

ARCADIS GUIDANCE TO THE CIVIL AVIATION
AUTHORITY ON HEATHROW EXPANSION PROGRAMME

**AN INITIAL REVIEW OF CONSUMER INTERESTS
IN THE DEVELOPMENT OF THE HEATHROW
AIRPORT LIMITED MASTERPLAN**



CONTACTS



JONATHAN EDWARDS

Account Lead for the
Civil Aviation Authority

M: +44 (0) 7881 354 720
E: Jonathan.Edwards@arcadis.com

Arcadis
34 York Way
London
N1 9AB



JASON BUCKLAND

Head of Aviation Business
Consulting

M: + 44 (0) 7818525930
E: Jason.Buckland@arcadis.com

Arcadis
Bernard Wetherill House
8 Mint Walk
Croydon CR0 1EA



Arcadis Guidance to the Civil Aviation Authority

Heathrow Expansion Programme Consumer Masterplan Review

Authors

Kevin Nelis
Jason Buckland
Theo Panayi

Checkers

Jonathan Edwards

Approver

Tim Walder

Report No.

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Date

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Contents

List of figures	5
Glossary	6
1 Executive Summary.....	7
1.1 Summary of findings	7
2 Introduction.....	10
2.1 Objectives of this report	10
2.2 How Arcadis conducted the review	11
2.3 Engagement	11
2.4 Report Structure	11
3 Overview of the “Golden Thread’	13
4 Our Review	25
4.1 The Golden Thread & Masterplan Development Process	25
4.2 Development of HAL’s Consumer Engagement Strategy	27
4.3 Synthesising consumer input into insights.....	28
4.4 The evolution of the draft Masterplan	28
4.5 Incorporating Cargo consumer interests.....	29
4.6 Effects of the promotion of increased competition	29
4.7 Departure from current (Q6) consumer approach and the incorporation of future consumer’s interests.....	30
4.8 Lessons learnt & reflections on best practice.....	30
5 Evidence Base & Appendices.....	31
5.1 The Masterplan Development Process.....	31
5.2 HAL’s Consumer Engagement Strategy	37
5.3 Synthesising consumer input into insights.....	37
5.4 The evolution of the draft Masterplan	39
5.5 Incorporating Cargo consumer interests.....	52
5.6 Effects of the promotion of increased competition	56
5.7 Departure from current (Q6) consumer approach and the incorporation of future consumer’s interests.....	57
5.8 Lessons learnt & reflections on best practice.....	58

List of figures

Figure 1 - HAL's Golden Thread.....	8
Figure 2 – The Five Stakeholder Propositions	14
Figure 3 - The guiding principles vs functional areas	15
Figure 4 - Specific Outcomes for each stakeholder group	16
Figure 5 – ‘Top-level’ Passenger Outcomes	17
Figure 6 - 12 Outcomes for Passengers.....	18
Figure 7 - Detailed passenger outcomes - example.....	18
Figure 8 – Example of passenger evaluation criteria	19
Figure 9 - Disciplines vs stakeholders	21
Figure 10 - Consumer drivers within disciplines.....	22
Figure 11 - Assembly Option BRAG for consumer evaluation themes	23
Figure 12 - Governance Approach to Scheme Development Process	33
Figure 13 - Royal Institute of British Architects Stages 0-4	34
Figure 14 - HAL's plans to introduce Strategic Business Objectives as design progresses	35
Figure 15 - HAL's suite of briefs for the HEP.....	36
Figure 16 - Multiple inputs into consumer BRAG statuses.....	38
Figure 17 - Example of customer journey mapping exercise	39
Figure 18 - High-level timeline of the HEP	40
Figure 19 – HAL’s distinction between Milestones & gateways	40
Figure 20 - Heathrow Cargo 'Factsheet'.....	56
Figure 21 - HAL’s identified Megatrends	57
Figure 22 - Key Themes of Consumer Insight.....	59

Glossary

Abbreviation	Description
BAU	Business As Usual
BRAG	Black, Red, Amber, Green – <i>Status showing 'Unworkable', 'less preferred', 'neutral', or 'preferred' respectively</i>
CAA	Civil Aviation Authority
CCB	Consumer Challenge Board
ConOps	Concepts of Operations
CX	Customer Experience
DCO	Development Consent Order
DER	Design Evaluation Reviews
DfT	Department for Transport
HAL	Heathrow Airport Limited
HEP	Heathrow Expansion Programme
IDT	Integrated Design Team
M3	HAL Governance Milestone Gateway 3
M4	HAL Governance Milestone Gateway 4
MSDM	Masterplan Scheme Development Manual
MSDP	Masterplan Scheme Development Process
NPS	National Policy Statement
NPV	Net Present Value
RIBA	Royal Institute of British Architects
SME	Subject Matter Expert(s)
T2	Heathrow Terminal 2
T5	Heathrow Terminal 5

1 Executive Summary

Arcadis has been appointed by the Civil Aviation Authority (CAA) to provide technical advice in support of its work on capacity expansion at Heathrow Airport.

The scope of the work completed by Arcadis and objective of this report is “To advise the CAA on how Heathrow Airport Limited (HAL) have reflected reasonable consumer interests in developing the expansion Masterplan”.

After the commencement of this workstream, HAL made clear that the anticipated target date for their M4 gateway (confirmation of a single preferred Masterplan scheme design to take into consultation #2) would be March 2019. This was a postponement from an original date of October 2018. Arcadis and the CAA agreed it would still be of value to continue this review, but as a result, this report may not provide a complete and comprehensive description of all activities leading up to the single preferred Masterplan. Instead, this report offers a view of the masterplanning process to date (December 2018). It does not and cannot offer commentary on the Masterplan itself. Nonetheless, we feel this review is timely and offers an opportunity to reflect whether consumer interests are appropriately considered throughout the masterplanning process to date.

Whilst we have understood and reviewed the methodology adopted by HAL for which consumer interests have been captured and reflected in the masterplanning process, the impact on end-user service quality is derived from how well the methodology and principles are embraced, translated into client requirements and implemented on the programme throughout the project lifecycle. We have sought to provide comment on this, to date, within our report but Arcadis wish to note that this area and its impact will continue and likely evolve as the programme develops.

1.1 Summary of findings

The Heathrow Expansion Programme’s (HEP) “Golden Thread” describes the link between HAL’s strategic vision for capacity expansion and the detailed Masterplan. The process appears simple and straightforward, but HAL have demonstrated a detailed and complex integration of data collated and various items of work completed.

Whilst similar processes can be found on many large capital and infrastructure delivery programmes, Arcadis consider the ‘Golden Thread’ process developed and applied by HAL as a clear and logical means of communicating and implementing HAL’s strategic vision into an actionable delivery plan(s).

HAL has explained the process has evolved its ways of working following the move to Outcome-Based Regulation, the introduction of the Consumer Challenge Board (CCB) and the need to have a clear line of sight in terms of expansion Masterplans. Through this initial and high-level review, Arcadis have seen sufficient evidence of HAL’s ability to maintain a sequential flow of representation of consumer interests from its strategic vision through to the level of ‘evaluation criteria’ for options appraisal.

At the time of this report, HAL remains at the Assembly Option development process stage. The anticipated target date for their M4 gateway (confirmation of a single preferred Masterplan scheme design to take into consultation #2) is now March 2019, a postponement from an originally proposed date of October 2018. Arcadis do not provide detailed reasoning for this postponement (October 2018 to March 2019) within this document, however delays in the programme raise the risk of increasing programme cost, which in and of itself is contrary to consumer interests. HAL appear to be aware of the volume of work required in order to meet their new deadline and are confident they can do so in the time remaining.

THE GOLDEN THREAD THAT LEADS FROM AMBITION TO PLAN



Figure 1 - HAL's Golden Thread

The Golden Thread has eight steps which are sequential, although some iteration does exist. Each step has been informed by stakeholder engagement and insight.

The first three of these eight steps are detailed in the Heathrow Strategic Brief. We think the strategic brief achieves its aims. It articulates clearly and concisely the needs of multiple stakeholders, not just passengers. There are five propositions aimed at satisfying the needs of a corresponding key stakeholder group - Airlines, Colleagues, Investors, Passengers, UK Communities and Environment.

The strategic brief also contains eight guiding principles. These guiding principles are to be used by HAL to guide the decision-making process for both capital development and future operational ways of working. These principles are familiar to Arcadis from other large capital delivery programmes and we deem them to be an appropriate list of high-level principles to enable greater end-user service delivery.

At the fourth step of the Golden Thread, Arcadis believe HAL have demonstrated good practice by splitting outcomes by stakeholder groups (propositions). This should enable an understanding of the link between client requirements and end user (consumer) benefits realisation. Based on the scope of this review and for the purpose of this explanation, we use the example of the Outcomes, Requirements, and Evaluation Criteria associated with 'Passengers'.

The 12 outcomes for passengers are then detailed in 2 ways with 12 Strategic Business Objectives and 12 Strategic Requirements. Both were discussed in our engagement and are included in our review. Arcadis has suggested that going forward HAL may not need to communicate both the Strategic Business Objectives and Strategic Requirements within the Golden Thread process. HAL is confident they have a reliable process for translating 'business objectives' (be they strategic or detailed) into 'requirements' (strategic or detailed) and removing the detail of both would help simplify the Golden Thread process for stakeholders.

Arcadis thought it was a demonstration of good practice that HAL have utilised data within certain steps of the Golden Thread process. The use of operational data to provide depth to consumer insights is a particularly constructive element of HAL's work. For the evaluation criteria for passengers, HAL has sought to incorporate insight from operations including live data from the airport. It has also collated and applied numerous internal and external data sets including cross sector benchmarks. Whilst good practice, as we have not yet seen a single preferred Masterplan scheme design, it is difficult to pass definitive judgement on how well this data has been utilised.

HAL has used a BRAG (**B**lack, **R**ed, **A**mber, **G**reen) process as a simplified expression of a more detailed evaluation process. It is a tool aimed at communicating their complex process, in a digestible manner, to stakeholders. Arcadis has emphasised to HAL that they should ensure that stakeholders are aware the BRAG 'colours' are a compilation of a more detailed set of metrics that are being used to deliver the Assembly Options process. We would also encourage a clearer articulation of the explicit trade-offs between stakeholder benefits based on the results of the evaluation criteria.

Arcadis consider the existing governance process used by HAL to be robust. We would expect to see the governance process more formally established, adopted and implemented in the future however, it is positive

to see the appointment of both a 'Proposition Owner' as well as a 'Discipline Lead' in various levels of the governance process.

HAL evaluated four of the 12 Strategic Requirements for passengers in Evaluation #1 and intend to further evaluate those four Strategic requirements and one additional Strategic requirement for passengers in Evaluation #2. Their rationale for why those Strategic Requirements were selected and reasoning for why they would be evaluated at each stage was, in principle, both valid and reasonable. However, we would propose that this list is not exhaustive of Strategic requirements that could reasonably be evaluated at a masterplanning stage. Namely Strategic Requirement 6 (based on reference to infrastructure) and Strategic Requirement 9 (based on reference to physical environment) could also be included in these evaluations. Both of these Strategic Requirements may have impacted upon the high-level physical design and configuration of the Assembly Options, therefore may have warranted consideration at a masterplanning stage.

Arcadis requested and HAL duly provided case studies of changes to the Masterplan scheme design that were a result of consumer feedback. In Arcadis' opinion the examples provided offer capacity, operational and/or resilience benefits. As such, these are likely to have been implemented with, or in despite of, direct consumer feedback and whilst they undoubtedly offer consumer benefits, it is our opinion that these benefits are likely to be secondary and not the primary reason for the design iterations. Design iterations on programmes of this size are not normally made for a single stakeholder group (or discipline). We have, therefore, not interpreted these case studies as evidence of changes based solely on consumer feedback. We know that design iterations must provide a range of benefits to satisfy multiple stakeholders but consider these examples as evidence of changes that benefit consumers.

In developing its Masterplan, HAL has provided evidence of high-level engagement with the cargo community limited to current Cargo operators at Heathrow Airport. We would believe that there exist commercial and contractual mechanisms, through which the cargo community can address issues they may have with an expansion at Heathrow Airport as proposed by the Masterplan.

Regarding the promotion of increased competition at Heathrow Airport, HAL have included new and additional Assembly Option Criteria and Sub-Criteria to their evaluation. It will look to assess the flexibility of the Assembly Options to enable new carriers to be introduced to the airport. However, it is not yet understood how this will impact the development of components. Whilst this is still progressing, we think that the 'willingness to pay' reports completed by HAL to validate their existing insight and Strategic Requirements may provide a view into consumer interest at a Masterplan level.

HAL has undoubtedly increased its formal stakeholder engagement and consumer insights research work as a result of the Heathrow Expansion Programme (HEP). We would encourage unified efforts to understand consumer interests for the expansion programme and in attempts to continually improve the airport. Arcadis would be keen to see more of HAL's work to date detailed in section 3 of their Consumer Engagement Strategy "How will Heathrow consumer engagement inform our business decisions?". We are aware of various activities which has been articulated to Arcadis in meetings, but not formally captured in their strategy.

We also recognise HAL's research into future airport customer trends and would advise further and continued research. HAL has also explained its efforts to understand global best practice in airport expansion with visits and contact with several comparator airports around the world, including those who have recently expanded or are planning to grow. This is a positive sign and an opportunity to capture further insight into consumer needs and we would encourage this to continue through the life of the HEP.

HAL has extensively used KPMG-Nunwood's 'Six pillars of CX excellence' methodology. This is an established customer experience (CX) methodology in the industry by a reputable consulting organisation. This has allowed HAL to benchmark its passenger experience against other organisations that use this same approach. We believe this engagement to have been productive. Arcadis also note that HAL make extensive use of this methodology and the implementation of those insights into the evaluation criteria creation process detailed in the Masterplan Scheme Development Manual (MSDM). The MSDM document is iterative and wherever appropriate HAL have modified their approach to the Masterplan scheme development process accordingly.

During our review Arcadis has observed HAL, on occasions, fail to sufficiently and coherently explain how consumer interests have been captured and reflected in the masterplanning process. In our opinion, communicating the methodology, the process to date, and the plans for continued insight going forward are important for stakeholder engagement. Stakeholders, such as the airline community, may benefit from a similar opportunity to engage and understand the process as Arcadis has experienced in completing our review and/or may find this report beneficial in describing and explaining the process. Stakeholders, such as the airline community, are also likely to welcome the opportunity to share their experience and expertise in consumer engagement with HAL which may further improve the methodology and implementation. Arcadis would note that whilst stakeholders may benefit from such engagement it does require a considerable and committed amount of the time and resource from the HAL team.

As this report is provided prior to the publication of the single preferred Masterplan, Arcadis conclude by reiterating the importance that HAL continue to demonstrate appropriate consideration for consumer interest throughout the entirety of the masterplanning process. We believe there is still a considerable volume of outstanding activity to finalise the scheme design, in developing the programme for delivery and in stakeholder engagement. HAL need to maintain clear commitment to ensuring consumer interests are appropriately considered up to and beyond the publication of the single preferred Masterplan for consultation #2.

2 Introduction

Arcadis has been appointed by the Civil Aviation Authority (CAA) to provide technical advice in support of its work on capacity expansion at Heathrow Airport. The CAA asked Arcadis to consider how well HAL has incorporated the interests of consumers into its Masterplan development process.

In addition to its general duties to act in the interests of consumers, the CAA has also been charged by the Secretary of State for Transport to provide information regarding the protection of the rights and interests of consumers in the Heathrow Expansion Programme. The definition of the term consumers is clearly defined by the CAA: “CAA12 defines users of air transport services as present and future passengers and those with a right in property carried by the service (i.e. cargo owners). We often refer to these users by using the shorthand of ‘consumers’”¹.

Arcadis agreed the scope of work with CAA on 2 July 2018 and began engagement with HAL on 18 July 2018. The Arcadis project charter defining this scope of work, as agreed by the CAA and Arcadis, is included in section 6.

2.1 Objectives of this report

The scope of the work completed by Arcadis and objective of this report is “To advise the CAA on how HAL has reflected reasonable consumer interests in developing the expansion Masterplan”

This report sets out Arcadis’ initial views on how well HAL has reflected reasonable consumer interests during the masterplanning process. These views are a reflection of the information provided by HAL, to date (December 2018).

After the commencement of this workstream, HAL made clear that the anticipated target date for their M4 gateway (confirmation of a single preferred Masterplan scheme design to take into consultation #2) would be March 2019. This was a postponement from an original date proposed of October 2018. Arcadis and the CAA agreed it would still be of value to continue this review, but as a result, this report may not provide a complete and comprehensive description of all activities leading up to the single preferred Masterplan. As such, it may be appropriate to update this report in the future, post the M4 gateway. This update is anticipated to be brief and provided in Q2 2019, in accordance with current Heathrow Expansion Programme (HEP) timeline. We provide the current programme timeline in section 5.4 of this report.

As described above, the CAA define consumers as both passengers and cargo owners. In this report, Arcadis has aimed to understand how the interests of both consumer groups have been appropriately considered but

¹ <http://publicapps.caa.co.uk/docs/33/CAP1658EconomicregulationofcapacityexpansionatHeathrow.pdf>

have dedicated more in-depth analysis to that of passenger interest, which was pre-agreed with the CAA to be appropriate.

