

**BEFORE THE INDEPENDENT HEARINGS COMMISSIONER
APPOINTED BY THE INVERCARGILL CITY COUNCIL**

UNDER the Resource Management Act 1991

IN THE MATTER of Part 8 of the Act

BY **SPACE OPERATIONS NEW ZEALAND
LIMITED**

Requestor

STATEMENT OF EVIDENCE OF ALEX DUNN

Dated: 14 September 2026

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Statement of evidence of Alex Dunn

Introduction

- [1] My name is Alex Dunn.
- [2] I am a Senior Planner employed by Southern Planning Group. I have more than twelve years' planning experience and am an Associate Member of the New Zealand Planning Institute.
- [3] I am the author of the Notice of Requirement, and have been involved with the project for several years.

Code of Conduct

- [4] I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023 and agree to comply with it. I confirm that the opinions expressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.
- [5] In preparing this evidence, I have relied on Mr Robin McNeill's corporate and operational evidence concerning the Ground Station, its activities, investment and locational requirements, and on Mr Graham Hulston's radio-engineering evidence concerning diffraction and clearance around radio paths. Where I draw planning conclusions from that information, those conclusions are my own.

Scope of evidence

- [6] I have been instructed by Space Operations New Zealand Limited (**Space Ops / Requestor**) to provide evidence on Space Ops' notice of requirement for a designation in respect of airspace and land surrounding the Awarua Satellite Ground Station (**Ground Station**). The land and airspace surrounding Lot 1 Deposited Plan 483454 and Lot 1 DP 524692 held in Record of Title 837915, located at 781 Colyer Road, and Lot 2 DP 524692 held in Record of Title 1134415, located at 721 Colyer Road (together, the **Site**).

[7] My evidence will address:

- (a) Executive Summary
- (b) Background
- (c) Site and Receiving Environment
- (d) The Notice of Requirement
- (e) Statutory Framework
- (f) Effects of the Designation
- (g) Relevant Planning Provisions
- (h) Alternatives Sites, Routes and Methods
- (i) Reasonable Necessity of the Designation
- (j) Submissions
- (k) Consultation and Changes Since Notification
- (l) Response to Council s42A
- (m) Proposed Designation Conditions
- (n) Part 2 RMA
- (o) Conclusion

[8] This evidence has been prepared with the assistance of a peer review from Mr John Kyle, Director at Mitchell Daysh. Mr Kyle has been practicing in the field of resource management planning for almost four decades and has extensive experience with designations and the notice of requirement process that leads to designations being set down in district plans.

Executive Summary

[9] The principal issue remaining in dispute is whether the horizon mask Airspace Limitation Surface should continue to apply across the

Industrial 4 Zone. Ms Spalding recommends that this part of the zone be excluded. I disagree with that recommendation.

- [10] I agree with Ms Spalding that the Awarua Satellite Ground Station is established nationally significant infrastructure¹that some form of horizon protection is reasonably necessary², and that the EMI component of the designation should be confirmed subject to the revised conditions³.
- [11] In my opinion, the effects on the Industrial 4 Zone do not justify removing the horizon protection altogether. The 5 degree surface rises progressively with distance, the full 35m Industrial 4 building height, and higher, can be achieved beyond approximately 377m from the Ground Station boundary. The requestor has also considered the concerns in the s42A report further and now proposes revised conditions which will mean that penetration of the surface is an assessment trigger rather than an automatic prohibition.
- [12] Having considered the effects of the requirement, the relevant planning framework, alternative sites and methods, and reasonable necessity, I consider the residual adverse effects to be acceptable and the designation to be reasonably necessary to achieve SpaceOps' objectives.
- [13] It is my opinion that the NoR should be confirmed over the full areas sought (for both the EMI component and the horizon mask protection), including the Industrial 4 Zone, subject to the revised conditions attached as **Appendix [A]** to my evidence.

Background

- [14] The Awarua Satellite Ground Station is an established satellite communications facility located at 721 and 781 Colyer Road. The Ground Satellite Station has been operational since March 2008. The Ground Station's establishment and expansion have been authorised through a series of resource consents. The original consent,

¹ Emma Spalding, *Section 42A Recommendation Report*, MIC-2025-20, 31 August 2026, at [115]

² s42A Report at [191]

³ s42A Report at [208]

LUC/2006/282, was granted in 2006 to establish and operate a European Space Agency Ariane Rocket Tracking Station. It authorised up to four dish antennas, each up to 11 m in diameter and 15 m in height, together with two relocatable buildings.

