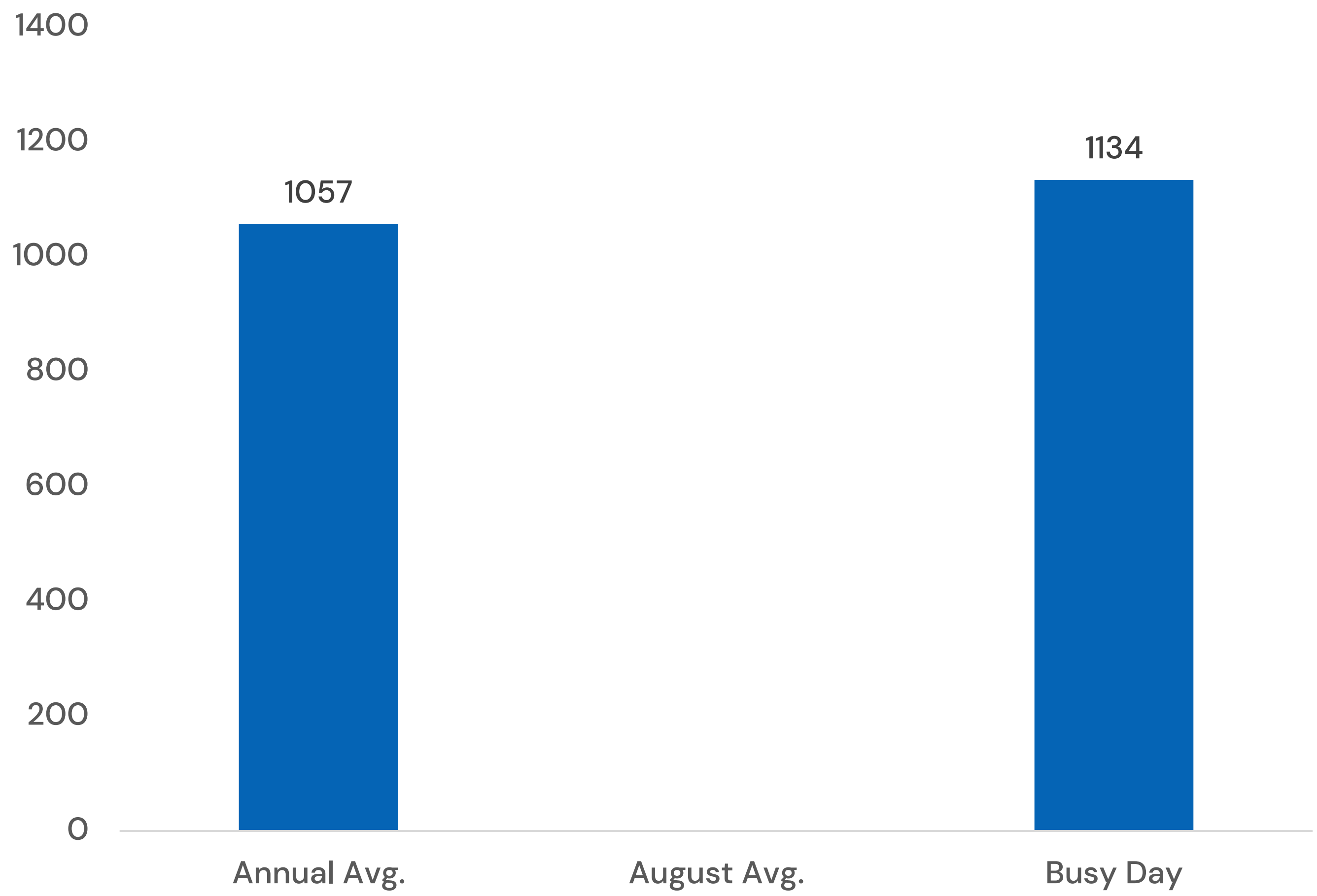
Source: York email, LGW submission

NRP thru'put: York assume an Aug. monthly ATM avg. of 1,131 daily ATMs. On a busy day this would represent >1,160 ATMs based on current intra month ratios

NRP, 2047 (York lo)



NRP, 2047 (GAL submitted)



To enable the sensitivity test we would like to clarify:

- Mix of traffic on busy day (e.g. % of long haul ATMs)
- Confirm our interpretation of the implied busy day ATMs

Source: York email, LGW submission

Appendix B: York Aviation and GAL Sensitivities

Baseline & NRP York & GAL sensitivities

Appendix B

Reference document for scenario comparisons

The outputs presented in this deck reflect the GAL DCO submission, the GAL sensitivity and the York High / Low cases.

To prepare the inputs for the environmental teams a wide range of data is required, to do this in a relatively short time period with only high level inputs available, this meant that some simplifying assumptions needed to be made (interpolation, scaling, etc.).

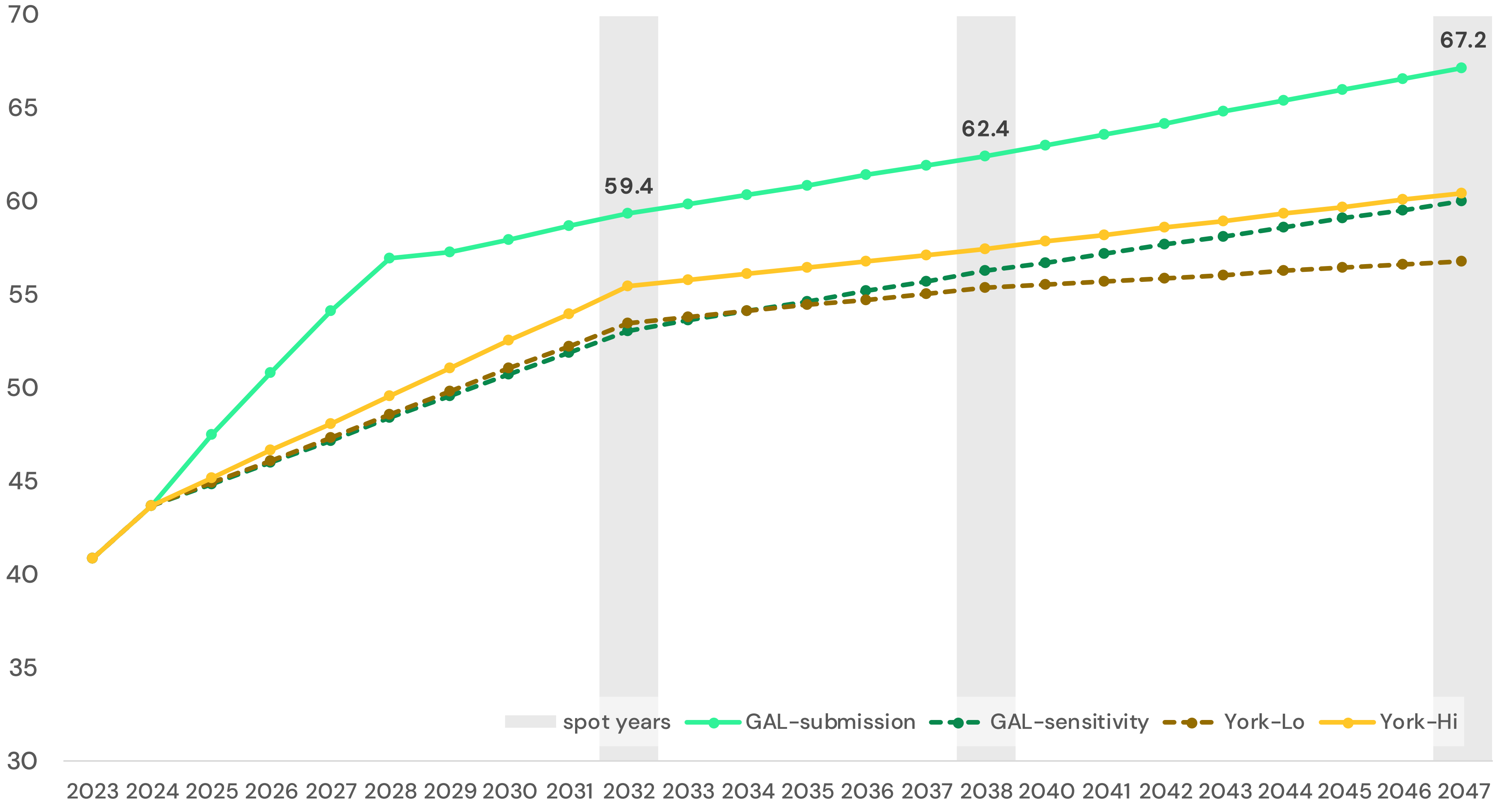
For example:

- Similar fleet mixes were assumed for the sensitivity outputs, although they were scaled to reflect to total yearly (or Leq) throughput
- Monthly profiles provide useful illustrative views of the seasonal profile though they may not match entirely that assumed by York
- Assumptions regarding busy day schedules provide a view of where York may have implicitly assumed the extra runway capacity is generated

Baseline Review

Baseline, Passengers: Annual passenger impact of c10% implied by York assumptions

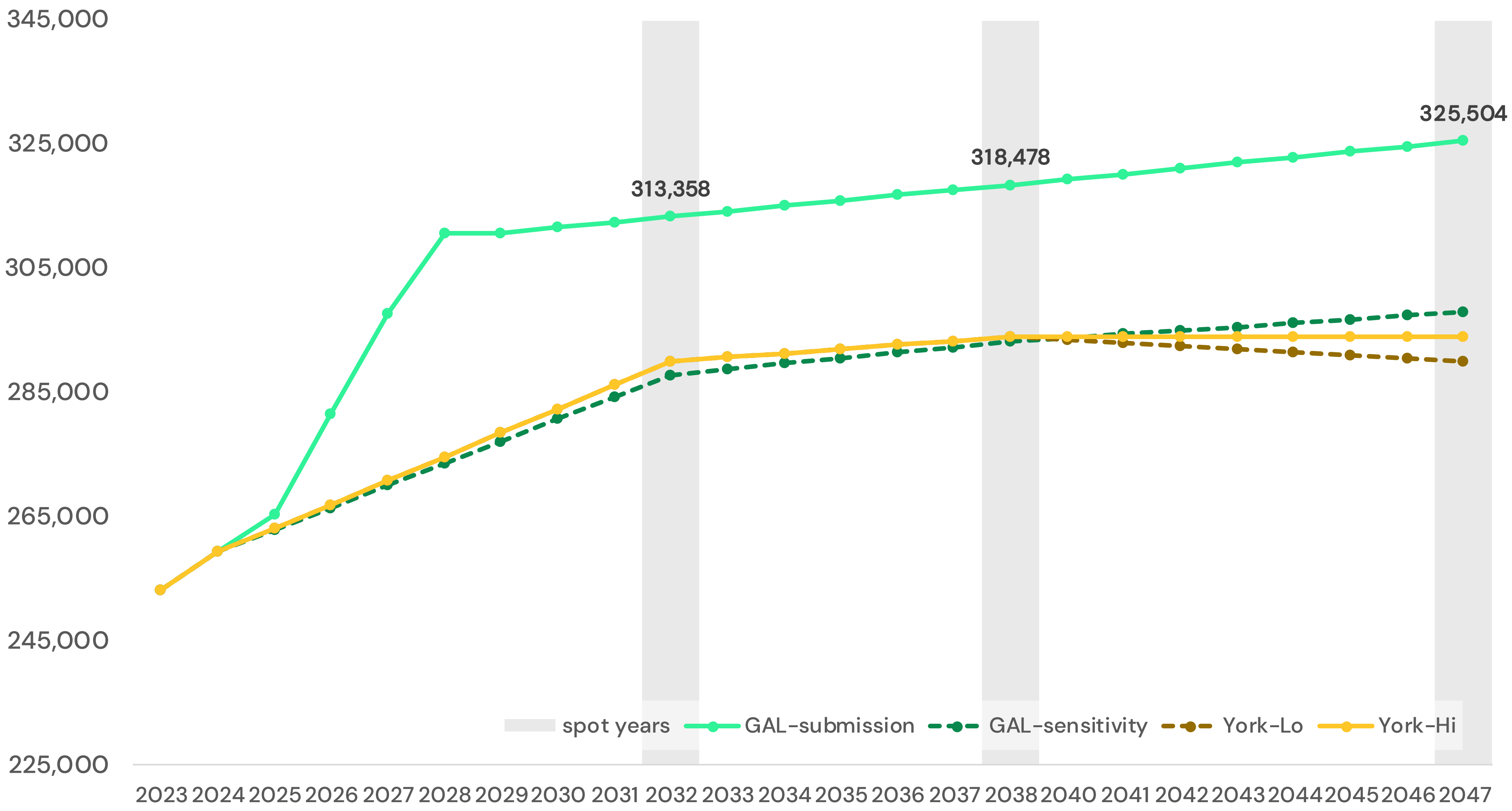
Baseline, Annual Passengers (m)



	2032	2038	2047
GAL-submission	59.4	62.4	67.2
GAL-sensitivity	53.1	56.3	60.1
York-Lo	53.5	55.4	56.8
York-Hi	55.5	57.5	60.5
'vs' Submission			
GAL-submission	0%	0%	0%
GAL-sensitivity	-11%	-10%	-11%
York-Lo	-10%	-11%	-15%
York-Hi	-7%	-8%	-10%

Baseline, ATMs: Annual ATM impact of c8% implied by York year round runway performance

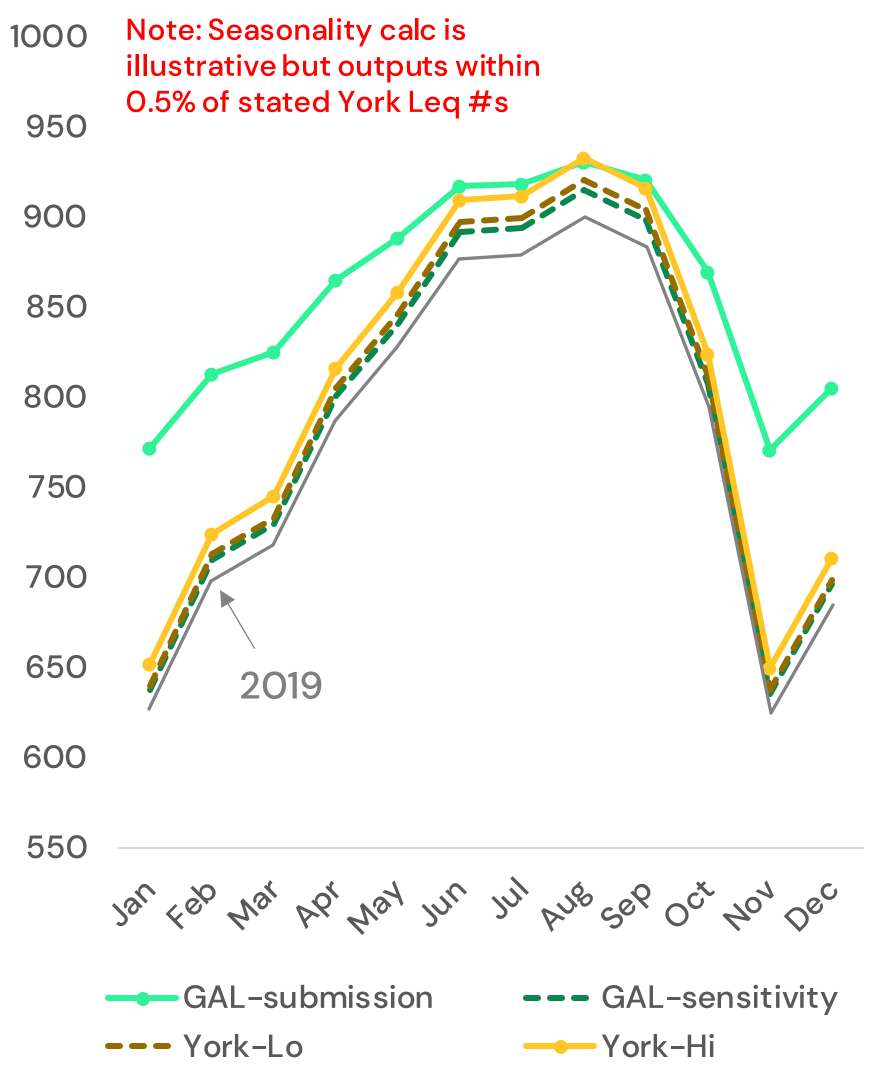
Baseline, Annual ATMs



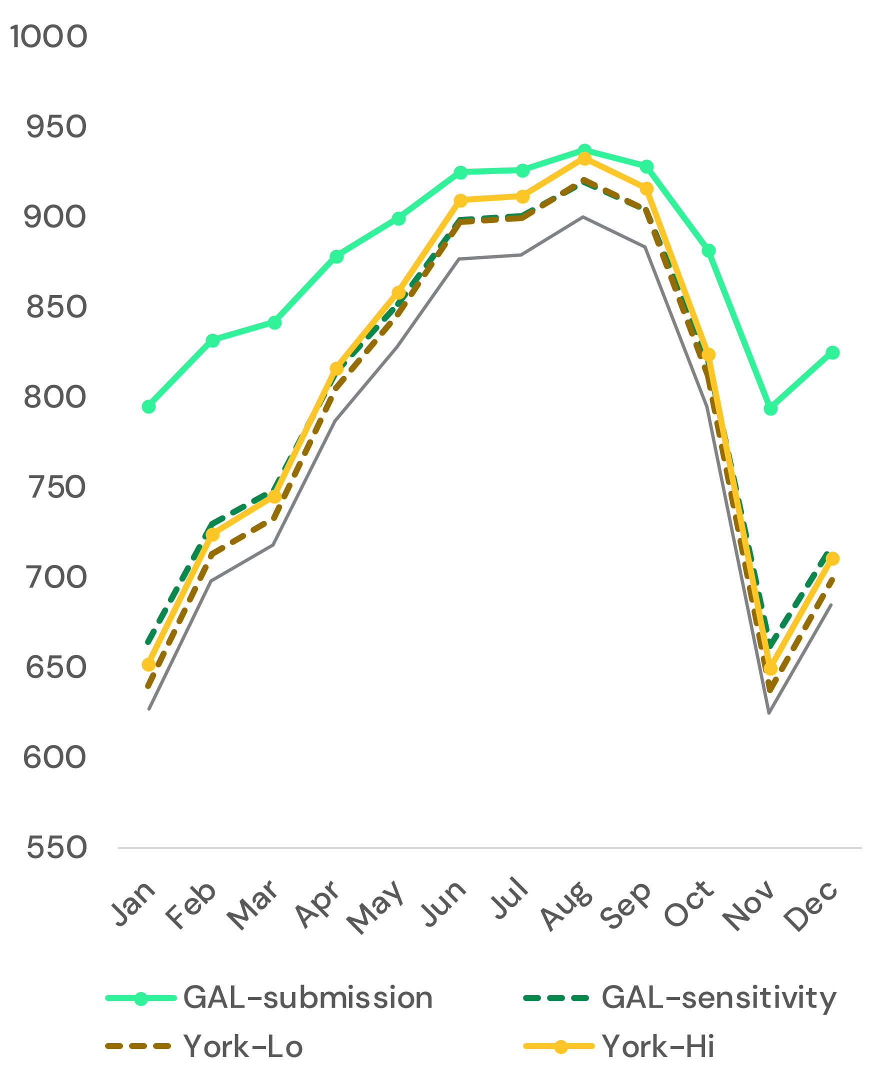
	2032	2038	2047
GAL-submission	313k	318k	326k
GAL-sensitivity	288k	293k	298k
York-Lo	290k	294k	290k
York-Hi	290k	294k	294k
'vs' Submission			
GAL-submission	0%	0%	0%
GAL-sensitivity	-8%	-8%	-8%
York-Lo	-7%	-8%	-11%
York-Hi	-7%	-8%	-10%

Baseline, ATM Profile (approx.): ATM impacts are most significant outside the peak summer season due to peak-spreading assumptions