The Arcadis review has been conducted simultaneously to the ongoing engagement of the CCB. The CAA were keen to ensure minimal duplication of activities by the CCB and Arcadis but still ensure a holistic review of the process for acquiring consumer insights by HAL. Therefore, the Arcadis review, as agreed with the CAA, focuses on the process of Masterplan development and the use and utilisation of consumer insight, rather than the acquisition of that insight.

The quality of the inputs into the Masterplan process used by HAL are out of scope of this report, and we have not considered these aspects. Our report has been drafted to provide advice to the CAA, as the reader of this report, and seeks to support their holistic understanding of HAL's activities and appropriate reflection of consumer interest in the HEP.

2.2 How Arcadis conducted the review

Arcadis utilised a core team to manage the engagement with the CAA and HAL and to lead our review. Arcadis also utilised several master planning and aviation Subject Matter Experts (SMEs) to provide assessment, insight and to support the quality assurance process.

Arcadis organised an initial introduction to the workstream with HAL. We agreed the scope of the workstream, the Project Charter, the information we would require access to and some general ways of working between the two parties. HAL shared relevant documents with Arcadis via a secure Microsoft SharePoint site.

Arcadis also set up meetings with HAL, which provided an opportunity for HAL colleagues to present its process for Assembly Options, development, and how it was incorporating consumer interests. Arcadis used these meetings to probe the material issued, in order to better understand HAL's processes and plans going forward.

Arcadis ensured close engagement with CAA colleagues and regular updates on the progress of our review. We provided fortnightly flash reports which included actions completed, actions to be completed, and other relevant information regarding the status of our review. We also held fortnightly teleconference meetings with the CAA workstream lead, Beth Corbould. The CAA and Arcadis also held several face-to-face meetings to discuss the workstream progress in more detail and to ensure the assessment was progressing appropriately. Arcadis have performed a comprehensive review of the documentation and information provided by HAL. A full list of the documents reviewed can be found in section 6.

2.3 Engagement

Arcadis consider HAL to have engaged productively with this review. HAL has been transparent and afforded suitable time and access to internal HEP leadership and colleagues from its consultancy partners.

Upon request for additional information by Arcadis, HAL cooperated in providing as much relevant information as possible in a constructive manner.

Arcadis have had ongoing dialogue through meetings and workshops with HAL to obtain relevant information on the HEP. The meetings with HAL were constructive and the exchange of information and response to queries has been direct.

2.4 Report Structure

This report is structured to be understood by individuals who have little or no prior knowledge of the Heathrow Expansion Assembly Option Process, or infrastructure masterplanning processes in general. The next three sections set out Arcadis' views and evidence base.

- **Section 3 – Overview of the “Golden Thread”**

This section provides context for the document as it aims to summarise the steps taken by HAL to transition from its Strategic Vision to a Masterplan.

- **Section 4 – Our review**

This section summarises Arcadis' views on consumer interest related topics and how consumer interest is reflected within the masterplanning process. This includes our views on the appropriateness of the 'Golden Thread' process described in Section 3.

- **Section 5 – Evidence base & appendices**

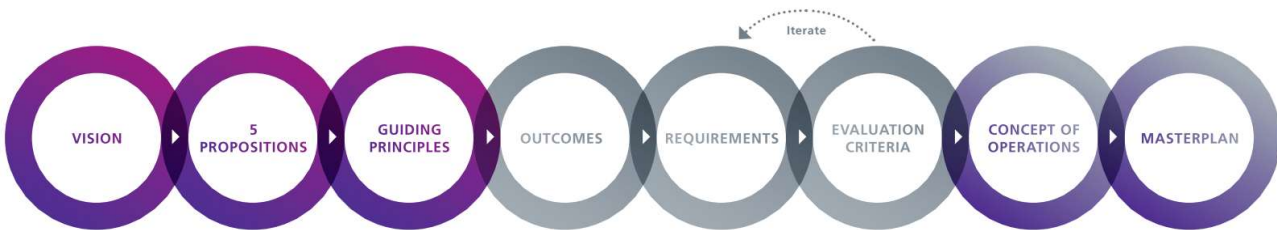
This section provides a summary of the information provided to Arcadis by HAL, upon which we have based our views.

3 Overview of the “Golden Thread”

The Heathrow Expansion Programme’s “Golden Thread” describes the link between HAL’s strategic vision for capacity expansion and the detailed Masterplan which aims to meet the needs of its five key stakeholder groups. At a high-level the process is seemingly straightforward. However, the process becomes increasingly detailed as one moves through its various elements. This may be challenging for those who are unfamiliar with it, therefore, in this section Arcadis has provided a summary of the Golden Thread.

The Golden Thread has eight steps, as shown in Figure 1. Steps are by-in-large sequential, although some iteration does exist. This section aims to describe these eight steps in more detail and provide a basis of context for the review in the following sections. We will cover each of the eight steps, in order from strategic (left) to granular (right).

THE GOLDEN THREAD THAT LEADS FROM AMBITION TO PLAN



Each step has been informed by multiple forms of stakeholder engagement and insight. For the purposes of this section’s description, Arcadis has not articulated the details behind that engagement however, more information on engagement methods and appropriateness is provided in Sections 4 and 5.



The first three of these eight elements are detailed in the ‘Heathrow Strategic Brief’, a High-level Programme Strategy Document, and as such are described at a programme level. They are applicable to the entire Heathrow Expansion Programme and to HAL’s strategy for the future of the airport more generally.



Five Propositions – HAL has five ‘Key Stakeholder Groups’. Each of the five propositions are aimed at satisfying the needs of its corresponding key stakeholder group, shown in figure 2.



Figure 2 – The Five Stakeholder Propositions

Each of the Five Propositions listed above are accompanied by more detail in the Strategic Brief. This explains why each Key Stakeholder group is important for HAL, as it gives a small number of high-level drivers, which will help achieve each Proposition.



Eight Guiding Principles:

- Safety and Security
- Affordable and Financeable
- Predictable
- Connected
- Simple
- Adaptable
- Sustainable
- Distinctive

These principles are to be used by HAL to guide the decision-making process for both physical infrastructure development, and future operational ways of working. These guiding principles will be anticipated to underpin how the airport will operate efficiently and provide great service for its customers.

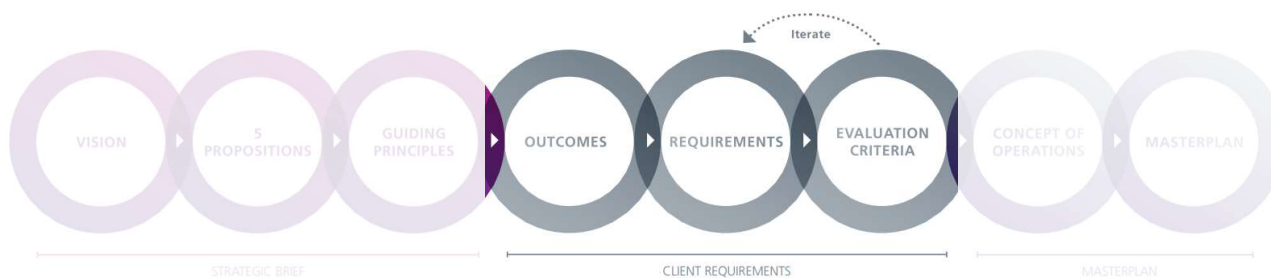
At a strategic level, these principles are applied to six 'functional areas', which are Surface Access, Airfield and Airspace, Terminal, Baggage, Cargo², and Heathrow Ecosystem. These principles are used to establish what HAL will aim to deliver, both from its physical infrastructure, and ongoing operations. The eight guiding principles and six functional areas offer a matrix for understanding what an "operationally efficient" airport, with great service delivery might entail, as demonstrated by Figure 3 below. The depiction of Guiding Principles and Functional Areas in a matrix format is not found in HAL documentation. This is an Arcadis representation of the principles implied through text.

Guiding principles vs functional areas	Surface access	Airfield and airspace	Terminal	Baggage	Cargo	Heathrow ecosystem
Safety and Security						
Affordable and Financeable						
Predictable						
Connected						
Simple						
Adaptable						
Sustainable						
Distinctive						

The Strategic Brief aims to answer:
What do these intersections look like for 'Future Heathrow'?

Figure 3 - The guiding principles vs functional areas

The following three steps of the Golden Thread are outlined in the Heathrow Expansion Programme's Client Requirements document.



At this level of the process, from the fourth step of the Golden Thread (Outcomes) onward, the steps are split out, to relate to a specific stakeholder group, as depicted in Figure 4 below.

² In this context, "Cargo" refers to 'Cargo and transshipment processing facilities'

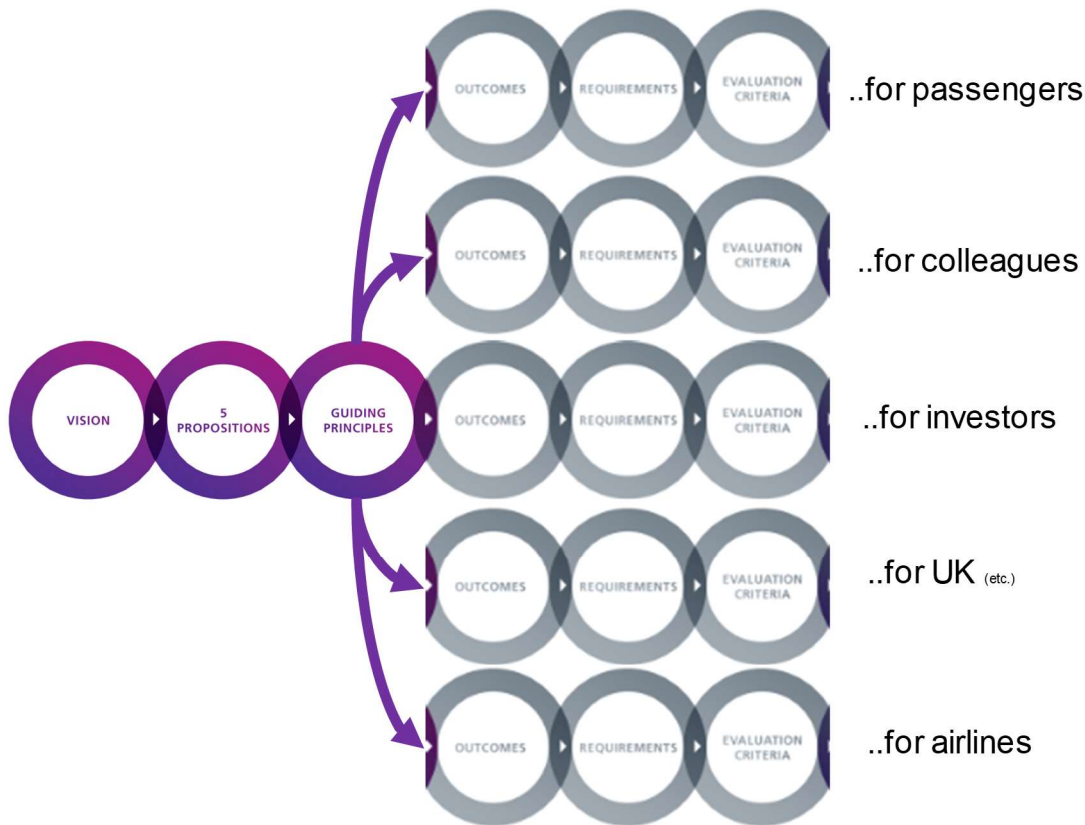


Figure 4 - Specific Outcomes for each stakeholder group

We understand the process is similar for all stakeholder groups, and that Outcomes, Requirements and Evaluation Criteria are bespoke to each of these 5 Key Stakeholder groups. Cargo owners are captured under the Airlines stakeholder group and are thus included in the Airline Proposition as well as having associated Outcomes and Requirements derived from their needs. Based on the scope of this review and for the purpose of this explanation, we use the example of the Outcomes, Requirements, and Evaluation Criteria associated with Passengers.



Passenger Outcomes are sometimes categorised into 4 groups known as “Top-level Outcomes”. This is not formal step in the Golden Thread, but instead, a way of articulating the outcomes for passengers easy-to-understand format which can be used in a variety of stakeholder engagement environments. These four “Top-Level” Passenger Outcomes are shown in Figure 5 below. For clarity, these are different outcomes to the outcomes HAL has developed as part of its outcome-based approach to service quality regulation (Outcomes-Based Regulation). For clarity, whilst the consumer engagement source is the same, these passenger outcomes were developed for a different purpose than the Consumer outcomes which Heathrow is developing as part of its outcome-based approach to business planning.

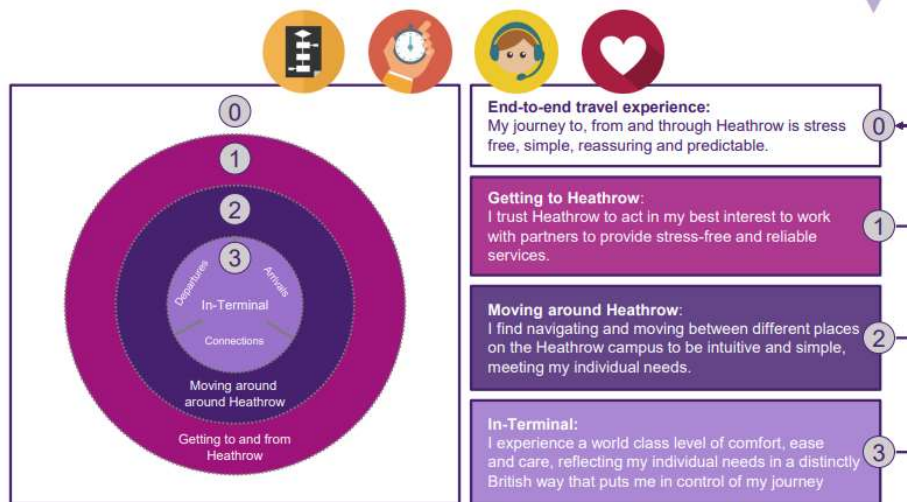
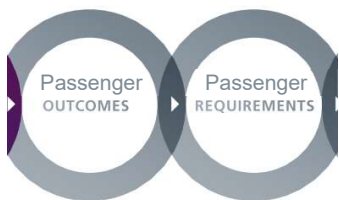


Figure 5 – 'Top-level' Passenger Outcomes



There are 12 outcomes defined for passengers. The 12 outcomes for passengers are detailed in 2 ways:

- Strategic Business Objectives
- Strategic Requirements.

- Strategic Business Objectives are the distillation of direct consumer engagement, so are articulations from the consumer perspective. (“I [the consumer] trust that Heathrow will.....”).
- Strategic Requirements are translations of the Strategic Business Objectives, so are articulations from HAL’s perspective (“Heathrow will ensure that consumers are.....”).

The process of how HAL capture insight from stakeholders and distil these into Strategic Business Objectives is not covered by the scope of this review. However, HAL has provided example extracts from its “insights register”. These documents log insight and therefore provide an audit trail of where various Strategic Business Objectives originate from.

Figure 6 below shows the 12 Strategic Business Objectives and the corresponding 12 Strategic Requirements. The column “EVAL#” indicates whether that Strategic Requirement has been assessed at Evaluation 1 & 2 (“1/2”), only Evaluation 2 (“2”) or not yet evaluated (“X”). These evaluation stages are opportunities for Assembly Options to be down-selected, with least preferred options discounted. For those which remain, this presents an opportunity for Assembly Option designs to be updated and improved based on the challenges, and feedback from the multiple different discipline perspectives gathered through the evaluation process. This governance process is detailed in section 5.1.1 of this report.

	Strategic Business Objectives	Strategic Requirement	EVAL#
1	I trust that Heathrow will help me make informed travel choices to put me in control of my journey options with useful, timely and accurate information	Information: Heathrow will ensure that consumers are given the right information, at the right time, and through the right medium to empower them to plan and inform their end-to-end journey	X
2	I am offered a range of choices to manage how I travel to, from and through Heathrow in a way that suits my needs	Choice: Heathrow will work with partners to offer a variety of destinations, travel (to / from / through Heathrow) and service options to meet different consumer needs	X
3	I am confident that I can travel to, from and through Heathrow in a time-efficient way with manageable distances	Speed / time / distance: Heathrow will ensure distances are manageable and (where longer distances are inevitable) offer attractive mobility solutions to enable efficient travel	1/2
4	I am confident that navigating to, from and through Heathrow will be logical and intuitive	Easy navigation: Heathrow will design airport journeys that are direct with minimal mode, level and directional changes to ensure easy and intuitive navigation	1/2
5	No matter when and where I am travelling, I can always trust Heathrow to deliver a predictable and reliable experience	Resilience: Heathrow will deploy infrastructure, process and technology that is flexible and robust to ensure predictable and reliable journeys for our consumers and their bags	1/2
6	I trust that Heathrow will assist in resolving problems when things don't go to plan and put me back in control of my journey	Resolution: Heathrow will have on-hand (well developed and well rehearsed) contingency plans for when things go wrong. Ensuring the right people, process, technology and infrastructure are in place to solve problems as they arise	X
7	I immediately recognise Heathrow as having an enjoyable and distinctly British sense of style, culture and hospitality	Identity: Heathrow will create a unique and exciting experience that celebrates British style, culture and hospitality	X
8	I feel calm and at ease at Heathrow because of the physical environment created for me	Hospitality: Heathrow will offer a variety of food and drink, retail, entertainment and hospitality services to meet the wide range of needs and desires of different consumer segments	X
9	I enjoy the little moments of joy that Heathrow creates to enhance my experience	Calm: Heathrow will offer a physical environment that is calm, clean and relaxed	X
10	I trust that Heathrow will treat me as an individual to provide personalised and appropriate assistance should I need it	Customer Service: Heathrow will offer personalised and differentiated service that is reflective of different consumer segments and journeys	X
11	I am confident that Heathrow will support my mobility needs and well-being as I travel within and between terminals	Extra Care: Heathrow will provide inclusive care and assistance to consumers in need of additional support (e.g. ageing population and extra assistance) to ensure the care, wellbeing and easy movement of all consumers through the airport	2
12	I am confident that Heathrow will look after and care of me	Safety / security: Heathrow will ensure consumers are kept safe and secure at all times	1/2

Figure 6 - 12 Outcomes for Passengers

The Strategic Requirements are then further split into detailed requirements (40 in total for passengers). Below in figure 7, Arcadis provides the breakdown for Strategic requirement 1 as an example.