- [15] RMA/2019/92 subsequently authorised further expansion of the Ground Station. This included retrospective approval for a 3.4m dish antenna and provision for an additional 20 dish antennas, of which 15 could be protected by radomes, together with 14 Yagi antennas, three buildings and a container shed.
- [16] RMA/2023/8 authorised an expansion of the Ground Station. This consent provided for a total of 148 antennas and 15 buildings across the site, with a 15-year lapse period.
- [17] More recently, RMA/2026/30, granted on 4 June 2026, authorised an additional four antennas and a new control building associated with Globalstar's operations within the Ground Station complex. It also re-authorised the remaining expansion previously covered by RMA/2023/8.
- [18] SpaceOp's Requiring Authority status was confirmed on 13 March 2025.
- [19] In addition to those approvals, the Ground Station is now subject to the separate land-based designation pursued through MIC/2025/19. The designation was confirmed by SpaceOps on 25 July 2026. The designation has subsequently been included in the Invercargill City District Plan.
- [20] The land-based designation provides for the construction, upgrade, maintenance and operation of the Ground Station insofar as it undertakes radiocommunication activities. Its scope includes structures, works and activities ancillary to the transmission and reception of information by radio waves. It therefore forms part of the planning framework for the Ground Station's ongoing operation and development, alongside the resource consent history outlined above.
- [21] It is clear from the above that the Ground Satellite Station has been existing for a number of years and is operational.

- [22] Awarua's location is operationally important because of its southerly position, flat surrounding terrain, low horizon and relative absence of physical obstruction. Mr McNeill explains that the Awarua site was selected in October 2004 following a search for a suitable Southland location. Its identified advantages included a low-interference radio environment, a low horizon in all directions, its rural setting and convenient access to Invercargill⁴.
- [23] The Ground Station communicates with spacecraft in low Earth orbit. Communication windows can be short and the ability to acquire spacecraft at low elevation increases the period for which communications can occur. The 5 degree elevation mask represents the operational envelope SpaceOps seeks to preserve while avoiding the much greater effects that a 0 or 3 degree protected surface would have on surrounding land.
- [24] There is also an existing Radio Spectrum Management (RSM) protection arrangement applying at Awarua. The relevant decision establishes a 2km receive protection area, with a protected frequency range of 2200–2290 MHz and a permissible interference level from terrestrial services of less than -154 dBW/MHz.
- [25] The planning issue that led to the NoR is that the long term operational environment of the Ground Station is affected by the potential use and development of land and activities outside SpaceOps' ownership and control. Physical development capable of penetrating the low horizon and incompatible terrestrial radiocommunication services could adversely affect a facility that is already established.
- [26] The NoR therefore seeks to place the relevant operational constraints within the resource management framework rather than relying solely on a radio-spectrum regime which may not readily apparent to landowners or District Plan users. The application identifies increased certainty for SpaceOps and surrounding owners, including through recording of the designation within the District Plan and consequential land information processes, as a benefit of this approach.

⁴ Robin McNeill, *Statement of Evidence*, dated 14 September 2026 at [35]

- [27] The SpaceOps site, and activities undertaken by SpaceOps, is not only nationally significant infrastructure, but significantly critical infrastructure to the wider international space communications community. Mr McNeill describes the Ground Station's role in international ground-station networks and in supporting launch and spacecraft operations. This includes facilities operated by KSAT and Leaf Space and support for ESA/CNES and Rocket Lab activities. In my opinion, these operational relationships mean the benefits of maintaining the Ground Station's functionality extend beyond the district and region⁵.

Site and Receiving Environment

- [28] The SpaceOps site is located within the Rural Zone of the Invercargill City District Plan. Much of the surrounding land is also Rural zoned, apart from the Industrial 4 Zone as shown in Figure 1 below.



Figure 1: Zoning (Source: ICC Maps)

- [29] The Industrial 4 Zone is of particular relevance to this NoR. This land is located generally to the north and north-west of the Ground Station. The zone is deliberately intended to accommodate industrial development.

