AIRWAYS

Ryans Road Industrial Development

Fast Track Application

Airways Submission Supplementary

AIRWAYS

Contents

1. Executive Summary	**3**
2. Requested Response	**4**
2.1 Outline of Request by The Panel	4
3. Safeguarding Assessments	**5**
3.1 Non-cumulative Assessment Bias	6
3.2 Over-reliance on a “2° Building Rotation” Mitigation	7
3.3 ILS Glidepath Disturbances	7
3.4 DME Loss of Information	8
3.5 Radar Impacts	9
3.6 Conditions of Consent	10
4. Recommendations	**10**
4.1 Additional Due Diligence Required	10
4.2 Recommendations to The Panel	10
5. Conclusion	**11**

1. Executive Summary

Airways Corporation of New Zealand Limited (Airways) appreciate the Panel's opportunity to respond to the further assessments relating to the industrial development in the Ryans Road precinct adjacent to Christchurch International Airport.

In response to 'Minute 6 of The Expert Panel' (Minute 6) Airways was asked to comment specifically (and individually from Christchurch International Airport Limited) on the Cyrrus, Navigatus, and L&R report's referenced in Appendix 1 of Minute 6 (collectively the safeguarding assessments) undertaken to evaluate the effects of the proposed development on nearby aviation navigation facilities.

The aviation safeguarding study recommend in Airways' initial submission to the Panel is part of the due diligence required to examine the potential risk to the safe operation navigational and surveillance equipment and services resulting from the proposed development. An initial assessment is often expected to reveal the requirement for additional reports or testing to ensure that safety standards are adhered to. The fact that the safeguarding assessments have been carried out should not be interpreted as demonstrating that aviation safety risks associated with the development have been adequately addressed.

Airways Communications, Navigation and Surveillance (CNS) engineers do not consider the study is of sufficient depth or rigour to address aviation safety risks, nor the solutions discussed to properly mitigate the risks to aviation safety if the development is approved as currently proposed. Principal areas of concern are:

- The safeguarding assessments are a desktop exercise, assessing the interference of the proposed development in isolation, not in conjunction with the surrounding area.
- Some proposed mitigations are unrealistic or implausible in this local context (e.g. rotating a building by 2 degrees, or 'code removing' selected buildings from the display).
- The modelling and parameters depicted are overly conservative which underplays the risk involved.

Importantly, the studies place significant reliance on Airways' ability and willingness to adjust, configure, or optimise aviation equipment and introduce procedures to mitigate the effects of the development, rather than requiring the applicant to avoid or fully mitigate those effects at the design stage. This could result in ongoing operational burdens and costs for Airways, and is not consistent with the principle that safeguarding should primarily be achieved by controlling

design, land use and development, and not achieved by operational workarounds.

Airways does not support the proposed Ryans Road Industrial Development in its current form because the safeguarding evidence provided does not demonstrate that aviation safety risks to critical CNS infrastructure (ILS, DVOR/DME, PSR/SSR) are fully understood, conservatively bounded, and reliably mitigated for the full build-out life of the development.

While Cyrrus and Navigatus conclude the impacts are “minor/acceptable” and “manageable,” those conclusions rely on highly specific building parameters, post-build operational or technical “mitigations” that are not available in practice, and are based on a project-only (non-cumulative) assessment, meaning that effects from this development must not be viewed in isolation, but all surrounding structures must be taken into account as well. Cyrrus explicitly ties acceptability to development being built exactly within modelled parameters. Navigatus also notes that lots will be sold and final building positions, heights, and floorplans “cannot be confirmed at this stage,” increasing uncertainty.

Airways supports the intent of the fast-track process to expedite development where appropriate; however, that intent cannot reasonably extend to developments where material safety risks remain uncertain, and where mitigation techniques are unproven or dependent on non-assured future actions. As the responsible provider of air navigation services to all air traffic in New Zealand, Airways strongly opposes the grant of consent for the Ryans Road Industrial Development without further work that is required in these circumstances.

2. Requested Response

2.1 Outline of Request by The Panel

Airways has been asked to respond to the Panel in relation to the proposed Ryans Road development. Specifically, the Panel has requested (in Appendix 1 of Minute 6):

- If Cyrrus and Navigatus are recognised experts and have been recommended by Airways to undertake the study, and whether any further technical assessments or peer review(s) are necessary.
- Commentary on the conclusions of the safeguarding assessments.