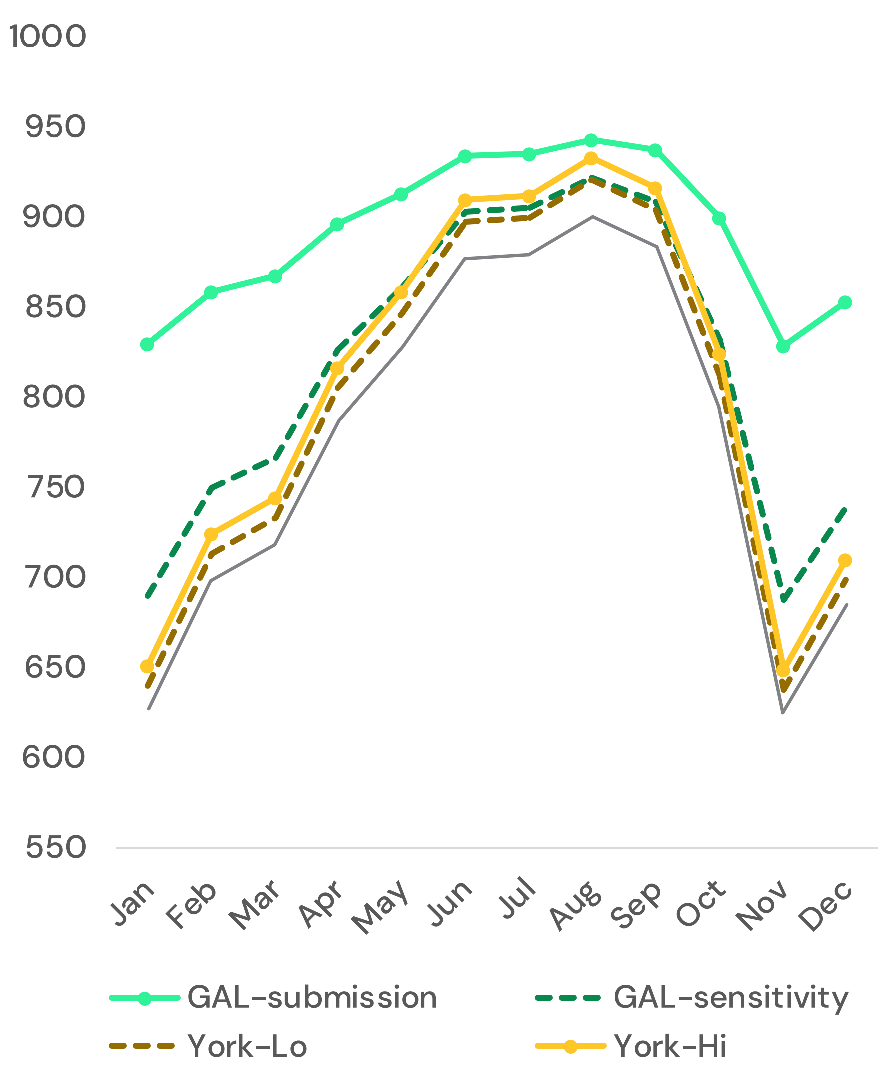
Baseline, ATMs (Avg/day), 2032



Baseline, ATMs (Avg/day), 2038



Baseline, ATMs (Avg/day), 2047



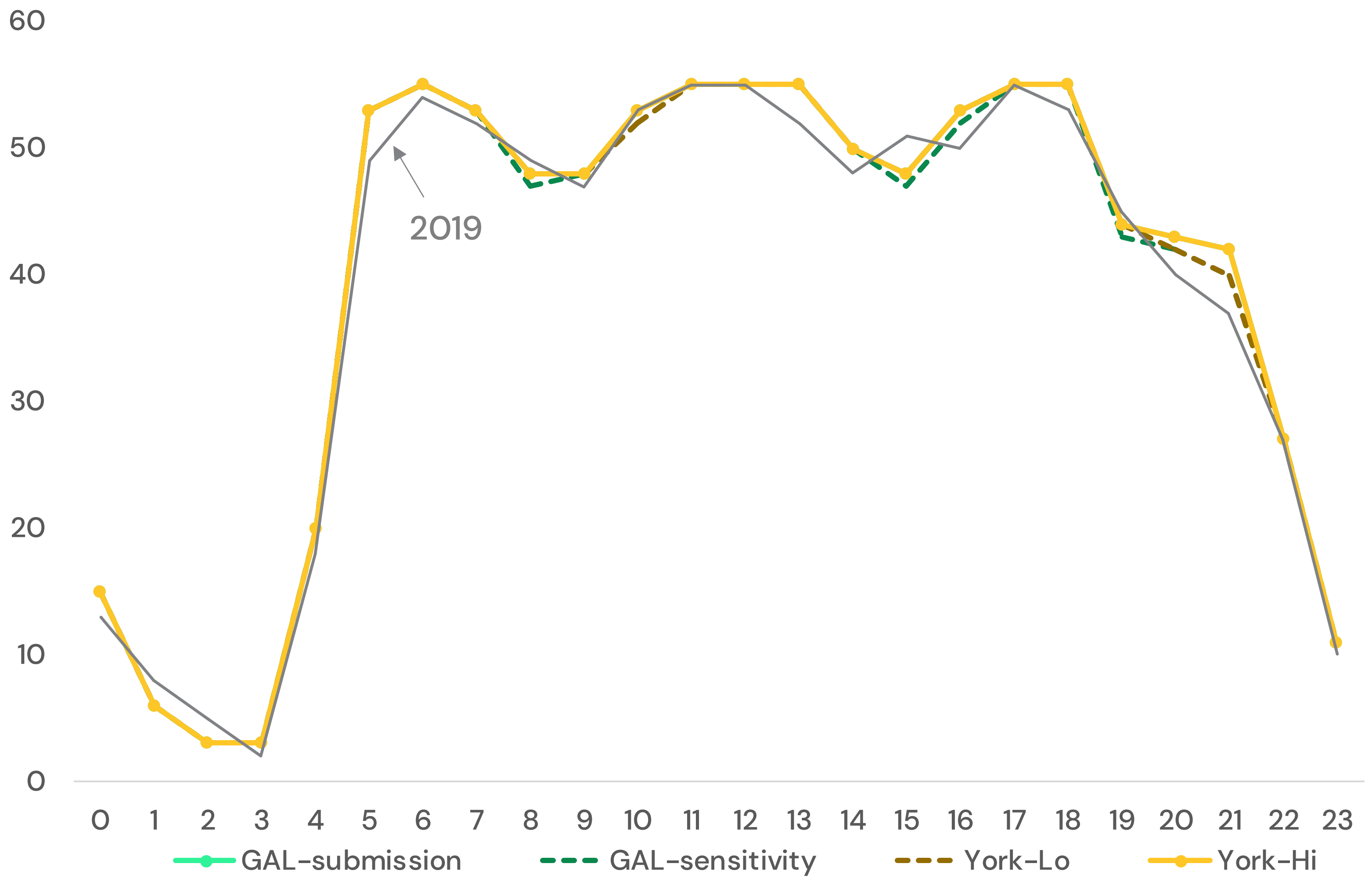
Baseline, ATM Profile (approx.): Summary Stats

Summary of August and Leq, AVG daily ATMs

	August (avg)			Leq		
	2032	2038	2047	2032	2038	2047
GAL-submission	930	937	944	925	932	940
GAL-sensitivity	915	920	922	904	909	913
York-Lo	921	921	921	905	905	905
York-Hi	933	933	933	917	917	917
vs GAL submission						
GAL-submission	0%	0%	0%	0%	0%	0%
GAL-sensitivity	-2%	-2%	-2%	-2%	-2%	-3%
York-Lo	-1%	-2%	-2%	-2%	-3%	-4%
York-Hi	0%	0%	-1%	-1%	-2%	-2%

Baseline, Busy Day ATM Profile (approx.): York's average Aug. #s would imply they are very close on 'busy' day runway utilisation

Baseline, ATMs (Avg/day), 2047 (UTC hour)



	August AVERAGE			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	930	937	944	0%	0%	0%
GAL-sensitivity	915	920	922	-2%	-2%	-2%
York-Lo	921	921	921	-1%	-2%	-2%
York-Hi	933	933	933	0%	0%	-1%

	Aug Avg : Busy			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1.02	1.02	1.01	0%	0%	0%
GAL-sensitivity	1.03	1.03	1.03	1%	1%	1%
York-Lo	1.03	1.03	1.03	1%	1%	2%
York-Hi	1.02	1.02	1.02	0%	0%	1%

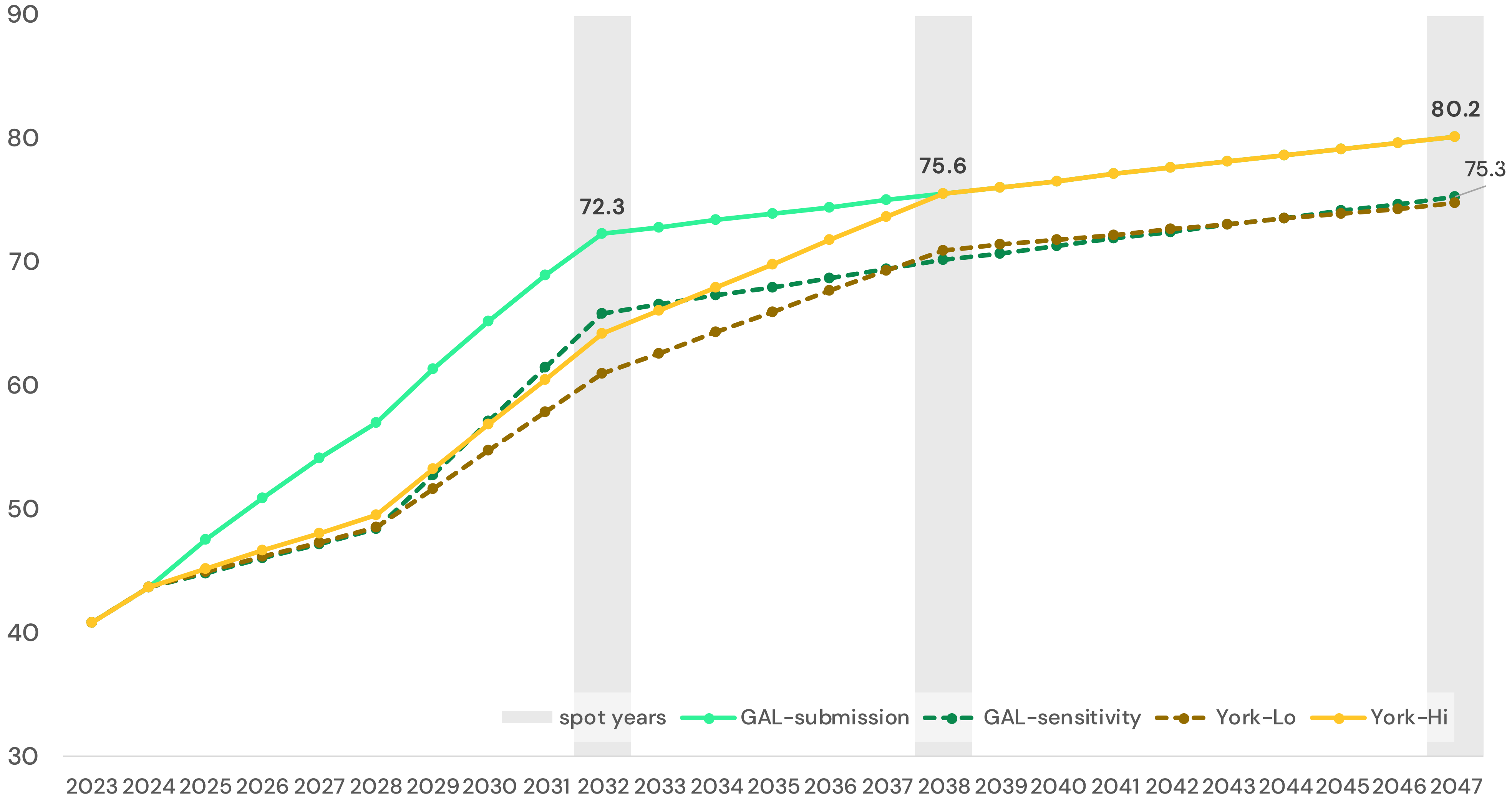
	August BUSY			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	950	954	956	0.0%	0.0%	0.0%
GAL-sensitivity	942	946	948	-0.8%	-0.8%	-0.8%
York-Lo	949	949	949	-0.1%	-0.5%	-0.7%
York-Hi	953	953	953	0.3%	-0.1%	-0.4%

Not provided by York but likely values based on reasonable ratios agreed with York

→ NRP Review

NRP, Passengers: By 2047 the variance reduces to <10%. York have a slower ramp up in early years

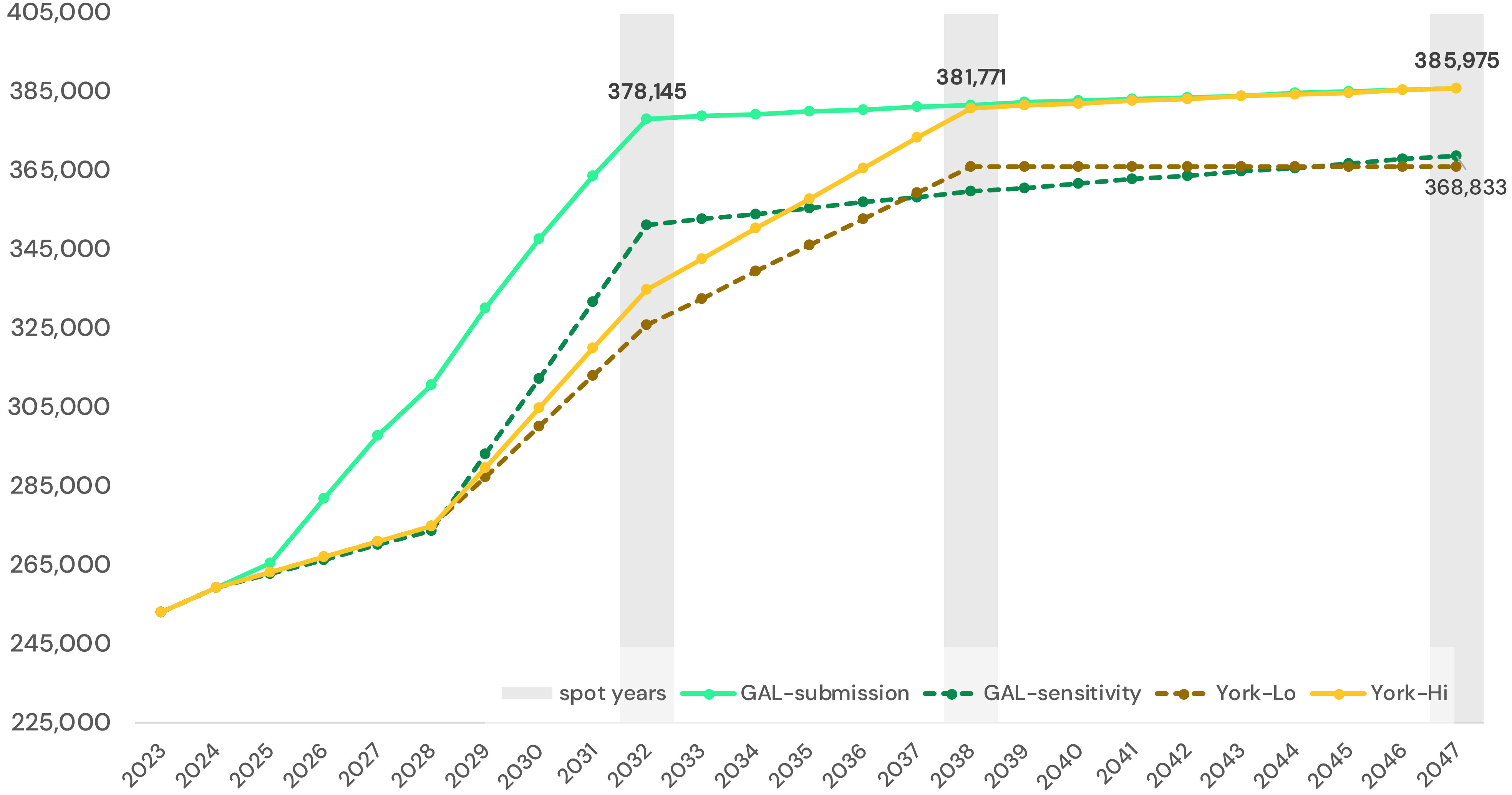
NRP, Annual Passengers (m)



	2032	2038	2047
GAL-submission	72.3	75.6	80.2
GAL-sensitivity	65.9	70.2	75.3
York-Lo	61.0	71.0	74.8
York-Hi	64.2	75.6	80.2
'vs' Submission			
GAL-submission	0%	0%	0%
GAL-sensitivity	-9%	-7%	-6%
York-Lo	-16%	-6%	-7%
York-Hi	-11%	0%	0%

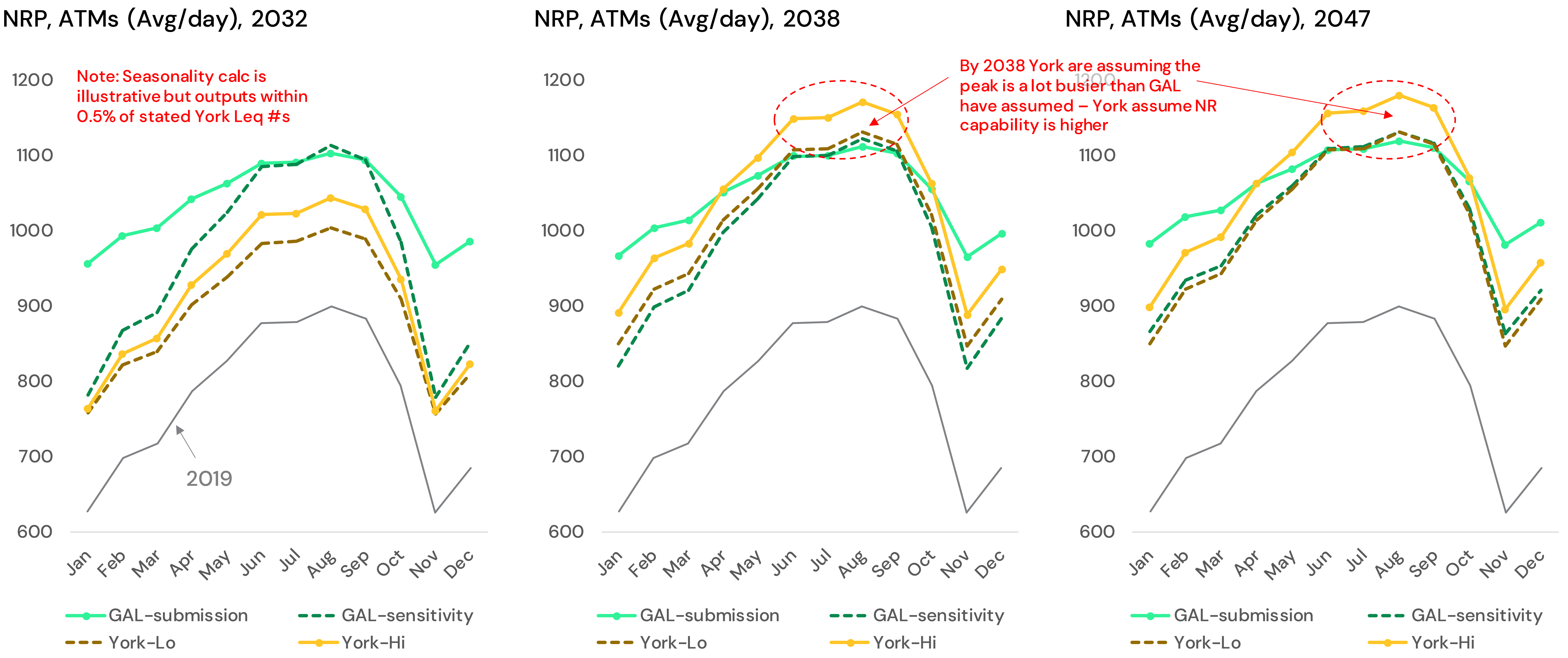
NRP, ATMs: York's hi case aligns with DCO submission for NRP ATMS

NRP, Annual ATMs



	2032	2038	2047
GAL-submission	378k	382k	386k
GAL-sensitivity	351k	360k	369k
York-Lo	326k	366k	366k
York-Hi	335k	381k	386k
'vs' Submission	'vs' Submisison		
GAL-submission	0%	0%	0%
GAL-sensitivity	-7%	-6%	-4%
York-Lo	-14%	-4%	-5%
York-Hi	-11%	0%	0%

NRP, ATM Profile (approx.): Peak season ATMs are HIGHER under both York scenarios by 2038



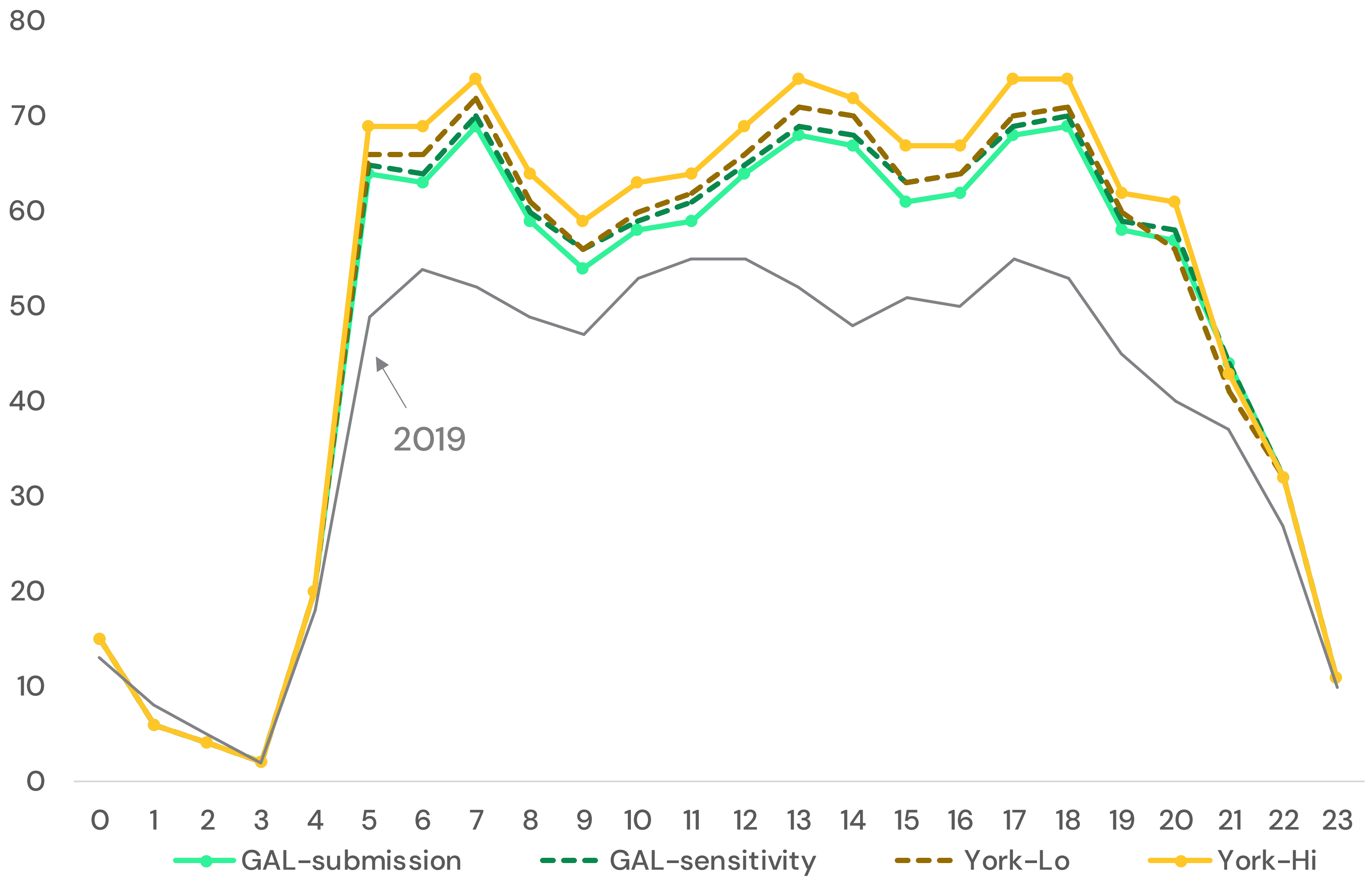
NRP, ATM Profile (approx.): Summary Stats show York assuming c4% higher August thru'put

Summary of August and Leq, AVG daily ATMs

	August			Leq		
	2032	2038	2047	2032	2038	2047
GAL-submission	1,103	1,112	1,119	1,097	1,107	1,115
GAL-sensitivity	1,113	1,123	1,132	1,100	1,111	1,121
York-Lo	1,004	1,131	1,131	988	1,115	1,115
York-Hi	1,045	1,172	1,180	1,029	1,156	1,164
vs GAL-submission						
GAL-submission	0%	0%	0%	0%	0%	0%
GAL-sensitivity	1%	1%	1%	0%	0%	1%
York-Lo	-9%	2%	1%	-10%	1%	0%
York-Hi	-5%	5%	5%	-6%	4%	4%

