[19] AIR NAVIGATION ASSESSMENT

QUEENSTOWN CABLE CAR

To: Southern Infrastructure Cable Car Project Team

From: Navigatus Consulting

Date: 31 Oct 2025

Queenstown Cable Car Project – Stage 1

Anticipated and known adverse effects – Air Navigation

1. Scope

This report sets out the known, potential and anticipated adverse effects (*possible effects*) on air navigation of the proposed Queenstown Cable Car project. These consider both construction and operational phases of the project. As this document is intended to support a Referral Application process under the Fast-track Approvals Act 2024, it does not include an assessment of the effects. Rather its intended purpose is to indicate the assessment process that will be included in the substantive application. While the aviation sector uses particularly technical and specialist terminology, this memorandum uses, in so far as is practicable, plain English terminology.

2. Relevant Aviation Context

2.1. Legal and Regulatory Framework

The Civil Aviation Authority (the CAA) is the regulatory agency that safeguards civil aviation in New Zealand. The CAA controls and monitors their ongoing adherence to safety standards.

The CAA has safety obligations under the 1944 Chicago Convention that established the International Civil Aviation Organisation (ICAO) and the NZ Civil Aviation Act 2023.

The CAA enforces secondary legislation in the form of Civil Aviation Rules (CARs) made under the Act. All aviation system 'participants' and other parties whose activity may influence aviation safety are required to comply with CARs. The CAA also issues guidance on how to comply with CARs in the form of Advisory Circulars (ACs). ACs contain information about standards, practices, and procedures that the Director of CAA (DCA) has found to be an acceptable means of compliance with the associated CAR.

If ACs cannot be complied with in full, then "alternative means of compliance" (AMOC) can be tabled. As the system is 'risk based', in complex cases a "safety case'' may be required to demonstrate how safety is assured.

NZ Aviation References relevant to Queenstown Cable Car Project

- CAR Part 139 – **Aerodromes Certification, Operation and Use**
- AC139-6 – **Aerodrome Design Requirements**
- AC139-15 – **Aeronautical Studies for Aerodrome Operators**
- AC139-10 – **Control of Obstacles**
- CAR Part 77 – **Objects and Activities Affecting Navigable Airspace**

Local Planning Reference relevant to Queenstown Cable Car Project

A. Queenstown Lakes District Council (QLDC) District Plan – **Notice of Requirement for Designation 4 (2015)**

2.2. Responsibilities

All 'participants' in the aviation system (airlines, airports, pilots etc.) must adhere to the CARs. Similarly, the Civil Aviation Act and CARs also apply to 'non-participants' – that being persons that are not within the aviation system – but whose actions may impact aviation safety.

Part 77 is the most relevant in the case of those parties intending to undertake construction near to aerodromes. The objective of this Part is to ensure aircraft safety is not compromised by any visual or structural obstacle, or by persons proposing to construct, alter, or use such an obstacle that could pose a hazard in navigable airspace. Aside from physical structures, hazards to navigable airspace covered by Part 77 include, for example, lights, lasers, colours, construction dust, etc.

2.3. Aerodrome Protection Surfaces

Aerodrome protection surfaces are imaginary three-dimensional surfaces established around an aerodrome to safeguard aircraft operations by preventing obstacles from encroaching into the airspace. These Obstacle Limitation Surfaces (OLS) define the limits to which objects can project into the airspace without affecting the safety and regularity of air operations. They are crucial for maintaining safe flight paths for both visual and instrument approaches, and ensuring the aerodrome remains usable. The OLS requirements for aerodromes operating medium and large transport aircraft (as is the case for Queenstown) are set out in AC139-6.

The OLS of Queenstown aerodrome together with the associated planning restrictions are also set out in the QLDC District Plan. The purpose of these restrictions is to limit the construction of any structure or facility which may inhibit the safe and efficient operation of Queenstown Airport. Any party proposing activity or development that penetrates the aerodrome's OLS must first seek approval by QAC and must comply with CAR Part 77.