REQUIREMENT	ID	PRIORITY
Heathrow will ensure that consumers are given the right information, at the right time, and through the right medium to empower them to plan and inform their end-to-end journey.	R00536	MUST
Heathrow will use simple and consistent wayfinding, which is integrated throughout the passenger journey.	R00180	SHOULD
Heathrow will enable/facilitate end-to-end passenger journeys.	R00226	COULD
Heathrow will provide the ability for passengers to track their bags.	R00668	COULD

Figure 7 - Detailed passenger outcomes - example

HAL employs the 'MoSCoW' prioritisation method (Must have, Should have, Could have, and Won't have) to each of the 40 detailed requirements as a method of showing their importance as demonstrated from their consumer engagement methods.



The sixth step of the Golden Thread, and last step covered in the Client Requirement documents is Evaluation criteria.

The methodology applied by HAL is to allocate an applicable evaluation criteria and evaluation metrics to each of the 12 Strategic Business Objectives and their corresponding Strategic Requirement described above. HAL have attempted to group these evaluation criteria into five themes. They are:

- Time efficient
- Logical and intuitive
- Predictable and reliable
- Safe and secure
- Care and support

Within these 5 Themes, there is a total of 20 evaluation criteria for passengers and 140 different evaluation metrics used to assess them.

The 140 evaluation metrics have been grouped by passenger evaluation criteria to apply in the evaluation. This is demonstrated by Figure 8.

HAL deems these to be applicable evaluation criteria which reflect interests of passengers. These have been informed by both their own stakeholder engagement programmes as well as principles taken from the KPMG-Nunwood's '6 Pillars of Consumer Experience Excellence', which draws on research from a large number of other customer engagements.

<i>STRATEGIC BUSINESS OBJECTIVES</i>	<i>STRATEGIC REQUIREMENTS</i>	<i>EVAL#2 PAX EXPERIENCE CRITERIA</i>
3	<i>SPEED/TIME/DISTANCE</i>	<i>TIME EFFICIENT</i>
4	<i>EASY NAVIGATION (MODE, LEVEL AND DIRECTION CHANGES)</i>	<i>LOGICAL AND INTUITIVE</i>
5	<i>PREDICTABLE AND RELIABLE JOURNEYS</i>	<i>PREDICTIVE AND RELIABLE</i>
12	<i>ENSURE THAT CONSUMERS ARE KEPT SAFE AND SECURE</i>	<i>SAFE AND SECURE</i>
11	<i>ENSURE CARE, WELLBEING AND EASY MOVEMENT FOR ALL CONSUMERS</i>	<i>CARE AND SUPPORT</i>

Figure 8 – Example of passenger evaluation criteria

The passenger evaluation criteria are applied across the four current Assembly Options.

Assembly Option is a term used by HAL to describe a potential way in which preferred components can be assembled together, into an entire scheme design which is 'viable' (see section 5.1).

The passenger evaluation criteria include both quantitative and qualitative evaluation metrics. HAL utilised subject matter experts' (SME) judgement from both within their organisation, and its consultancy partners to determine the evaluation against these metrics.

Each Masterplan scheme design component was assigned a BRAG (Black, Red, Amber, Green) status against each of these quantitative and qualitative evaluations.

HAL were keen to articulate that these BRAG statuses are used as an 'indicative tool' for evaluation. This is understood to be a useful way to represent multiple different mutually-exclusive metrics which could not be

otherwise understood side by side, and that BRAG statuses are not the actual comparison mechanism for comparing Assembly Options against each other.

HALs BRAG scale is shown below.



In evaluating the Assembly Options, HAL has sought to apply additional lenses to their assessment of stakeholder value in each Assembly Option. This means there is not one single BRAG colour for each Masterplan component, instead multiple depending upon which perspective one used to assess that component. For example, from the perspective of (say) passengers a particular component may be Green (more/most preferred), whereas that same component, when viewed from (say) a sustainability perspective may be Pink (Less Preferred).

In the Masterplan Scheme Development Manual (MSDM), HAL have defined 7 categories of assessment known as 'Disciplines'.

Each of the 7 disciplines are applied to each Assembly Option to give an overall assessment of that Assembly Option. These disciplines can be understood not as evaluation criteria (described above), but instead as an assessment of the benefits case for each proposed Assembly Option. When assessing Assembly Options, the 7 disciplines are used to help assessors understand which components of the Assembly Option are particularly attractive, which components are detractors and where trade-offs might exist between different operational or stakeholder benefits associated with that Assembly Option. As a result, these 7 disciplines are a staple of the process to identify stakeholder value and are central to the scheme development process.

The 7 disciplines are:

- Operations & service
- Business case
- Property
- Planning
- Sustainability
- Community
- Delivery

HAL has appointed a Discipline Lead (or Leads) as the principal representative for that discipline at multi-disciplinary scheme development workshops.

HAL has 'weighted' disciplines equally, meaning analysis will not favour benefits in one of these disciplines over benefits in any others.

It has been noted by the CCB, Arcadis and others, that Consumers or Passengers are not featured on this list as a distinct discipline in their own right.

The methodology HAL has employed is to use their 7 disciplines as cross-cutting themes against the five stakeholders Propositions as shown in Figure 9 below.

	Passenger	Investor	Airline	UK Comm.	Colleagues
Ops & Service	✓ Passenger experience		✓ Airfield performance	✓ Mode share	✓ Colleague travel
Business Case	✓ Increased competition	✓ Infrastructure adaptability	✓ Airline operating cost		
Delivery	✓ Minimise disruption	✓ Schedule		✓ Construction logistics	
Sustainability	✓ Passenger environment			✓ Noise	
Community	✓ Mitigation			✓ Community facilities	✓ Apprenticeship
Planning	✓ Associated development			✓ Green Belt	
Property	✓ Hotel development	✓ Property impacted		✓ Residential property	

Figure 9 - Disciplines vs stakeholders

Figure 10 below, shows how each of the 7 disciplines can be viewed through the sense of a Key Stakeholder; in this example, passengers. It depicts that while Consumer Drivers are considered in each of the 7 disciplines, customer insight has indicated that primary drivers for customers concern 'Operations & Service' and 'Business Case' issues.

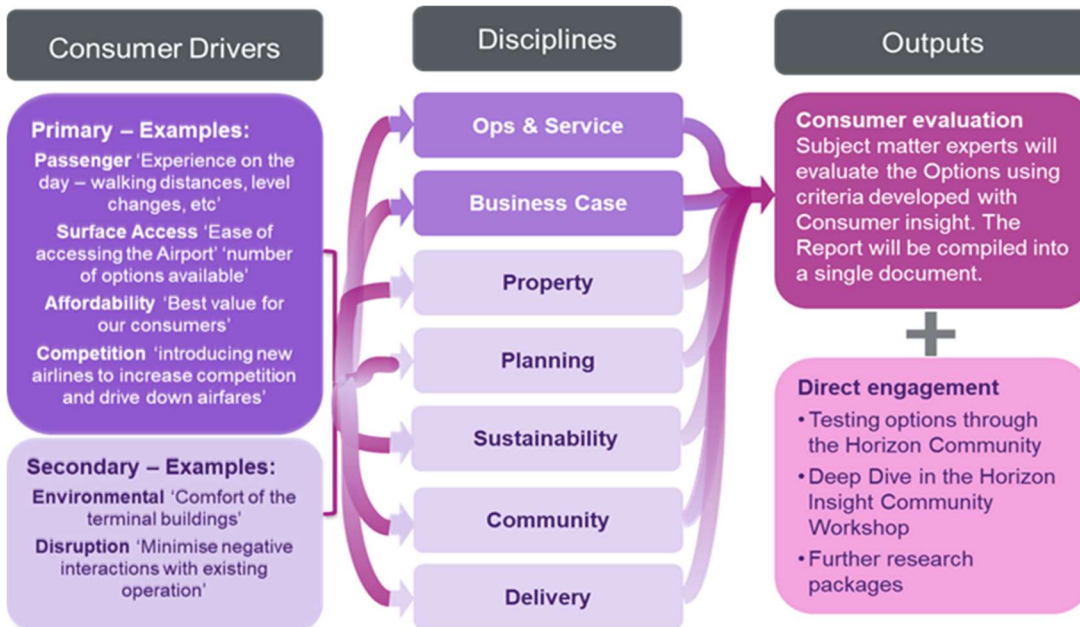


Figure 10 - Consumer drivers within disciplines

The outputs of this analysis (disciplines vs stakeholder benefits) are then managed through a well-defined Assembly Option Development Governance Process. This is described in Section 5 of our report. It describes how HAL address stakeholder concerns raised by poor performance against various disciplines. The Assembly Option is then redesigned accordingly, in order to address concerns and build-upon the benefits of the Assembly Option, that have been identified during its assessment.

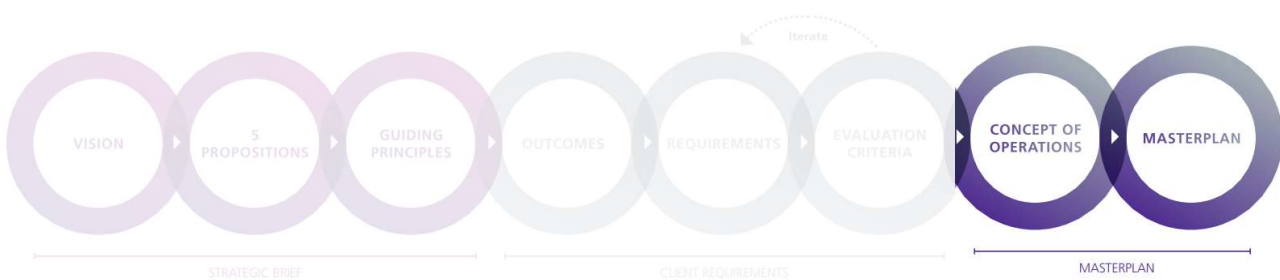
Arcadis has been given access to the latest draft of the "Heathrow Expansion Passenger Service Evaluation Management Plan". This document aims to describe the process of evaluation of the expansion Assembly Options through the passenger experience lens. Figure 11 below shows how the four current Assembly Options are rated against the five evaluation criteria themes for passengers' experience.

EVALUATION CRITERIA	A01B	A02B	A03B	A04BB	FOR REFERENCE MOST PREFERRED	
OVERALL						
TIME EFFICIENT	GRT to parkways + Southern Access Tunnel + TSA 2 APR (revised) + TSA 30 (revised) + 30M (revised) T51: greater level changes that reduce the journey time longer	GRT to parkways + Southern Access Tunnel + TSA 2 APR (revised) + TSA 30 (revised) T51: greater level changes that reduce the journey time longer T52: 100m level change at TSA 20	GRT to parkways + Southern Access Tunnel + TSA 2 APR (revised) + TSA 30 (revised) T51: greater level changes that reduce the journey time longer T52: 100m level change at TSA 20 T53: no improvement to T2B connection	GRT to parkways + Southern Access Tunnel + TSA 2 APR (revised) + TSA 30 (revised) T51: greater level changes that reduce the journey time longer T52: 100m level change at TSA 20 T53: no improvement to T2B connection	GRT to parkways + Southern Access Tunnel + TSA 2 APR (revised) + TSA 30 (revised) T51: greater level changes that reduce the journey time longer T52: 100m level change at TSA 20 T53: no improvement to T2B connection	AN AIRPORT AND FACILITY DESIGN PART IS CONSISTENT OF CONSUMER DESIRES TO HAVE TIME EFFICIENT JOURNEY WITH SHORT DISTANCES TO, FROM AND THROUGH HEATHROW
LOGICAL AND INTUITIVE	All 20 terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All 20 terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All 20 terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All 20 terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All 20 terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	AN AIRPORT CONFIGURATION THAT PROVIDES JOURNEYS WITH MINIMAL LEVEL AND DIRECTIONAL CHANGES TO ENSURE AN EASY, LOGICAL AND INTUITIVE PASSENGER JOURNEY TO, FROM AND THROUGH HEATHROW
PREDICTIVE AND RELIABLE	GRT to parkways + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	GRT to parkways + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	GRT to parkways + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	GRT to parkways + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	GRT to parkways + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	AIRPORT INFRASTRUCTURE, PROCESS AND TECHNOLOGY THAT IS FLEXIBLE AND ROBUST TO ERROR PREDICTABLE AND RELIABLE JOURNEYS FOR PASSENGERS
SAFE AND SECURE	T51: 100m level change across the combined A/D journey (T51) + TSA 2 APR (revised) + TSA 30 (revised) T52: 100m level change across the combined A/D journey (T52) + TSA 2 APR (revised) + TSA 30 (revised)	T51: 100m level change across the combined A/D journey (T51) + TSA 2 APR (revised) + TSA 30 (revised) T52: 100m level change across the combined A/D journey (T52) + TSA 2 APR (revised) + TSA 30 (revised)	T51: 100m level change across the combined A/D journey (T51) + TSA 2 APR (revised) + TSA 30 (revised) T52: 100m level change across the combined A/D journey (T52) + TSA 2 APR (revised) + TSA 30 (revised)	T51: 100m level change across the combined A/D journey (T51) + TSA 2 APR (revised) + TSA 30 (revised) T52: 100m level change across the combined A/D journey (T52) + TSA 2 APR (revised) + TSA 30 (revised)	T51: 100m level change across the combined A/D journey (T51) + TSA 2 APR (revised) + TSA 30 (revised) T52: 100m level change across the combined A/D journey (T52) + TSA 2 APR (revised) + TSA 30 (revised)	A FACILITY INFRASTRUCTURE THAT IS DESIGNED TO ENSURE CONSUMERS ARE SAFE AND SECURE AT ALL TIMES
CARE AND SUPPORT	All terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	All terminals, both across the same level + TSA 2 APR (revised) + TSA 30 (revised) T51: 100m level change at TSA 20 T52: 100m level change at TSA 20 T53: 100m level change at TSA 20	A FACILITY DESIGN THAT SUPPORTS THE JOURNEY OF PASSENGERS THAT REQUIRE ADDITIONAL SUPPORT AND ENSURES THE CARE, WELLBEING AND EASY MOVEMENT OF ALL CONSUMERS

Figure 11 - Assembly Option BRAG for consumer evaluation themes

The evaluation criteria and metrics can be ‘cut’ in a number of different ways depending on their intended purpose. Evaluation teams can then choose which way to ‘cut’ their assessment to provide different perspectives on Assembly Option. An alternative lens through which assessment teams might view Assembly Option, may be by functional area for example, ‘west arrivals airside’, ‘T5x departures landside’ etc.

These evaluation summaries are not used rigidly to choose one Assembly Option over another. Instead, different lenses and summarises of evaluation criteria are used to facilitate challenge and debate amongst discipline leads, Stakeholder representatives and design teams, in order to mitigate negative impacts and build on the benefits of each Assembly Option from multiple, different discipline and stakeholder perspectives.



The final two steps of this Golden Thread process are Concepts of Operations (ConOps) and the Masterplan.

Concept of operations

Concepts of operations (ConOps) are a written description or visual depiction that communicates the characteristics of a proposed system from a stakeholder’s perspective (those who will use the system). We have not sought to investigate this steps of the Golden Thread as, in our opinion, it is too early in the process for HAL to have documented much material on detailed operations yet. This may exist in an extremely high-level form as part of the Assembly Options, but it is likely to be expanded upon post M4 entry (early 2019).

The process described above, both for passengers and the other four key Stakeholder groups, will culminate in a **single preferred Masterplan**. This will not only contain a scheme design to meet the needs of the key stakeholders but demonstrate the methodology behind key trade-offs between stakeholder's interest as well as a development plan to deliver the scheme design.

It is worth noting that the last two steps of the Golden Thread are less static, than this type of graphic may have one believe. Concepts of Operations are iterative and constantly refined. Likewise, while a Masterplan 'Scheme design' may reach a point in time where it becomes fixed, the Masterplan more generally (design, delivery planning, phasing, operations etc.) will be iterative and refined throughout the life of the assets.

