AIRWAYS

# Auckland Air Traffic Control Tower Replacement

## Decision Document

**March 2025**

AIRWAYS

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# 1. Introduction

In November 2024, Airways conducted industry consultation to gather feedback on the Auckland Air Traffic Control Tower replacement options. This followed initial consultation in 2022, the outcome of which was to develop a hybrid solution with digital contingency. At that time, Airways indicated it would first investigate digital contingency and reconfirm the proposed approach prior to physical construction.

Having undertaken significant work and due diligence on digital solutions, the proposal consulted on in November 2024 was to construct a replacement physical tower as the most reliable, cost-effective and lowest-risk solution for Auckland Airport's current runway operations

Feedback was received from the industry in December 2024 and in February 2025, Airways engaged with the industry to clarify some of the points raised in the submissions.

This Decision Document provides a summary of the feedback received on the consultation proposals and, having carefully considered all of the feedback received, decisions made.

# 2. Industry consultation process

Consultation began on 8 November 2024 and submissions were originally due Wednesday 4 December 2024. This was extended to Friday 6 December 2024 at the request of stakeholders.

Airways sought feedback from customers and stakeholders on the following questions:

- **Question 1:** Do you have any feedback on whether the preferred option described in this paper is the right approach?
- **Question 2:** Based on the information provided, do you have any other feedback for the replacement of the tower?

Airways received six responses from the following organisations:

- Air New Zealand (Air NZ)
- Auckland International Airport (AIAL)

- Board of Airline Representatives NZ (BARNZ)
- International Air Transport Association (IATA)
- New Zealand Airline Pilots Association (NZALPA)
- Qantas

In reviewing the submissions, Airways noted there were some differing interpretations of the information presented in the consultation document. In February 2025, Airways published a clarification document to clarify information provided in the consultation document, based on feedback provided by stakeholders. This was supported by an industry meeting to discuss feedback and provide the opportunity to clarify information further. The meeting was held on Monday 17 February 2025 and attended by representatives of all submitters as well as the Civil Aviation Authority (CAA) and Ministry of Transport (MoT).

Following this process, Airways invited respondents to review and, if necessary, update their submission. AIAL provided an additional submission. Submissions are published on the Airways website along with the initial consultation document and clarification document.

The response submissions provided a broad range of feedback covering themes both specific to the tower replacement and more general feedback. This document summarises the key themes from the submissions received, as well the additional information requested during the clarification process.

# 3. Decision

As outlined in the November 2024 consultation document, there are a number of significant risks associated with a digital solution for the replacement of the Auckland Tower at New Zealand's largest and busiest airport. Airways appreciates the feedback received throughout the consultation process.

These submissions and feedback have been considered carefully. There are significant risks associated with a digital solution, including the higher ongoing costs (on top of the costs for constructing a location for the digital solution), and the operational complexity at Auckland Airport. These risks can be mitigated by the construction of a physical tower, and doing so does not preclude Airways from transitioning to a digital solution further down the track**. As such, Airways has decided to proceed with its preferred option of a replacement physical tower**.

# 4. Feedback specific to the tower replacement consultation

Airways received a range of comments as part of the responses to the Auckland Tower Replacement Consultation. The below outlines the feedback received that is specific to the tower replacement, and Airways' response to that feedback.

## 4.1 Preferred Solution Change

All respondents except NZALPA provided feedback and sought further clarification on the decision by Airways to no longer pursue a digital solution for Auckland air traffic control.

- AIAL sought to better understand why a 10 -year timeframe is insufficient to transition to a digital solution and requested details of any reports prepared in respect of the feasibility of a digital solution.
- BARNZ requested Airways make clear its intentions for digital aerodrome services including whether the need to urgently respond to sightline conflicts has contributed to the strategic planning.
- Air NZ and Qantas reiterated their 2022 position that a fully digital solution should be deployed at Auckland Airport and Air NZ reiterated BARNZ's request to clarification of Airways' digital aerodrome strategy.
- IATA reiterated its response from 2022 that a digital tower should be explored until and unless it is clearly demonstrated that the option is untenable due to safety or technical considerations.

### Airways' response

The November 2024 consultation document outlined Airways' rationale for not proceeding with a digital solution under Section 6.2.2 *Fully Digital Tower Option*.