Protection Surfaces most relevant to the Cable Car Project

The following OLS are directly relevant to the Cable Car project and need to be considered when developing the detail of designs and routing option (refer Figure 1):

- The runway side transition surfaces at the western end of main runway and northern end of the cross-runway. *Note: QAC-initiated changes to these surfaces are anticipated and so the restrictions related to the main runway may prove be less constraining than currently indicated in the District Plan.*
- Take-off Climb and Approach OLS (for both the western end of main runway and northern end of cross runway). *Note: In the case of the cross runway, given close-in terrain, there are surfaces for both a straight flight path and a curved flight path.*
- Inner Horizontal Surface to the north of the aerodrome. *Note: this surface is a flat plane 45m above the aerodrome elevation. Given the mountainous nature of the area much of the Inner Horizontal Surface is penetrated by close-in terrain.*
- Type A protection surface at the western end of main runway. *Note: Type A surfaces are only prepared for international airports. Obstacles penetrating these surfaces influence aircraft allowable take-off weight. Given Queenstown's short runway, any such pentation will have a direct material effect on the commercial viability of international routes out of Queenstown (e.g. to Australian destinations).*

Figure 1 Queenstown Airport: Airport Approach and Protection Measures

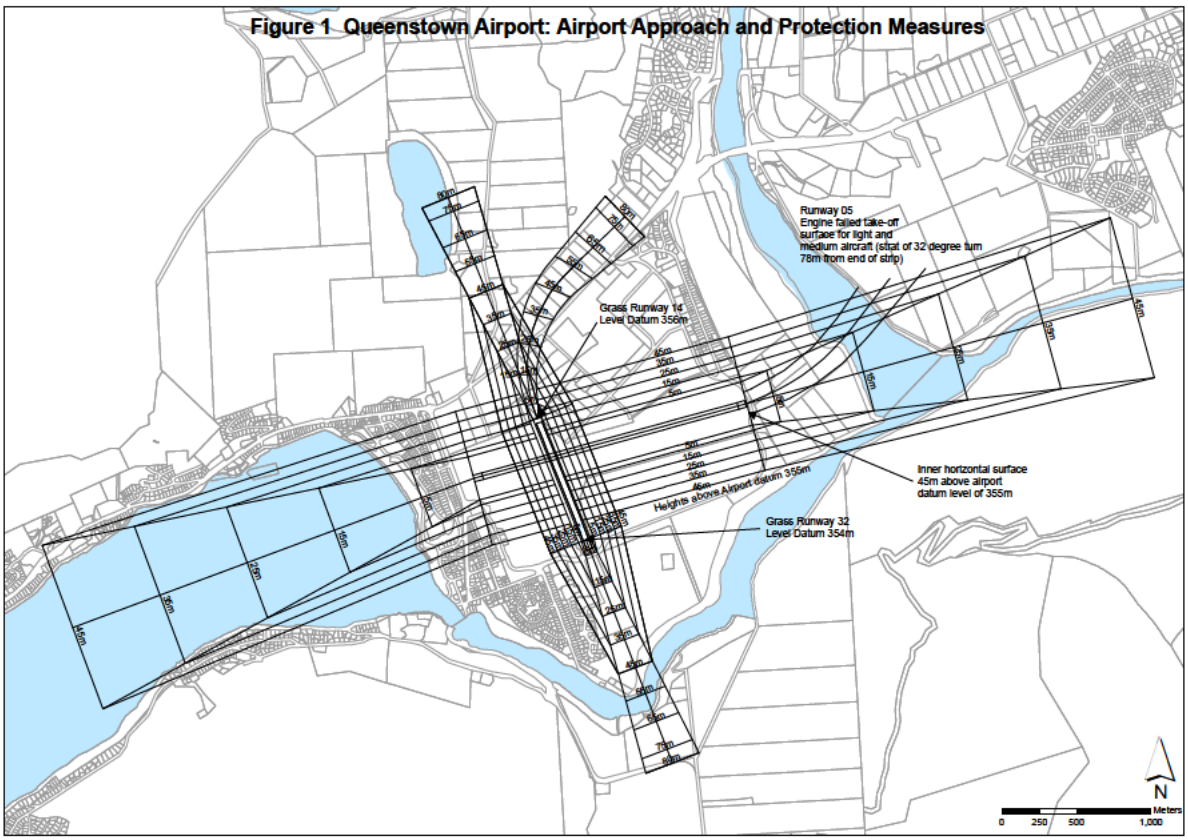

Figure 1: Aerodrome OLS as shown in District Plan.