NRP, Busy Day ATM Profile (approx.): It is likely York assume another c80+ movements on the busy day under the NRP (assumptions below)

NRP, ATMs (Avg/day), 2047 (UTC hour)



	August AVERAGE			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1,103	1,112	1,119	0%	0%	0%
GAL-sensitivity	1,113	1,123	1,132	1%	1%	1%
York-Lo	1,004	1,131	1,131	-9%	2%	1%
York-Hi	1,045	1,172	1,180	-5%	5%	5%

	Aug Avg : Busy			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1.02	1.02	1.01	0%	0%	0%
GAL-sensitivity	1.03	1.02	1.02	0%	1%	1%
York-Lo	1.03	1.03	1.03	1%	1%	2%
York-Hi	1.03	1.03	1.03	1%	1%	2%

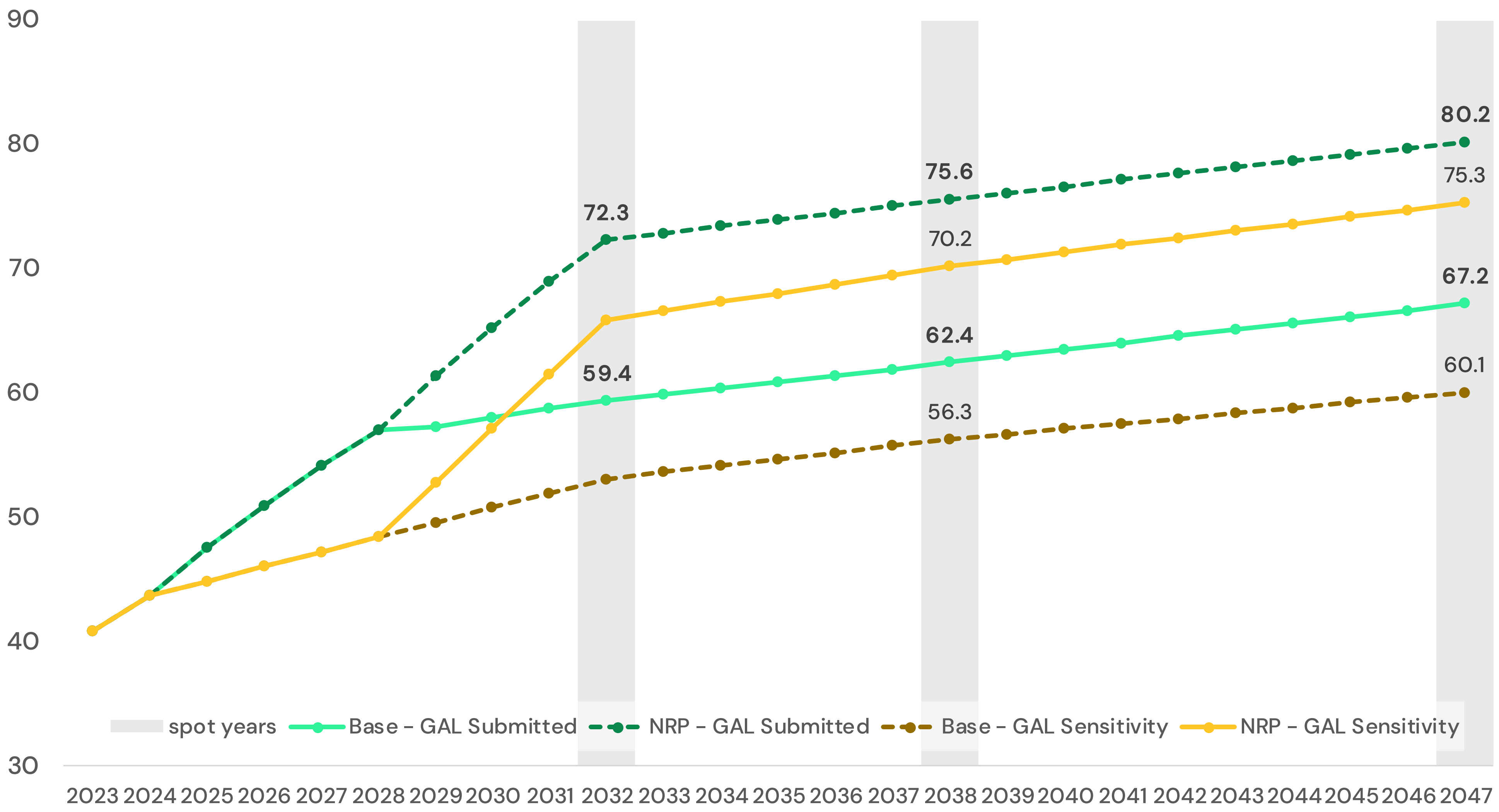
	August BUSY			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1,126	1,132	1,134	0%	0%	0%
GAL-sensitivity	1,142	1,150	1,154	1%	2%	2%
York-Lo	1,035	1,166	1,166	-8%	3%	3%
York-Hi	1,076	1,206	1,215	-4%	7%	7%

Not provided by York but likely values based on ratios confirmed with York

→ Passenger Comparison vs DCO submission (by scenario)

GAL Submission vs GAL Sensitivity – Passengers

DCO Forecasts (Base/NRP), Annual Passengers (m)

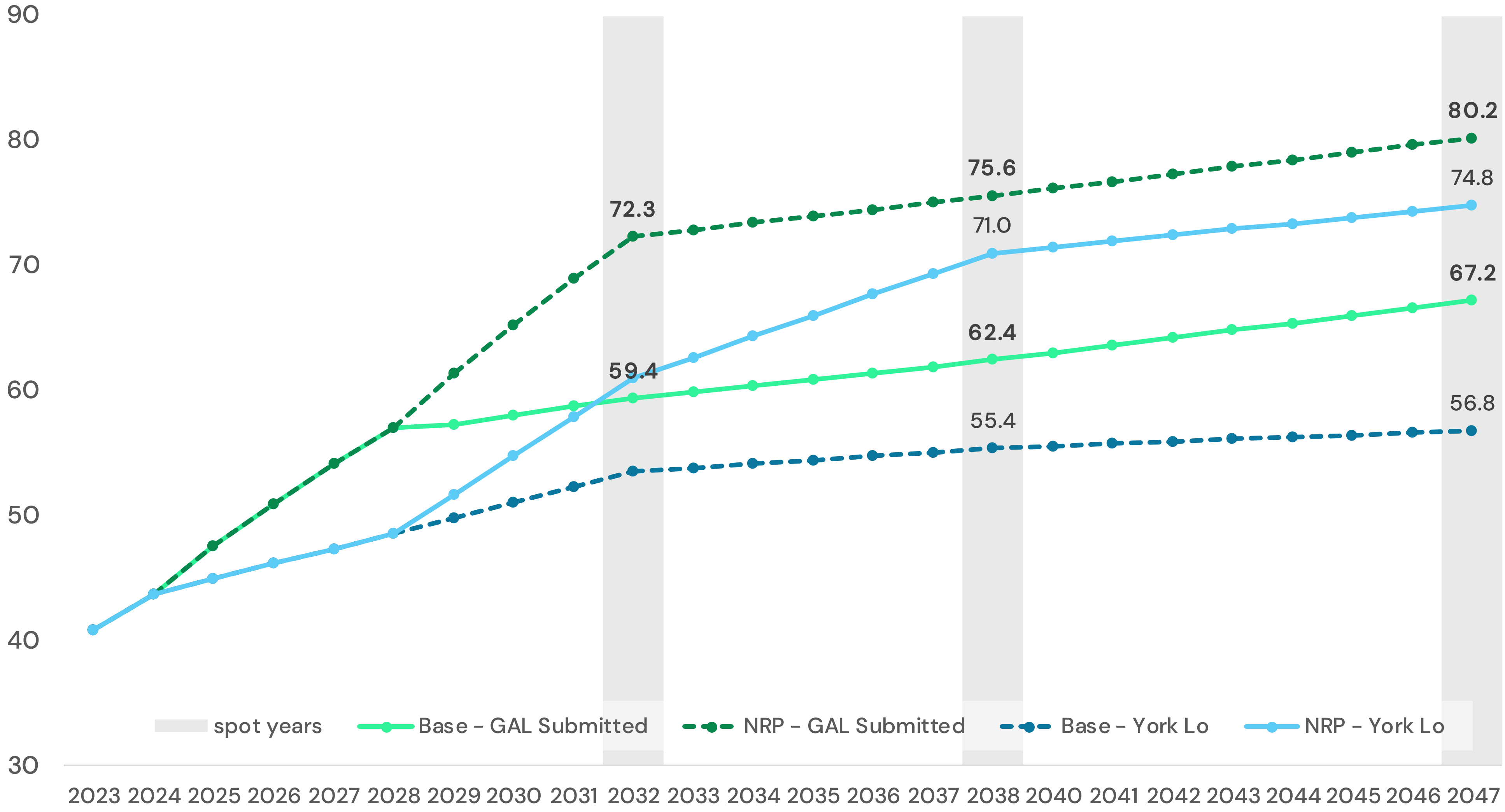


	2032	2038	2047
Base – GAL Submitted	59.4	62.4	67.2
Base – GAL Sensitivity	53.1	56.3	60.1
var	-11%	-10%	-11%
NRP – GAL Submitted	72.3	75.6	80.2
NRP – GAL Sensitivity	65.9	70.2	75.3
Var	-9%	-7%	-6%

GAL Base vs NRP	12.9	13.2	13.0
GAL Sensit. Base vs NRP	12.8	13.9	15.2

GAL Submission vs York Lo- Passengers

DCO Forecasts (Base/NRP), Annual Passengers (m)

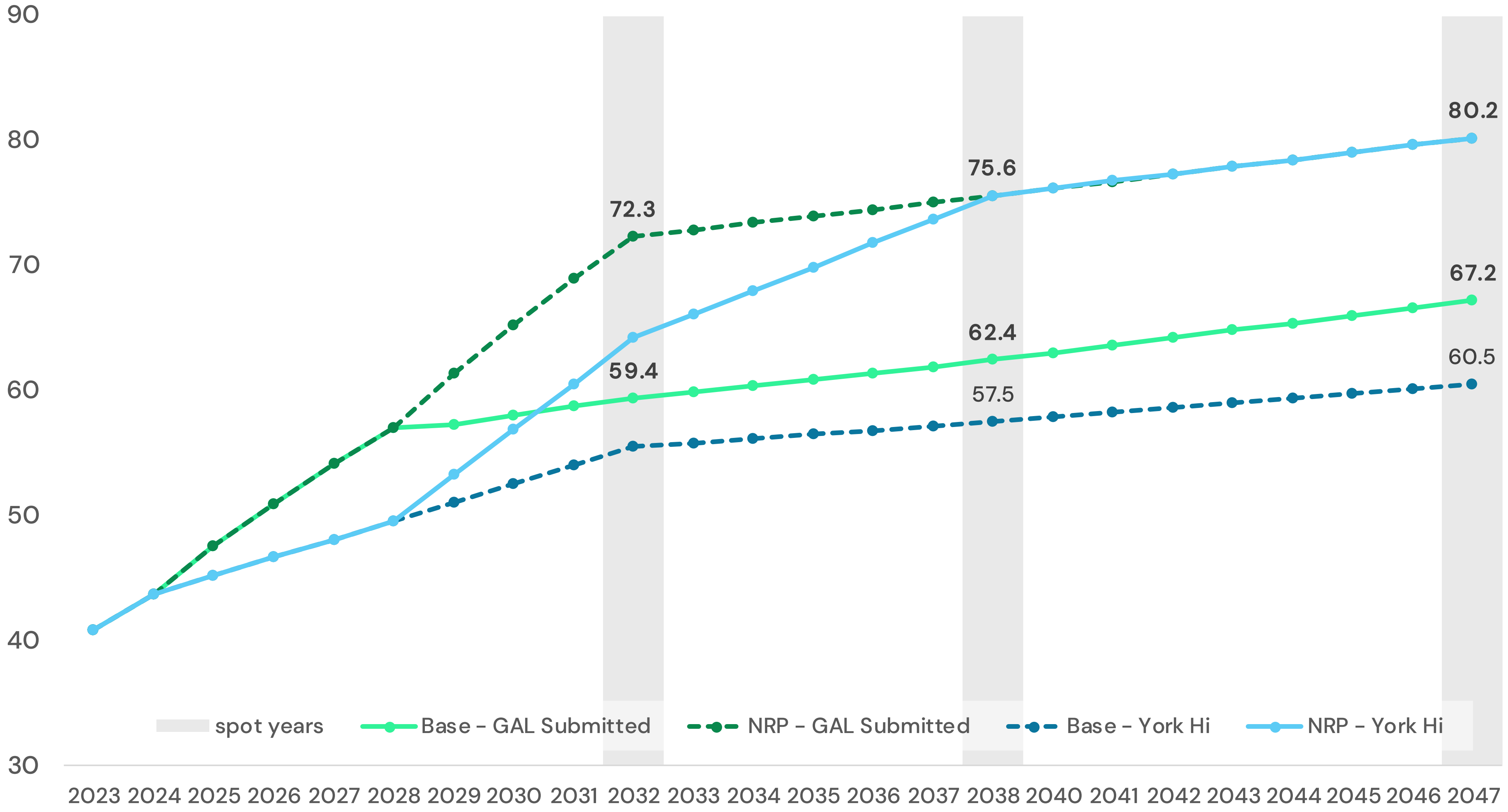


	2032	2038	2047
Base - GAL Submitted	59.4	62.4	67.2
Base - York Lo	53.5	55.4	56.8
var	-10%	-11%	-15%
NRP - GAL Submitted	72.3	75.6	80.2
NRP - York Lo	61.0	71.0	74.8
var	-16%	-6%	-7%

GAL Base vs NRP	12.9	13.2	13.0
York Lo base vs NRP	7.5	15.6	18.0

GAL Submission vs York Hi – Passengers

DCO Forecasts (Base/NRP), Annual Passengers (m)



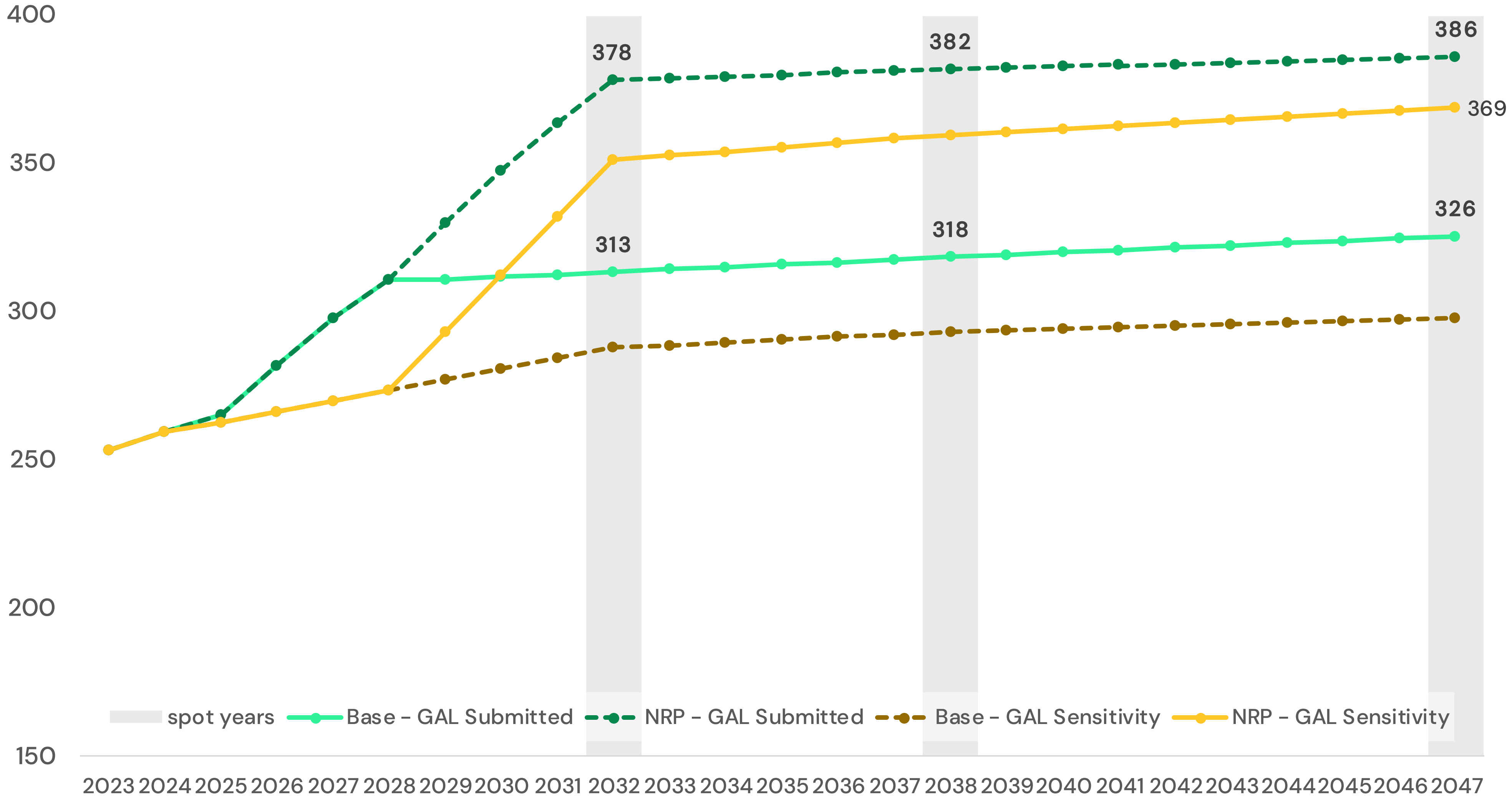
	2032	2038	2047
Base – GAL Submitted	59.4	62.4	67.2
Base – York Hi	55.5	57.5	60.5
var	-7%	-8%	-10%
NRP – GAL Submitted	72.3	75.6	80.2
NRP – York Hi	64.2	75.6	80.2
var	-11%	0%	0%

GAL Base vs NRP	12.9	13.2	13.0
York Hi base vs NRP	8.7	18.1	19.7

ATM Comparison vs DCO submission (by scenario)

GAL Submission vs GAL Sensitivity – ATMs

DCO Forecasts (Base/NRP), Annual ATMs (k)

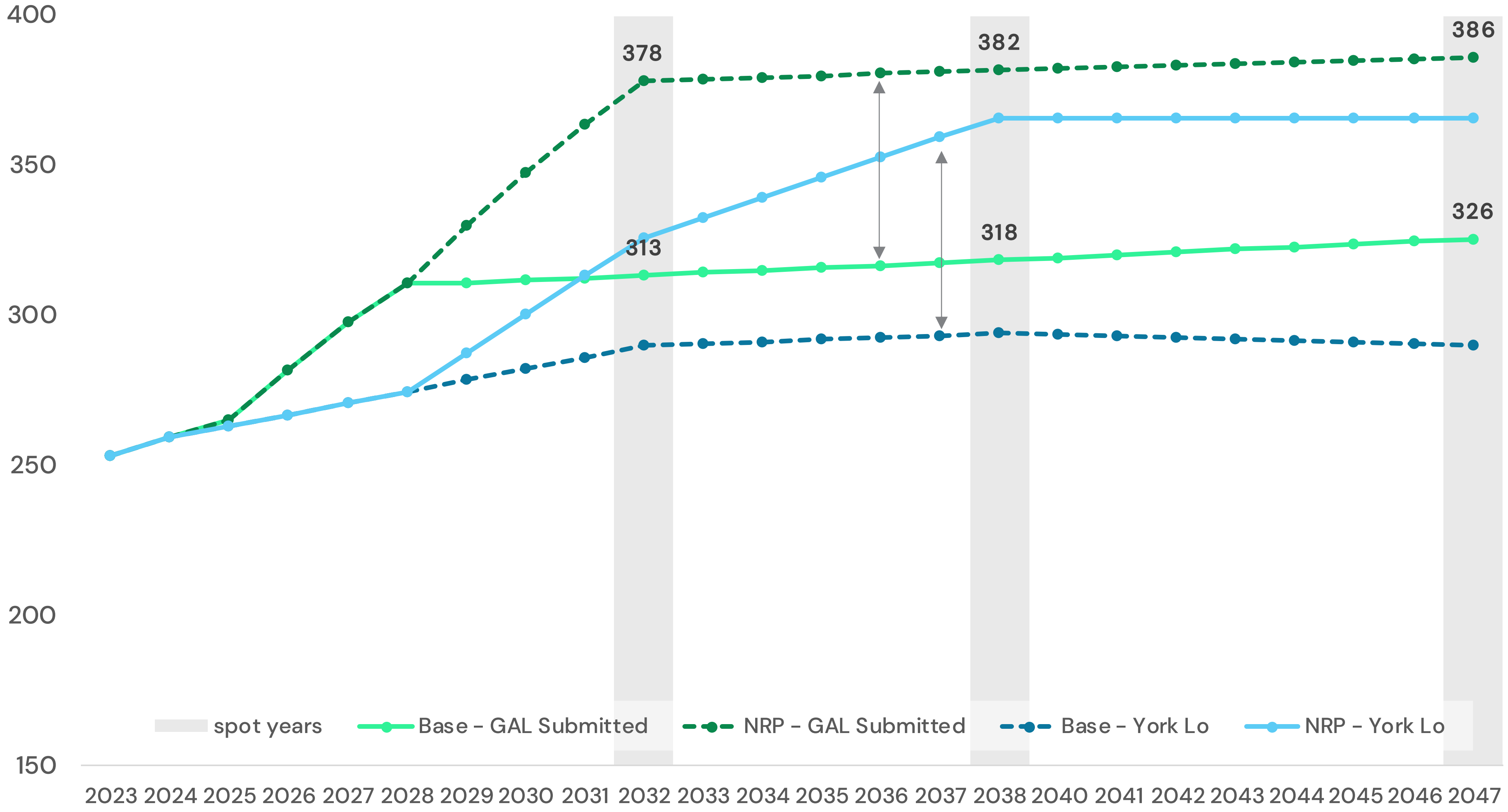


	2032	2038	2047
Base – GAL Submitted	313k	318k	326k
Base – GAL Sensitivity	288k	293k	298k
var	-8%	-8%	-8%
NRP – GAL Submitted	378k	382k	386k
NRP – GAL Sensitivity	351k	360k	369k
Var	-7%	-6%	-4%

k ATMs			
GAL Base vs NRP	65	63k	60
GAL Sensit. Base vs NRP	63	6k	71

GAL Submission vs York Lo- ATMs

DCO Forecasts (Base/NRP), Annual ATMs (k)