- Identification of any major information gaps or uncertainties in the studies, influencing the confidence in the effects on aviation safety (and if there are any measures available to address those uncertainties or gaps).
- Assessment of whether the proposed mitigation and management measures specified are adequate and appropriate to manage effects on aviation safety.
- Whether the proposed conditions capture all recommended measures that should be taken in such circumstances, or if additional measures required to address aviation safety matters.
- Whether Airways shares the reports' conclusions that the effect of the development on air navigational services is 'acceptable,' and the certainty of the proposed mitigations, including comment on the level of acceptability of the various identified effects and certainty of outcomes provided by the conditions.

The response to these requests is set out in section 3 below.

3. Safeguarding Assessments

Airways confirms Cyrrus and Navigatus are recognised experts in aviation safety and have been recommended by Airways as being appropriately qualified to assess aviation impacts. However, that these experts are appropriately qualified does not mean the assessments provided are adequate in the context – Airways considers more information is required to demonstrate that the effects of the proposed development on aviation safety can be adequately and safely managed.

The request by Airways for the applicant to conduct a safeguarding study was part of an initial investigation to assess what further work would be required to demonstrate that any modification leave the CNS infrastructure in a condition that is at least as safe a condition or that there is no reduction in coverage of the services they offer. Any perceived or actual reduction in safety must be rigorously and critically assessed. The scale of any additional work to sufficiently mitigate detrimental aviation safety effects and how these will be verified (flight inspection, analysis, etc.) will be agreed upon between all parties before it is conducted. Further work can range from additional experimentation to a comprehensive aeronautical study requiring significant analysis and input from multiple subject matter experts conducted over several months. Certain mitigations also require regulatory approval by the Civil Aviation Authority (CAA).

Airways had requested (and the applicant agreed) to review the applicant's completed safeguarding assessments so that our engineers could confirm its robustness, with a view to determining what next steps would be required. This was not adhered to and the applicant chose instead to lodge the safeguarding assessments with the Pannel and request the Panel to continue toward making a decision.

The safeguarding assessments raise substantial concerns from technical, regulatory, and liability perspectives. It appears overly conservative in its assessment and invokes mitigations that are either wholly unrealistic or cannot be applied in actuality within our present configuration. If the applicant had discussed this with Airways prior to lodgement, Airways could have worked with the applicant and its consultants constructively to try and find workable solutions that do not adversely affect aviation safety.

Within the short response timeline available, Airways has identified the following significant shortcomings, information gaps and uncertainties that most affect aviation safety. Airways' responses show that there are significant shortcomings, information gaps and uncertainties, and the mitigation and management measures proposed by the applicant are not adequate or appropriate to manage aviation safety effects. Airways' view is that further technical assessments and/or peer reviews are considered necessary to address the aviation safety effects.

3.1 Non-cumulative Assessment Bias

The safeguarding assessments are framed around whether this modelled development (with a particular set of assumed buildings) is acceptable, rather than whether CNS performance remains safe for aircraft operations under all cumulative and foreseeable development in the wider precinct.

- Cyrrus' "acceptable standard" conclusion is explicitly conditional on development occurring within the modelled parameters (height, width, and orientation), or else it must be re-modelled.
- The Navigatus report states the lots will be sold to individual owners and exact building parameters "cannot be confirmed at this stage," meaning the Panel is being asked to accept risk without fixed, auditable design detail.

Both points indicate that further study is required to determine what is 'acceptable' within this context.

Airways' view is that the proposed industrial development will have a greater effect on the services and further study is needed to ascertain how much additional mitigation is required.

The recent history of local works demonstrates that a one-off "model case" is not sufficient for a staged, multi-owner industrial subdivision adjacent to precision approach aids and a surveillance radar system. The safeguarding framework must address cumulative build-out, design drift, and future nearby developments—otherwise risk is simply deferred until after construction, when it is far harder and costlier to correct for interference to the CNS infrastructure. This is not an acceptable approach and that the issues need to be addressed prior to construction to avoid adverse effects on aviation safety.

3.2 Over-reliance on a "2° Building Rotation" Mitigation

The Cyrrus report identifies "significant disturbance" to the ILS glidepath on runway 02, even after reducing or removing nearby buildings, due to multipath interference to approaching air traffic. Building orientation is then explored as a mitigation and the report models two 20m buildings rotated counterclockwise by 2°. Airways considers promoting this as a mitigation unacceptable without more information further detailing the building material specifications which will identify the potential level of electromagnetic spectrum interference.