In summary, the concern with a fully digital solution was that it introduced significant risks due to the lack of operational experience with digital towers at major international airports in New Zealand. This makes it challenging to ensure the safety and reliability of the service at the country's largest and busiest airport. Airways' priority is to provide safe and efficient air navigation services and the due diligence work undertaken between 2022 and 2024 did not provide sufficient confidence in the ability to maintain effective service at Auckland Airport with a digital solution in the timeframe available.

The key concerns as outlined in the consultation document were:

- There is an absence of proven examples in similar environments (outlined in more detail below).
- The technology requires substantial validation and operational trials to assess suitability, and the lack of precedent increases the risk of scope creep affecting both pricing and timing.
- The regulatory pathway is unproven and therefore the timing for certification is unclear.
- Ongoing operational costs are expected to be higher than the initial build cost for a physical tower with more frequent lifecycle replacements required for digital equipment.

There are also site limitations with only two suitable sites identified, one suitable for a digital mast and one for a mast or tower, as outlined in Section 4 of the November 2024 Consultation document. These limitations including restricting visibility from the second site if a mast was constructed on the first site. If a mast was constructed on the second site, there would be no ability to build a physical tower should the digital solution prove unfeasible.

In relation to the questions raised by AIAL regarding the 10- year time frame, and BARNZ regarding the digital strategy, Airways provided an update to all stakeholders on 5 November 2024 on its approach to digital solutions. This update included the baseline, scenario and strategy reports provided by THINK Research, and the current preferred option for digital air traffic services to transition to regional hubs over a 15-year period of time. However, no decision has been made and Airways is currently undertaking detailed consideration, research and due diligence prior to finalising a recommended approach. Further information was provided in the clarification document.

## 4.2 Auckland Capacity (International Equivalents)

One of the reasons given in the consultation document for moving away from a digital solution was that *"Auckland Airport's current and projected capacity exceeds that of any digital tower currently in operation globally."*

Clarification was sought by BARNZ, Air New Zealand and Qantas on the capacity of Auckland Airport compared with other digital installations specifically Budapest, London City, Western Sydney and Changi.

During the clarification meeting, there were questions raised about the collaboration between the number of movements in relation to digital installations.

### Airways' response

The below information was provided in the clarification document:

| Aerodrome | Annual Movements |
|---|---|
| Auckland | 157,000 (2024) |
| Budapest | 120,000 |
| London City | 60,000 (Max planning limit of 111k) |
| West Sydney (Not commissioned) | 63,000 (Est by 2030) |
| Changi | Prototype/Lab Only |

It was also clarified that NavCanada, known for its progressive approach to Digital Towers, has adopted a strategy of not implementing digital towers at aerodromes with more than 150,000 movements per year.

Movements are significant to the decision to implement a digital solution. A digital solution is replicating a three-dimensional view in two dimensions which alters the way that a controller monitors traffic in relation to perception of depth, motion and speed, spatial awareness, and field of view and perspective. There are also limitations to the speed to which a camera can adjust to contrast, or shift focus from near to far options, compared with the human eye.

While a digital airport service can replicate much of what a controller can see from a tower, a controller does need to adjust their technique to safely manage traffic in a two-dimensional environment. Technology has demonstrated this can be accomplished at lower levels of traffic, controller workload and complexity, but the technology is not proven at higher levels in regard to managing increased complexity, workload, technology requirements and safety management.

Given this information, Airways reiterates its concerns outlined in the consultation document that, given the scale of operations at Auckland Airport, it is not considered prudent for New Zealand's largest aerodrome to be the first to adopt a digital tower.