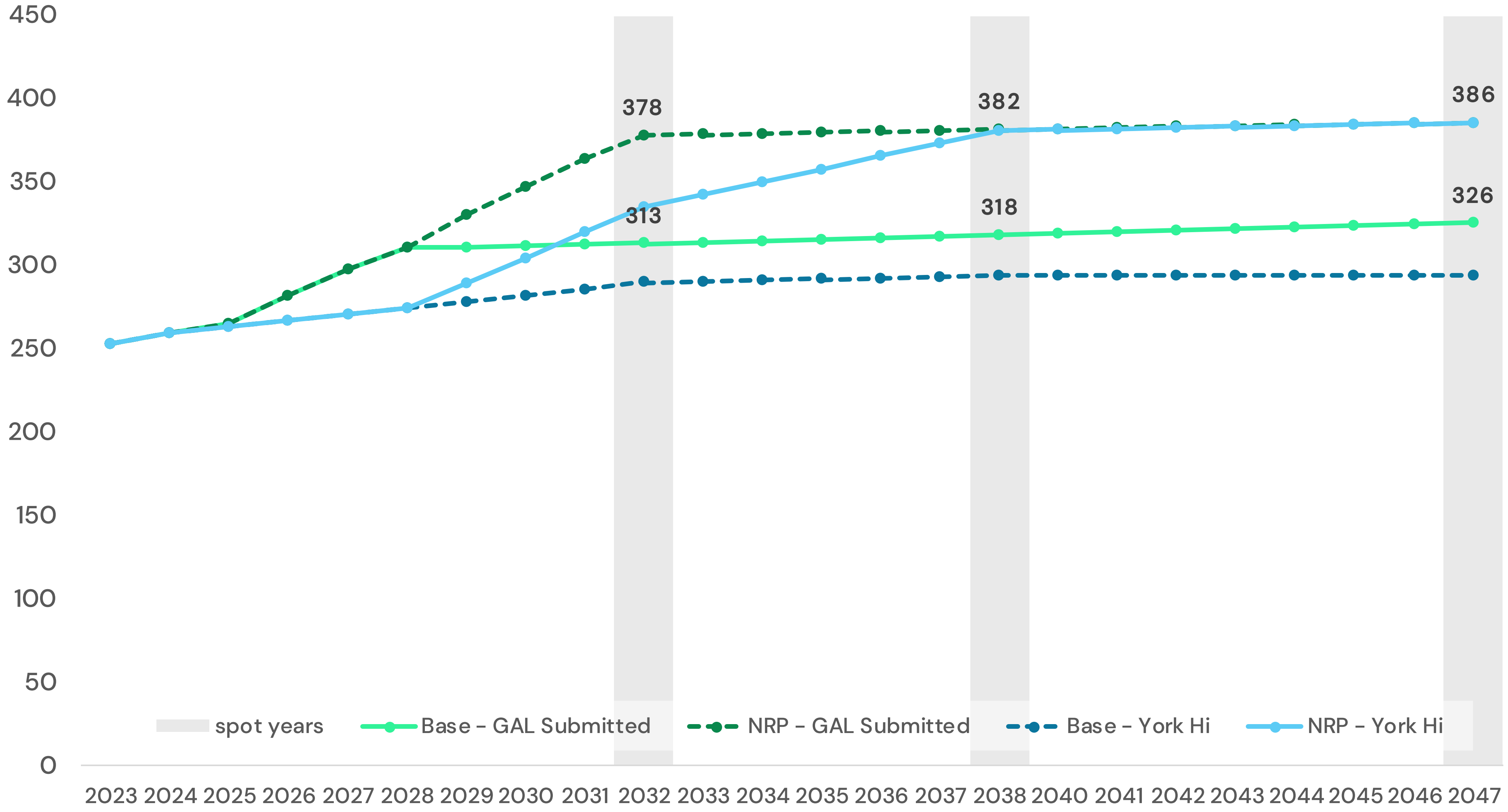


	2032	2038	2047
Base – GAL Submitted	313	318	326
Base – York Lo	290	294	290
var	-7%	-8%	-11%
NRP – GAL Submitted	378	382	386
NRP – York Lo	326	366	366
var	-14%	-4%	-5%

k ATMs			
GAL Base vs NRP	65	63	60
York Lo base vs NRP	36	72	76

GAL Submission vs York Hi – ATMs

DCO Forecasts (Base/NRP), Annual ATMs (k)



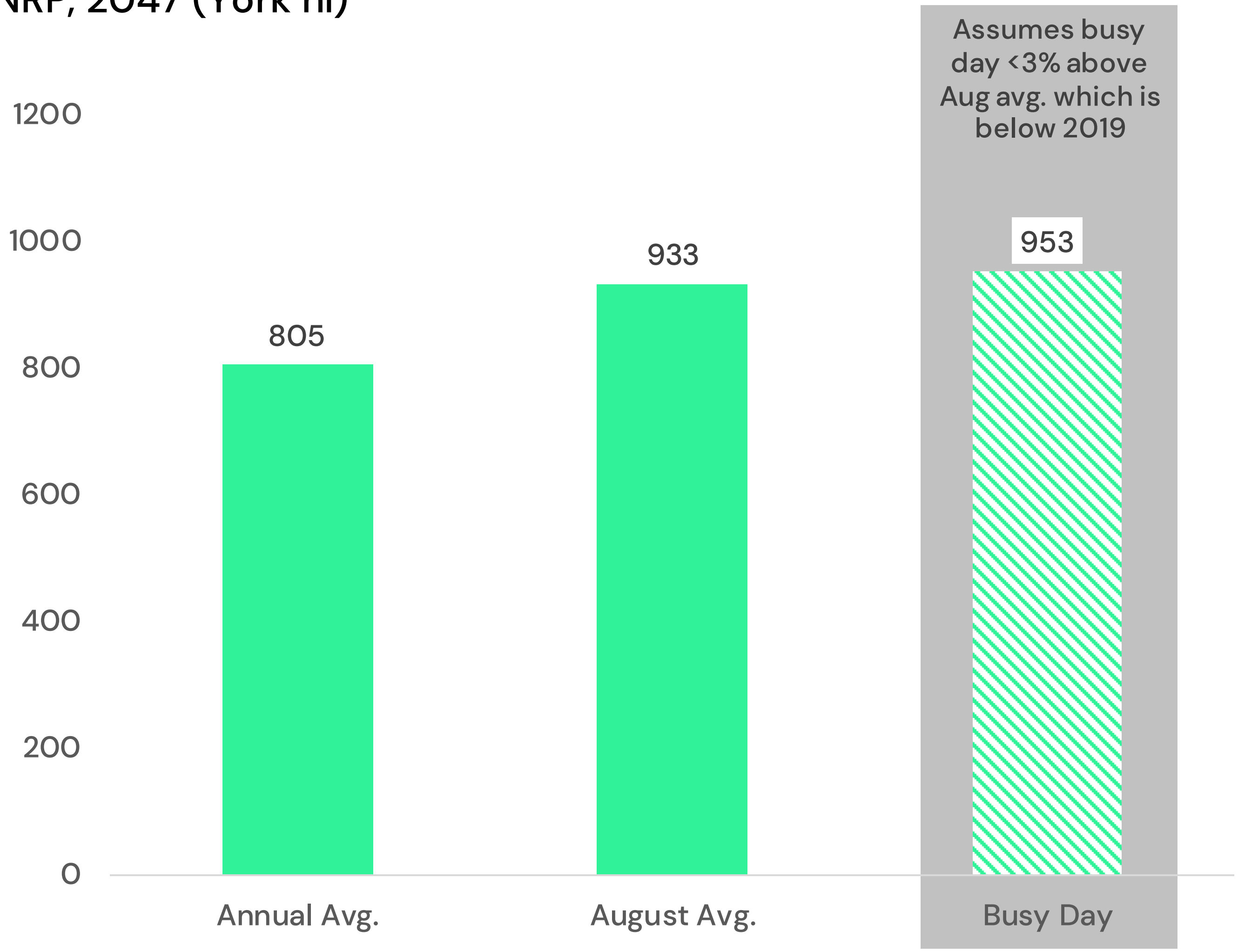
	2032	2038	2047
Base – GAL Submitted	313	318	326
Base – York Hi	290	294	294
var	-7%	-8%	-10%
NRP – GAL Submitted	378	382	386
NRP – York Hi	335	381	386
var	-11%	0%	0%

k ATMs			
GAL Base vs NRP	65	63	60
York Hi base vs NRP	45	87	92

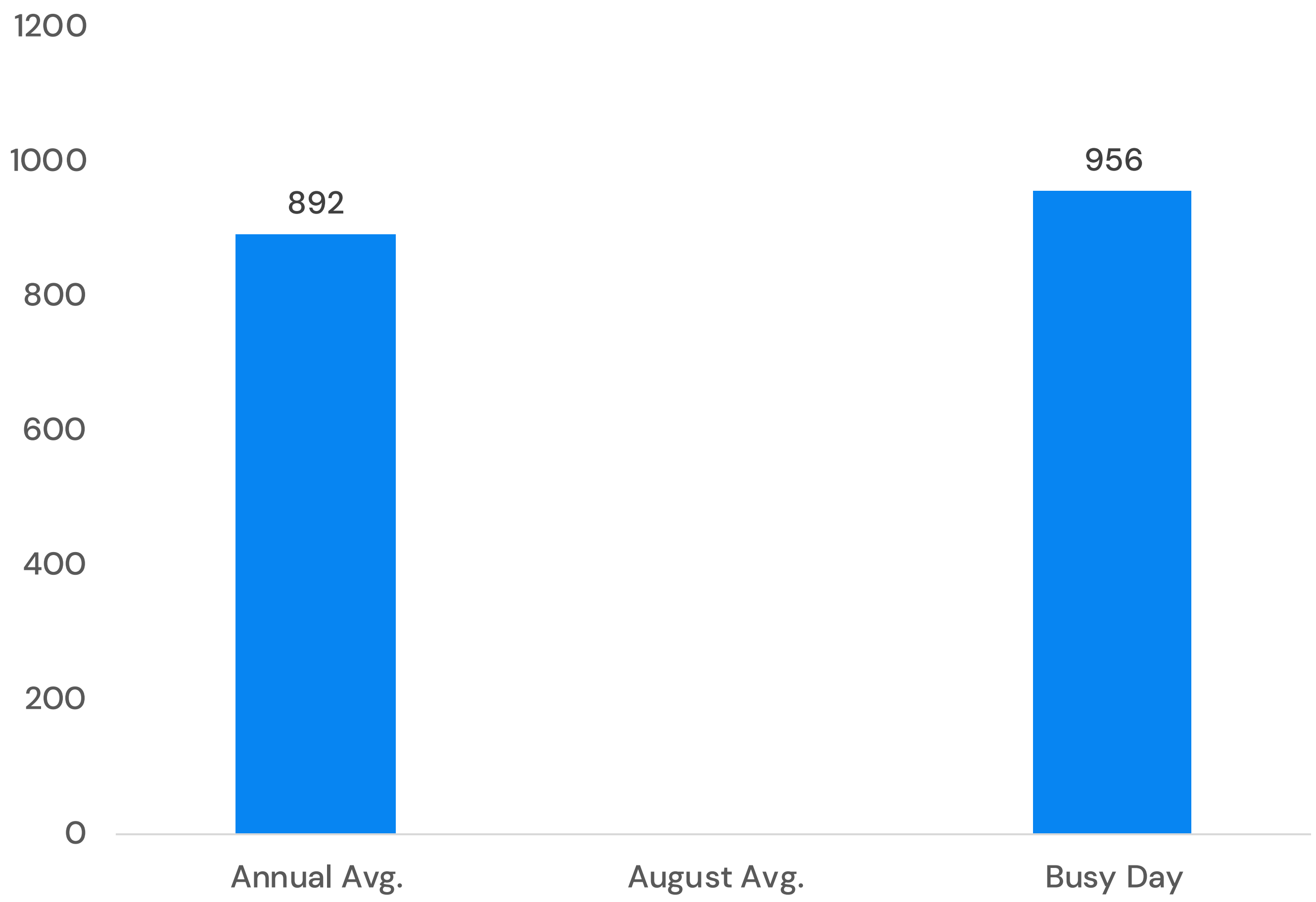
→ York – High

Baseline thru'put: York assume an Aug. monthly ATM avg. of 933 daily ATMs. On a busy day this would represent ~960 ATMs based on current intra month ratios

NRP, 2047 (York hi)



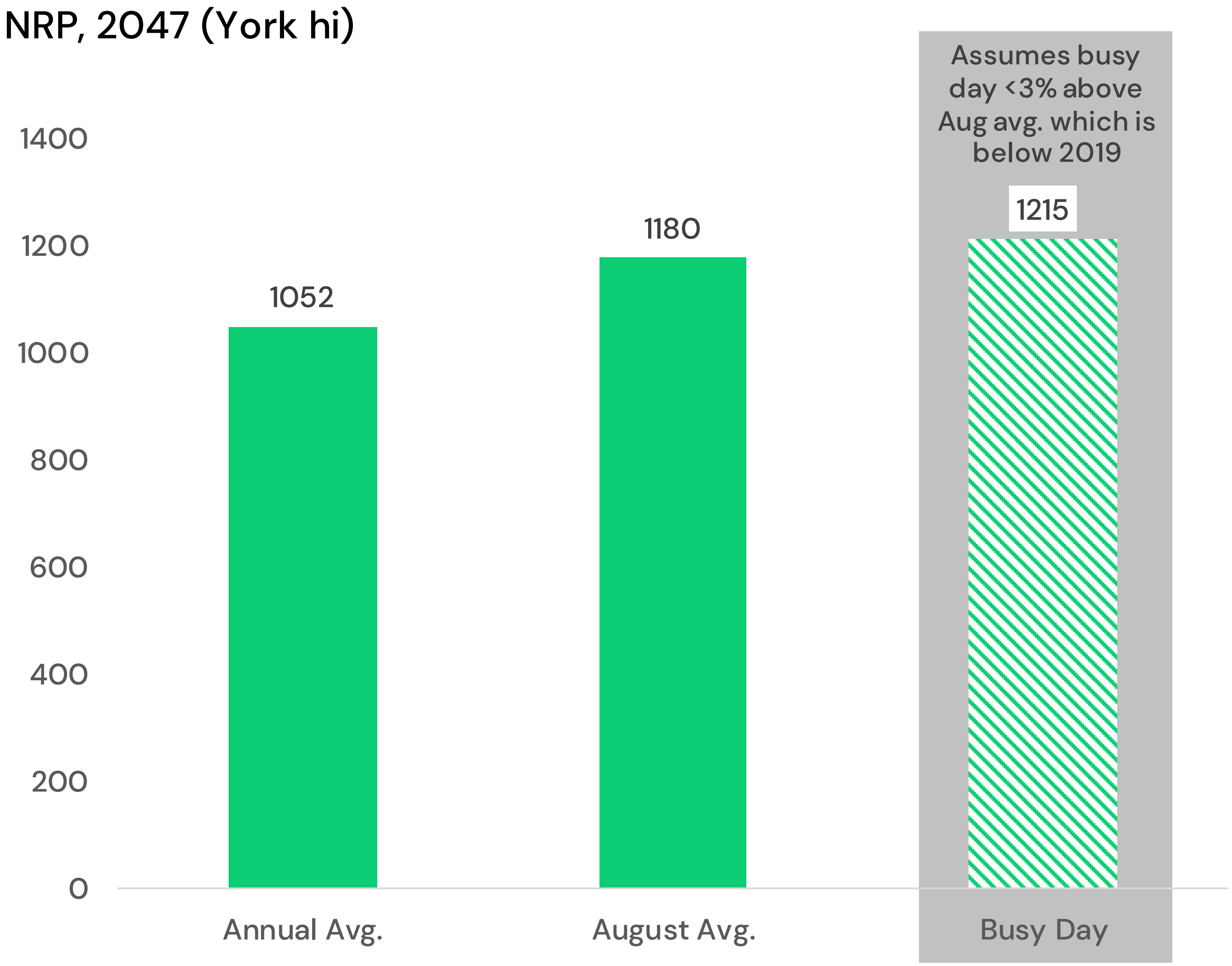
NRP, 2047 (GAL submitted)

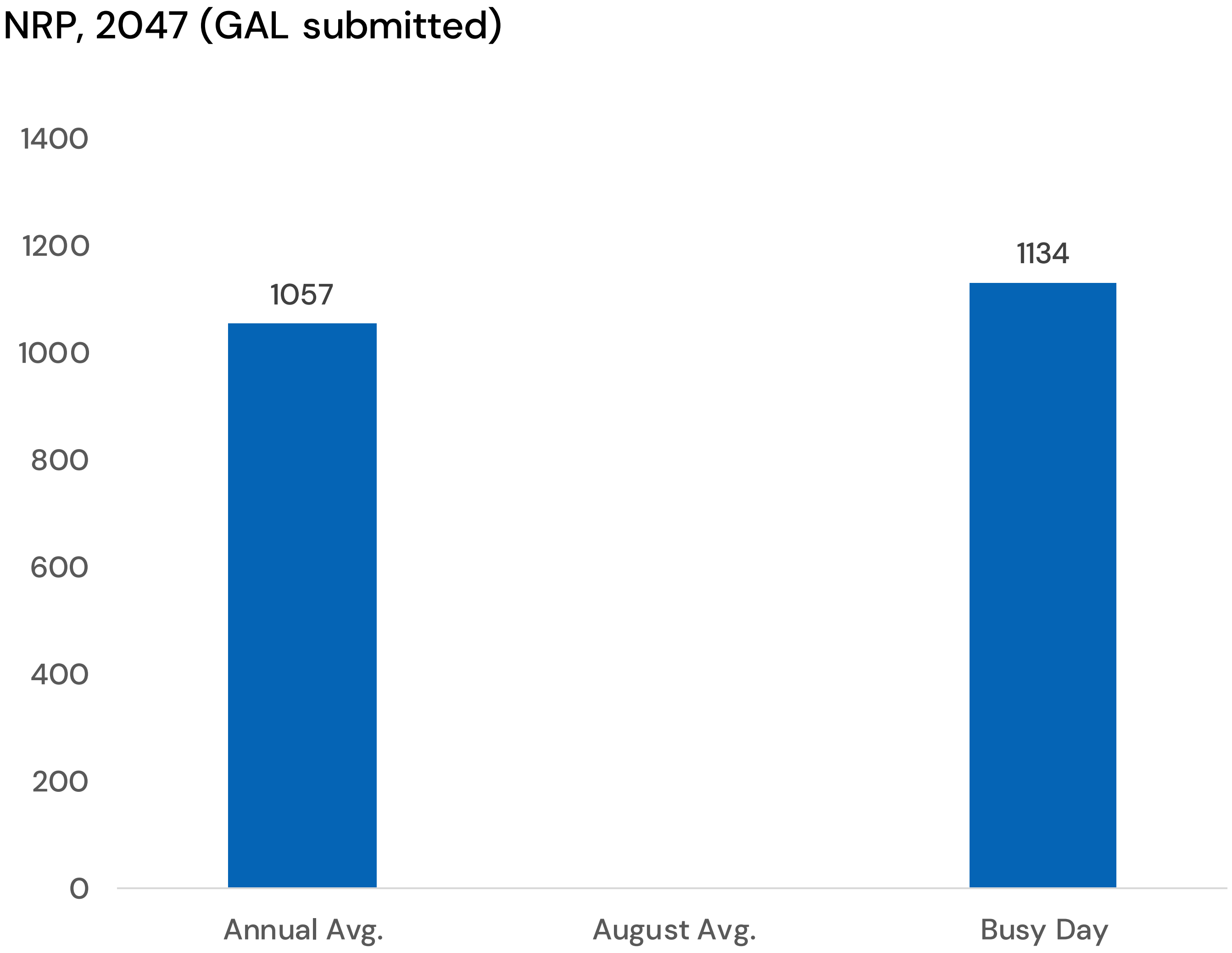


Note: A figure of 960 was shown in Appendix A, this was based on the 2019 ratio. Recognising the physical limits of the runway and York's position questioning GAL's throughput assumptions, a slightly lower ratio was assumed for this analysis

Source: York email, LGW submission

NRP thru'put: York assume an Aug. monthly ATM avg. of 1,180 daily ATMs. On a busy day this would represent >1,200 ATMs based on current intra month ratios