The premise that performance protection is achieved by "fine-tuning" geometry rather than by maintaining robust, conservative exclusion or controlled zones is not considered adequate. Although Cyrrus asserts the incremental effect is "minor" and "imperceptible," Airways disagrees and remains concerned that a mere 2° orientation change is an unrealistic mitigation in a real-world industrial build environment without further study. Unverified assumptions based on theory that have not been tested onsite cannot be relied upon in a report of this nature.

3.3 ILS Glidepath Disturbances

The safeguarding assessments note the glidepath modelling tool assumes "a perfectly flat terrain." Cyrrus' own results show the scenario produces substantial simulated glidepath disturbance on runway 02 (e.g., Zone 2 ±5.4 µA), which Airways believes would produce 'scalloping' or disruption to an aircraft's flight path in real-world approaches. This phenomenon is unacceptable to aviation safety. Further experimentation and study in collaboration with Airways is required to properly assess the impact this could have.

The Cyrrus mitigation proposal that offers the degradation of the ILS status from Cat 3 structure to Cat 1 is not an acceptable option at Christchurch International Airport. The Cat 3 ILS structure is a service level provided in agreement with Christchurch International Airport Limited and both domestic and international airlines. This would also require significant physical modification of the Airways ILS equipment and recertification, and constitutes a time-consuming and expensive undertaking.

In summary, the mitigations presented are not suitable in this environment. Antenna radiation patterns are overly idealistic, and not plausible real-world examples.

The Cyruss report is overly reliant on modelling and needs to use more actual data from local sources (council, surveyors, etc.) to verify results.

3.4 DME Loss of Information

The Cyrrus report acknowledges reflections from the proposed development cross the extended runway centreline and states: “In theory an aircraft flying at 100 knots could lose DME range information for up to 18 seconds in the final 0.5 NM of the approach…” Cyrrus then relies on “velocity memory” to compensate.

Airways considers this mitigation totally unacceptable. Under no circumstances is it appropriate to have a planned loss of navigation signal for aircraft on approach. Aircraft flying a DME approach are fully reliant on receiving this information constantly (linked to their autopilot), especially during periods of darkness or inclement weather. A predicted DME information loss of up to 18 seconds during a critical phase of flight is, on its face, a serious integrity and resilience issue which cannot be easily dismissed. Velocity memory or dead reckoning is an emergency function for loss of signal due to weather or malfunction and simply cannot be used as a mitigation under these circumstances. At a minimum, it requires (a) strict avoidance by design, or (b) demonstrated acceptability through flight inspection evidence and an operational safety case, and (c) regulatory approval from the CAA; not a modelling narrative.

The Cyruss report also mentions that ‘SDES is not currently enabled on the DME ground transponder, configuring the DME with SDES will, if required provide immunity from building reflections.’ SDES can be used, however it is not a wise use of this function as it creates a blind range (creates an area where aircraft cannot detect distance to the ground installation) and decreases the DME transponder reply efficiency to the aircraft, together with reducing the number of aircraft that can use this facility. Exploring SDES as a mitigation is possible, but

will require internal assessment, flight inspection evidence and trials over a period of months to provide the verification.

3.5 Radar Impacts

The Cyrrus report states the Indra PSR pencil beams “can be configured to avoid radar illumination of the proposed development,” and that the SSR builds an internal reflector file to ignore reflections. Navigatus further suggests post-build mitigation via “software code to remove static building returns,” and concludes Airways would have scope to simply “code remove” offending buildings.

These statements are presented as though configuration and processing headroom is effectively unlimited and consequence-free. In reality, radar configuration changes are a trade-off between coverage, detection performance, clutter mitigation, and resilience, particularly when many existing buildings already penetrate safeguarding surfaces. The mitigations listed are pure assumptions and are not plausible with the operational configuration of the radar. Radar systems are procured to deliver specific performance to de-conflict air traffic in busy areas, such as Christchurch International Airport. Radars are extremely complex and sensitive units and any mitigation that decreases the sensitivity of the radar will increase the potential for the loss of or false targets which would raise safety concerns.

‘Code removal’ of buildings from radar screens is not possible with this installation. Airways is required to provide a standard of coverage at main trunk airports. Visibility must be maintained within controlled airspace and any reduction will present itself as increased workload for Air Traffic Controllers, disrupted airspace and reduced flight efficiency unnecessarily increasing fuel costs and carbon miles.