4 Our Review

The following section contains Arcadis' commentary on how HAL has "reflected reasonable consumer interests in developing the expansion Masterplan". Our assessment is based on the information and supporting evidence provided by HAL as detailed in Section 3 and Section 5 of this report. Our commentary is provided as an assessment of HAL's process and progress at the time of this report (November 2018).

4.1 The Golden Thread & Masterplan Development Process

Arcadis believe the 'Golden Thread' process³ HAL has employed, provides a clear and logical flow from HAL's strategic vision to actionable delivery plans. This process, or ones very similar to it, are found on many large capital and infrastructure delivery programmes. While the methodology itself is understood to be good practice in construction generally, the impact on end-user service quality is derived from how well the steps are embraced by the client organisation's leadership team, how well the methodology is translated into detailed client requirements, and ultimately how well the methodology is implemented at asset design levels. Arcadis is aware of instances on such capital delivery programmes that aim to adopt such a methodology at a strategic level but lack the consistency to maintain a sequential flow, from vision and guiding principles through to delivery and asset operation. This does not appear to be the case with HAL to date. HAL has said that the process has become more explicit in its ways of working following the move to Outcome-Based Regulation, the introduction of the CCB and the need to have a clear line of sight in terms of expansion Masterplans. Through this initial high-level review, Arcadis has seen sufficient evidence of HAL's ability to maintain a sequential flow of representation of consumer interests from its strategic vision through to the level of 'evaluation criteria' for options appraisal (which is where the Assembly Option development process has progressed to thus far).

Arcadis is encouraged to see passengers as central to the HAL Vision ("To give passengers the best airport service in the world"). We consider the strategic brief achieves its aims by articulating clearly and concisely, the needs of multiple stakeholders, not just passengers. The guiding principles used to inform capital development and operational decision-making are familiar to Arcadis from many other large capital delivery programmes and we deem them to be an appropriate list of high-level principles to enable great end-user service delivery.

At the outcomes level, Arcadis found it good practice to split outcomes based on various stakeholder groups (propositions) which will enable a clear understanding of the link between client requirements and end user (consumer) benefits realisation. Arcadis is comfortable with the level of information and insight gathering from consumer groups to inform these outcomes and understand these are not definitive but may continue to evolve slightly as engagement with consumers continues.

Arcadis has found it helpful for the purposes of this review that HAL articulated both Strategic Business Objectives and Strategic Requirements. Arcadis questions whether going forward, in communicating the process, it is necessary to demonstrate both. We think that as the Strategic Requirements are built from the Strategic Business Objectives and the Strategic Requirements are those that have been developed into a detailed evaluation criterion, it may be appropriate to remove the demonstration and detail of Strategic Business Objectives in the future. This may help simplify what is a granular and complex process. It would remove a potential source of confusion, for stakeholders not completely understanding of the process. Arcadis consider that this should only be done if HAL is confident it has an accurate and reliable process for translating 'business objectives' (be they strategic or detailed) into requirements (strategic or detailed). In our engagement, it appears that HAL is confident that this is the case. Whilst we offer this suggestion, we acknowledge that HAL may choose not to do so as it is keen to articulate the methodical process it has applied and the level of granularity it has applied from the outset.

³ Arcadis wish to note that what may appear, and can be shared, as a simple and clear process is actually a multi-layered, detailed and at times complex integration of various items of work and streams of information collated by HAL. Understanding the implementation and application of the process can become complex and difficult upon first review. Arcadis has endeavoured to explain the process to an appropriate and helpful level for the CAA.

Arcadis understands the process described in the Client Brief is continuing to develop and HAL look to understand more consumer insights and apply them into more granular detailed requirements. Arcadis would encourage this process to continue in earnest.

Evaluation criteria applied for passenger experience seems to be informed by extensive insight from HAL operations, the capturing and utilisation of numerous data sets and live data at Heathrow Airport, and review of cross-industry benchmarks provided by HAL's partners. Arcadis were impressed by the intentions and work undertaken by HAL to utilise data and the robustness of their data sources.

HAL, upon request, provided short case studies to demonstrate examples of the changes to the scheme design and why they were perceived to be in the interests of consumers, based on feedback and insight received. In section 4.4 of this document we provide some high-level commentary on the appropriateness of these examples. This has helped demonstrate and provide further evidence as to the inclusion of consumer interests in the process.

HAL has set out how it intends to evaluate the Assembly Options as part of the development process and define this within the seven disciplines identified in the Masterplan Scheme Development Manual. The manual indicates that HAL will be using a BRAG status in Assembly Option development to evaluate the multiple options available as part of the options appraisal process. Arcadis note that when requesting examples of how 'consumer interest' had been reflected in outcomes, the information provided by HAL related almost exclusively to 'passenger experience'. While Arcadis agree 'passenger experience' is an important topic in consumer interest, we understand passenger experience to be only a 'sub-subject' of the Operations & Service discipline. Arcadis would have liked to have seen more examples of other 'discipline subjects' relating to consumer interest.

The use of the BRAG process is a simplified expression of a more detailed process that HAL will be undertaking as part of the Assembly Options process. It is a tool to communicate choices to stakeholders that is understandable and can be applied across the whole Masterplan Development process. Arcadis appreciate that, given the number of criteria and metrics, many of which are difficult or not useful to quantify, using BRAG as a visual aid to aid constructive discussion on Assembly Options is reasonable.

However, Arcadis stress that HAL should ensure that stakeholders are clear and fully aware that this BRAG process is a simplification of a more complex process. That each one of the BRAG 'colours' is a compilation of a more detailed set of metrics that are being used to deliver the Assembly Options process. Explicitly explaining that this simplification (the use of BRAG) is for communication purposes will prevent criticism of HAL's process. It will prevent wrongful interpretation that HAL is using a simplified BRAG tool and narrow set of criteria to evaluate options which HAL has demonstrated to Arcadis not to be the case. It will also help avoid criticism from stakeholders that HAL is not considering consumer interests as an integral part of the evaluation process. Similarly, Arcadis are aware of the criticism of HAL for not using 'Passenger' as a distinct discipline. Further demonstration of their approach to include passenger interests as a cross-cutting 'subject' within many of their disciplines (as depicted in Figure 7) may also help clarify matters.

Furthermore, Arcadis admittedly found the explanation of how BRAG statuses were actually used within the Assembly Option evaluation process difficult to grasp, other than to say it is used by evaluators to facilitate a constructive conversation regarding each Assembly Option's benefits and detractors. Arcadis would encourage a clearer articulation of the explicit trade-offs between stakeholder benefits based on the results of evaluation criteria across the disciplines.

Arcadis consider the governance process to be robust and was reassured by appointment of both a 'Proposition Owner' as well as a 'Discipline Lead' in various levels of the governance process. We would expect to see the various levels of senior management boards, as well as multi-disciplinary evaluation review teams, that HAL deploy on a programme of this nature. However, the establishment and the robust nature of the process further satisfied our assessment and we believe adds credibility and vigour to the process. Whilst we have not endeavoured to explore specific examples of stakeholder interest conflict in these forums, our view was the consistent representation of propositions and disciplines would act as a safeguard against potential biases towards any particular stakeholder group, or discipline.

As described in more detail in section 5.1, HAL has identified examples where the Masterplan development process has been updated to allow for more time to understand and incorporate increased stakeholder engagement. While it cannot be said with any certainty whether stakeholder engagement opportunities were the primary reason for these changes, HAL has no doubt used this time to better inform themselves with greater stakeholder views and increased analysis from its customer insights team.

HAL decided to evaluate four of the 12 Strategic Requirements for passengers in Evaluation #1. HAL intend to further evaluate those four Strategic requirements and an additional Strategic requirement for passengers in Evaluation #2.

HAL has explained in our workshops its rationale for determining which of the 12 Strategic Requirements would be evaluated at each evaluation stage. In principle, we found their rationale valid and reasonable. In summary, HAL explained that only several of their Strategic Requirements were applicable to be evaluated at a Masterplan level. This was because of the level of specificity in design. For example, Strategic Requirement 5 states: "Heathrow will create a unique and exciting experience that celebrates British style, culture and hospitality". At this stage, this requirement is unlikely to impact the Masterplan design. This requirement would be applicable at later and more granular design stages.

Arcadis accepting this line of reasoning in principle. We agree that Strategic Requirements 3, 4, 5, 11 & 12 should be evaluated in Evaluation 1 & 2. However, we would propose that this list is not exhaustive of Strategic requirements that could reasonably be evaluated at a masterplanning stage. Namely Strategic Requirement 6 (based on reference to infrastructure) and Strategic Requirement 9 (based on reference to physical environment) could also be included in these evaluations. Both of these Strategic Requirements may have impacted upon the high-level physical design and configuration of the Assembly Options, therefore may have warranted consideration at a masterplanning stage.

Our other observation is that by only including 5 selected Strategic Requirements in Evaluation 1 & 2, HAL should take care not to de-value the other 7 Strategic Requirements that will not be evaluated. In our engagement with HAL, it has not demonstrated any behaviours to suggest this is a risk likely to mature but it is a risk we have identified.

Ultimately, HAL has indicated that it will need to come forward with a Masterplan that satisfies the needs of all its stakeholders. HEP Leadership are clear this will be a critical requirement of any successful DCO application, and as such must be confident in the process through which HAL aims to meet the needs of its Key Stakeholder Groups.

Arcadis are aware HAL has amended the timeline for the development of the HEP Masterplan. At the time of this report (December 2018), the original M4 Gateway date has been postponed by approximately 6 months. The reasoning for this amendment to the timeline is beyond the scope of this review and not detailed within this report.

Nonetheless, HAL has shown a willingness to incorporate consumer interests and provided examples of where it has modified the Masterplan process based on this new timeline to allow for additional consumer engagement.

HAL has created roles within the Heathrow Expansion Programme to champion the development of 'Next-generation' Passenger Requirements. These individuals are embedded throughout various levels of seniority within the organisation including the Expansion Senior Leadership Team. This is a positive step towards ensuring HAL sufficiently consider the changing needs and behaviours of its consumers.

4.2 Development of HAL's Consumer Engagement Strategy

HAL has been able to demonstrate that it has developed a credible Consumer Engagement Strategy with a clear emphasis on consumer needs. The development of this strategy has sought to incorporate the views of consumers and the current version sets out the methodology on how the views of consumers are being considered in the Masterplan process and through a 'Golden Thread' principle.

HAL will still need to continually demonstrate that the views of consumers are being championed throughout the masterplanning process. HAL has indicated that the strategy will be reviewed on a regular basis to consider the emerging views of consumers as the Masterplan takes shape.

HAL has identified gaps in its consumer knowledge and is seeking to manage this by undertaking additional research and consumer engagement that it will incorporate in any future update of its Consumer Engagement Strategy. We would encourage this activity to continue and would be keen to see more of HAL's work to date detailed in section 3 "How will Heathrow consumer engagement inform our business decisions?" which has been articulated to Arcadis, but not formally captured in their strategy. HAL have expressed a continued determination to bring consumer insight into the programme and are currently producing a consumer report. HAL have offered to make this report available to the CAA and Arcadis once complete.

4.3 Synthesising consumer input into insights

While Arcadis' scope was focused on 'how consumer interests were integrated into the Masterplan development programme' rather than insight acquisition or synthesis, we found the use of operational data to provide richness to consumer insights a particularly constructive element of HAL's work to synthesise consumer interests. This point is important to understand HAL's claim that it is an 'intelligent client'. This is a source of insightful information which many capital development client organisations cannot benefit from.

Many large capital delivery organisations suffer from a lack of historical user data simply by the fact they are delivering capital or infrastructure in a non-operational environment. This is obviously not the case with HAL and in our opinion this insight has been used well.

Arcadis would like to commend HAL for the work undertaken to identify the robustness of their data sources and subsequent exercise to disregard data from non-credible sources, helped by its partners Blue Marble (described in section 5.3). We understand this initiative was a recommendation made to HAL by the CCB. We consider this a great example of HAL's level of maturity in data management protocols, and one which also demonstrates HAL's openness to seeking guidance and counsel from the CCB's expertise. We would encourage HAL's continued collaboration with the CCB on such matters.

4.4 The evolution of the draft Masterplan

HAL has clearly evolved its Masterplan through the Assembly Options stage of the process and to reflect feedback and input it has received from stakeholders. It is worth reiterating that the anticipated target date for their M4 gateway (confirmation of a single preferred Masterplan scheme design to take into consultation #2) has moved from the original target date of October 2018 to March 2019. The timetable for developing the Masterplan is continually under review and the current plan is to deliver the proposed Masterplan scheme design by mid-January 2019, and for the proposed Masterplan, including delivery programme by the end of March 2019 ['Proposed' as the Masterplan will still be subject to change based on consultation #2].

Arcadis do not provide detailed reasoning for this postponement (October 2018 to March 2019) within this document, however delays in the programme raise the risk of increasing programme cost, which in and of itself is contrary to consumer interests. Nonetheless, Arcadis believe HAL has shown flexibility in the process to adequately consider consumer interests throughout the development of their Masterplan Scheme design.

HAL has pointed to examples where it has made changes to the original Masterplan based on consumer interests and needs. HAL has explained how the changes have fed through into the Assembly Options process and have led to certain options being discontinued. In section 5.4 of this document, we include case studies HAL has provided Arcadis as examples of changes made to component designs or Assembly Option as a result of Consumer engagement and to explain why they were perceived to be in the interests of consumers.

We think these case studies offer appropriate examples of design iterations which provide various benefits to airport operations over previous versions of the design options. We think these examples and design

iterations offer credible examples of the influence of consumer interest. However, we do not interpret these examples to be changes based solely on consumer feedback. The examples offer capacity, operational and/or resilience benefits, which are likely to have been implemented with, or in despite of, direct consumer feedback. Whilst they undoubtedly offer consumer benefits, it is our opinion that these benefits are likely to be secondary and not the primary reason for the design iterations.

However, Arcadis is aware it would be impractical to expect design iterations to be made exclusively on the basis of consumer experience alone if the design would negatively impact other operational or business case benefits of the scheme design. While it is not evident passengers are at the very heart of these changes, it would be our view that, no single stakeholder (or discipline) can solely be at the heart of design iterations. Design iterations must provide a range of benefits to satisfy multiple stakeholder interests.

4.5 Incorporating Cargo consumer interests

There is evidence that HAL has engaged with the cargo community in developing its Masterplan. The engagement to date has been at a high-level and we understand has been limited to current Cargo operators at Heathrow Airport.

In section 5.3 of this document we describe the process of providing quality assurance to the sources of consumer insight (Blue Marble study). As this exercise was primarily instigated based on recommendations from the CCB, that exercise focused on the robustness of passenger insights. A similar exercise has not been conducted for cargo consumers. While this is not necessarily a recommendation from Arcadis, we speculate the engagement with the Cargo Community is likely to be less rigorous than some of the research conducted into passenger insights. This may impact on the quality of cargo inputs into the masterplanning process and may be an area HAL wish explore in the future.

As the Masterplan evolves HAL should be able to demonstrate how the needs of the cargo community are expressed in the overall components of the Masterplan and how these will be assembled as part of the final airport proposition / solution.

Finally, substantiating claims of positive feedback to HAL from Cargo owners is more difficult than it is for passengers. From information provided to Arcadis, more detailed feedback has been captured on passengers' interests through the statutory consultations processes. However, as detailed in our report, we consider that there exist more rigorous commercial and contractual mechanisms, through which the cargo community can address and resolve serious objections they may have with the future operations of an expanded Heathrow Airport, and as a result will tend to have more formal representation in the options appraisal process.

4.6 Effects of the promotion of increased competition

HAL has included new and additional Assembly Option Criteria and Sub-Criteria to their evaluation. This new criterion will assess the flexibility of the Assembly Options to enable new carriers to be introduced to the airport. It is not yet understood how the inclusion of this new evaluation criterion will impact the development of components.

HAL has completed 'willingness to pay' reports which have been used to validate their existing insight and Strategic Requirements. Whilst this work is still developing, Arcadis would note the research may provide a view into consumer interest at a Masterplan level. This would be achieved by demonstrating the balance between increased consumer benefits from additional capacity and choice, and increased consumer benefit from improved operational resilience. This balance between choice and operational resilience could influence the potential physical capacity the Masterplan aims to deliver, the operating capacity the airport is targeting, and the way consumer benefits are increased. However, HAL has not explicitly applied this research to their Assembly Option appraisal process for developing a Masterplan.

4.7 Departure from current (Q6) consumer approach and the incorporation of future consumer's interests.

HAL has clearly increased its formal stakeholder engagement and consumer insights research work as a result of the HEP. We encourage the lack of a distinction between the expansion programme and HAL's efforts to understand consumer drivers to continually improve the airport.

HAL's Masterplan document seeks to use 'futurology' insight where possible. For example, HAL use research on Global Megatrends to set some of the direction of change HAL is likely to see throughout a large duration of the Masterplan's life (up to 2040).