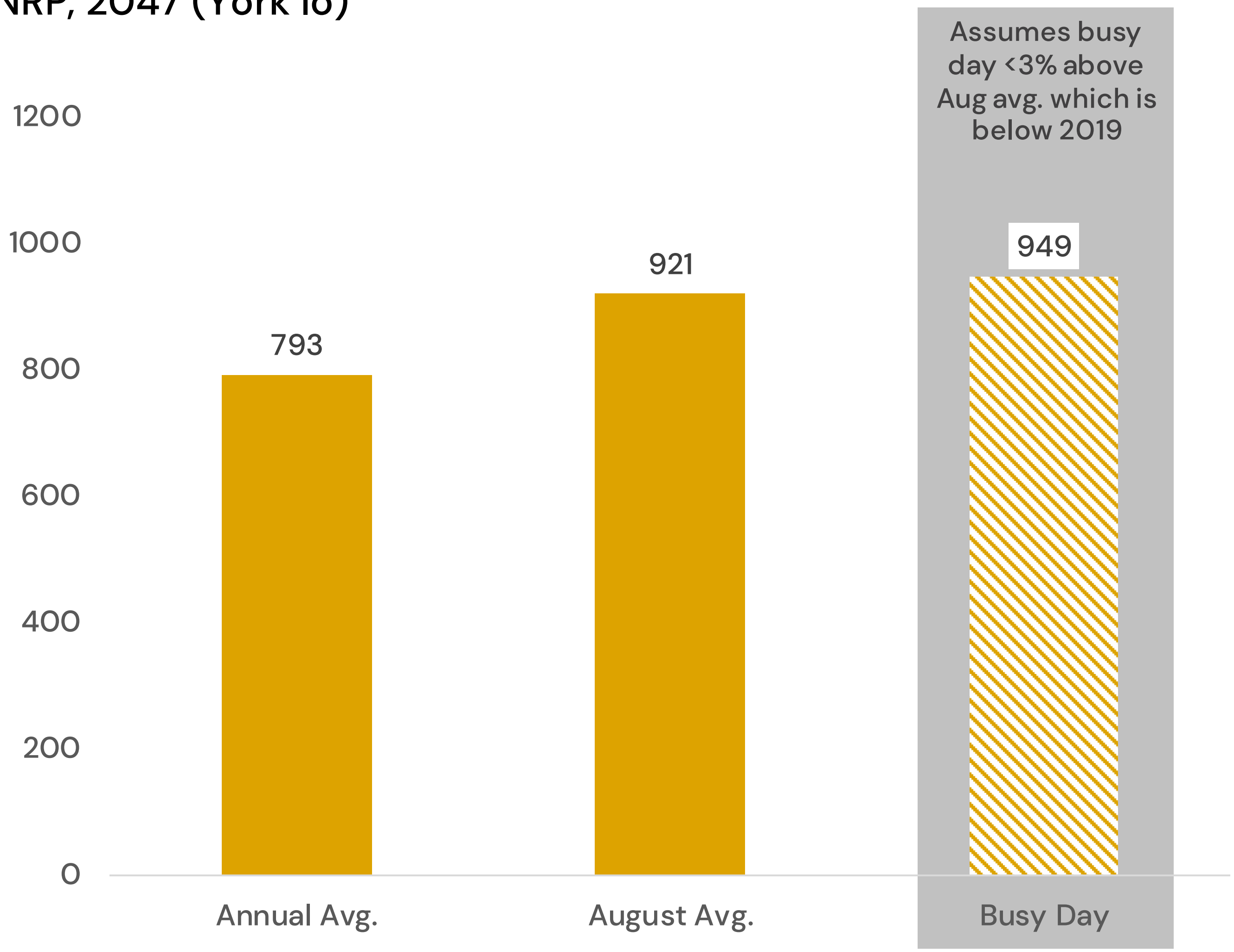


Source: York email, LGW submission

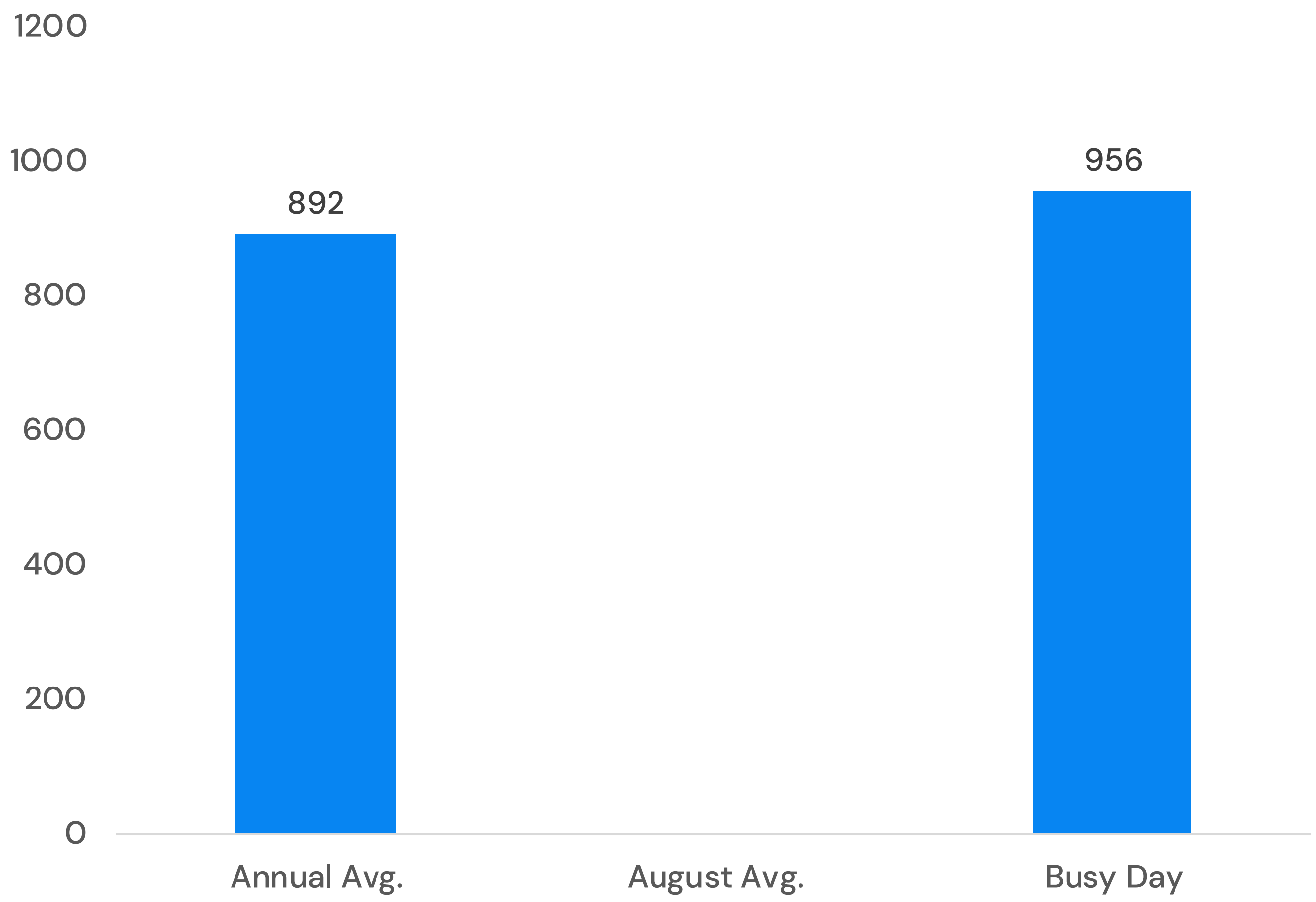
→ York – Low

Baseline thru'put: York assume an Aug. monthly ATM avg. of 921 daily ATMs. On a busy day this would represent ~950 ATMs based on current intra month ratios

NRP, 2047 (York lo)



NRP, 2047 (GAL submitted)

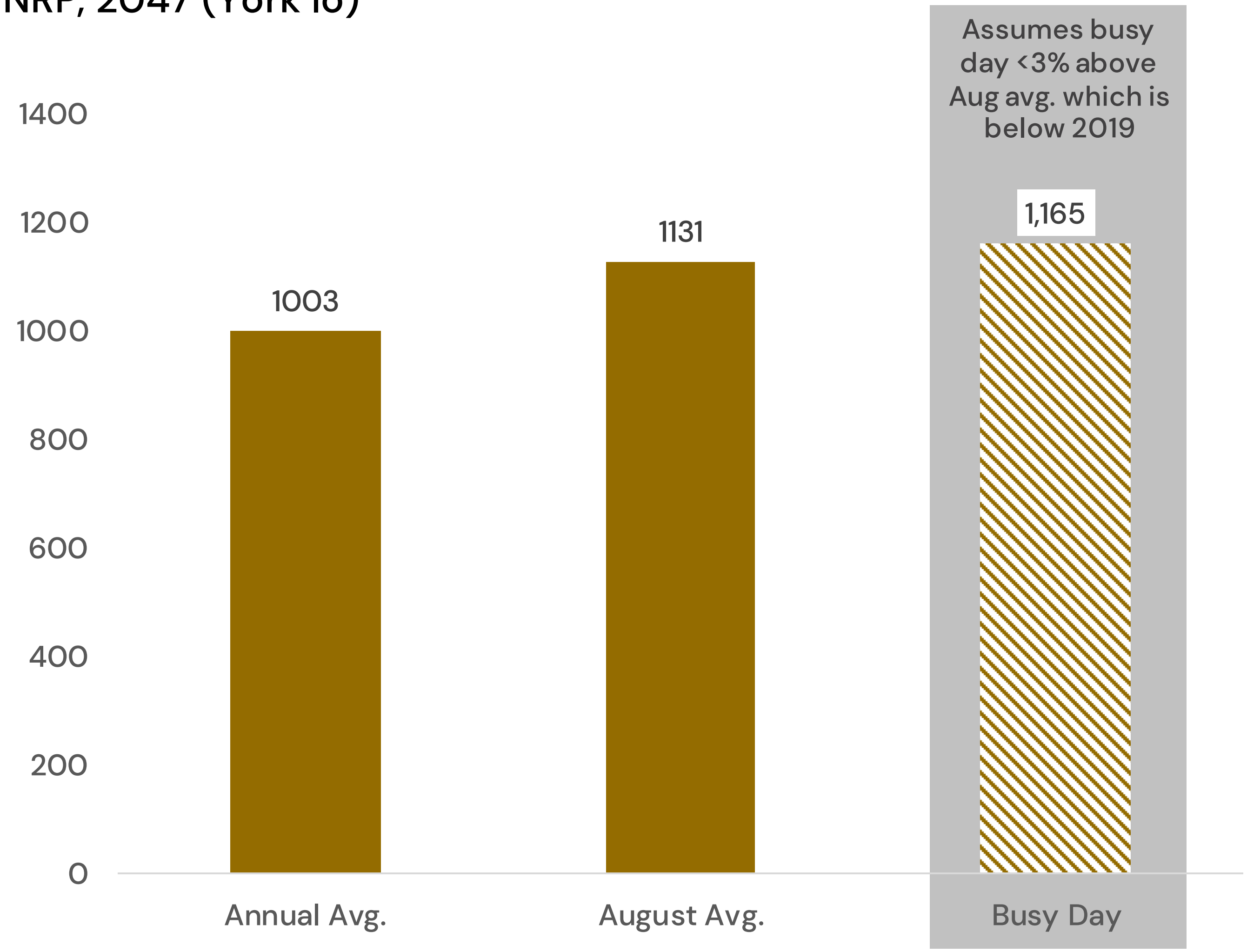


Note: A figure of 960 was shown in Appendix A, this was based on the 2019 ratio. Recognising the physical limits of the runway and York's position questioning GAL's throughput assumptions, a slightly lower ratio was assumed for this analysis

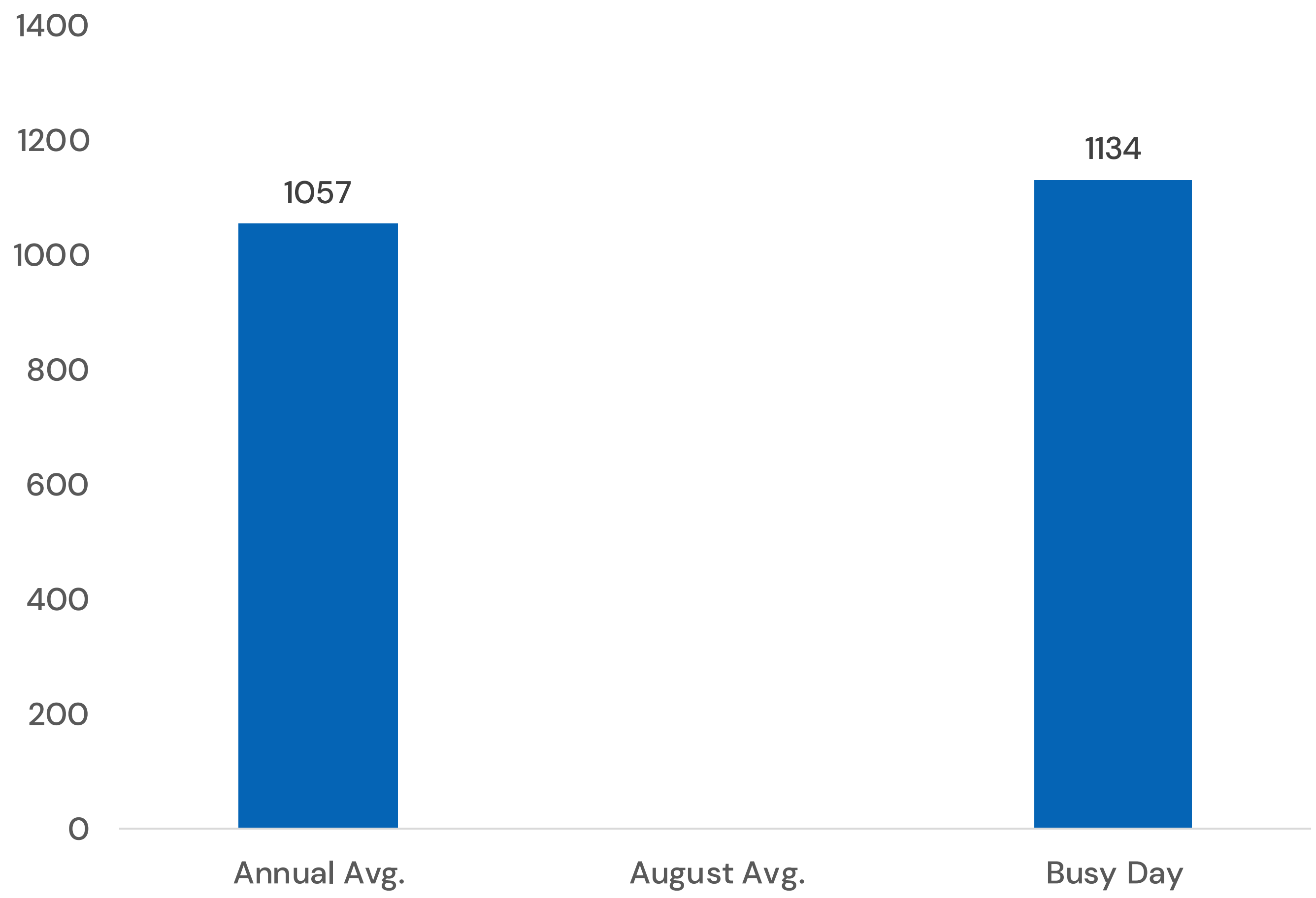
Source: York email, LGW submission

NRP thru'put: York assume an Aug. monthly ATM avg. of 1,131 daily ATMs. On a busy day this would represent >1,160 ATMs based on current intra month ratios

NRP, 2047 (York lo)



NRP, 2047 (GAL submitted)



Source: York email, LGW submission

York Sensitivities

→ How treated for sensitivity analysis

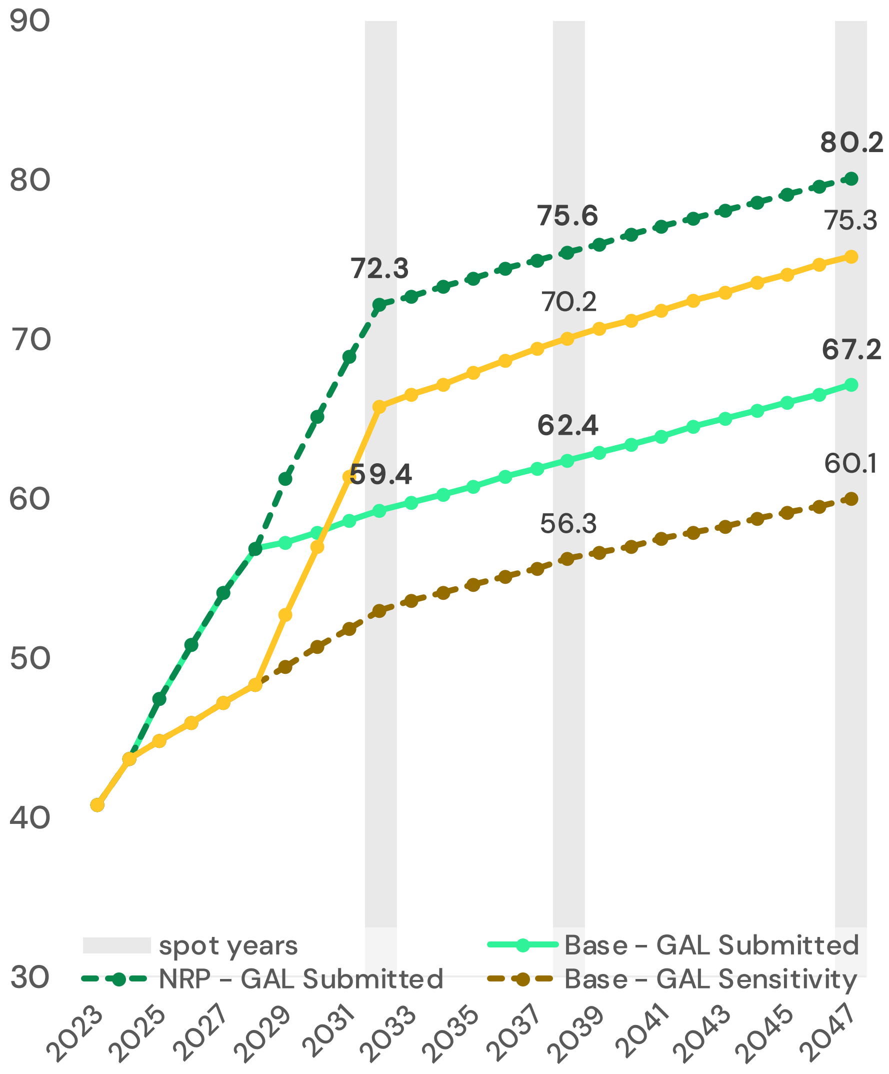
Main Assumptions

Other Area	Comment
Traffic Mix (Long vs short haul)	▪ Working assumption is that traffic mix is comparable to GAL scenario. ▪ This approximation was confirmed with York
Fleets (Generation)	▪ Working assumption is that fleet mix is comparable to GAL scenarios

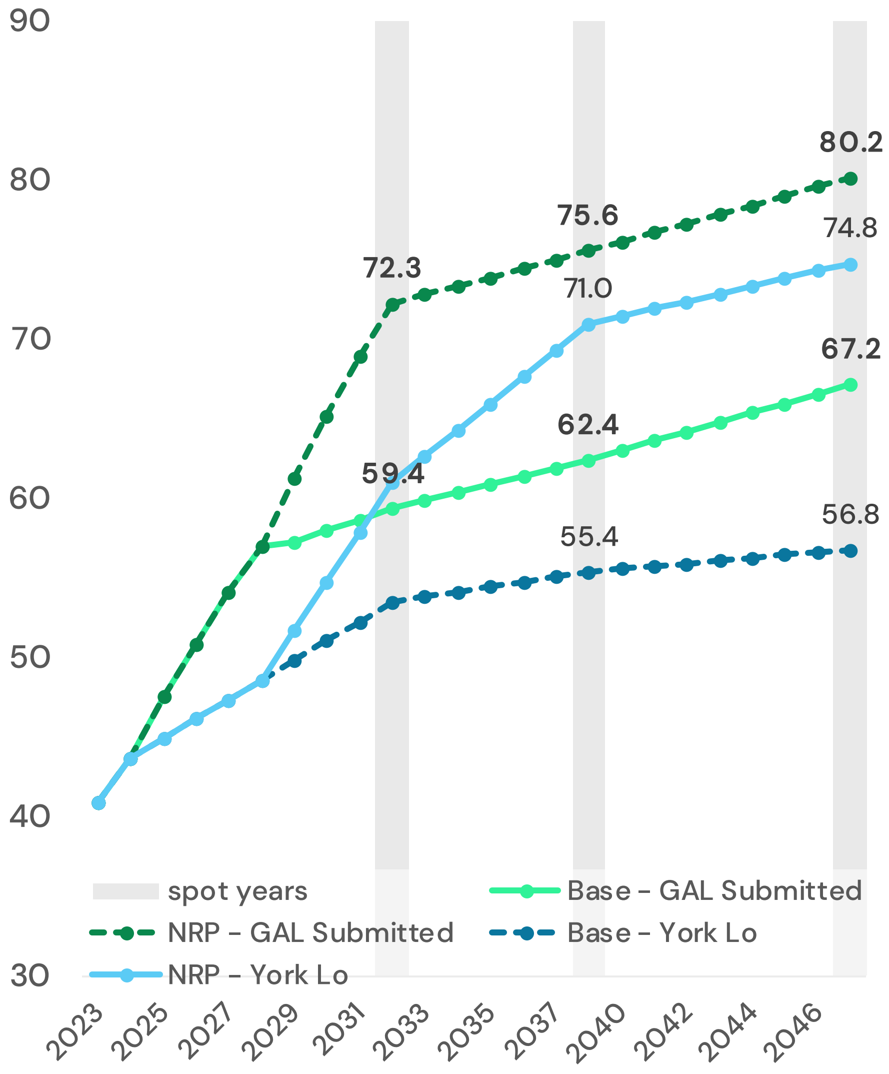
Selected Additional Outputs Required for Environmental Analysis

Recap/reminder (Pax, m)