⁵ McNeill Evidence at [52] – [76]

- [30] Renewable electricity generation and a number of other activities are supported by the Industrial 4 policy environment.. Stewart Family Assets has advanced a wind generation proposal and several submissions on the NoR refer to future solar, battery storage and energy infrastructure.
- [31] I understand that no consents have been issued for these activities in the Industrial 4 Zone, including no consent for the windfarm activity. If activities of this nature exceed height limits for the zone their activity status is likely restricted discretionary. Notwithstanding this I have assessed the effect of the proposed limitations arising from the designation on the wider Industrial 4 land.
- [32] Council's Water Services Group is also investigating a community water supply at Awarua, with associated wells, pumps and an anticipated 11kV electricity supply upgrade.

The Notice of Requirement

- [33] The designation purpose is **Airspace Limitation Surface and Electromagnetic Interference Limitation Area**.
- [34] The Airspace Limitation Surface consists of a 5 degree horizon mask commencing 2 m above the SpaceOps site boundary and extending for a maximum of 3km.
- [35] The surface is not a uniform 3km height restriction. Its height increases continuously with distance. This is reflected in the cross-sections provided attached as **Appendix [B]** to my evidence. The extent of Industrial 4 land impacted by a building height of less than 35m is shown in the diagram attached as **Appendix [C]** to my evidence.
- [36] The 2m starting point was selected to avoid an impractical ground-level control immediately outside the boundary and to allow ordinary low-level activities such as fencing, stock and low vegetation that would be considered to have acceptable effects on SpaceOps operations. It also provides a practical datum from which the limitation surface can be surveyed and mapped.

- [37] The Electromagnetic Interference (EMI) Limitation Area extends for 2km. As now clarified, it applies to terrestrial radiocommunication services and the protected spacecraft-reception frequencies.
- [38] The coastal marine area and public conservation land identified on the designation plan are excluded from the designation (both the horizon mask and EMI components).
- [39] The NoR as originally lodged and at the time the s42A report was authored, provided for SpaceOps to give written approval to a penetration of the limitation surface, but did not specify the information requirements, assessment criteria or process that would apply to such an approval. Following submissions, I recommend that this pathway be made more explicit and transparent and this has now been included in proposed conditions attached to my evidence. In this way, penetration of the surface of the horizon mask restriction is seen more like an assessment trigger rather than an automatic prohibition.

Statutory Framework

- [40] Section 168(2)(b) expressly provides for a requiring authority to give notice of a requirement in respect of land, water, subsoil or airspace where a restriction is reasonably necessary for the safe or efficient functioning or operation of the relevant project or work. This is the statutory basis for the restrictive designation sought by SpaceOps.
- [41] Section 171 requires Council, when considering a requirement and submissions, and subject to Part 2, to consider the effects on the environment of allowing the requirement and have particular regard to the relevant national policy statements, regional policy statement, plans and proposed plans, together with the other matters identified in s171.
- [42] Section 171(1A) expressly prevents Council from having regard to trade competition or the effects of trade competition.
- [43] SpaceOps does not own or otherwise hold a sufficient interest in all of the land over which the restrictive designation would operate. s171(1)(b) requires consideration of both whether adequate consideration has been

given to alternative sites, routes or methods and whether the work and designation are reasonably necessary to achieve SpaceOps' objectives.

- [44] Council's Engineering Review⁶ raised questions regarding the relationship between the RMA and the radiocommunications regulatory framework. The EMI component of the NoR is informed by the Radiocommunications Act 1989 and RSM framework, while the designation itself is sought and assessed under Part 8 of the RMA. Importantly, the horizon mask aspect of the proposal addresses physical obstruction, which is not regulated through the radiocommunications framework.
- [45] Section 176 of the RMA provides that, once a designation is included in the District Plan, a person may not do anything in relation to designated land that would prevent or hinder the project or work without the prior written consent of the requiring authority. The revised Condition 2 as set out in this evidence provides greater clarity as to how that written-consent process is intended to operate and be assessed. This provides greater certainty and clarity to affected landowners.
- [46] I refer to and accept the legislative sections addressing the above matters, as set out in the s42A report.

Effects of the Designation

- [47] Section 171(1) requires the territorial authority, when considering a Notice of Requirement, to consider the effects on the environment of allowing the requirement.