Arcadis would encourage further and continued research into future passenger needs and trends during the Masterplan but appreciate the ability to capture, process and incorporate these requirements is difficult. HAL, like other airport operators, major capital programmes, and large organisations inside and outside of the infrastructure sector, will need to be constantly aware and reviewing technology and market disruption and its influence on future consumer requirements and their ability to respond.

4.8 Lessons learnt & reflections on best practice

HAL has explored best practice in airport expansion globally with visits and contact with several comparator airports around the world, who have recently expanded or are planning to grow. This is a positive sign and we would encourage this to continue through the life of the HEP.

In addition to the aviation sector, HAL has provided examples where they have incorporated approaches used by other sectors in developing consumer interests.

There are limited examples that involve regulated businesses such as HAL that are at similar scale or complexity and it should be acknowledged that HAL will also be 'breaking new ground' in this space.

HAL has extensively used KPMG-Nunwood's 'Six pillars of CX excellence' methodology. This is an established customer experience (CX) methodology in the industry by a reputable consulting organisation. This has allowed HAL to benchmark its passenger experience against other organisations that use this same approach and the consultants are regularly re-visiting the six pillars methodology to ensure it is in line with current thinking. This should ensure the tools being used by HAL are maintained and kept up to date which will allow a consistent approach to be used through the lifecycle of the Masterplan development and beyond. HAL may also wish to consider how other non – aviation, regulated industries have sort to protect the interests of the consumer; this is not intended to recommend a new and large-scale piece of research but to suggest that best practise, from all sectors, could be incorporated in the HEP. On balance Arcadis found the evidence cited from outside aviation more limited.

Arcadis also understand the CCB had identified a lack of direct engagement with potential future customers of the airport. We understand the development of the Horizon Insights Community was one way in which HAL has aimed to constructively address this feedback from the CCB. HAL has articulated close engagement with HS2 was a key source of lessons learnt in creating such a community, which is deemed a huge success to date by HAL. Arcadis believe the community to be an important source of direct consumer engagement for the programme going forward.

5 Evidence Base & Appendices

This section contains information that HAL has shared with Arcadis during our review. Arcadis provide a summary of this information for the benefit of the CAA in order to add context and background to the views expressed in the previous section.

As described in section 2.2, Arcadis gathered evidence in a number of ways including reviewing documentation provided by HAL, skype conferences and face-to-face meetings, as well as exchanging specific queries based on the documentation provided for a direct response from HAL.

In some instances, during this section, we found it helpful to provide direct quotes from HAL which describe elements of its Assembly Option development process. We distinguish these direct quotes using text boxes. These may be from direct engagement with HAL colleagues during meetings, sections of text taken from their documents, or material sent to Arcadis as a response to specific queries. In some cases, the documentation reviewed by Arcadis was still in a 'work-in-progress' or 'current draft' format and so was accompanied with such caveats. Arcadis appreciate there will be an element of flexibility in some of these documents to allow for what is still an ongoing process and allows HAL to continue to develop and refine its approach.

Finally, this is not an exhaustive collection of the material provided as evidence to Arcadis. Arcadis used all of the information provided to them to formulate their views, but in this section, we present a selection of information we felt was most helpful in providing a background to our review. In section 6 of this document, we provide a list of all the documentation provided by HAL, should more thorough information be required by the CAA.

5.1 The Masterplan Development Process

HAL's Masterplan Scheme Development Manual (MSDM) sets out HAL's proposed Masterplan Scheme Development Process. It includes the methodology for identifying and evaluating scheme options and selecting the scheme that will be the subject of an application for Development Consent Order (DCO).

The MSDM document provides a summary of the process. Arcadis have provided a list of the four main stages, and the associated milestones & gateways.

Stage of nps	Outputs
<p>Stage 1 – Strategic Definition: The purpose of this stage is to set the objectives for the project and define the key inputs into the process.</p>	<ul style="list-style-type: none"> • Key inputs & defined objectives
<p>Stage 2 – Component Options Development: Here, the key components will go through a design development process culminating in first DCO Consultation (consultation one).</p>	<ul style="list-style-type: none"> • Long list of components • Short list of components • DCO Consultation Inputs • Preferred Key component Options
<p>Stage 3 - Masterplan Options Development: In this stage, preferred options from the key components will be combined to create assembly options, culminating in an initial preferred Masterplan.</p>	<ul style="list-style-type: none"> • Long list of Assembly Options • Continued (non-statutory) stakeholder engagement • Short list of Assembly Options • Preferred Masterplan scheme design

Stage 4 - Masterplan Finalisation: In this stage, the preferred Masterplan formed in Stage 3 will be developed further, to be used for Consultation 2. This stage will conclude with the submission of the DCO application.

- Improved Preferred Masterplan scheme design
- Consultation 2 feedback
- Ongoing environmental impact assessments
- Mitigation measures on communities & environment
- DCO application submission

M1 Milestone: To mark the point at which stakeholders have become sufficiently familiar with the inputs from Stage 1, Strategic Definition.

M2 Milestone: The completion of the component option reviews.

M3 Milestone: To confirm the shortlist of assembly options to be taken forward to detailed evaluation. This milestone is sub-divided into three parts, M3a M3b and M3c, as explained further in Section 5.

M4 Gateway: To approve the preferred Masterplan option to be taken forward to consultation two.

M5 Gateway: To approve the Masterplan and supporting materials for DCO submission.

While Arcadis was aware of HAL's strategic brief and Masterplan Scheme Develop Process before, this review has uncovered and sought to understand how consumers interests are captured and applied within this process.

For the avoidance of doubt, the process described above is not a separate process from that described by the 'Golden Thread'. The Masterplan Scheme Development Process described above is what a formal process of milestones which HAL will progress to develop a scheme design which is 'viable'. In this context HAL defines 'viable' as:

- Affordable
- Operable
- Deliverable
- Winnable

Whereas the Golden Thread process shows how HAL aim to move through these milestones, in order to achieve a viable scheme design, that has also been developed in a way that will deliver value for its five Key Stakeholder Groups.

5.1.1 Governance

HAL has provided the following evaluation governance process to show how various levels of review forums inform decision making on the development of the components, Assembly Options and ultimately the Masterplan.

Evaluation Briefings

- The Masterplan Team supported by technical experts present the options and supporting evaluation material to the evaluation teams at the same time to ensure all receive a consistent message

Intra Evaluation Discipline team sessions

- The Discipline Lead holds regular sessions with the subject leads within the discipline to develop evaluation output

Inter Evaluation Discipline reviews

- The leads for each Evaluation Discipline come together and present their initial findings for peer review and challenge
- Enables consistency of interpretation of the options and material
- Supports the calibration of scoring – i.e. one person's Amber is not another's Red
- First opportunity to identify themes and potential trade of issues – i.e. a low capex cost option but high impact to communities etc.
- Improves quality of messaging

Design Evaluation Reviews (DER)

- The DER takes place every Thursday chaired by the Head of Design and Head of Infrastructure

- Membership includes Evaluation Discipline leads, senior members of the Integrated Design and DCO Team (IDT), and HEP programme team members
- The evaluation feedback is presented to the IDT and programme team; it is challenged to ensure key insight and learning are understood to support continuous improvement of options

Leadership Team Rummage (formerly the Options Design Rummage)

- Senior Heathrow Expansion Team leadership attend
- Not a decision-making body but an opportunity to hear and digest material
- Evaluation output presented by each discipline lead and ‘rummaged’ to ensure understanding
- Key themes and implication on infrastructure options are outlined by the masterplanning Team

Options Approval Group

- Attended by a sub-group of the Expansion Programme Board and includes representatives from the airline community
- Formally receives evaluation feedback and implications on choices
- Approves recommendations for further scheme development

Expansion Programme Board

- Formally approves the HAL position on the development of the scheme

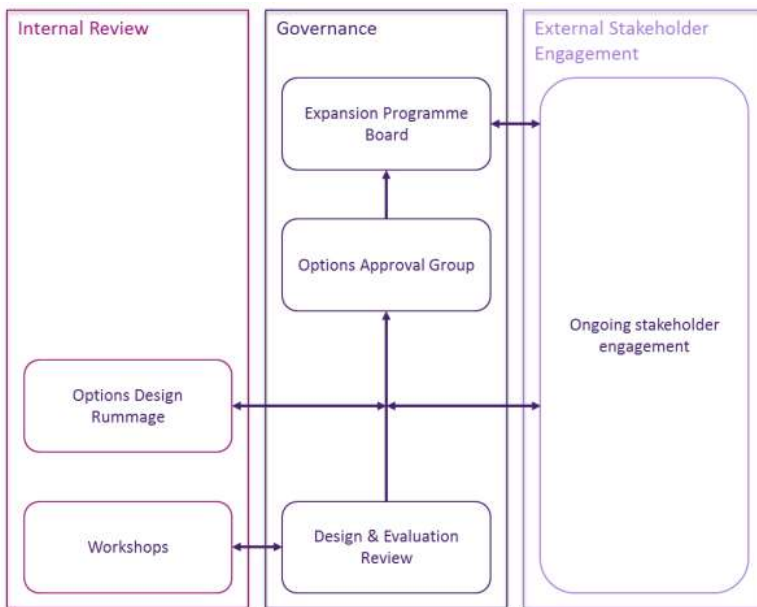


Figure 12 - Governance Approach to Scheme Development Process

HAL has explained that the masterplanning process has been designed in a way to allow for iteration. “If challenges in proposed assembly options cannot be resolved through the above governance process, there is the opportunity to feed this back to the Integrated Design Team who can investigate potential remediation. Should a conflict of interest arise between HAL Key stakeholder, keys areas for discussion will be escalated to the Expansion Senior leadership team. Here, all options are reviewed, and the most appropriate and logical action will be taken forward”

Arcadis - Q: How might trade-offs between potentially conflicting consumer interests be made? (say, Business travellers vs family vs UK leisure vs connections etc...)

HAL - A: "In line with current terminal development and Heathrow's strategic objective to appeal to a diverse range of consumer groups, the needs and interests of all groups are considered. Several passenger experience criteria (e.g. Time Efficiency, Logical and Intuitive, Predictable and Reliable) are of benefit to multiple passenger groups, and so far, few (if any) trade-offs have been identified.

Conflicts across consumer interests may arise at later stages, as detailed design emerges (e.g. retail mix; space provision for premium services; the provision of family toilets/changing areas versus additional standard cubicles). As these emerge, the programme will seek to benchmark using best practice in current infrastructure development and the influence of any additional information about passenger mix in a particular location. In addition, we will continually go back to test our thinking with specific consumer groups, for instance the Horizon community will be invaluable in understanding consumer drivers."

Arcadis - Q: What is HALs plans for how consumer interest will be incorporated beyond masterplanning as the design increases in detail?

HAL - A: Consumer interest will be continually incorporated and reviewed as the design process increases in detail. This will be achieved by deep diving into key themes of insight and creating increasingly detailed evaluation criteria, with design detail being continually evaluated against these criteria. As plans become more detailed, consumer interest will become increasingly prevalent e.g. facility design

We have set-up the insight community which will allow us to more quickly test different concepts amongst users and non-users of the airport both online and through workshops. This work is not a one-off and is part of how Heathrow has made sure consumers are at the heart of our designs and plans e.g. T2.

Furthermore, HAL has articulated an ambition to relate the inclusion of additional Strategic Business Objectives to the Royal Institute of British Architects (RIBA) stages. There are 8 RIBA stages in total (0-7). HAL has indicated all 12 of their Strategic Business Objectives will be considered by stage 4. A short description of the stages relating to programme & asset design is shown in figure 13 below.

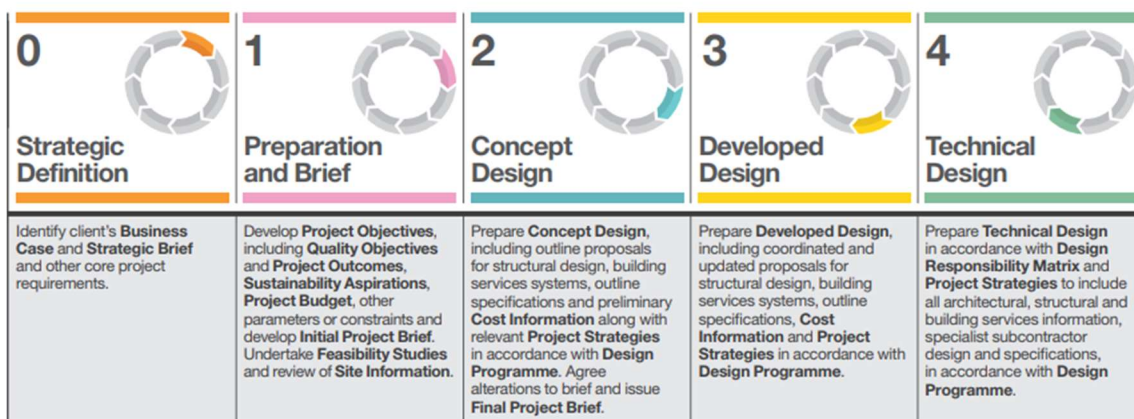


Figure 13 - Royal Institute of British Architects Stages 0-4

Figure 14 below shows how HAL intend to incorporate each of the 12 Strategic Business Objectives for passengers.



Figure 14 - HAL's plans to introduce Strategic Business Objectives as design progresses

It is also understood that these Strategic Business Objectives and equivalent strategic and detailed requirements will increase through various levels of granularity as the design progresses in detail. HAL provide an example using Strategic Business Objective #3.

Strategic Business Objectives	Translates to...	Strategic Requirement
3 I am confident that I can travel to, from and through Heathrow in a time-efficient way with manageable distances	Speed / time / distance:	Heathrow will ensure distances are manageable and (where longer distances are inevitable) offer attractive mobility solutions to enable efficient travel

Detailed Requirement level hierarchy example

- Level 1 - 'As shown above'
- Level 2 - "Walking distances will be short with minimal level changes to provide an excellent level of service" (levels of granularity increase through L3... L4... L5...etc.)
- Level 6 - "No journey between point X and Y will be over Z metres without the use of an automated people mover solution, with a speed of Z metres per second".

This increasing level of design granularity and specificity is captured and articulated in a series of Development briefs, shown in figure 15 below.

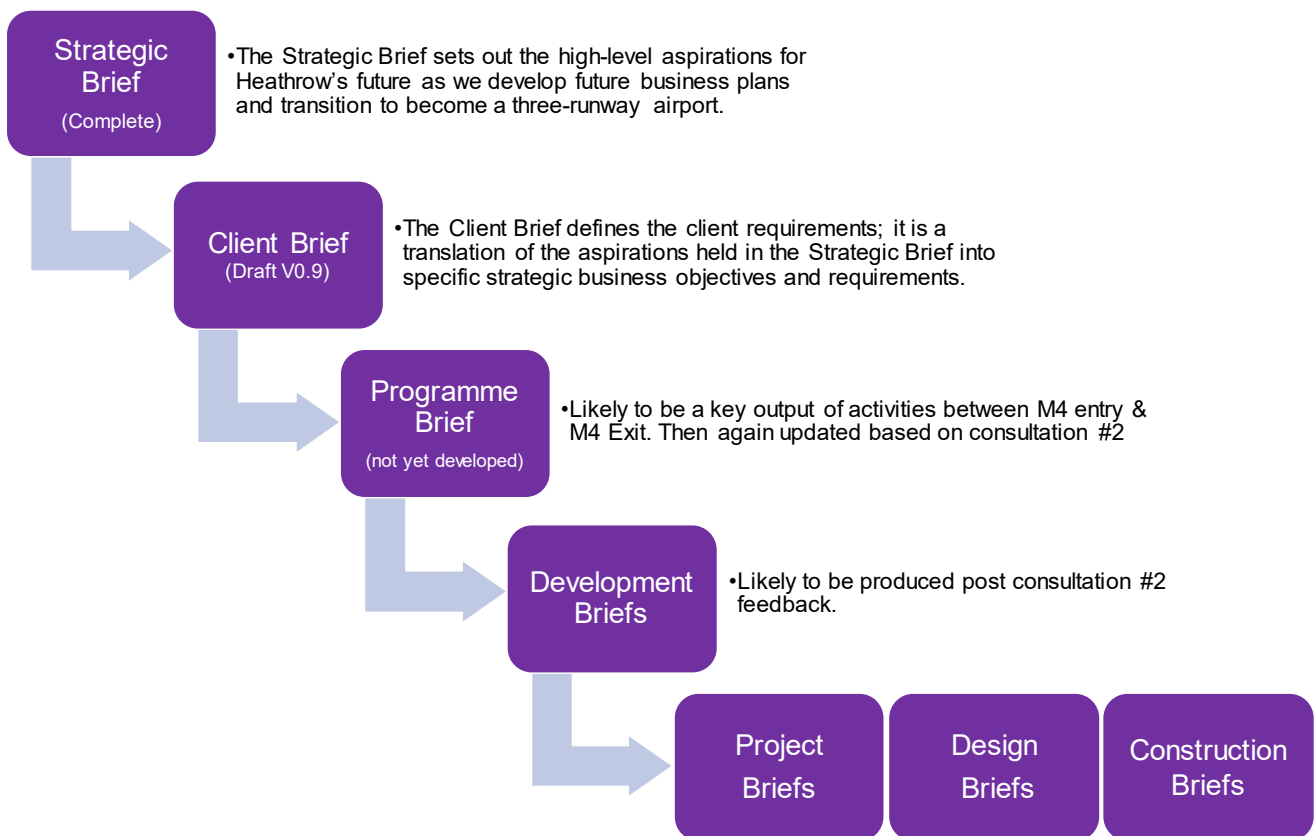


Figure 15 - HAL's suite of briefs for the HEP

In each of these briefs, HAL will be translating more of the Strategic Business Objectives and Strategic Requirements into more detailed design briefs. The Client Brief also identifies a “Proposition Owner” for each of the five key stakeholder groups identified in the strategic brief who are each accountable for the delivery of the Strategic Business Objectives related to that stakeholder group. Proposition Owners are shown below.