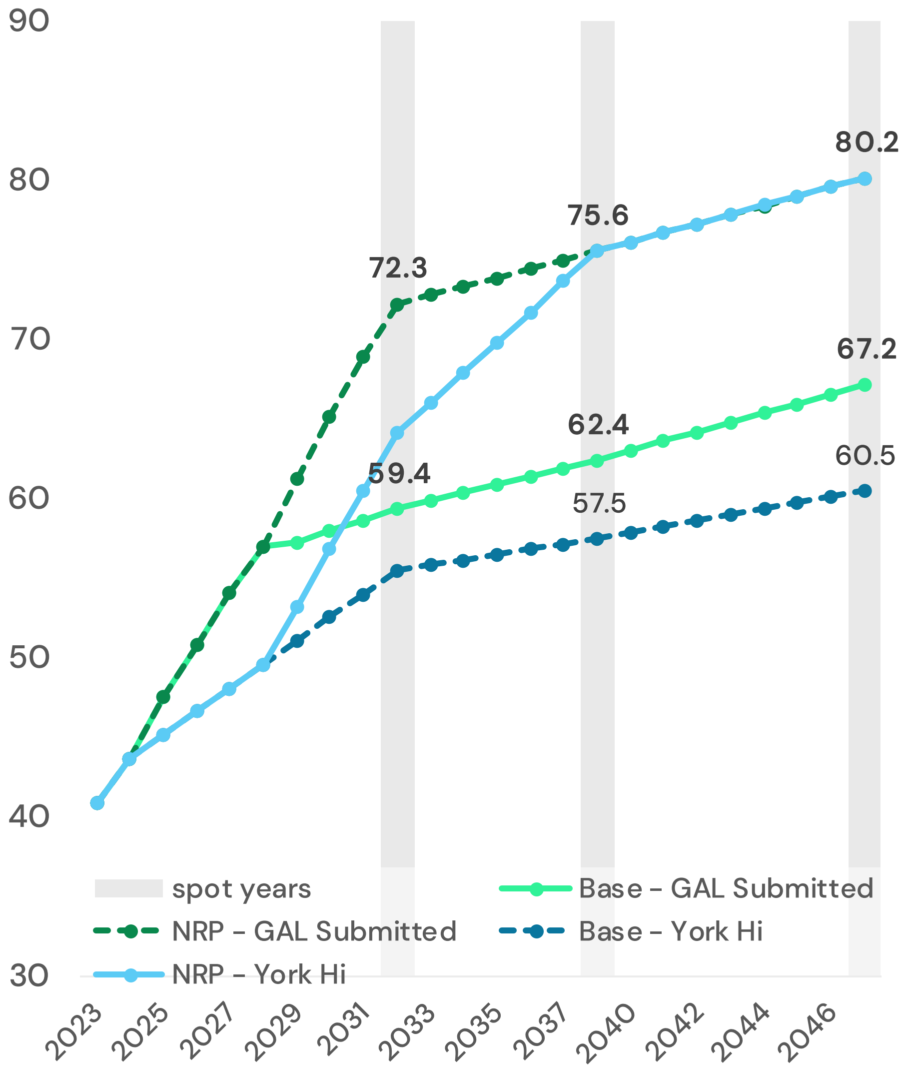
GAL/GAL sensitivity



GAL/York Lo



GAL/York Hi



Summary of additional requests

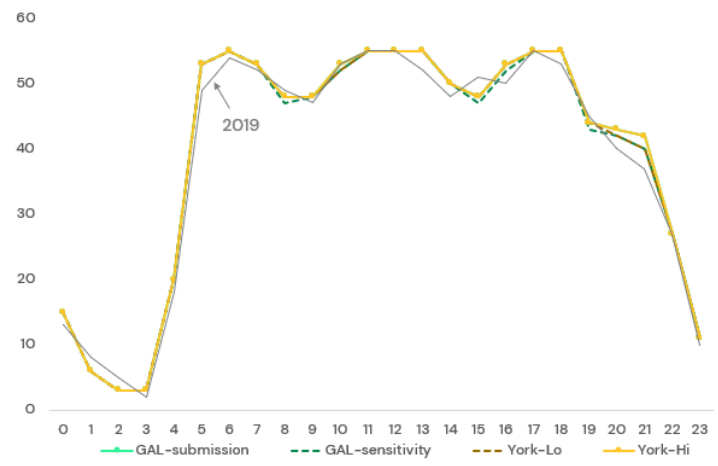
Who	Request	Status
All	Annual ATMs / Passenger values	▪ provided
Various	Passenger numbers for the peak day by hour of the day for all the scenarios (baseline and NRP) and all the forecast years	▪ provided
	Passenger profile across the year	▪ provided
	Conversion factor to go from an August peak day to June peak day	▪ provided
	Employee numbers for them all	▪ provided
	Cargo outputs	▪ provided
Noise	Lden/Leq adjustments	▪ provided
Economic	Updated modelling	▪ provided

Impact of additional/fewer ATMs on a busy day: Passengers by hour
BASELINE

Baseline

Baseline, Busy Day ATM Profile (approx.): York's average Aug. #s would imply they are very close on 'busy' day runway utilisation

Baseline, ATMs (Avg/day), 2047



	August AVERAGE			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	930	937	944	0%	0%	0%
GAL-sensitivity	915	920	922	-2%	-2%	-2%
York-Lo	921	921	921	-1%	-2%	-2%
York-Hi	933	933	933	0%	0%	-1%

	Aug Avg : Busy			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1.02	1.02	1.01	0%	0%	0%
GAL-sensitivity	1.03	1.03	1.03	1%	1%	1%
York-Lo	1.03	1.03	1.03	1%	1%	2%
York-Hi	1.02	1.02	1.02	0%	0%	1%

	August BUSY			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	950	954	956	0.0%	0.0%	0.0%
GAL-sensitivity	942	946	948	-0.8%	-0.8%	-0.8%
York-Lo	949	949	949	-0.1%	-0.5%	-0.7%
York-Hi	953	953	953	0.3%	-0.1%	-0.4%

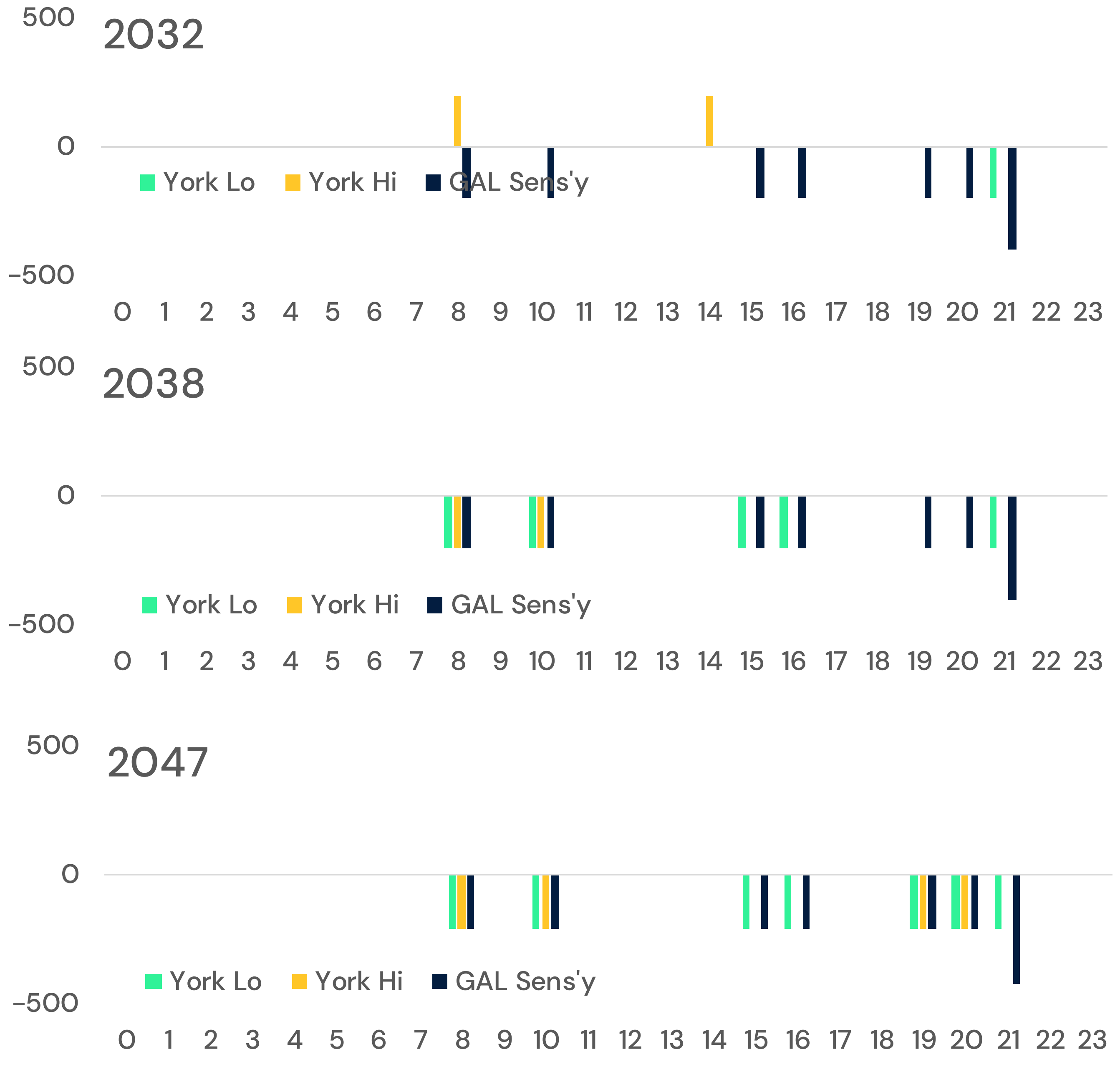
Not provided by York but likely values based on reasonable ratios

With very little difference in implied busy days (ATMs), there will be limited impact on passengers

Note 1: Outputs reflect total passengers (ie including Xfers, which are estimated at c4% of demand)

Note 2: Outputs are for total passengers not split by arrival / departure. Applying underlying mix of traffic will be appropriate (e.g. 70% departing/30% arriving in 0600 hour)

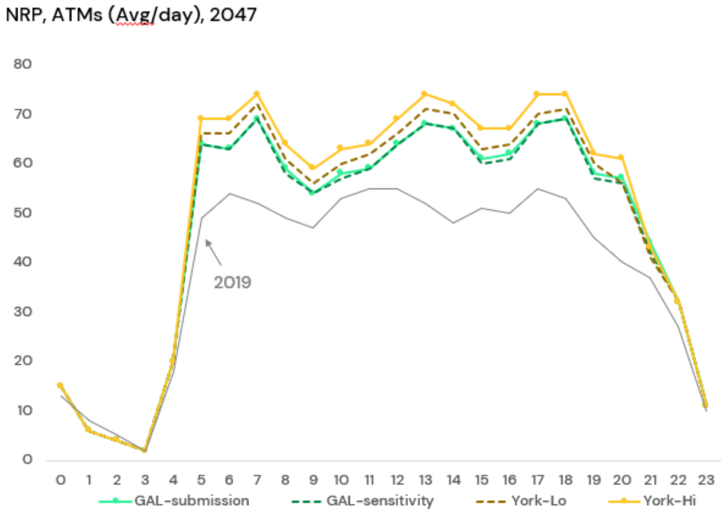
Hourly passenger overlay (vs GAL baseline submission)



Impact of additional/fewer ATMs on a busy day: Passengers by hour
NRP

NRP

NRP, Busy Day ATM Profile (approx.): It is likely York assume another c80+ movements on the busy day under the NRP (assumptions below)



	August AVERAGE			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1,103	1,112	1,119	0%	0%	0%
GAL-sensitivity	1,086	1,093	1,096	-2%	-2%	-2%
York-Lo	1004	1131	1131	-9%	2%	1%
York-Hi	1045	1172	1180	-5%	5%	5%

	Aug Avg : Busy			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1.02	1.02	1.01	0%	0%	0%
GAL-sensitivity	1.03	1.03	1.03	1%	1%	1%
York-Lo	1.03	1.03	1.03	1%	1%	2%
York-Hi	1.03	1.03	1.03	0.8%	1.1%	1.6%

	August BUSY			vs GAL Submission		
	2032	2038	2047	2032	2038	2047
GAL-submission	1,126	1,132	1,134	0%	0%	0%
GAL-sensitivity	1,118	1,124	1,126	-1%	-1%	-1%
York-Lo	1,034	1,165	1,165	-8%	3%	3%
York-Hi	1,076	1,207	1,215	-4%	7%	7%

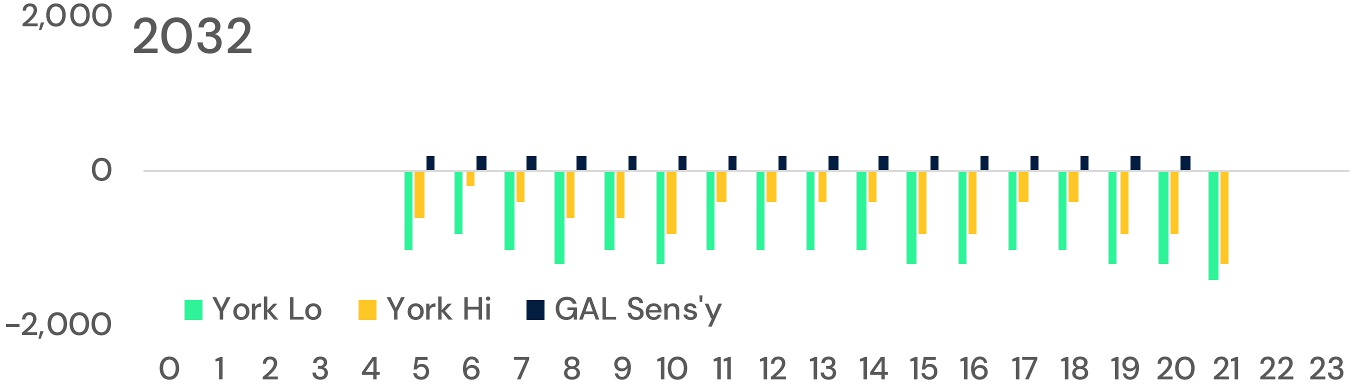
Not provided by York but likely values based on ratios

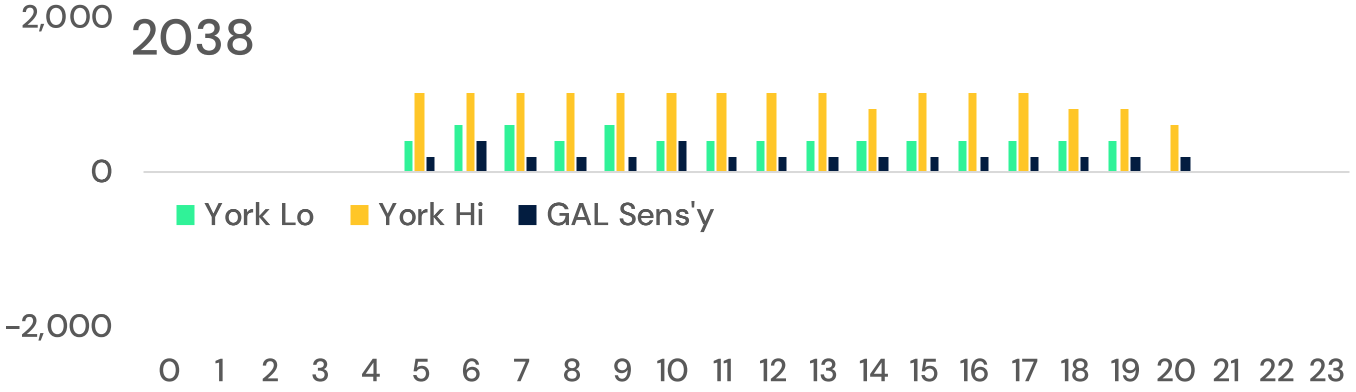
The NRP impacts are more significant, this has been 'converted' to an approximate hourly passenger impact

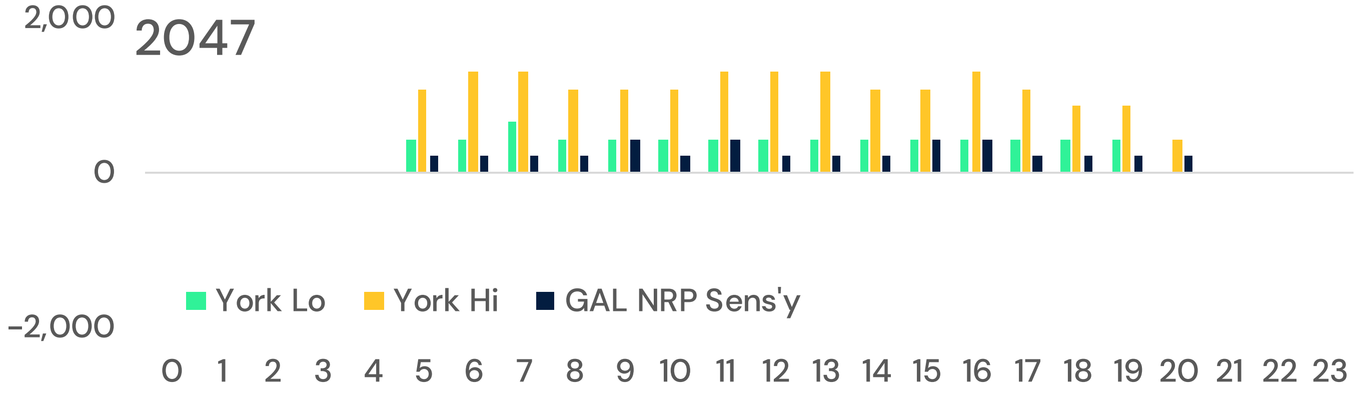
Note 1: Outputs reflect total passengers (ie including Xfers, which are estimated at c4% of demand)

Note 2: Outputs are for total passengers not split by arrival / departure. Applying underlying mix of traffic will be appropriate (e.g. 70% departing/30% arriving in 0600 hour)

Hourly passenger overlay (vs GAL NRP submission)



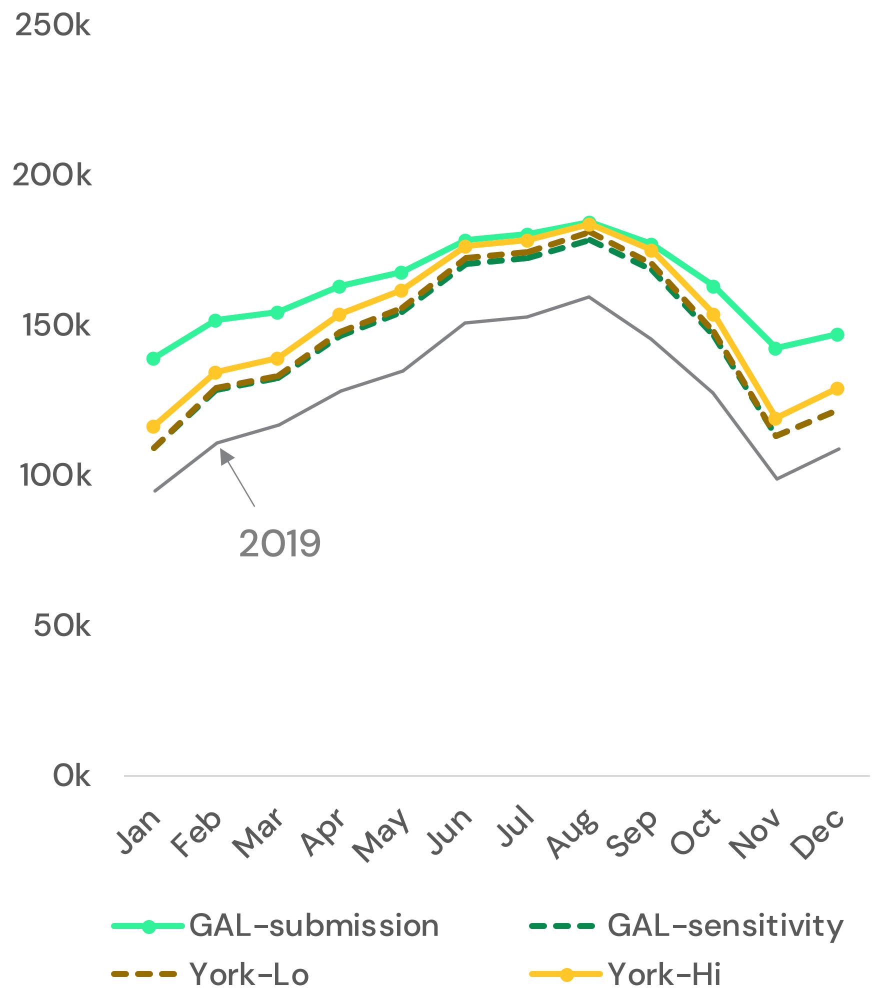




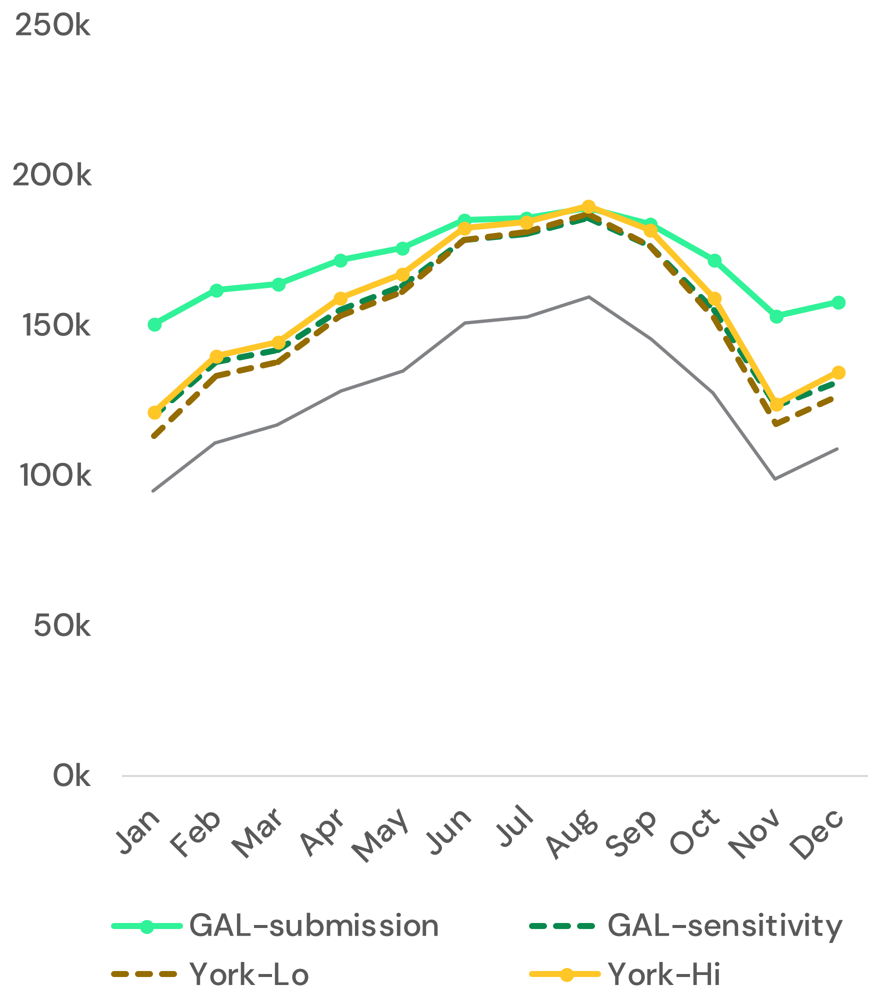
Passenger profile across the year – BASELINE