2.4. Airspace and Terrain

The airspace around Queenstown aerodrome is unusually complex, with both close-in terrain and the closeness of urban development requiring many of the operating procedures to be 'non-standard' and also demanding a high level of pilot skill. Given the regular passenger transport operations (jets and turbo-prop), the airspace is "controlled" – that is, an Air Traffic Control (ATC) unit manages the airspace. ATC operate under a rigorous set of procedures set out in the Manual of Air Traffic Services (MATS).

Given the local complexities and constrained navigable airspace, any proposed changes to the operating environment require careful analysis based upon both simulations and detailed stakeholder engagement to develop effective mitigations.

2.5. Commercial

Given the closeness of terrain and urban development, complex mix of operations, and relatively short runway, Queenstown Airport Corporation's (QAC) commercial opportunities are more constrained than is normal for an international airport.

The QAC Master Plan has recently been through public consultation and has been endorsed by QLDC as the majority shareholder. The next update will be completed in FY26 for the FY27 to FY36 period.

3. Potential Effects of the Proposed Cable Car Project

3.1. Areas of Potential Effect

Given the proposed routing of the cable car over high terrain and in close vicinity of the aerodrome; much of the physical infrastructure of the cable car system including pylons, cables, and equipment used during construction will penetrate various protection surfaces of the aerodrome (refer Figure 1). Based upon the current concepts and proposed and alternative cable car routes, there are three areas of potentially direct effects on the safety and operability of air navigation:

- **Elevations of 400m or greater above mean sea level (AMSL).** All infrastructure above this elevation penetrates the aerodrome's inner horizontal protection surface.
- **Western end of the main runway.** This runway is used by domestic jet and turbo-prop passenger services and also international jet services.
- **Northern end of the cross runway.** This runway is used almost exclusively by airplanes serving the local aviation tourist services (ref Figure 2 and 3).