## 4.3 Cost Confidence

Airways stated in its 2024 consultation that the construction of a physical tower was the most reliable, cost effective and lowest-risk option. All respondents sought further clarification on costs:

- BARNZ and AIAL stated cost estimates for both the physical tower and digital contingency appeared low.
- AIAL reiterated its commitment to continuing to work closely with Airways throughout the construction process. AIAL noted that an updated costing exercise may result in reconsideration of the relative merits of the options and timings including the merit of extending the life of the existing tower.
- AIAL also requested further detail on the costing and constructability review for physical tower construction.
- Air NZ noted it is unclear what the overall price path looks like given the spend is proposed over three pricing periods and the asset enters the pricing asset book in 2029. They requested Airways to be rigorous in its approach to costing and managing the delivery of the replacement tower.
- Qantas noted the consultation document estimates showed the cost of constructing a new physical tower is comparable to implementing a fully digital solution based on work conducted by Airways and requested further analysis and assessments to be shared.
- IATA requested whether there are any tax advantages from the different options, and whether the depreciation schedules are different for each option based on their differing lifecycles. They also requested clarification that if 'Work-in-Progress' (WiP) is not part of the cost-base until the asset is delivered into service, the reason for the material figures allocated to the financial years prior to 2027, and for clarification on how the project risk will be determined particularly where cost-base has assumed operational from a date, but service delivery hasn't commenced?
- NZALPA's cost feedback related to their preference for a 70-metre tower and is covered below in more detail.
- In their supplementary response, AIAL raised a number of additional costs whose inclusion was not clarified by Airways.

### Airways' response

Airways provided cost estimates as part of the clarification document and these are reproduced at Appendix A of this document. As stated in the clarification document, these costs are based on feasibility work conducted in conjunction

with an external Quantity Surveyor and reflect current assumptions about the site, access and potential congestion due to other airport construction.

Costs will be further refined during the next design stages however Airways is cognisant of both its own and the wider industry's cost constrained environment.

As outlined in the clarification document, the cost difference between solutions is not cited as a reason to construct a conventional tower, and the increase on the cost would be represented as increased risk on an unsuccessful implementation of digital as well as increasing the infrastructure costs of a digital tower, albeit to a lesser extent. The cost driver for the decision is the risk of having to build both a higher cost Digital Contingency Tower and a conventional tower should a trial be unsuccessful.

## 4.4 Risk management process

AIAL requested information in their submission around risks related to the operational environment that the tower will be constructed in, specific to the assumptions underpinning the costings.

In the clarification meeting held on 17 February 2025, there was a request for further information on the risk management process undertaken to better understand how the preferred approach has been reached.

### Airways' response

Initial feasibility work has been undertaken in consideration of the known constraints around the operational environment in which the tower will be constructed. Once a decision has been made and Airways moves to the preliminary and detailed design phases, a comprehensive risk assessment will be undertaken. Airways will continue to work collaboratively with AIAL to ensure that risks are identified and managed as part of the construction process.

The key risks that have informed Airways decision is outlined in the November 2024 Consultation Document. These are the unproven capability of a digital solution at an aerodrome of the scale of Auckland Airport; site limitations that would render Airways with no effective site for a physical construction should a digital solution prove unsuitable; and the uncertain regulatory environment. When combined, these factors have the potential to limit or prevent Airways' ability to deliver safe and efficient air navigation services at New Zealand's largest and busiest airport.

## 4.5 Pier A1 impact on visibility from the Current Tower

Feedback was received in relation to the impact of Pier A1 on the visibility from the current tower. Some of this feedback conflated the primary and contingency tower and was addressed in the clarification document.

AIAL has requested further information to support the statement that the dimensions of Pier A1 will limit future growth.

### Airways' response

As outlined in the Clarification Document, the planned height of Pier A1 has not influenced the preference to proceed with a physical conventional replacement tower. It is a consideration in determining whether to proceed with a replacement tower now or in three years.

More details are included in Section 2.5 of the Clarification Document.

## 4.6 70 metre Tower option

In their response, NZALPA reiterated the preference for a 70-metre physical tower to control both the current runway and the proposed northern runway when it is complete. NZALPA outlines a range of factors including safety, serviceability and sustainability. They also reiterate the need for long-term thinking and that the construction of the northern runway is a certainty and the only uncertainty is when it will occur.

### Airways' response

Airways appreciates NZALPA's feedback which was formed in discussion with air traffic control staff at Auckland Airport.

Airways notes that the concerns raised by NZALPA regarding safety, serviceability and sustainability have been considered in the proposal to construct a 45-metre tower but with the consideration of the current runway only.

As outlined in the clarification document, a 70-metre tower concept, originally proposed to control both runways, was developed before Airways fully understood the details of AIAL's extensive development plans, many of which are still being planned, designed and communicated to Airways.