Baseline, Passengers (Avg/day), 2032

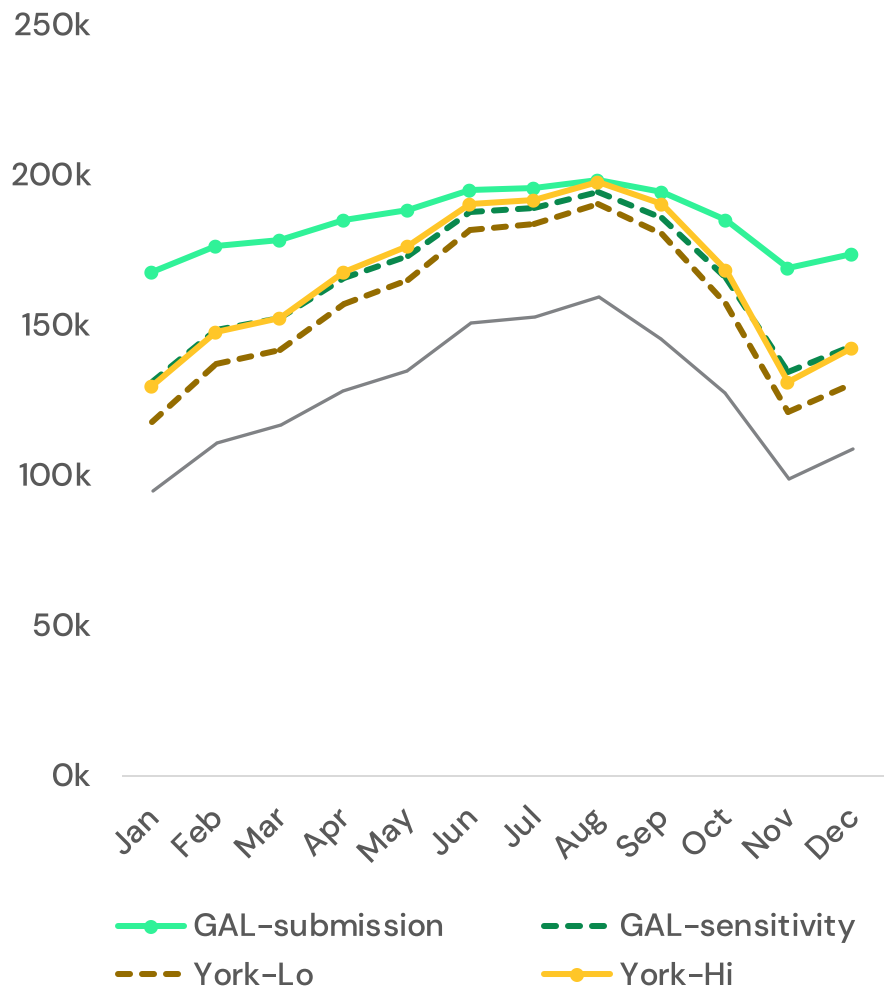
Note: Seasonality calc is APPROX for all years



Baseline, Passengers (Avg/day), 2038

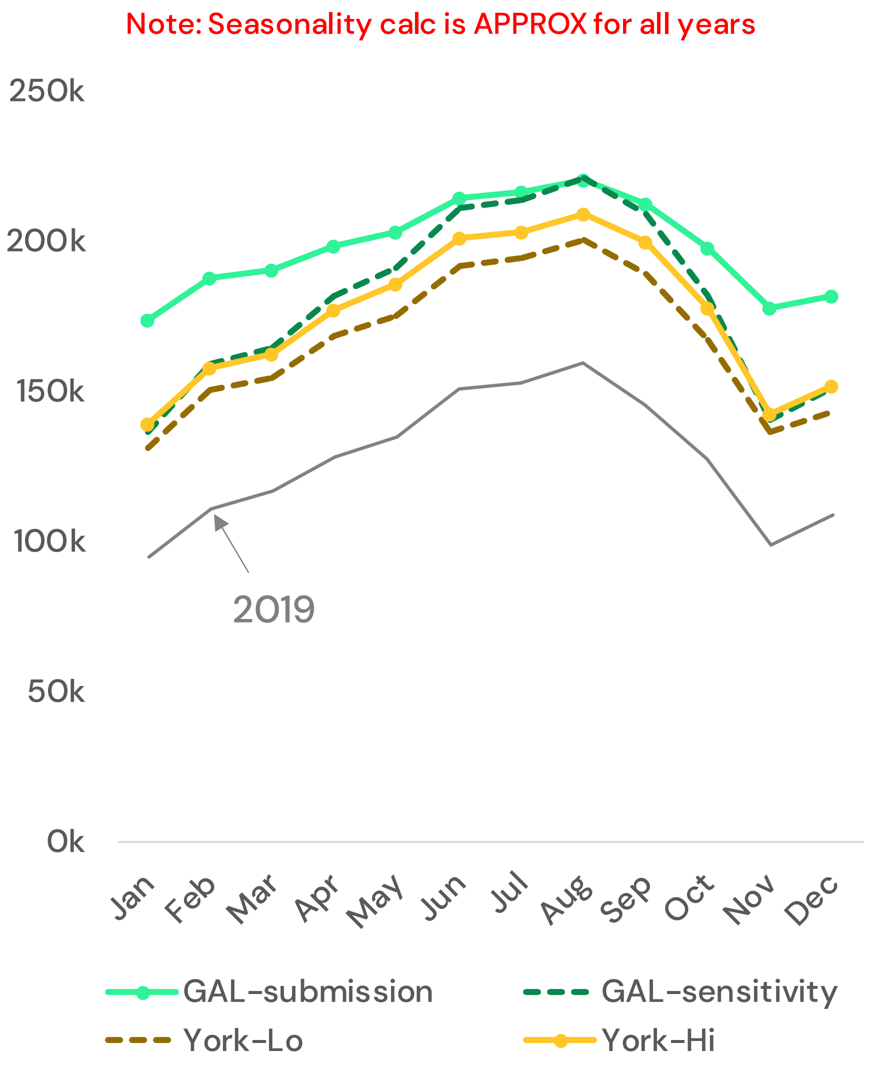


Baseline, Passengers (Avg/day), 2047

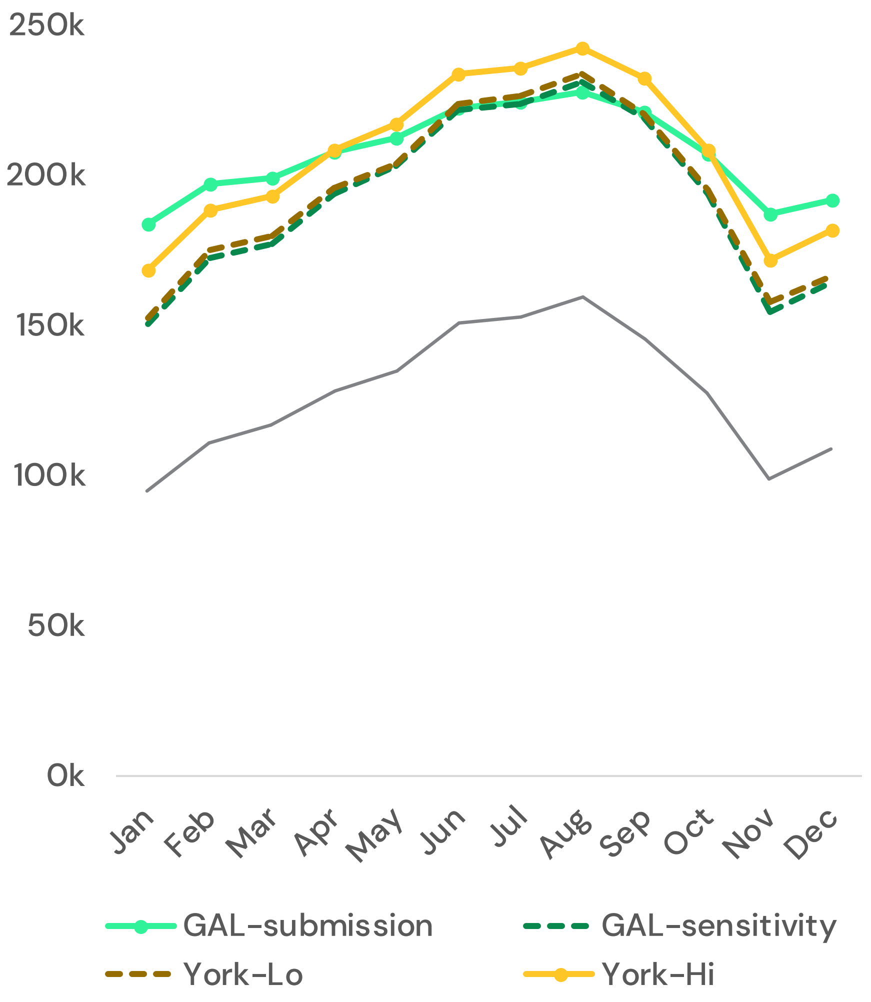


Passenger profile across the year – NRP

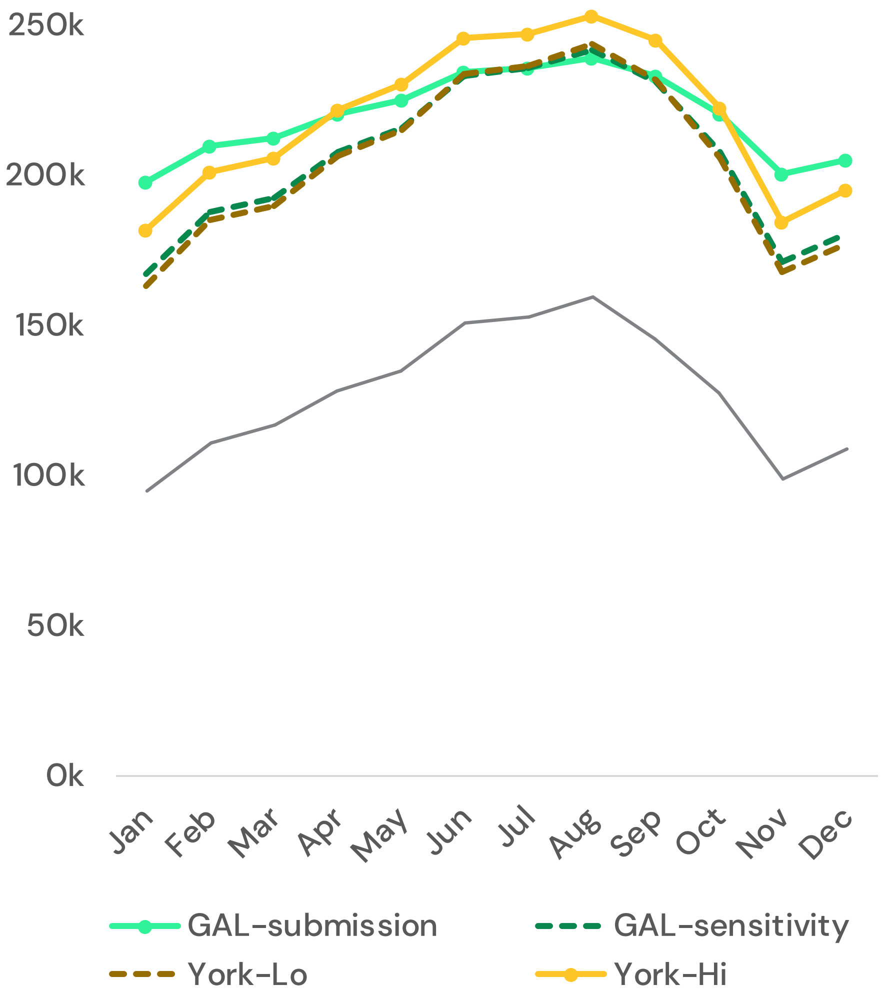
NRP, Passengers (Avg/day), 2032



NRP, Passengers (Avg/day), 2038

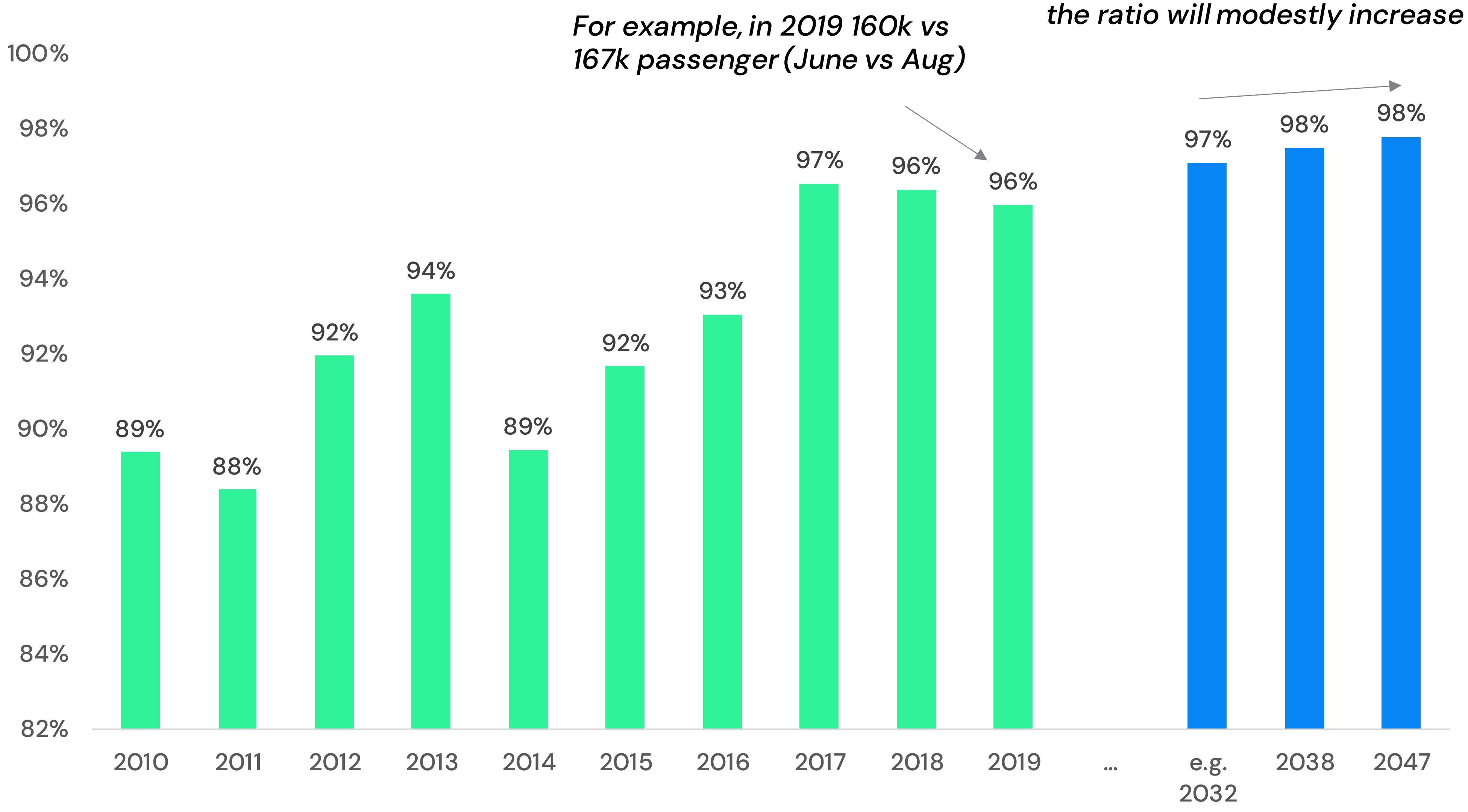


NRP, Passengers (Avg/day), 2047



Conversion factor to go from an August peak day to June peak day (again for all the scenarios/years)

June peak day as % of Aug peak day (Passengers)

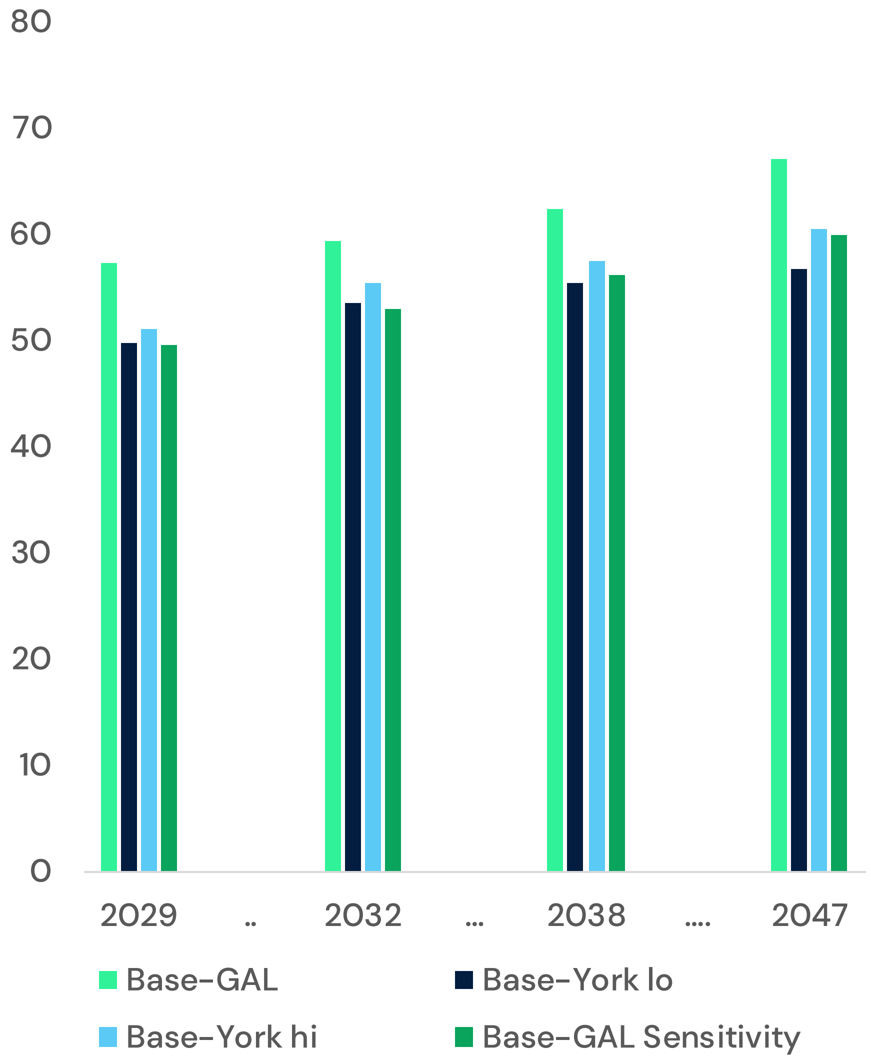


See below for suggested ratios.

	2029	2032	2038	2047
Base GAL	96%	97%	97%	97%
Base-York lo	96%	96%	96%	96%
Base-York hi	96%	96%	96%	96%
NRP GAL	96%	97%	97%	97%
NRP-York lo	96%	96%	96%	96%
NRP-York hi	96%	96%	97%	97%

Employee numbers – Impact on total.
BASELINE

Passengers (m)



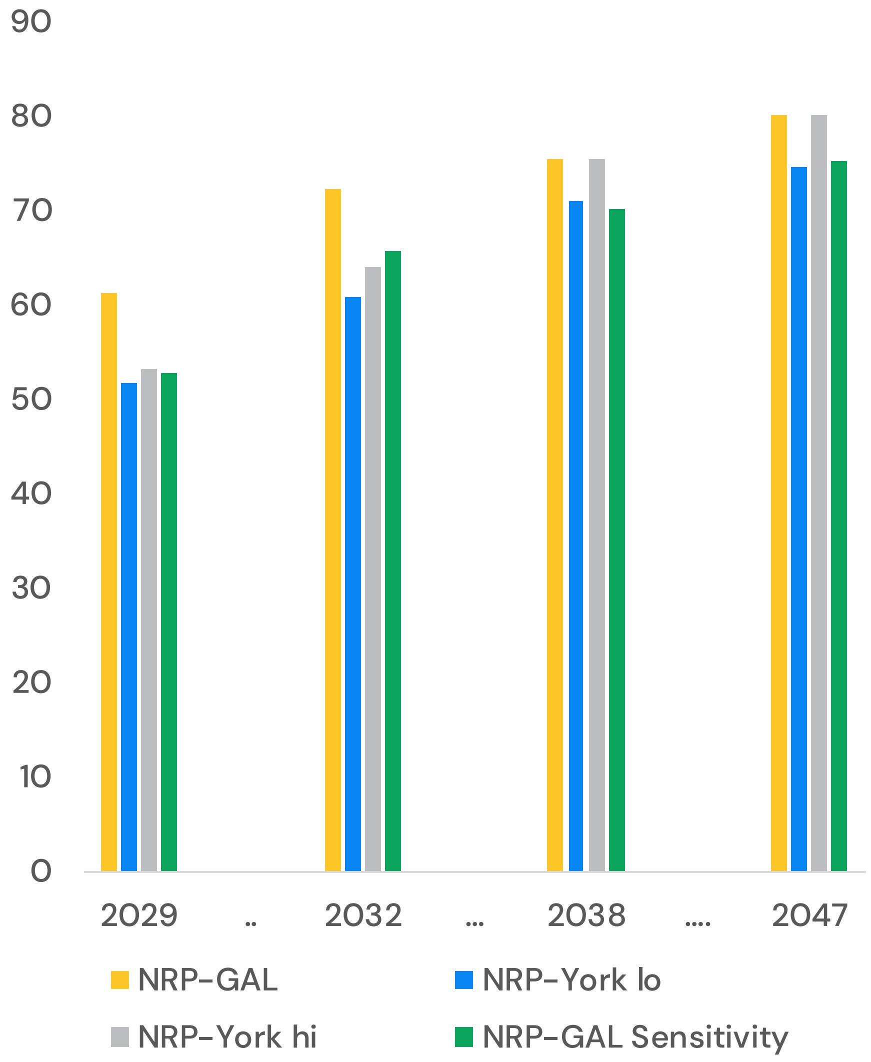
Employees (total)

Employees (#s)