Airspace Limitation and Physical Obstruction (horizon mask)

- [48] The principal effect of the Airspace Limitation Surface (horizon mask) is the restriction it places on the height of buildings, structures, vegetation and temporary structures that penetrate the proposed horizon mask surface.
- [49] I do not consider that the area beneath the Airspace Limitation Surface should be treated as land subject to a new absolute maximum building

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Dr A Sathyendran, *Review of Space Operations New Zealand application*, dated June 2026

height. Under the revised conditions set out in my evidence, development below the surface can occur without approval from SpaceOps. Penetration of the surface instead triggers a requirement to obtain approval and an assessment of whether the particular penetration would materially affect the operation of the Ground Station. The effect is therefore more accurately described as an additional development constraint and approval requirement, together with the possibility that a proposal may need to be relocated, redesigned or, where an unacceptable operational effect cannot otherwise be addressed, may not be able to proceed in its proposed form.

- [50] The extent of that constraint varies materially according to distance from the Ground Station. The surface commences 2m above the boundary of the existing Ground Station designation and rises outward at 5 degrees. Calculations show that the resulting height is approximately 10.7m at 100m, 23.9m at 250m, 45.7m at 500m, 89.5m at 1 km, 176.9m at 2km and 264.5m at the 3km outer extent.
- [51] The effect is therefore greatest immediately adjoining the Ground Station and diminishes progressively with distance. This distinction is important because the mere fact that land falls within the 3km radius does not mean that development otherwise permitted or anticipated by the District Plan will be constrained. At increasing distances, the Airspace Limitation Surface is well above the height of buildings and structures ordinarily anticipated under the underlying Rural and Industrial 4 Zone provisions.
- [52] The 5 degree surface is also not an amenity based height control. It derives from the operational requirement of the Ground Station to acquire, track and communicate with spacecraft at low elevations. The information provided by SpaceOps following Council's engineering review explains that the Ground Station predominantly communicates with low Earth orbit spacecraft approximately 400–600 km above the Earth. Individual passes can be short, and spacecraft which do not pass directly overhead may only be visible for a few minutes and may remain comparatively close to the horizon throughout the pass.
- [53] This means the lower in elevation that a spacecraft can be acquired and tracked, the longer the potential communication window. Conversely, an

obstruction within the relevant low-elevation sector can delay initial acquisition, shorten a communication window, interrupt tracking or communications, and potentially affect the range of missions capable of being serviced. However it is acknowledged that not all of SpaceOps' customers require low horizons⁷.

- [54] I consider that consequence relevant even where an obstruction would not render the Ground Station completely incapable of operating. Ms Spalding accepts that an obstruction can result in reduced efficiency and shorter communication windows. The restrictions of the NoR are not simply to ensure that some level of operation remains possible, it includes ensuring that the Ground Station can continue to operate efficiently.
- [55] Mr McNeill describes interference arising from reflected signals, including reflections from moving objects⁸. These mechanisms mean that visual line of sight and reliable radio performance are not identical concepts. The cross-sections in Appendix B illustrate the proposed geometric screening surface. They do not demonstrate that every object below that surface would be free of radio effects.
- [56] Physical obstruction is also materially different from many other environmental effects because it cannot readily be addressed at the receiving site after the structure has been established. Filtering and other receiver-side measures may have a role in addressing some forms of electromagnetic interference, but they cannot recreate a physical line of sight that has been obstructed by a building, turbine, mast or vegetation. Onsite mitigation measures such as filtering, shielding, antenna relocation or equipment upgrades do not provide an equivalent means of addressing physical obstruction of the satellite acquisition and tracking.
- [57] I therefore consider that it is appropriate to manage potential obstruction as there are no equivalent mitigation measures available to mitigate effects of such structures. Without a horizon mask, there is no trigger point for assessment of structures (and the like) which could adversely

⁷ McNeill Evidence at [83]

⁸ McNeill Evidence at [88]-[90]

impact the operation of the Ground Station. This is particularly so for substantial permanent structures where subsequent removal or alteration may be impracticable.

- [58] If the horizon mask component of the NoR is not confirmed, SpaceOps would essentially have to rely on the restricted discretionary activity status for buildings greater than 35m for Council to have consideration on the legally established SpaceOps site. It is not desirable to rely on this. Further, controlled activity consents must be granted and structures within the 4ha land identified within the NoR as having a maximum height of less than 35m could adversely affect SpaceOps' established operations.
- [59] Not every penetration of a horizon plane will necessarily have the same operational consequence. Dr Sathyendran identifies azimuth, elevation, distance, size and construction of a structure, together with the particular elevation angles and directions relied upon by the Ground Station, as relevant to determining whether a specific structure will cause an obstruction. He considers a case by case assessment better matched to the actual effect⁹.
- [60] I consider that advice supports refinement of the way the Airspace Limitation Surface is administered, rather than removal of the surface itself. The 5 degree plane provides a clear and readily identifiable screening mechanism. The revised conditions would then enable the actual effect of a penetration to be assessed having regard to the characteristics identified by Dr Sathyendran. Having discussed this matter with Mr Miller and Mr Hulston, it is considered that the horizon mask mechanism proposed will achieve the necessary protections for the existing operations.
- [61] I also consider the selected 5 degree surface to represent a meaningful attempt to limit effects on surrounding land. SpaceOps has advised that lower elevation surfaces would provide greater operational benefit but would extend the land-use restriction much further. Ideally SpaceOps