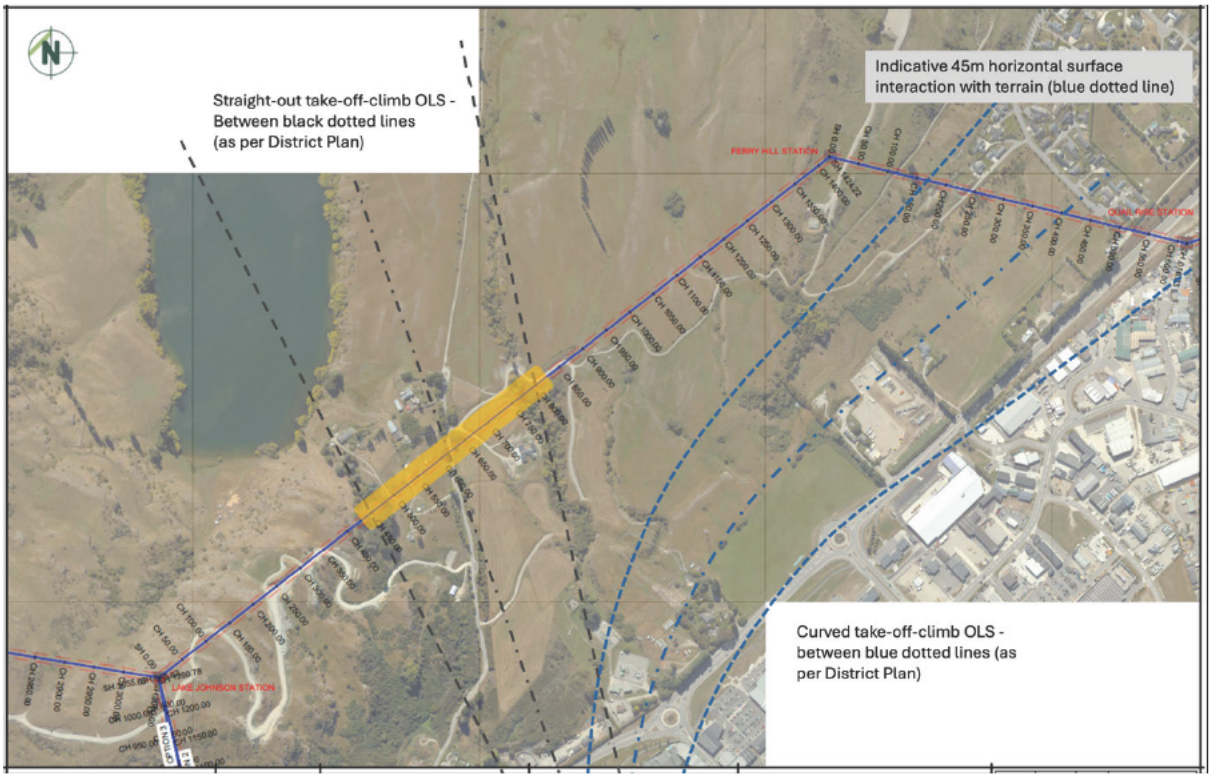

Figure 2: Illustration of cross-runway take-off and approach OLS overlaid on proposed cable car route (Frankton North to Ladies Mile - Route A). As the terrain penetrates the straight-OLS, the cable would also (orange area). This is probably not the case for the curved-path OLS.