Stakeholder proposition	Role/title
Passengers	Future Heathrow, Director
Investors	Finance Director
UK Communities	Community & Stakeholder Director
Environment*	Sustainability & Environment Director
Airlines	Expansion Airline Strategy Director
Colleagues	People Director - Expansion

*Note: The Strategic Brief classifies ‘UK Communities & Environment’ as a single Key Stakeholder Group, and such a single, high-level proposition. However, (assumingly for the purposes of appropriate and distinctive representation) the Client Brief has then split this proposition between two propositions owners.

Currently the MSDM document is on its fifth iteration. HAL has articulated to Arcadis that it has given careful consideration to all the consultation feedback received and, wherever appropriate, have modified their approach to the Masterplan scheme development process accordingly. HAL gave examples of instances where the process has been updated based on an attempt to allow adequate time to incorporate multiple

stakeholders' interests and insights. This was given as a key reason for the splitting of Milestone 3 into 3 sub-milestones (M3a, M3b & M3c).

Finally, referring to the process for evaluating different Assembly Options from a number of perspectives, HAL has produced a "Heathrow Expansion Evaluation Management Plan". The document is broken down by each of their five key stakeholder groups. In each section, they aim to evaluate the various Assembly Options against the list of detailed evaluation metrics, assigning each a BRAG status which can be summarised.

A narrative is then provided for each of the four Assembly Option including subsections on:

- Overview
- Physical infrastructure or geographic areas (e.g. Landside, East Campus, Pier Service etc...)
- Passenger types (e.g. Arriving passengers, Connecting passengers etc.)
- Resilience
- Concerns
- Recommendations for Improvements and,
- Underpinning Assumptions

5.2 HAL's Consumer Engagement Strategy

Arcadis is aware of reviews being conducted by the Consumer Challenge Board (CCB) into the appropriateness of HAL's Consumer Engagement Strategy. Given the consumer engagement experience and credibility associated with that board, and upon guidance from the CAA, Arcadis has not sought to repeat this work. However, to provide context on the maturity of this strategy and its progression, Arcadis asked if HAL was continuing to update this strategy.

HAL: "We are always evolving our understanding of what matters to consumers and will be issuing updates to the consumer engagement strategy at regular points going forward the next one is due before the end of the year. Since June we have currently added work packages looking at:

- Airport Choice
- Resilience
- Next Generation of travellers
- Access Charging

We have identified that these are four areas where we require additional consumer engagement in order to fill our knowledge gap."

We also understand the next formal iteration of the document is due by the end of 2018. This iteration will include more detail on the additional research areas described above.

5.3 Synthesising consumer input into insights

Arcadis - Q: It appears there is a large volume of data and multiple data sources to gain insight into consumer interests. Can HAL provide information on if and if so, which data sets were prioritised? Would Heathrow say some consumer engagement information was given more significance than others? If so, which and why?

HAL - A: "It is true, there is a large volume of data which is driving consumer interest in the evaluation process. Each source of data has been given equal weighting when being used to evaluate assemblies. This has been achieved by rolling up data from the sources (i.e. QSM data, ASQ data, Horizon community outputs etc.) into key themes and keeping track of these within consumer insight logs, as well as continually tracking changes made to the Masterplan driven by this consumer insight."

HAL also alludes to a requirement for the data to be 'rolled-up' (consolidated) further, and as such has created the synthesis criteria, which has been used within the Validation Phase. On the recommendation from the CCB, HAL has aimed to improve the validity of their customer research through the use of an external customer research agency (Blue Marble).

HAL and Blue Marble colleagues calculated approximately 105 different engagement data sources. Blue Marble graded each of these sources depending on their quality and thus reliability, from 2-6. (6 being research from an accredited market research firm and 2 meaning ad-hoc informal engagement). Any data source which was given a graded 2 or 3 was discarded to prevent bias in analysis. Data sources graded 4-6 were taken into the synthesis stage.

Throughout this workstream HAL has made Arcadis aware of several ways in which current airport operational data is used to help better inform its customer insights work, and to add richness to its more formal passenger engagement data sources.

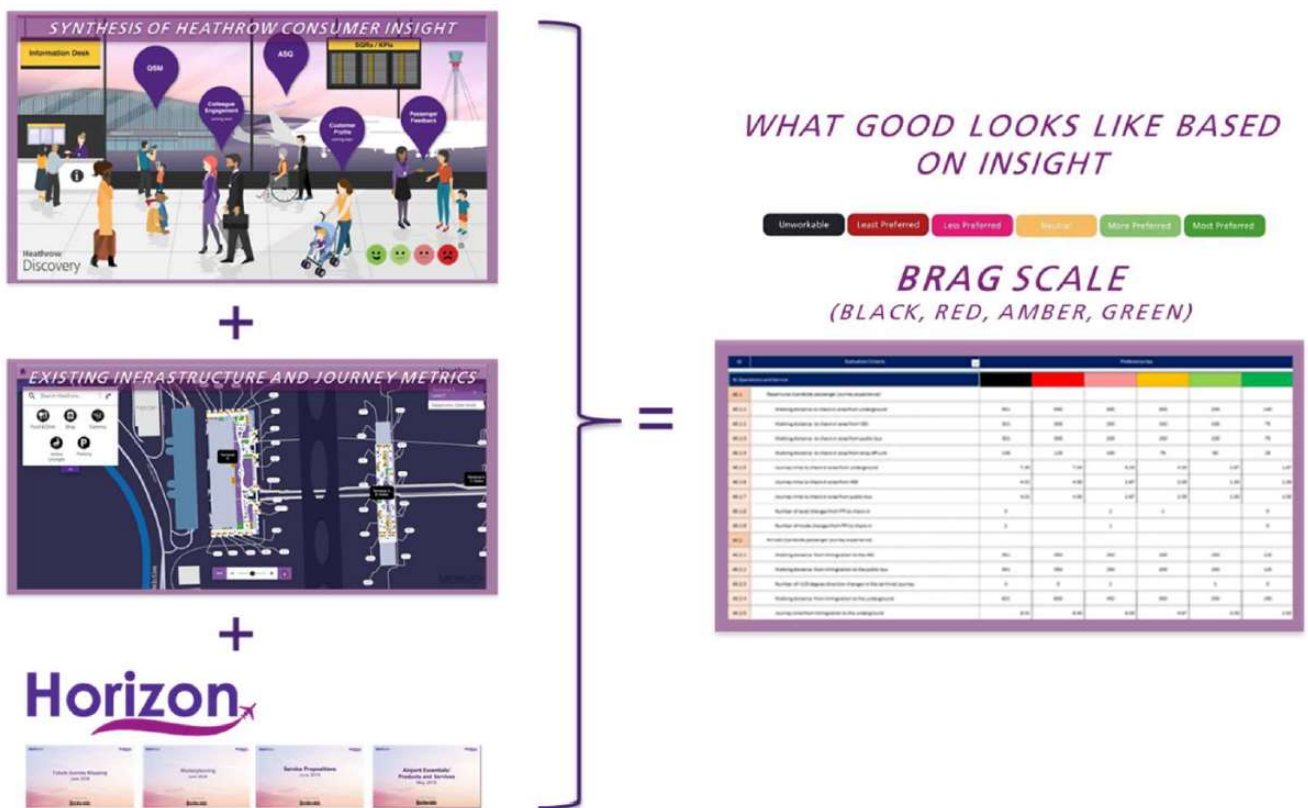
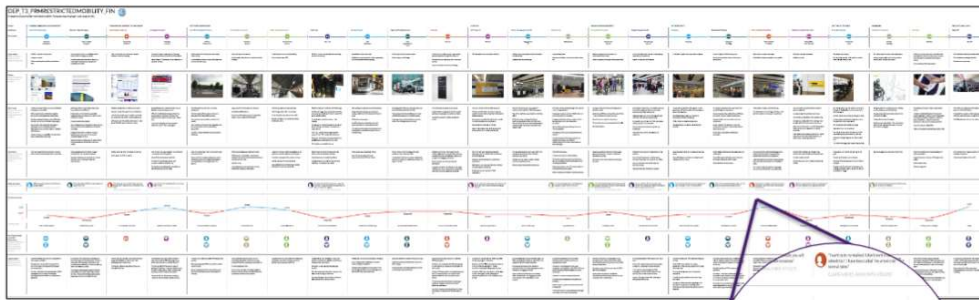


Figure 16 - Multiple inputs into consumer BRAG statuses



70 x multi-dimensional journey maps
 17 "Generic" maps
 53 Persona-specific maps

Emotional experience, "pain-points"
 Opportunities to improve



Figure 17 - Example of customer journey mapping exercise

Finally, the CAA & CCB are aware of HAL's Horizon community, which is a core element of their Consumer Strategy. The Horizon community is a group of over 3,000 individuals with whom HAL regularly use to "co-create" the future Heathrow vision. They are made up of a cross section of passengers from various demographics and passenger types.

According to Heathrow, The Horizon Insights Community is:

- Available 24/7
- Seamlessly links between mobile, tablet and desktop
- 30+ research tools
- Continuously innovating and updating
- Co-create the future of Heathrow with passengers
- Aid rapid and effective decision making
- Drive closeness with travellers
- Engage our stakeholders
- Independently established for Heathrow and contains a mix of consumers (different nationalities, ages, users and non-users of Heathrow etc.)
- To test our understanding, answer questions, validate themes and garner more insight; allowing us to further develop our strategic business objectives and how we evaluate our Expansion opportunities.

HAL's engagement with this community is helped by the Consumer engagement organisation, Join The Dots Consulting.

5.4 The evolution of the draft Masterplan

Figure 18 below shows a high-level timeline of the HEP. This timeline is HAL's most up-to-date estimates of the Masterplan development milestones as of October 2018.



Figure 18 - High-level timeline of the HEP

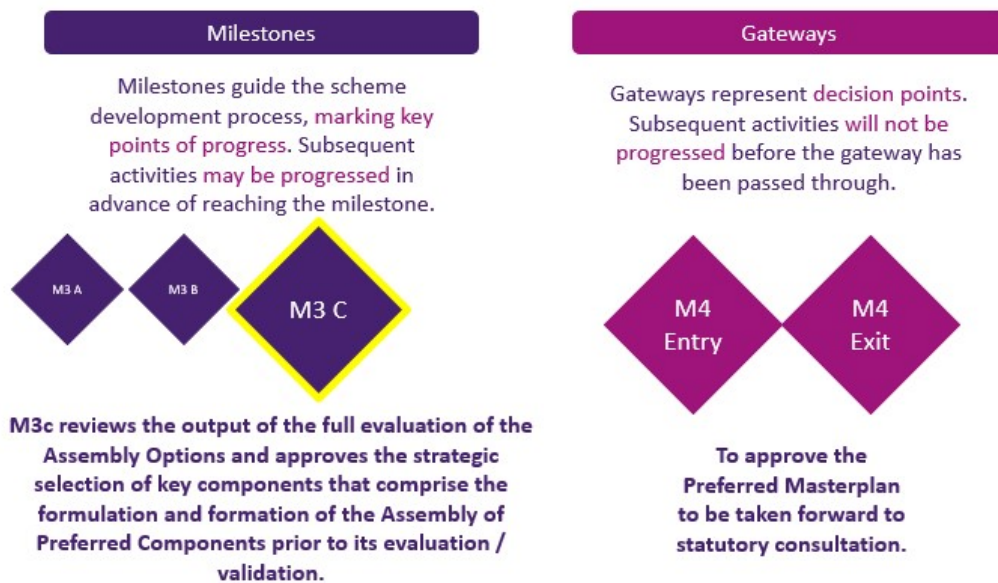


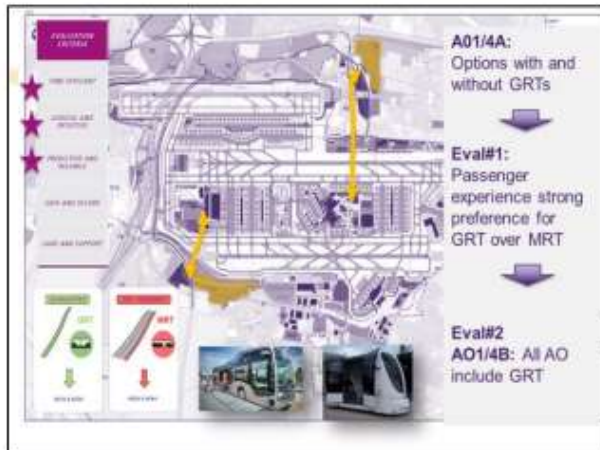
Figure 19 – HAL’s distinction between Milestones & gateways

HAL has articulated “M4 ‘Entry’ and ‘Exit’ terms are simply the start and end of the process of confirming the Masterplan”.

During various Arcadis-HAL meetings regarding this assessment, HAL notionally mentioned occasions in which the current key component designs or short-listed Assembly Options had changed based on feedback from their consultations, their Horizon community, or wider stakeholder engagements. Arcadis were keen for these examples to be captured and asked HAL to provide examples in the form of short case studies. We asked that these short case studies demonstrate examples of the changes and why they were perceived to be in the interests of consumers, based on their feedback. Below we list these case studies, as provided to Arcadis by HAL. In section 4.4 of this document we provide some high-level commentary on the appropriateness of these examples.

For clarity, some of these case studies make use of quoted terms (“...”) which are referring to the passenger experience evaluation criteria themes (Time efficient, Logical and intuitive, Predictable and reliable, Safe and secure & Care and support). Therefore, when HAL use, for example, “predictable” in this sense, they refer to the attempt to demonstrate the criteria of predictability, thus demonstrating consumer interest.

Case study



Title

Passenger Experience: Parkway connectivity - MRT vs buses

Task Order

1.3

Date

October 2018

Consumer interest

- Consumer insight indicates that consumers want time efficient, logical, intuitive and predictable journeys when travelling through the airport.
- One area for consideration is the journey from the parkways into the terminal areas. Consumer feedback has indicated that if a consumer is using the parkways, then transport into the airport needs to be as frequent and reliable as possible.
- Feedback from the Horizon community and insight from QSM and ASQ has indicated that MRT (Mass rapid transport) i.e. buses are perceived as slow and old fashioned. In comparison GRT (group rapid transit) i.e. pods are preferred due to the associated increased frequency and speed.

“Bus services are adequate but often not the preferred form of transport (outside, old fashioned etc)” (Quote obtained from QSM insight log).

Initial design proposals

- A suite of key evaluation criteria have been applied based on their alignment with the Strategic Brief commitments, Strategic Business Objectives and Requirements. The criteria covered are those that can be reliably assessed at an assembly option level, namely: Walking Distance, Journey Time, Level Changes, Mode Changes and Intuitive Flow.
- The evaluation has shown that Assembly Options A03B&A04B are able to provide the largest provision of pier served gates, so these are the preferred options.

Evaluation and design development

- In order to support fast movement from parkways, all AO's now include GRT rather than MRT (change occurred from Evaluation 1 to Evaluation 2).
- Strong feedback from the Horizon community has indicated that buses are not the preferred mode of transport. Due to this, where possible, all AOs include GRT rather than MRT.

Case study



Title

Passenger Experience - Pier served stands in T5 A and B extension

Task Order

1.3

Date

October 2018

Consumer interest

- Making the journey at Heathrow as logical, intuitive and time efficient as possible is a core requirement for passengers. It is recognised that confusion can occur when consumers have to incur a mode change in order to get to their gate.
- Pier service stands have been shown to have a significant impact on the quality of service provided to passengers. They allow for a more comfortable handling of passengers and minimise the need of further level changes and remove mode changes to buses. Depending on airline operating model and aircraft size the use of pier serviced stands can also assist in providing reliable aircraft punctuality. The above is particularly significant for passengers with reduced mobility, those travelling with children and during adverse weather conditions.
- Feedback from the Horizon community and insight from QSM and ASQ has indicated that pier serviced stands are preferred by the consumer, as a single mode of transport is preferred.

“Walking distances and complex routes (level changes, circuitous etc) are frequently criticised.”
(QSM insight log)

Initial design proposals

- A suite of key evaluation criteria have been applied based on their alignment with the Strategic Brief commitments, Strategic Business Objectives and Requirements. The criteria covered are those that can be reliably assessed at an assembly option level, namely: Walking Distance, Journey Time, Level Changes, Mode Changes and Intuitive Flow
- From a pier service perspective AO3B3&AO4B provide the experience desired by passengers and support the logical and intuitive, as well the safe and secure criteria.