With current limited insights into terminal expansion and assuming the northern runway remains free of blind spots, positioning a 70-metre tower centrally will not necessarily eliminate blind spots for either runway. It may also introduce new blind spots, due to restrictions on surface view, leading to greater reliance on technologies or procedural control. Additionally, constructing a taller tower to mitigate these obstacles would result in significantly higher construction costs.

However, the 70 metre option was not a selected option from the initial 2022 consultation and was not included in the interim review point.

Airways notes NZALPA's feedback on the existing tower environment and cost of remedial work within the current tower. These concerns are shared by Airways and are outlined in the consultation document as part of the rationale for building a replacement physical tower sooner rather than later.

### 4.7 Stranded asset

At the consultation meeting held in February 2025, there was a concern raised about the physical tower construction resulting in a stranded asset should Airways transition to a digital solution at a future stage.

#### Airways' response

Airways is cognisant that the aviation industry is evolving and digital air traffic solutions are inevitable within New Zealand. At the same time, Airways' priority is to deliver safe and efficient air traffic solutions.

As outlined in Section 3.1 of this document and the clarification document, the preferred approach to future digital air traffic control services currently being investigated retains physical towers at main trunk aerodromes while transitioning regional aerodromes to remote digital services. Airways reiterates that no decision has been made and the project has an anticipated 15-year time horizon from commencement.

As outlined in the November 2024 consultation document, construction of a physical tower does not preclude future advancements. Should Airways move to a digital solution at Auckland Airport in the future, the new physical tower can still serve as a mast for mounting cameras and sensors, supporting a hybrid or fully digital setup if needed. This flexibility allows Airways to adapt to evolving technologies without compromising current safety and operational efficiency

# Appendix A: Cost clarification

**Conventional Tower Replacement Costs:**

| Budget Item | Cost |
|---|---|
| Construction Costs | $22,500,000 |
| Construction Escalation | $2,700,000 |
| Equipment | $1,800,000 |
| External Professional Fees | 7,331,089 |
| Project Resourcing | $5,170,040 |
| **CONVENTIONAL TOWER CAPEX TOTAL** | **$39,501,129** |

**Construction Cost Breakdown:**

| Main Heading Item | Cost |
|---|---|
| Site Preparation | $652,350 |
| Substructure | $1,773,005 |
| Frame | $2,010,500 |
| Structural Walls | $505,425 |
| Upper Floors | $319,200 |
| Roof | $422,700 |
| Exterior Walls and Exterior Finish | $3,320,500 |
| Stairs and Balustrades | $450,000 |
| Fitout | $4,416,000 |
| Sanitary Plumbing | $325,000 |
| Electrical Services | $460,000 |
| Vertical and Horizontal Transportation | $270,000 |
| Special Services | $50,000 |
| Drainage | $100,000 |
| External Works | $1,058,500 |
| Design Development | $1,198,739 |
| Preliminaries | $3,479,745 |
| Margins | $1,673,773 |
| Rounding | $14,563 |
| **Min Option Tower Only TOTAL** | **$22,500,000** |

## A.1 Inclusions & Exclusions

The following items were specifically included or excluded from the "Construction Cost" line item of the "Conventional Tower Replacement Costs" table. Some elements that are required, such as 'Airways Equipment & Fitout', are included in the other lines.

- Items Specifically Included
  - Preliminary and General allowances for construction Land side (18%). Building Design to meet Air side Design requirements, included.
  - Square tower footprint.
  - Allows for two levels of service floors within the tower.
  - General site clearance allowance i.e. no removal of existing structures or hard surfaces.
  - Allowance for connections into existing services only, assumed all site services are located at boundary of development.
  - Pavement and Hardstand allowances for Aircraft movements.
  - Walkway allowance for frame and roof structure only.
  - Design Development allowance of 7.5% based on current Feasibility level design information.
- Items Specifically Excluded
  - GST
  - Contingencies
  - Escalation
  - Currency Fluctuations
  - FF&E
  - Airways Equipment and Fit-out
  - Contaminated ground conditions
  - Boring through rock
  - Upgrading of infrastructure
  - Any works outside of the "service boundary"
  - Generators.
  - Any landlord (Auckland International Airport Limited) requirements
  - Consents, levies and infrastructure growth charges