⁹ Dr A Sathyendran, Comments on Space Ops Response, 27 August 2026 at [3].

would have a 3 degree surface. The 5 degree surface has therefore been selected as a practical compromise¹⁰.

[62] I consider the 5 degree surface, combined with the revised case specific approval pathway set out in attached conditions, to represent a proportionate response reasonably necessary to protect SpaceOps' operations and objectives while not unnecessarily restricting potential land uses on surrounding land.

[63] Overall, I consider effects associated with the airspace limitation and physical obstruction surface have been mitigated to an acceptable degree due to the amended condition 2 pathway.

Effects on Industrial 4 land

[64] The effects of the Airspace Limitation Surface are more material in relation to the Industrial 4 Zone than the surrounding Rural Zone. The Industrial 4 Zone was specifically established to accommodate large-scale industrial development, and buildings up to 35m in height are anticipated through the District Plan's controlled activity framework. Structures above 35m are also capable of being considered as restricted discretionary activities.

[65] I also acknowledge that the Airspace Limitation Surface extends across a substantial geographical portion of the Industrial 4 Zone. However, I do not consider that geographical extent can be equated with the extent of lost industrial development capacity or opportunity.

[66] A 35m building would need to be approximately 377m from the Ground Station boundary to sit wholly beneath the 5 degree surface. Once beyond that distance, the limitation surface itself does not prevent a building from achieving the 35m height provided for by the District Plan. At 500m, for example, the surface is approximately 45.7m above ground level.

[67] Approximately 4ha of the Stewart Family Assets landholding would be potentially prevented from achieving the full 35m height (noting the

¹⁰ McNeill Evidence at [25]

proposed amended condition 2 pathway for approval). While other development within the 3km radius may still penetrate the surface where structures substantially exceed 35m, I consider that distinction important when assessing the scale of the effect on the ordinary industrial development anticipated by the zone.

- [68] Structures exceeding 35m are already subject to a restricted discretionary resource consent process under the District Plan. Other constraints may increase the restriction in activity status, for example the windfarm application is fully discretionary due to the use of Awarua Siding Road for access. The designation would introduce a further consideration where such a structure penetrates the Airspace Limitation Surface, and I accept that this is an additional regulatory and development constraint. It may result in additional design work, technical assessment, relocation or modification of a proposal.
- [69] The proposed resource consent that has been lodged for wind turbines on the Stewart Family Assets land illustrate the potential significance of the control for particularly tall structures. None of the proposed turbines would comply with the 5 degree surface as presently located on the proposed resource consent plans. I therefore accept that the designation has the potential to materially affect the design and location of such structures (noting this proposal is at a relatively early stage of consenting and is not part of the receiving environment).
- [70] However, under the revised conditions set out in my evidence, penetration no longer equates to an automatic inability to establish that structure. It triggers an assessment of whether the particular structure would materially compromise the operation of the Ground Station.
- [71] Temporary structures are also relevant to an industrial environment. Cranes and other construction equipment can penetrate the surface for comparatively short periods. In my opinion it would be disproportionate to treat every temporary penetration in the same manner as a permanent building or turbine. The revised approval pathway provides for temporary penetrations to be addressed through a streamlined and consistent process and, where necessary, through operational coordination concerning timing and duration.