Evaluation and design development

- In order to support the logical and intuitive as well as safe and secure criteria, AOs which had a higher percentage of pier serviced stands were marked more favourably during Evaluation 1 and Evaluation 2.

Case study



Title

T5X-N APM Resilience

Task Order

1.3

Date

October 2018

Consumer interest

- Masterplan Assembly Options 3 and 4 assume the construction of a northern satellite to serve 10MPPA. Once operational, this satellite will be served by an APM from T5X-W. A three-track APM offers greater resilience against delays and complete unavailability of one or more tracks in a two-track option.
- Why is this component or consideration relevant to consumers? To be "Time Efficient" and "Predictable" are two criteria identified by consumers as being important to their journeys. Should one or more tracks become unavailability, the resilience plan is assumed to include the use of buses and the airside road network to service the northern satellite. This option reduces dwell time in the T5X-N IDL and takes longer overall than APM use, so is not conducive to time efficiency. To use a replacement bus service also detracts from "predictability", as it is contrary to the signage, maps and other information sources that state the use of an APM.
- What information has Heathrow captured through surveys/working groups etc that has identified this as an important issue to consumers?

Insights from the Horizon community have highlighted themes around the importance of "Predictability" "Time Efficiency", and of a preference for fixed track modes of transport over and above road vehicles. Examples include "Bus services are adequate but often not the preferred form of transport (outside, old fashioned etc)"

Initial design proposals

- A two-track APM was included in the original AO3 and a three-track option in AO4.
- AO4 is preferred as an additional track offers higher resilience and increased predictability.

Evaluation and design development

The evaluation process identified an APM as the preferred option, compared to MRT (buses). A two-track option is considered operationally less resilient so AO4 is the preferred.

Case study



Title

Passenger Experience: M25 Motorway Access

Task Order

1.3

Date

October 2018

Consumer interest

- Context/background information: The stretch of the M25 near Heathrow is one of the busiest stretches of the national motorway network. It is a key means of connecting road users to Heathrow and the wider motorway network (M3, M4, M40 and M1).
- Why is this component or consideration relevant to consumers? Being "Time Efficient" and "Predictable" are two criteria identified by consumers as being important to their journeys. Many departing Heathrow consumers (whether private car users, taxi customers or 'Kiss and Fly' drop-off) use the M25 on their final approach to Heathrow. Delays caused by heavy congestion or incidents affect punctuality at the airport and can cause consumers to miss flights or experience additional anxiety associated with their journey. Localised traffic resultant from an incident on the motorway, slip roads or surrounding roads can take significant time to clear.

- What information has Heathrow captured through surveys/working groups etc that has identified this as an important issue to consumers?

Insights from the Horizon community have highlighted concerns with road access close to Heathrow (e.g. *"The car journey progresses in stages and the roads that cause most concern are during the final stretch"* *"Barriers to Drive and Park: Unpredictable traffic and motorway delays"*: *"The roads around the airport are associated with frustrating delays and airport signage can prompt even more concern"* (QSM insight log)

Initial design proposals

- Masterplan Assembly Options included a single M25 junction in Assembly Option 3 only.
- AOs which have more than one M25 junction have been marked more favourably in evaluation 1 and 2.

Evaluation and design development

- Evaluation 1 identified weaknesses in the resilience of a single M25 junction in Assembly Options 1(A), 2(A). As a result, Assembly Options 1(B) is now inclusive of a second M25 junction.

Case study



Title

Airfield Efficiency (reduce taxi times and improve resilience)

Task Order

1.3

Date

October 2018

Consumer interest

- Context/background information: Optimising airfield layout increases the efficiency of airline/handler operations and offers a greater ability to respond in disruption scenarios.
- Why is this component or consideration relevant to consumers? Factors including taxi distance, adaptability to service multiple aircraft types, the inclusion of facilities e.g. de-icing pads and minimised disruption in construction phasing all ensure the delivery of a feasible 740k schedule and minimise disruption effects.
- What information has Heathrow captured through surveys/working groups etc that has identified this as an important issue to consumers?
(e.g. "being delayed on aircraft less desirable than being delayed in terminal")

Initial design proposals

- All assembly options recognise the challenges associated with legacy design e.g. cul-de-sacs (push back time and resilience) and terminal situation (requirement for runway crossing). These have been minimised where possible.

Evaluation and design development

- What decisions were made in the evaluation process? Were amendments made to the original design or were other factors deemed to be more important to consumer requirements?
A satellite strategy, whereby stands are accessible from multiple taxiways, improves resilience and freedom of movement around the airfield.

Case study



Title

Terminals/Public Transport spine proximity and connectivity

Task Order

1.5

Date

October 2018

Consumer interest

▪ Background information

Heathrow is committed to ensuring that post-expansion, no additional cars are used to access the airport by passengers or colleagues. Encouraging use of the public transport network will be vital to keeping to this commitment. Proximity to end destination (terminals or surrounding offices and facilities) is cited as a key driver for using public transport modes.

▪ Why is this component or consideration relevant to consumers?

Proximity from public transport to terminals, hotels and surrounding facilities is beneficial for consumers as it reduces the time of journeys and associated stress and anxiety. Greater proximity between terminals and facilities and the public transport spine also increases consumers' perceptions of public transport as a credible alternative to other modes (such as private car and taxi); this resultant choice is beneficial for consumers.

▪ What information has Heathrow captured through that has identified this as an important issue to consumers?

Through the insight community, it has been identified that proximate and clearly signposted public transport is beneficial and preferable (*"Surface access pain point: Lack of clarity on pathway to terminal, inconvenient transfer locations"* INS555; *"Motivations to Drive and Park: No or inconvenient public transport"*, INS419).

Initial design proposals

▪ How was this consumer challenge considered in the initial masterplanning process?

Inclusion of GRTs between parkways and terminals (therefore, with easy access to the public transport network) ensure that perimeter locations near to parkways are well connected. GRTs provide a mode more predictable and reliable, and time efficient, than alternative road-based transport. Walking distances have been kept to a minimum in key public transport areas.

Case study



Title

Space per million passengers

Task Order

Task Order 1.5

Date

October 2018

Consumer interest

▪ Background information:

Floor area per million passengers is an indicator of the amount of passenger-facing space. Greater passenger-facing space is conducive to a strong commercial offer, delivering choice and quality for consumers and adequate seating availability. Greater space reduces the potential for congestion and overcrowding, conducive to a more pleasant and relaxed atmosphere.

▪ Why is this component or consideration relevant to consumers?

Consumers have highlighted the importance of "Logical and Intuitive" and "Time Efficient" journeys through Heathrow, and those which through "Care and Support" provide service to passengers with reduced mobility or additional needs. A strong M2/MPPA ratio facilitates adequate space, seating, supporting facilities (e.g. toilets, family spaces, quiet spaces) and commercial offers.

▪ What information has Heathrow captured that has identified this as an important issue to consumers?

Feedback from the insight and Horizon communities have highlighted choice in retail offering as fundamental (*Fundamentals for good ambience: factors contributing to an appropriate range of facilities incl good selection of catering outlets/shops, mix of retail outlets (price and function), accessible, toilets, internet*", INS1185) and Consultation 2 feedback included considering passengers with reduced mobility.

Initial design proposals

▪ Description of the specific design challenge

Considering the wider context (land requirement for stands, airport supporting facilities and taxiways, whilst minimising land-take) an efficiently spaced terminal is desirable. Balancing all land requirements is a challenge.

Evaluation and design development

▪ What decisions were made in the evaluation process? Were amendments made to the original design or were other factors deemed to be more important to consumer requirements?

A preference has been highlighted through the evaluation process for larger piers (36m+) rather than the 27m piers proposed in the assembly options. This will enable key facilities such as retail, F&B, seating, etc. There is a walking distance/journey time benefit associated with wider piers as moving walkways can be accommodated.

Case study



Title

Terminal 1

Task Order

1.5

Date

October 2018

Consumer interest

▪ Background information

Heathrow Terminal 1 closed to passenger-facing operations in summer 2015. Most of the building remains dormant though the baggage system remains operational and services Terminal 2 baggage operations. With renovation and facilities upgrades, Terminal 1 offers the opportunity to bring on-line additional capacity earlier than other options, from ~2027, versus 2030s in alternative Terminal 2 expansion plans.

▪ Why is this component or consideration relevant to consumers?

Additional capacity is beneficial for consumers. It offers consumers a greater choice of destinations and encourages price competition among airlines. To deliver additional capacity earlier than other options allows passengers to enjoy the benefits earlier. However, it adds wayfinding complexity through additional decision points on walking routes, bus routes and landside transfers, and is not as intuitive in its design or flow as alternative expansion plans in Terminal 2. Additionally, airside connections are not possible using the T1 facility which offers a poorer experience as passengers will have to use a landside route to connect to other terminals.

▪ What information has Heathrow captured through surveys/working groups etc that has identified this as an important issue to consumers?

The insight community have cited choice of destination as a key driver (*"Ease of access is the second biggest reason why passengers chose Heathrow after their choice of destination"*, INS389) and expressed price competition as a key benefit (*"The choice of carriers is almost entirely based on price, with low willingness to pay for shorter travel time or carrier-specific services"*, INS1253).

Initial design proposals

▪ How was this consumer challenge considered in the initial masterplanning process?

Common to all assembly options (B), T1 is assumed to be expanded and redeveloped as a standalone low cost short haul carrier facility. AO3B & AO4B retain T2's baggage system within T1. AO1B and

AO2B re-uses available parts of the existing terminal (i.e. reclaim hall). 13 MPPA capacity is assumed for T1.

The Preferred Assembly options 'T2 Phase 2' and 'T2 North' assume that T1 is replaced by an expanded Terminal 2. Consumer benefits of these options are being considered within evaluation 3, such as newer Heathrow design and the resultant flow benefits.

- **Description of the specific design challenge**

The use of legacy T1 infrastructure with a sub-optimal head height aconvoluted passenger flow between passenger processing nodes, will provide a poorer passenger experience for users operating from this terminal. In addition, initial optioneering has shown that an airside connections facility would not be possible, limiting further connectivity and suitability for other airlines.

Evaluation and design development

- **What decisions were made in the evaluation process? Were amendments made to the original design or were other factors deemed to be more important to consumer requirements?**

Evaluation 2 of four assembly options and evaluation of the Preferred Assembly has considered consumer requirements through multiple criteria: to be logical and intuitive, safe and secure, predictable and reliable, time efficient and care and support (of consumers with additional needs).

- **How was the design evolved through evaluation process?**

T1 wasn't included in any AO(A) options but all 4 AO(B) options – T2 Phase 2 was present in AO1 and 2. The Preferred Assembly looks at 2 possible T2 expansion plans rather than utilising T1 at all, with resultant consumer benefits.

5.5 Incorporating Cargo consumer interests

This report predominately focuses on passengers, but Arcadis understand that the CAA has a duty to protect 'consumers' in its broadest sense. As described above, this CAA deems consumers as both Passengers (Current & Future) as well as "those with a right in property carried by the service".

Arcadis understand this is a broad term and generally includes:

- Cargo "forwarders" - who organise/facilitate cargo transport,
- "Shippers" - who carry out the physical transport process,
- Retailers/producers - whose actual goods are being transported,
- Consumers who ultimately purchase the cargo being transported.

Arcadis appreciate the importance to consider all consumers and their interests in the development of the Masterplan, including those with a right to cargo. We would speculate that those with a right to cargo may be able to influence HEP, unlike passengers, through more direct engagement and via market forces. This may lead to a view that that cargo owners require less intervention to provide protection. Nonetheless, Arcadis has endeavoured to understand how HAL are incorporating the interests of this group of consumers, and HAL has provided various evidence to support their view that they are appropriately incorporating their views. However, Arcadis has not been witness to any material influence being exercised in this engagement with HAL regarding the HEP.

HAL were keen to articulate to Arcadis that their Airfreight customers are key to unlocking a sustainable source of growth for the airport. HAL has provided information that states they are already the UK's largest 'port' for international freight – approximately 70% UK Long-haul air-cargo trade goes via Heathrow (33% by value, see figure 20 below). As a result, HAL is keen to understand how this service offering can be improved through the HEP.

On HAL's Cargo Strategy document they provide the strapline relating to cargo consumers is "Timely, reliable and easy to do business with".

HEP Leadership articulated that 'Just-In-Time' logistics is a competitive advantage for organisations, and as such Operations & Service (ensuring an operationally resilient airport with short and predictable air-to-air transshipment times) becomes a key driver for cargo owners, not just sheer capacity increase. This has been captured in HAL's Cargo Strategy (2015). The Cargo strategy development supported by Seabury Group and published November 2015, involved Interviews, Surveys and Benchmarking activities with a range of Cargo stakeholders and industry associations. According to HAL leadership it provided useful insight into where the focus for HEP needs to be to meet Cargo partners' aim for timely and predictable cargo services. HAL has relayed that this strategy has received positive feedback from the community.

HAL: In 2018 the Cargo Steering Group was launched with 20 representatives from across the industry. The purpose of this group was to review the Cargo Strategy and make sure it remains relevant. It also allowed prioritisation of pipeline projects to make sure focus was placed on the correct improvement points. Nick [Kennedy, Associate Director, Atkins – Airport supporting facilities & operations] has been leading this work and has been feeding this into the Masterplan development process.

Arcadis - Q: What efforts have been made to incorporate the interests of cargo consumer?

HAL - A: “Consideration has been given to the interest of cargo consumers throughout the Masterplan development process. Heathrow Head of Cargo, Nick Platts has been engaged as an evaluator in the masterplanning process.

Heathrow has developed a robust understanding of the needs of cargo consumers. The Heathrow Cargo Strategy released in 2015 provided a long-term vision for Heathrow to be one of the best European hubs for cargo by offering a timely and predictable service. The strategy was developed in consultation with airlines, hauliers, handlers and industry associations.

Since the strategy was issued, work has been done to make sure this remains relevant. In 2017, a cargo mapping tool was developed to look at tracing a single customer experience through the journey, using a cargo item as the unifying thread. Workshops were held to test this tool with representatives from the cargo community and allowed key challenges around the cargo experience to be identified”

Finally, HAL has provided several additional case studies showing how stakeholder engagement with the cargo community has influenced changes to the development of their current Assembly Options shown below.

Case study



Title

Cargo truck call-forward park

Task Order

Task Order

Date

October 2018

Consumer interest

- **Context/background information:**

The Cargo Centre to the south of the airport services an increasing number of goods-in vehicles, leading to resultant congestion, Health and Safety challenges and delays. A truck call-forward point offers the ability to safely dwell whilst waiting for a slot at the Cargo Centre.

- **Why is this component or consideration relevant to consumers?**

Cargo consumers expect a 'Time Efficient' and 'Predictable and Reliable' experience at Heathrow. A call-forward truck park offers a safer, more intuitive and less stressful experience for consumers of the cargo centre.

Initial design proposals

- **How was this consumer challenge considered in the initial masterplanning process?**

In order to facilitate the truck park and associated processes being as 'logical and intuitive' and 'time efficient' as possible, all assembly options sited the truck park to the east of the M25, close to the cargo centre.

- **Description of the specific design challenge:**

To support cargo operations a truck park was incorporated into the design to the east of the M25. This will enable a layby for trucks whilst idling for call to stand.

Evaluation and design development

- **How was the design evolved through evaluation process?**

It was identified that a truck lay by to the east of the M25 would provide a more efficient space for trucks to ensure they could rapidly respond to a call to stand.

CARGO - TRUCK PARK

IAG Feedback

IAGC currently have processes in place which ensure that freight is consolidated and that our truck utilisation is optimised – as do the likes of DHL and other cargo stakeholders.

If the demand for an offsite from the cargo is there – IAGC would still not require this resource, however, would like more details on the design, costing and IT functions proposed.

DHL Feedback (Con 1 - 2.04)

Option B would not be the optimal location for a truck park. Firstly, it is on the wrong side of the M25 in terms of accessing the horseshoe, and it is not big enough to host the large numbers of trucks required. Access to the M25 from Shoreham Road is already congested, so this option would require dedicated slip road from the M25 or the widening of Shoreham road. It would make more sense for the truck park to be located at point C.

Segro Feedback (Con 1 - 2.08)

Option 4 for cargo facilities is not a suitable or sustainable location given it is some distance away from the main cargo area. This would create inefficiency in the cargo sector by increasing traffic congestion as a result of commercial vehicles travelling longer distances.



HEP Response

Following evaluation and Con1 feedback, options A, B & D have been discontinued.

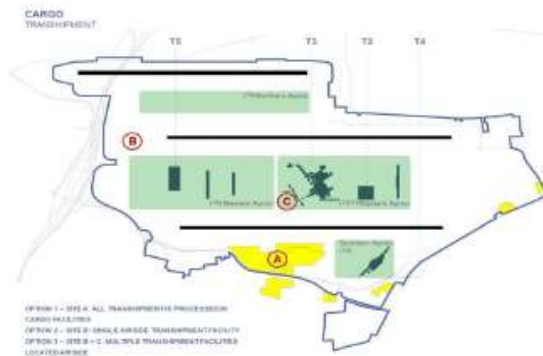
Option C has been developed to locate the truck park to the south of the cargo centre and east of the M25

CARGO TRANSHIPMENT

IAG Feedback

In today's operations, intact, transshipping freight arriving into Heathrow is towed back to Ascentis for storage. A cargo transshipment area capable of holding intact transshipping ULDs for a short period of time would help to reduce the amount of cargo driver trips to and from Ascentis, and may help to reduce congestion on airside roads. Out of the three FTA masterplan options presented by HAL, at this stage, the preferred option would be Option 3 – if this would mean that we could have our own dedicated facility.