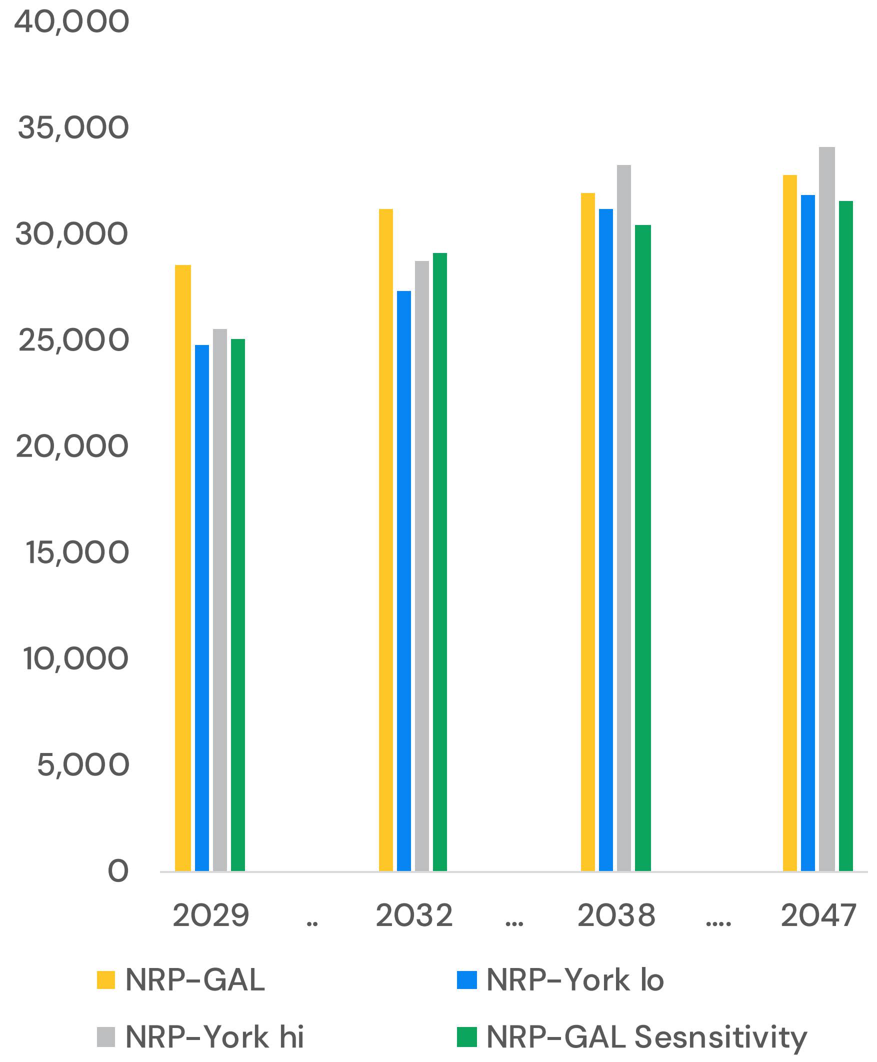
	2029	2032	2038	2047
Base-GAL	27,609	28,077	28,770	29,721
Base-GAL Sensitivity	24,130	25,490	26,319	26,964
Base-York lo	24,493	26,062	26,292	25,877
Base-York hi	25,107	27,036	27,288	27,563

Employee numbers – Impact on total.
NRP

Passengers (m)



Employees (total)

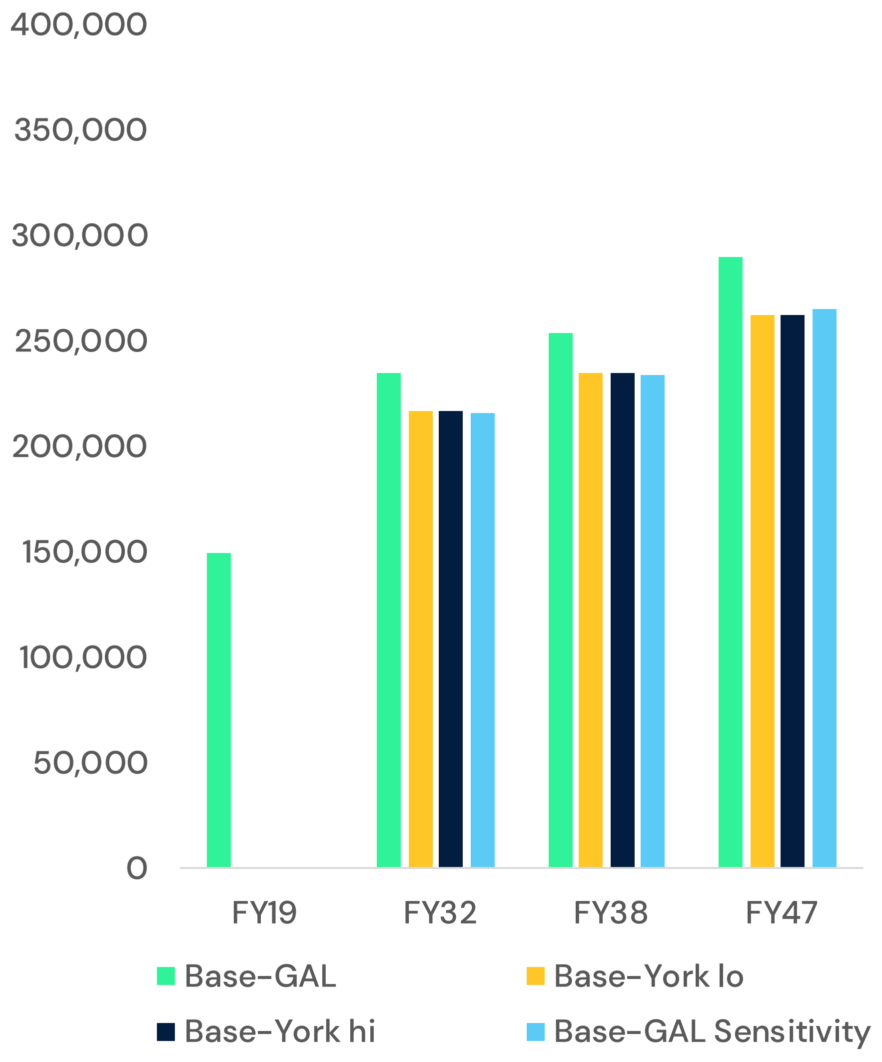


Employees (#s)

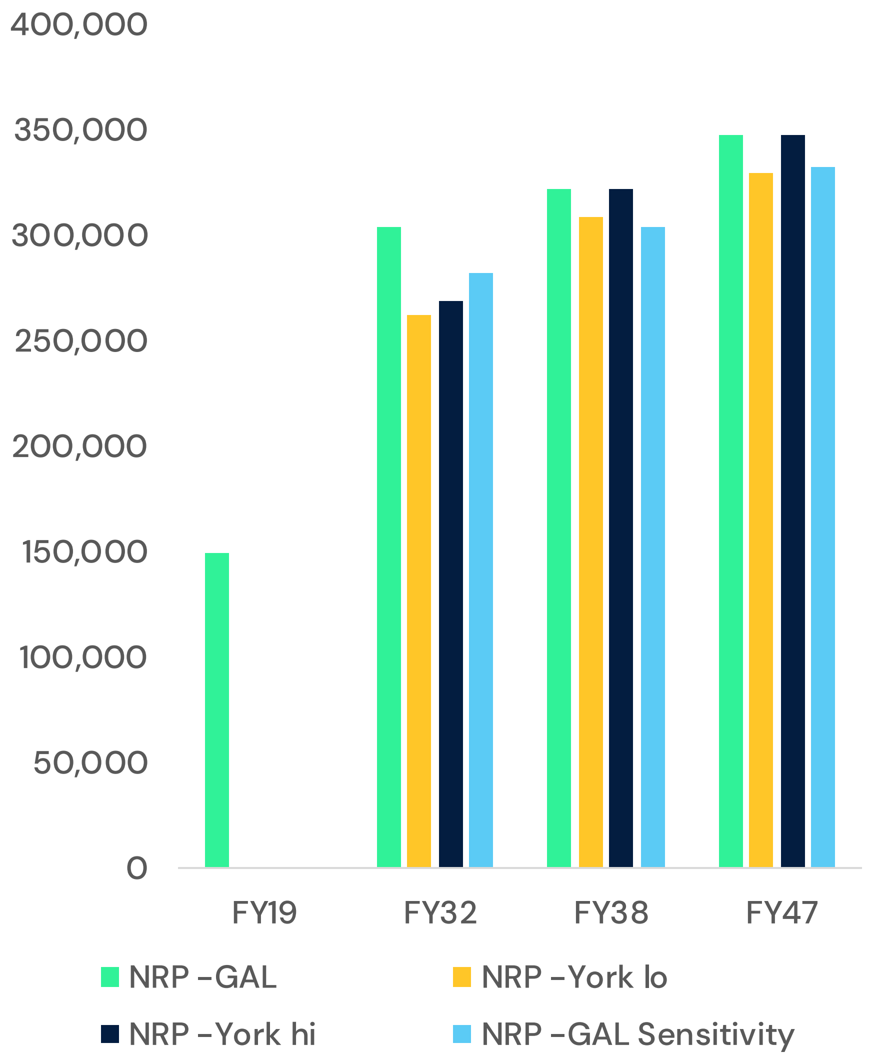
	2029	2032	2038	2047
NRP-GAL	28,596	31,199	31,985	32,822
NRP-GAL Sensitivity	25,151	29,252	30,661	32,057
NRP-York lo	24,832	27,381	31,242	31,842
NRP-York hi	25,576	28,817	33,266	34,140

Cargo, tonnages: Scaled of total movements as we understand traffic mix assumed by York comparable to GAL forecasts

LGW Cargo Tonnages – Baseline



LGW Cargo Tonnages – NRP



Summary (tonnes)

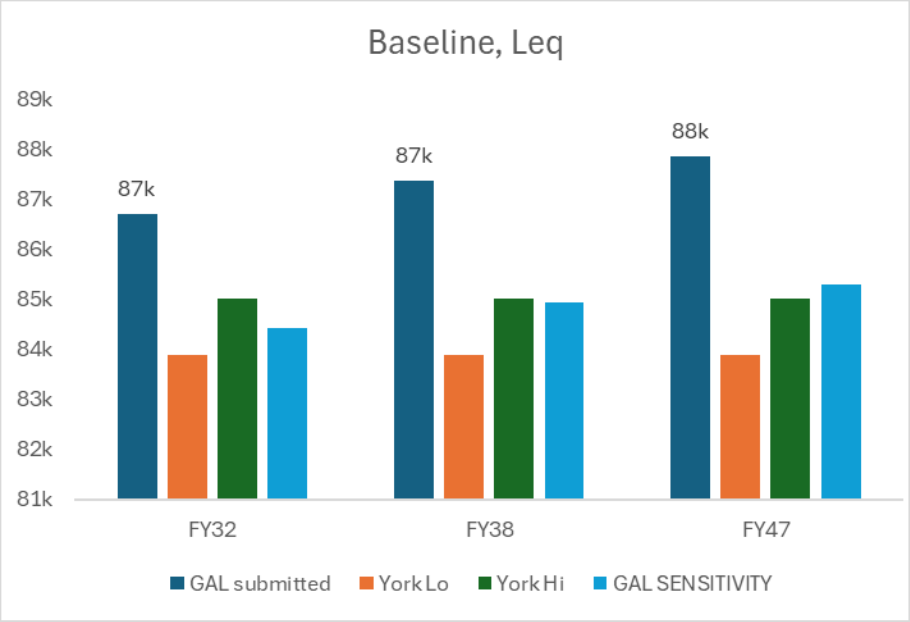
	2032	2038	2047
Base-GAL	234,969	254,499	290,499
Base -GAL Sensitivity	215,857	234,271	265,930
Base-York lo	217,454	234,938	262,383
Base-York hi	217,454	234,938	262,383
NRP-GAL	304,626	322,949	348,430
NRP -GAL Sensitivity	282,967	304,275	332,956
NRP-York lo	262,619	309,608	330,398
NRP-York hi	269,870	322,297	348,453

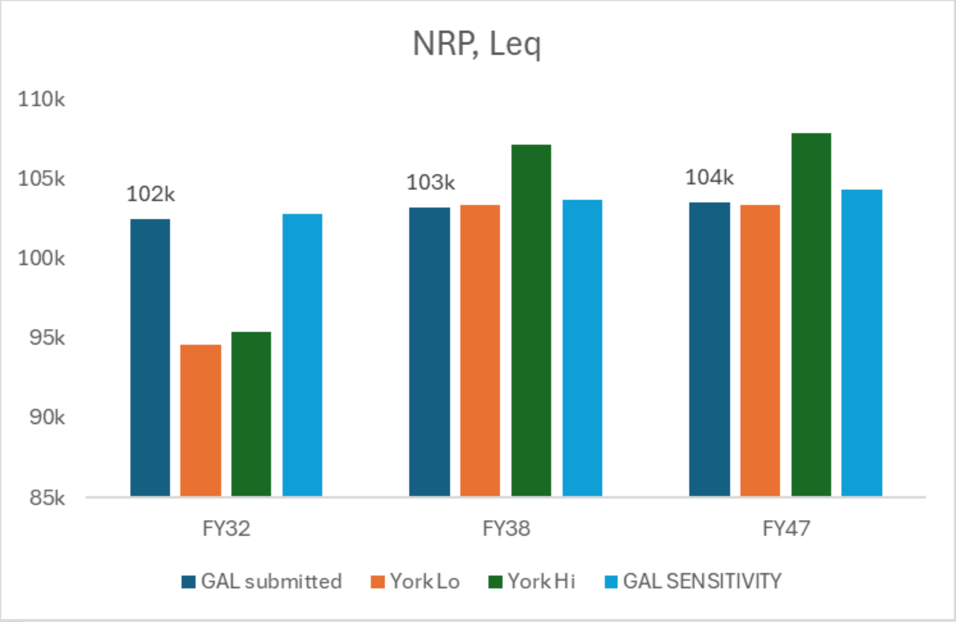
Annual time series of outputs

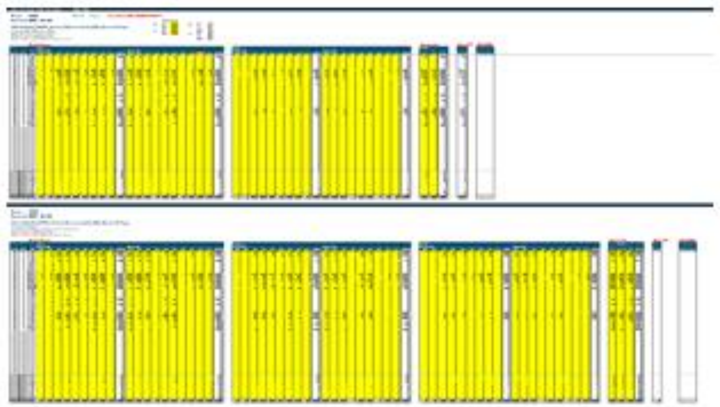
Note 1: Spot years used with annual interpolation between them
Note 2: Consistent approach with GAL Submission so interim years marginally different to submission

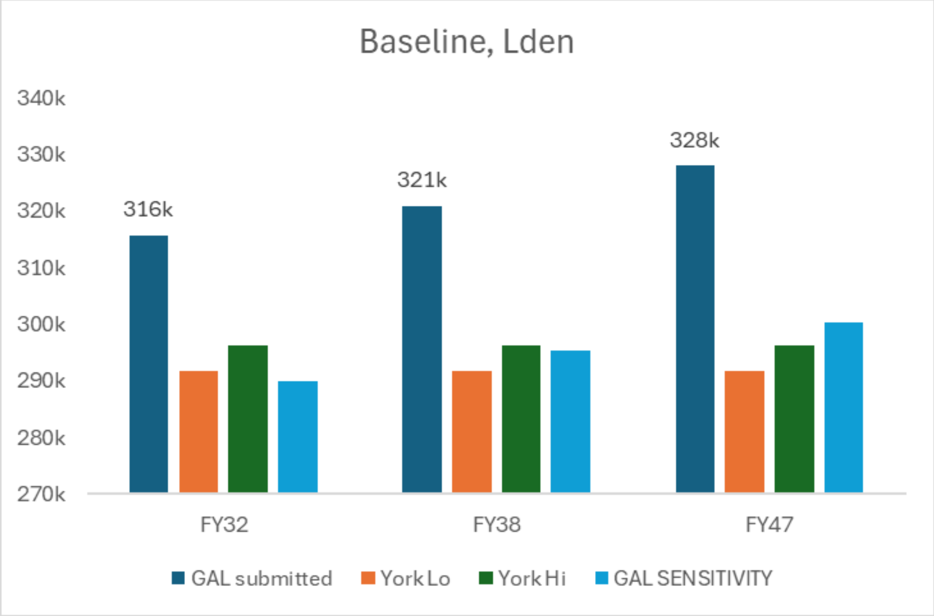
	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
BASELINE ANNUAL PAX, m																
GAL-submission	59.4	59.9	60.4	60.9	61.4	61.9	62.4	63.0	63.5	64.0	64.6	65.1	65.6	66.1	66.7	67.2
GAL-sensitivity	53.1	53.6	54.2	54.7	55.2	55.7	56.3	56.7	57.1	57.5	58.0	58.4	58.8	59.2	59.6	60.1
York-Lo	53.5	53.8	54.1	54.5	54.8	55.1	55.4	55.6	55.7	55.9	56.0	56.2	56.3	56.5	56.6	56.8
York-Hi	55.5	55.8	56.2	56.5	56.8	57.2	57.5	57.8	58.2	58.5	58.8	59.2	59.5	59.8	60.2	60.5
BASELINE ANNUAL ATMS																
GAL-submission	313k	314k	315k	316k	317k	318k	318k	319k	320k	321k	322k	322k	323k	324k	325k	326k
GAL-sensitivity	288k	289k	290k	291k	291k	292k	293k	294k	294k	295k	295k	296k	296k	297k	297k	298k
York-Lo	290k	291k	291k	292k	293k	293k	294k	294k	293k	293k	292k	292k	291k	291k	290k	290k
York-Hi	290k	291k	291k	292k	293k	293k	294k	294k	294k	294k	294k	294k	294k	294k	294k	294k
NRP ANNUAL PAX, m																
GAL-submission	72.3	72.8	73.4	73.9	74.5	75.0	75.6	76.1	76.6	77.1	77.6	78.1	78.7	79.2	79.7	80.2
GAL-sensitivity	65.9	66.6	67.3	68.0	68.8	69.5	70.2	70.8	71.3	71.9	72.5	73.0	73.6	74.2	74.7	75.3
York-Lo	61.0	62.7	64.3	66.0	67.7	69.3	71.0	71.4	71.8	72.3	72.7	73.1	73.5	74.0	74.4	74.8
York-Hi	64.2	66.1	68.0	69.9	71.8	73.7	75.6	76.1	76.6	77.1	77.6	78.2	78.7	79.2	79.7	80.2
NRP ANNUAL ATMS																
GAL-submission	378k	379k	379k	380k	381k	381k	382k	382k	383k	383k	384k	384k	385k	385k	386k	386k
GAL-sensitivity	351k	353k	354k	355k	357k	358k	360k	361k	362k	363k	364k	365k	366k	367k	368k	369k
York-Lo	326k	333k	339k	346k	353k	359k	366k	366k	366k	366k	366k	366k	366k	366k	366k	366k
York-Hi	335k	343k	350k	358k	366k	373k	381k	382k	382k	383k	383k	384k	384k	385k	385k	386k

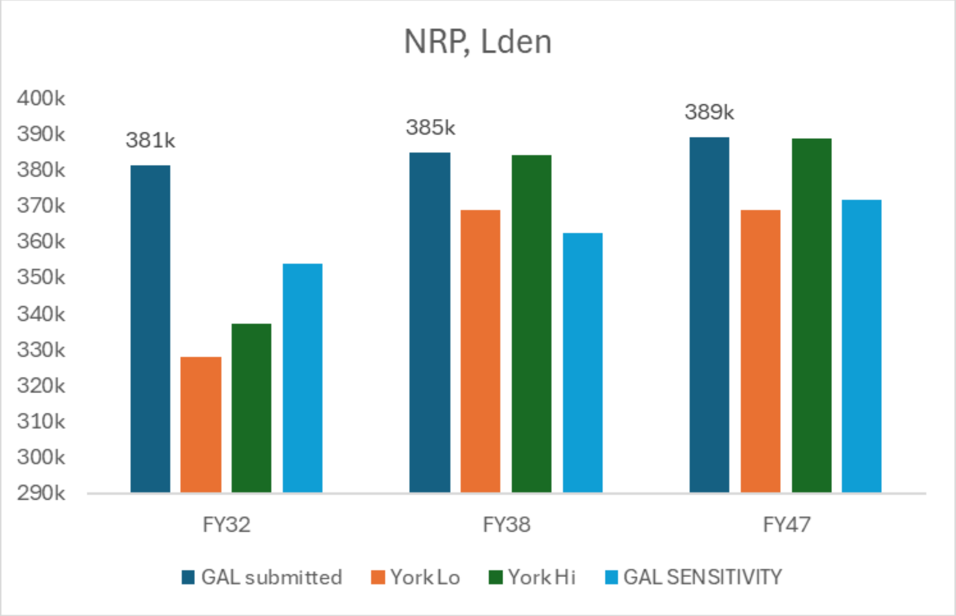
Noise – Sample extracts (ATMs for Leq/Lden periods)











→ Reference: York inputs/email tables

Inputs from York (1/2)

	Year	Average Day Peak Month	Average Day 92 Day Leq period	Annual Average	Aircraft Capacity	Load Factor	Annual Commercial Movements	Mppa
Baseline								
Low Case	2032	921	905	793	210	88%	290,000	53.5
Low Case	2038	921	905	793	215	89%	294,000	55.4
Low Case	2047	921	905	793	218	90%	290,000	56.8
High Case	2032	933	917	805	210	90%	290,000	55.5
High Case	2038	933	917	805	215	91%	294,000	57.5
High Case	2047	933	917	805	224	92%	294,000	60.5
NRP								
Low Case	2032	1,004	1,020	892	213	88%	326,000	61
Low Case	2038	1,131	1,115	1,003	218	89%	366,000	71
Low Case	2047	1131	1115	1003	227	90%	366,000	74.8
High Case	2032	1,045	1,029	917	213	90%	335,000	64.2
High Case	2038	1,172	1,156	1,044	218	91%	381,000	75.6
High Case	2047	1180	1164	1052	227	92%	386,000	80.2

Inputs from York (2/2)

	DAILY MOVEMENTS			AIRCRAFT SEATS AND LOAD FACTOR				ANNUAL COMMERCIAL MOVEMENTS	MPPA
	Average Day Peak Month	Average Day 92 Day Leq period	Annual Average	YAL Aircraft Size	YAL Load Factor	GAL Aircraft Size	GAL Load Factor		
BASELINE									
12 ADDITIONAL DAILY MOVEMENTS	921	905	793	218	90%			290,000	56.8
						224	92%	290,000	59.6
24 ADDITIONAL DAILY MOVEMENTS	933	917	805	218	90%			294,000	57.7
						224	92%	294,000	60.5
NRP CASE									
366,000 ANNUAL MOVEMENTS	1,131	1,115	1,003	227	90%			366,000	74.8
						227	92%	366,000	76.5
386,000 ANNUAL MOVEMENTS	1,180	1,164	1,052	227	90%			386,000	78.4
						227	92%	386,000	80.2