Lifting the beams (meaning that the radar beam is tilted further upward to avoid ground clutter)is presented as a solution, but the impact of this is underplayed, especially when separating smaller general aviation aircraft from commercial airliners at lower altitudes. The report takes an overly simplistic view of reflections and to achieve the mitigations as stated would severely compromise radar performance below the specified standard in a sector where it is necessary to see high volume traffic. Although yet to be fully analysed (given the timeframes available to prepare this response), this would reduce detection at greater ranges over Lake Ellesmere, Tawhaki airfield, and the Port Hills GA corridor. It would also hamper approaches from aircraft over the city. Airways engineers disagree with the assertion that this will only be an issue for aircraft under 1000ft (20nm sample range).

An aeronautical study must quantify the development's impact on the current radar operations accurately to prove that there is an acceptable margin of radar configuration available. The operational impacts of any configuration changes need to be within acceptable limits of what can be achieved and not merely assumed that any configuration change is achievable within acceptable limits. The time taken to test and prove the modification to the configuration may take considerable time with no guarantee of success.

3.6 Conditions of Consent

Airways cannot comment on, suggest amendments to, or responsibly engage with the proposed conditions in the absence of further analysis. To do so would risk proceeding on the basis of untested assumptions—specifically, that the relevant safety issues are already known and fully characterised, that they can be reliably quantified, and that they are capable of being appropriately managed through conditions of consent. This is not the case. Without the certainty of this information, Airways cannot support the imposition of conditions that may not address the full scope or complexity of the aviation safety risks presented by the proposed development.

4. Recommendations

4.1 Additional Due Diligence Required

Airways believes the safeguarding assessments have raised some valid points regarding interference; however, we disagree that the mitigations as they stand are sufficient. Experimental testing is required to be carried out to ensure risks are assured to be within acceptable limits for aviation safety. This has not been achieved at this stage. This will include further study and formal flight inspections to provide a high-fidelity, justifiable result, rather than placing trust in a single unverified computer model. Airways must be involved in this process.

4.2 Recommendations to The Panel

Airways respectfully requests that the Panel decline consent as currently proposed or defer a decision until the above due diligence is completed and the residual risk to aviation safety is proven to be as low as reasonably practicable. Additional risk cannot be introduced. The typical pathway for such a development would be collaborative meetings with stakeholders to determine what further work is required. This may include analysis, flight testing, trials or additional aeronautical studies sufficiently comprehensive to provide the detail required to give confidence in the mitigations. Such an exercise would be worked

through in collaboration with all stakeholders over the time necessary for all parties to be comfortable with the outcome.

5. Conclusion

This application is for a large, staged industrial development situated in close proximity to precision navigation and surveillance infrastructure, and it is Airways' strong position that there are significant information gaps, uncertainties and deficiencies in the work done by the applicant to date. On the evidence currently provided, particularly the non-cumulative assessment basis, the fragility of the "2° rotation" mitigation, the acceptance narrative around up-to-18-second DME data loss, and technical assumptions such as use of SDES and code removal of buildings from radar screens, Airways does not accept that risks are adequately understood or mitigated.

The request for the applicant to complete a safeguarding study was part of an initial assessment, which is typically expected to reveal the requirement for further action and due diligence to ensure safety is maintained. In this case, the safeguarding assessments have shown Airways that further action is required and we oppose the grant of consent until Airways concerns regarding interference to CNS infrastructure has been addressed and the residual risk to aviation safety is proven to be as low as reasonably practicable. Airways estimates, based on previous exercises of this nature, that the timelines involved may take upwards of 6 – 9 months and may not provide the outcome sought by the applicant. Airways raises our concerns that this application is not suitable for the Fast-Track Approvals process on the basis of the complexities of the aviation environment and the incompleteness of the project information as it relates to aviation safety.

Furthermore, the studies place significant reliance on Airways' ability and willingness to adjust, configure, or optimise aviation equipment and introduce procedures to mitigate the effects of the development, rather than requiring the applicant to avoid or fully mitigate those effects at the design stage. This approach could result in ongoing operational burdens and costs for Airways, and does not align the principle that safeguarding should primarily be achieved by controlling design, land use and development, and not achieved by operational workarounds.

Aviation safety is at the level it is today because of the resilient systems in place that are assessed against global standards. As those responsible for ensuring risk is minimised in New Zealand's air communication, navigation, and surveillance systems Airways cannot in good conscience endorse a situation where risks are higher than present.