Option 1 would see no change to today's operations; therefore if there is an option to reduce cargo driver trips to and from Ascentis such as Option 2 or 3, Option 2 or 3 would be preferred over Option 1. Option 3 would be preferred over Option 2, due to the fact that a shared facility at Option 2 may cause issues with customs. If IAGC could have their own transshipment facility at T5, then other airlines could use the facility at T3 (Option 3), which would be favourable to other airlines due to its location.



HEP Response

Following feedback from the evaluators, Option 3 has been developed in all AO's.

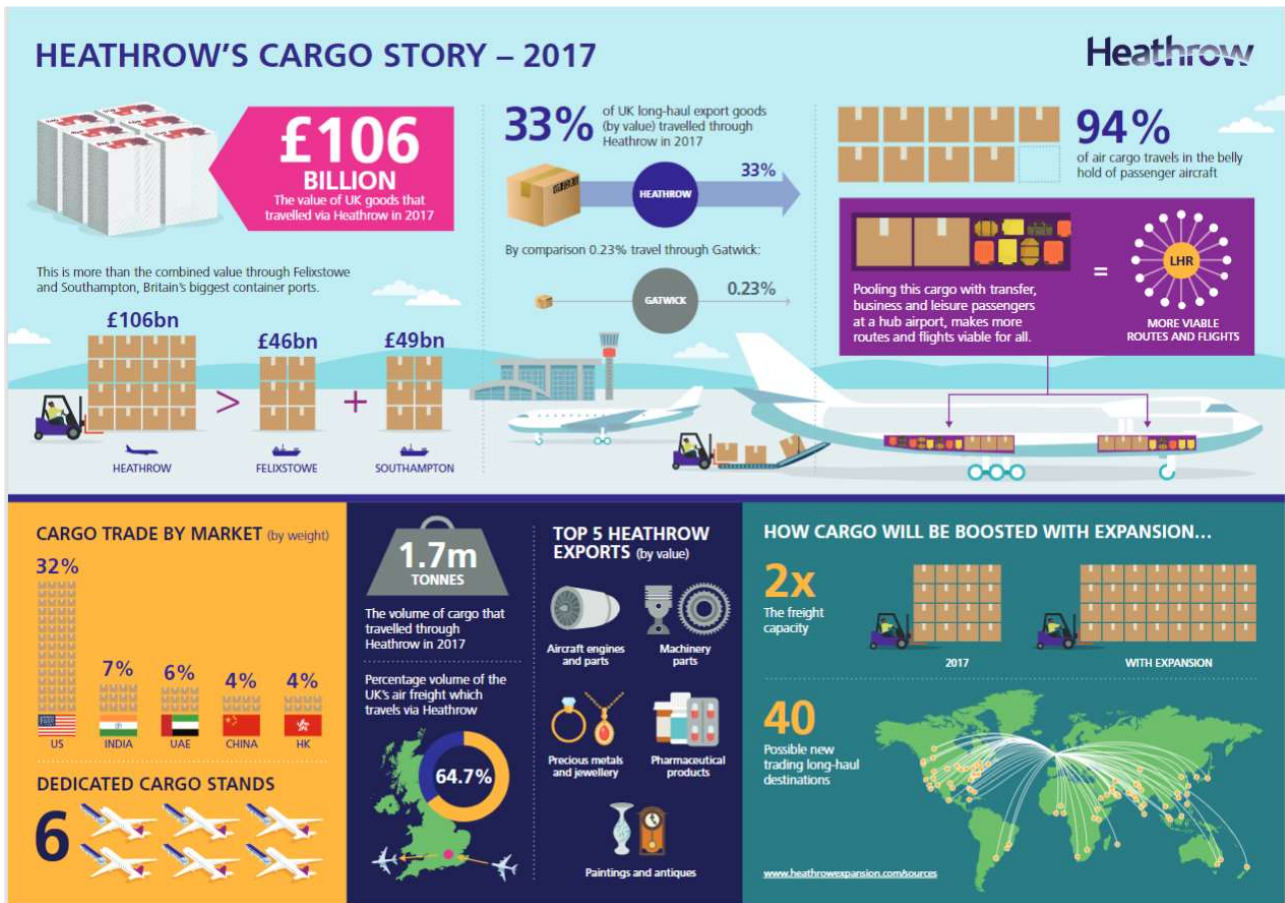


Figure 20 - Heathrow Cargo 'Factsheet'

5.6 Effects of the promotion of increased competition

Arcadis is aware of new Assembly Option assessment criteria and sub-criteria. These criteria have been incorporated into the Assembly Option appraisal process. It includes:

- **Criteria:** Ability to promote increased airline competition in the consumer interest
- **Sub-criteria:** Ability to support different growth scenarios and flexibility to enable new airlines to operate from Heathrow.

HAL has explained that this new assessment criterion is to assess the flexibility of the Assembly Options to enable new carriers to be introduced to the airport. HAL has also explained the delivery of certain scope, for example new satellites and extensions of existing terminals, will determine when new carriers can be introduced.

In theory, this should promote competition between airlines and subsequently drive competition on prices. This has the potential for increased consumer choice of carrier and destination at the airport which in principle should be in the interest of consumers.

In addition to this criterion, an important evaluation consideration is which assembly option benefits the consumer by offering new routes, and so expanding consumer choice earlier. This consideration, to what degree the assembly options allow capacity expansion to be achieved in a sufficiently timely fashion, is being studied by HAL. This impacts consumer choice and HAL communicated, through discussions with their chief economist, that they see consumer choice being broken into 2 broad categories of benefits:

1. Direct benefits – E.g. More flights, more destinations, less cost than one might otherwise pay.
2. Indirect/catalytic benefits – E.g. Economic impact given as Net Present Value (NPV), measured over 60 years.

HAL has completed 'willingness to pay' reports which have fed into the Insight Register. This has then been used to validate HAL's existing consumer insight and Strategic Requirements.

HAL has not explicitly applied this research to their Assembly Option appraisal process for developing a Masterplan to date. Work in this area is still developing and it is likely to be considered at more detailed stages of the design process.

5.7 Departure from current (Q6) consumer approach and the incorporation of future consumer's interests

HAL has sought to demonstrate they are incorporating consumer interest over and above its business as usual (BAU) engagement. HAL were keen to dispel any perception of a different programme of stakeholder engagement for BAU from that of the expansion programme.

HAL: "There isn't separate engagement for HEP, it all helps Heathrow to provide for consumers in the short, medium and long term. We have created a single customer team to ensure that as a business there is only one voice of the consumer that is being used across all timeframes."

HAL has shared with Arcadis the outputs of a number of pieces of analysis into future consumer demographics, behaviours, and interests, as well as research into what HAL calls its 2040 Megatrends. Taken from their Strategic Brief, "Megatrends can be thought of as transformative, global forces with the potential to define our future world with their far-reaching impact on business, societies, economies, cultures and personal lives."

- Connectivity and convergence
- Cognitive era
- Bricks and clicks
- Smart is the new green
- Social and geopolitical trends
- Health, wellness and wellbeing
- New business models
- Urbanisation – city as a customer
- Future of infrastructure
- Innovating to zero
- Future of energy
- New markets beyond BRICS*
- Future of mobility

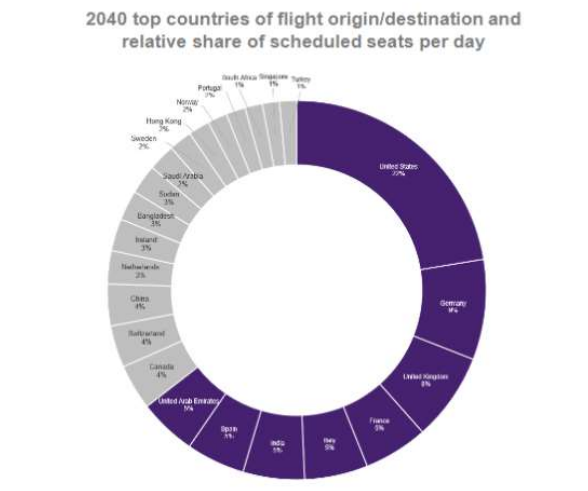
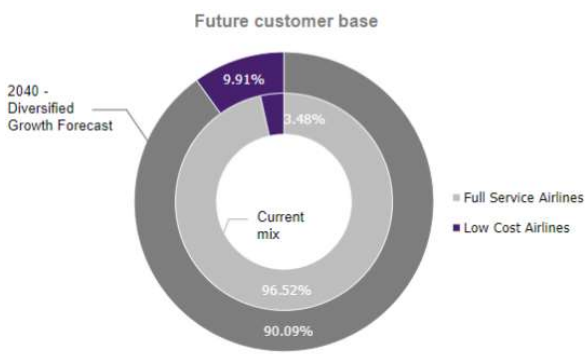


Figure 21 - HAL's identified Megatrends

Arcadis - Q: What measures are being considered to ensure the infrastructure which is delivered between now – 2026 can be flexible enough to continue to meet changing consumer interests beyond its initial construction?

HAL - A: “Within the Ops & Service discipline, every approach has been taken to ensure that there will be minimum disruption to the current operation. For example, each assembly option was evaluated across the disciplines to ensure that current levels of passenger experience are maintained between now and 2026. All disciplines have an abiding view towards ensuring future flexibility, at this stage of the development it is with a view point of ensuring that we preclude future opportunities to change rather than trying to design for account for potential future changes.”

This is also informing new forms of consumer insights research such as the “Next Generation Traveller” research mentioned in section 5.2.

5.8 Lessons learnt & reflections on best practice

Arcadis - Q: Have HAL sought to include lessons learnt from others large capital/infrastructure development programmes.

HAL - A: “We have gathered best practice from HS2, Water and other regulated sectors and been advised by the CCB on other best practice. Through Heathrow membership of AURA (Association of the Users of Research Agencies) we have able to pull on the experience of insight professionals from over 150 different UK companies in terms of best practice.

Several visits have been undertaken to learn from other international airports, both in terms of their expansion plans and existing operations. These have included, Atlanta, Las Vegas, Los Angeles, Hong Kong, Chennai, Istanbul, Frankfurt, Amsterdam, Munich, Dubai, Abu Dhabi amongst others

These visits have provided significant learning, for example:

- The Hong Kong approach to resilience in automated people movers has been tested in our options
- The covered landside interchange and commercial area in Munich has challenged the importance of developing an appropriate ‘front door’ to the expanded terminal due to the impact on customer experience.
- Istanbul’s approach to floor height within their new terminal to protect infrastructure flexibility and adaptability is being tested to ensure we can meet the needs of future passenger groups.”

While Arcadis has not investigated this question in any greater detail, HAL articulated in our engagement on this assessment and in other engagements relating to HEP completed by Arcadis, that they are leveraging guidance on best practice from research led studies to help shape their thinking. They do so by seeking to leverage insight from a “range of world class companies including Arup, Caroline Thompson Associates, Ipsos Loyalty and Truth Consulting and others”.

HAL also make extensive use of KPMG-Nunwood’s “6-pillars of Customer Experience excellence” within their insights team, and the implementation of those insights into the evaluation criteria creation process detailed in the MSDM.

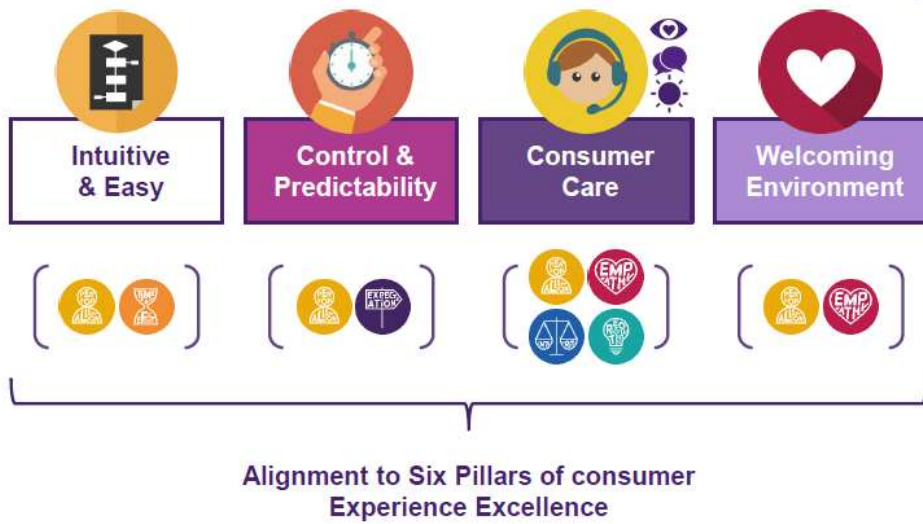


Figure 22 - Key Themes of Consumer Insight

HAL, through working with KPMG, has sought to gain access into consumer insights in a wide variety of industries, not just aviation, construction or capital delivery. Through this work HAL can draw upon a range of customer experience benchmarks.

6 Arcadis Workstream Documentation





HAL Consumer Review						
Ref	Item	Source	Date Create	Publicity Status	Received	
A	Consumer Engagement Strategy v3	HAL	Jun-18	Internal/confidential	19/07/2018	
B	Future Heathrow - Golden Thread	HAL	Jun-18	Internal/confidential	19/07/2018	
C	Masterplan Scheme Development Manual v5	HAL	Jun-18	Internal/confidential	19/07/2018	
D	Future Heathrow - Passenger experience - Evaluation Overview	HAL	Jul-18	Internal/confidential	19/07/2018	
E	Heathrow Strategic brief	HAL	?	Public Domain	19/07/2018	
F	Strategic Shedule	HAL	?	Internal/confidential	19/07/2018	
G	CCB Members Profile	HAL	?	Internal/confidential	25/07/2018	
H	Consumer Challenge Board Terms of Reference	HAL	?	Internal/confidential	25/07/2018	
I	Expansion Consumer Evaluation (Consumer "Golden Thread" for Masterplan Evaluation)	HAL	Jul-18	Internal/confidential	03/09/2018	
J	Heathrow Journey Mapping	HAL	?	Internal/confidential	03/09/2018	
K	Future Heathrow - TEAM UPDATE Master Planning Assessment, Evaluation and Operating Concept	HAL	Nov-17	Internal/confidential	03/09/2018	
L	con 1 Stakeholder Engagement	HAL	?	Internal/confidential	03/09/2018	
M	Heathrow KPMG Journey Mapping Assets	HAL	?	Internal/confidential	03/09/2018	
N	Passenger Experience - Evaluation - Evaluation 1 DRAFT TESTING EVAL	HAL	?	Internal/confidential	03/09/2018	
O	ARR T3 GEN V1.0 - Journey map	HAL	?	Internal/confidential	03/09/2018	
P	Arcadis Expansion Update - Consumer benefit	HAL	Sep-18	Internal/confidential	03/10/2018	
Q	Scheme Development Process	HAL	Sep-18	Internal/confidential	04/10/2018	
R	Heathrow Horizon 18th September - Assembly Options Workshop	HAL	Sep-18	Internal/confidential	10/10/2018	
S	Heathrow Horizon Master 18th September - workshop video	HAL	Oct-18	Internal/confidential	10/10/2018	
T	2017 Heathrow Cargo Factsheet	HAL	?	Internal/confidential	23/10/2018	
U	Cargo-strategy	HAL	?	Internal/confidential	23/10/2018	
V	Case study 1 - GRT MRT	HAL	Oct-18	Internal/confidential	23/10/2018	
W	Case study 2 - Pier service	HAL	Oct-18	Internal/confidential	23/10/2018	
X	Case study 3 - APM	HAL	Oct-18	Internal/confidential	23/10/2018	
Y	Case study 4 - M25 junction	HAL	Oct-18	Internal/confidential	23/10/2018	
Z	Case study 5 - Airfield	HAL	Oct-18	Internal/confidential	23/10/2018	
AA	Case study 6 - MT_terminals_publictransport	HAL	Oct-18	Internal/confidential	31/10/2018	
AB	Case study 7 - MT_cargotruckpark	HAL	Oct-18	Internal/confidential	31/10/2018	
AC	Case study 8 - MT_SRTaccess	HAL	Oct-18	Internal/confidential	31/10/2018	
AD	Case study 9 - MT_MPPAspace	HAL	Oct-18	Internal/confidential	31/10/2018	
AE	Case study 10 - MT Terminal 1	HAL	Oct-18	Internal/confidential	31/10/2018	
AF	Willingness to pay report	HAL	?	Internal/confidential	31/10/2018	
AG	Draft Client Breif_v0.99_AWG	HAL	Sep-18	Internal/confidential	31/10/2018	
AH	Draft Passanger Service Evaluation Report	HAL	?	Internal/confidential	31/10/2018	
AI	Insight Masterplan consumer review	HAL	?	Internal/confidential	31/10/2018	
AJ	Manual Consultation Report	HAL	?	Internal/confidential	31/10/2018	

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