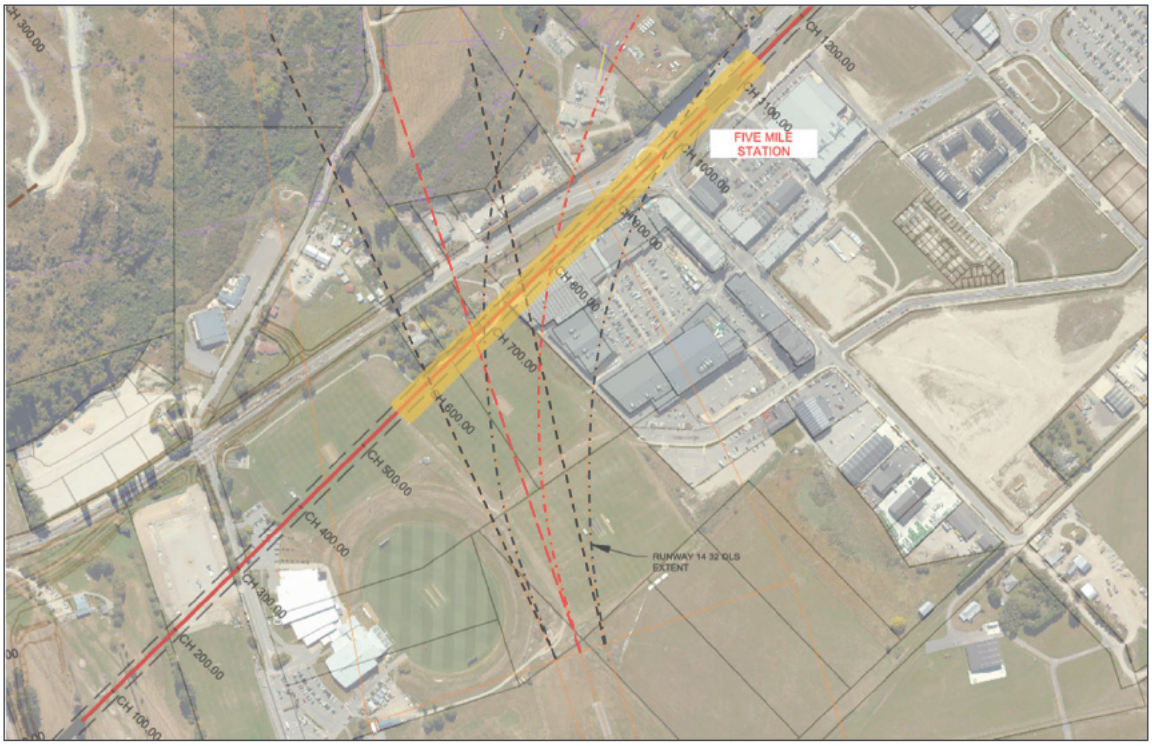

Figure 3: Illustration of cross-runway take-off and approach OLS overlaid on proposed cable car route (Frankton North to Ladies Mile - Route B). The orange area shows the length of cable route that passes under the two OLS. Note that the curved OLS forms a lower surface than that of the straight OLS.

3.2. Methods of Addressing the Effects

The QLDC District Plan is explicit in the requirements to engage with QAC for any proposed activity or developments in areas that will or may penetrate the air navigation protection surfaces of the aerodrome. When considering the potential effects of such activity or development, QAC are required to understand the inherent risks, assess the effectiveness of proposed mitigations, and compliance with their aviation certificates. If QAC determine the risk to air navigation is unacceptable, they may dis-allow the activity or development or require changes so that the risk is determined to be acceptable. In doing so QAC may seek the advice of the CAA.

The cable car design process will need to incorporate:

- Refining the engineering design of the cable car infrastructure with the aim of avoiding or limiting the penetration of the protection surfaces. Where penetration cannot be avoided, any risk to air navigation must be shown to be low enough so as to be acceptable. Determination of the risk typically involves the preparation of an aeronautical study for consideration by the airport and acceptance by the CAA.
- Selecting and modifying the cable car route and possibly height of structures to eliminate or reduce the risk to, or effect on, air navigation safety and the utility of aviation.
- Ensuring the design of the cable car does not result in concentrations or groups of people in an area at the western end of the main runway that forms an area referred to as the Runway End Protection Area (REPA).
- Compliance with CAA requirements regarding the effect of construction activity on aviation safety and air navigation.
- Compliance with CAA requirements regarding the marking and lighting of structures.

Elements of the design approval process that SIL will need to consult on and that may need to be undertaken by aviation stakeholders are:

- QAC assessing the air navigation risk of any temporary or permanent activity or penetrations of OLS and determining if that can be allowed.
- Local general aviation (GA) operators undertaking risk assessments as part of modifying current flight procedures or other means to address aviation risk and public safety risk.
- QAC assessing and possibly accepting some utility and commercial impact of changes to mitigate aviation safety risk to facilitate the development of the cable car routing.
- QAC seeking approval for any proposed changes to operations and hence to their aerodrome operator's certificate, and CAA approving these.

The Civil Aviation Act and associated CARs put in place processes in which the risks of effects can be identified, assessed, and subsequent mitigation development and compliance activity considered. The associated Civil Aviation legal regulatory obligations will apply to the cable car developer and any aviation organisations and licenced personnel who may potentially be affected.

These extant requirements will ensure air navigation safety and capacity implications are fully understood and assured.

The process for considering each cable car route and option is similar in principle but will need to differ in detail in each case. The following process diagram illustrates the various steps that will or may need to be progressed (see Figure 4). The following is noted:

The requirement at the western end of the main runway will be that all parts of the cable car structures must be built so as to be under the runway's Type A protection surface.

The selection of Frankton North to Ladies Mile (Route A) and the Frankton Flats to Ladies Mile (Route B) will need to consider both aviation and non-aviation factors. In the case of Route B, the aviation requirement will be that the cable and associated structures do not penetrate the curved-flight-path or straight-flight-path OLS at the northern end of the cross runway and meet any required imposed by CAA (under CAR Part 77 processes). In the case of Route A, as penetration of the straight-path OLS cannot be avoided, the requirement will be to, through a combination of cable-way design and changes to flight approach and departure procedures; seek to reduce cable-strike risk to 'as low as reasonably practicable (ALARP) and to a level acceptable to QAC (as required under the Airport's Safety Management System put in place under CAR Part 139) and the CAA (under CAR Part 77 processes).