- [72] I therefore agree with Ms Spalding that the designation has the potential to reduce development flexibility in the Industrial 4 Zone¹¹. Where I disagree is with her conclusion that this effect is necessarily significant and justifies removing the Industrial 4 Zone from the horizon mask altogether.
- [73] That conclusion was reached largely on the basis that penetrations of the notified surface would constrain development which might otherwise be anticipated. In my opinion the revised approval mechanism materially alters that position. The 5 degree surface now functions as an assessment trigger rather than an absolute maximum height. It retains the ability for industrial development, including development penetrating the surface, to proceed where its actual effects can be demonstrated to be acceptable.
- [74] I consider that effect to be material but geographically limited when considered against the wider Industrial 4 landholding.
- [75] The effect on ordinary warehouse and industrial building development diminishes quickly with distance. Beyond approximately 377m from the SpaceOps boundary, the 35m Industrial 4 height can be achieved beneath the limitation surface.
- [76] The most significant remaining interaction is therefore with unusually tall infrastructure, including large wind turbines, substantial chimney stacks and major masts. Industrial buildings in the wider Invercargill and Southland area are relatively low in height compared to the horizon mask sought. The Tiwai Point Aluminium Smelter Chimney, the tallest component of an industrial building in Southland, is approximately 137m tall. Should such a chimney (or chimneys) be required in the Industrial 4 Zone, there is ample room for them to establish well below the horizon mask, even if they exceed 35m.
- [77] I do not consider it appropriate to state that these structures are prohibited in all cases. The now revised Condition 2 pathway should allow technical information about a particular penetration to be assessed before SpaceOps determines whether written consent can be given.

¹¹ s42A Report, at [120].

This process is consistent with several District Plan designation examples. For example, Designation 4 within the Queenstown Lakes District Council Plan contains conditions that set out the process to penetrate airport height surfaces. The condition pertaining to the Inner Horizontal Surface states:

New objects or extensions of objects that penetrate the inner horizontal surface shall be prohibited except where the object is shielded by an existing immovable object, or the party on whose land the object is located or who is otherwise responsible for the object has provided to the Queenstown Airport Corporation Limited an aeronautical study prepared by a suitably qualified and independent person which has determined the object will not adversely affect the safety or regularity of airport or aircraft operations, and that study has been accepted by the Queenstown Airport Corporation Limited, and the Queenstown Airport Corporation Limited has provided its written approval to the penetration.

[78] This approach is also identified within the Wellington City District Plan for the Wellington Airport Obstacle Limitation Surfaces. The Requiring Authority in this instance clearly relies on the standard s176 approval process for any penetration, but has a specific note in the designation that Wellington International Airport Limited may request an aeronautical study to inform its decision regarding whether to provide for any breach of the conditions pursuant to Section 176 of the RMA.

[79] A similar approach is being proposed in this instance. Two options are being promoted for condition two.

(a) The first is a detailed assessment pathway that explicitly outlines exactly what is required, including a technical assessment requirement and outlines the number of working days that approval must be obtained.

(b) The second is a more simplified condition, that effectively achieves the same outcomes but does not require approval to be provided in a certain timeframe. The simplified condition is based on conditions that exist as part of existing Designations, as outlined above.

- [80] I consider that this is a more proportionate response than excluding the Industrial 4 Zone entirely, particularly because that zone is also the area where the scale and height of future structures means there is the greatest potential for physical obstruction to arise which will compromise SpaceOps' operations and their ability to achieve their stated objectives.
- [81] Overall, it is assessed that effects on the Industrial 4 land have been mitigated to the best practicable degree, while providing restrictions only reasonably necessary to achieve SpaceOps' objectives. On balance, I consider effects associated with the NoR to be acceptable on Industrial 4 land.

Electromagnetic Interference

- [82] The second component of the designation is the Electromagnetic Interference (EMI) Limitation Area extending 2km from the Ground Station.
- [83] This excludes equipment producing radiofrequency emissions only as an incidental by-product of its operation and not for telecommunication purposes. The examples of terrestrial radiocommunication services include broadcasting, cellular networks, fixed wireless, microwave links, land-mobile radio, radio telemetry and radio-based SCADA systems.
- [84] This clarification is important to the effects assessment. Ordinary industrial equipment such as motors, pumps, VSDs, transformers, switchgear, generators, inverters and battery systems is not captured merely because it contains electrical or switching components. Similarly, ordinary rural technology is not controlled simply because it uses electricity.
- [85] Infrastructure or industrial activities may nevertheless incorporate a terrestrial radiocommunication component, such as a microwave link, fixed wireless connection or radio-based SCADA system. In that circumstance it is the relevant radiocommunication service, rather than the underlying industrial, electricity or water infrastructure itself, which may need to be designed or operated consistently with the protected receive environment.