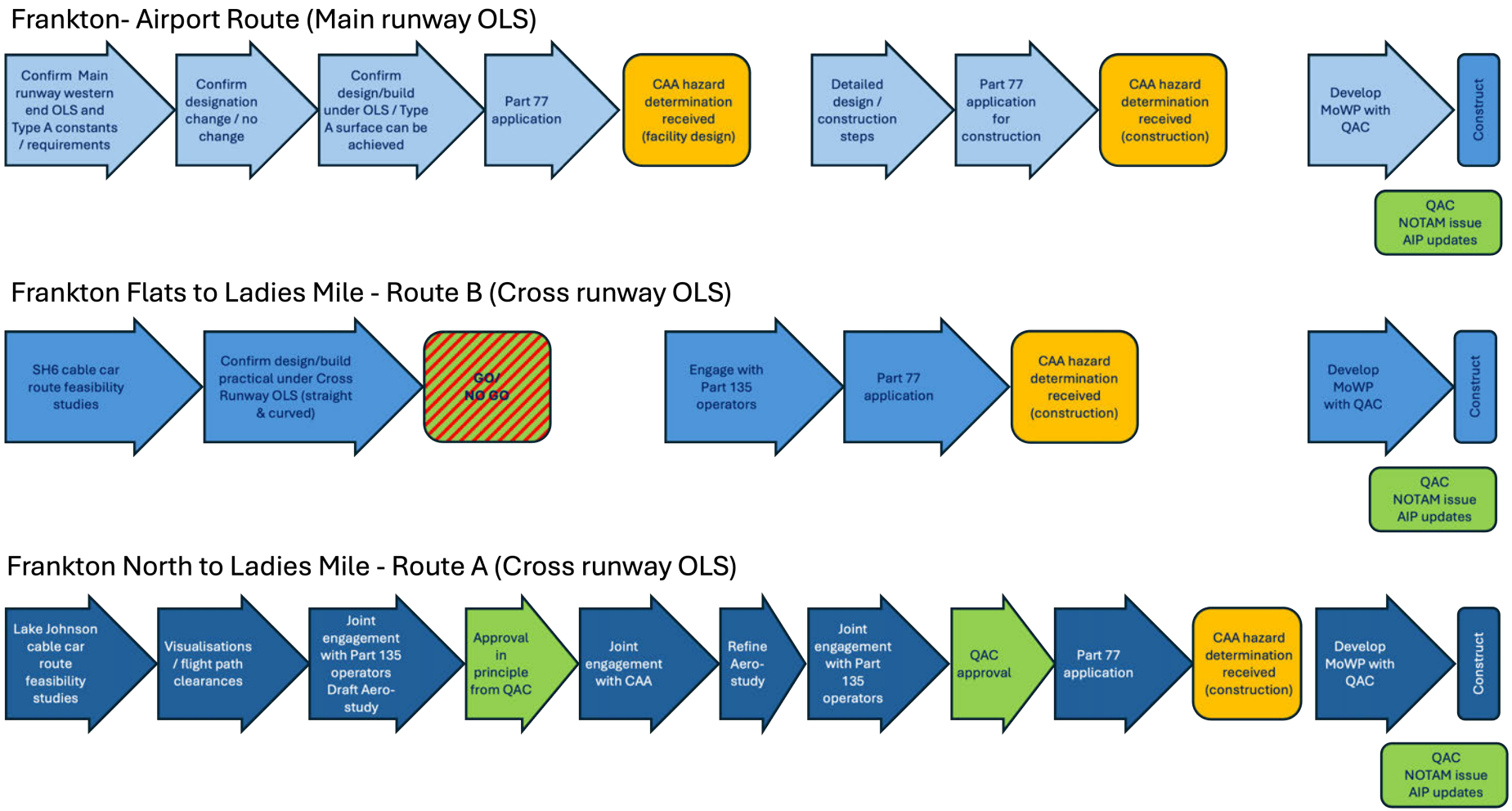

Figure 4: Illustration of processes to consider and address aviation related requirements.

Quality Control

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