- [86] The substantive -154 dBW/MHz interference protection is also not a planning standard created for the first time by this NoR. It reflects the existing RSM protection framework applying to terrestrial services within the Awarua protection area. The designation provides greater planning visibility and certainty for landowners, and a mechanism for that protection to be recognised through the District Plan.
- [87] I accept that the designation nevertheless introduces an additional planning consequence for a new terrestrial radiocommunication service that does not meet the relevant threshold. There may be costs associated with frequency selection, technical design or coordination. However, given the narrow class of activity affected and the existing radiocommunications framework, I consider those effects to be limited.
- [88] Ms Spalding reaches the same conclusion¹². She considers that the revised EMI controls will not materially constrain anticipated rural, industrial or infrastructure activities and that any resulting economic effects are likely to be negligible. I agree with that assessment.
- [89] Overall, effects relating to EMI controls are assessed to be acceptable.

Effects on Other Infrastructure

- [90] I have also considered the potential interaction between the Airspace Limitation Surface and other infrastructure. The most specific matter raised during processing relates to the planned upgrade of the 11kV electricity network along Awarua Siding Road to support both the Ground Station and ICC's water-supply investigations.
- [91] Typical overhead distribution infrastructure is approximately 8–15m high and may therefore penetrate the limitation surface where located immediately adjoining the Ground Station. This is a genuine potential effect of the NoR.
- [92] However, that effect is geographically confined because the height available beneath the surface increases quickly with distance. It does

¹² s42A Report, at [90]

not mean that electricity distribution infrastructure is prevented throughout the wider 3km area.

- [93] Further, the revised approval pathway in conditions attached to my evidence allows the actual interaction between a proposed pole or line and the Ground Station to be assessed. Where an overhead solution cannot be accommodated without a material operational effect, alternatives such as relocation or undergrounding can be considered.
- [94] The EMI limitation should also not materially constrain the operation, maintenance or upgrading of electricity or water infrastructure. Council similarly accepts that properly operating electrical infrastructure is not itself a terrestrial radiocommunication service, although ancillary microwave or radio-SCADA components will be subject to the EMI condition.
- [95] I therefore consider effects on other infrastructure capable of being appropriately managed through the revised conditions and as such, effects on other infrastructure as a result of the designation are assessed to be acceptable.

Economic and Development Effects

- [96] The potential economic effects of the NoR arise principally from its influence on future land use and development decisions rather than from any direct acquisition or physical occupation of surrounding land.
- [97] I acknowledge that an additional approval requirement can itself have an economic effect. A applicant for consent may incur additional design, technical assessment and consenting costs. There may also be reduced flexibility in the siting or height of a structure where a penetration would materially affect the Ground Station.
- [98] These matters are most relevant to the Industrial 4 Zone, where larger buildings and structures are anticipated. Submitters have also raised concerns regarding investor confidence and the possibility that uncertainty over the designation could discourage industrial or renewable energy investment.

- [99] I agree that those potential economic effects should not be dismissed. I also agree with Ms Spalding that changes in land value, considered in isolation, should be given limited weight and that the more relevant resource management issue is the effect on development capacity, flexibility and certainty¹³.
- [100] Where I differ from Ms Spalding is in the is in the significance and weight attributed to the potential economic effects of the horizon mask. Ms Spalding acknowledges that the extent of the potential economic effect has not been quantified, but identifies potential reductions in development flexibility, investment certainty and the economic benefits anticipated from the Industrial 4 Zone¹⁴.
- [101] Mr McNeill's evidence provides information on the scale of existing investment and employment associated with the Ground Station¹⁵. That information assists in understanding the importance of the infrastructure resource being protected. However, I do not treat the value of that existing investment or employment as a quantified economic benefit created by the designation, or assume that all of it would be lost if the designation were not confirmed.
- [102] Ms Spalding moderates the weight attributed to the proposal's positive effects partly because some protection already exists under the radiocommunications framework¹⁶. I agree that existing protection is relevant when assessing the additional benefits of the EMI component. However, I do not consider that reasoning provides a basis for reducing the weight attributed to the separate benefits of the horizon mask. The existing radiocommunications framework does not manage physical obstruction of the Ground Station's satellite communication paths, as Council's engineering reviewer expressly acknowledges¹⁷. The horizon mask therefore provides an additional form of protection, rather than duplicating the existing EMI protection.

¹³ s42A Report at [122]

¹⁴ s42A Report at [120]

¹⁵ McNeill Evidence at [158]-[163]

¹⁶ s42A Report, at [65]-[67]

¹⁷ A Sathyendran, *Comments on Space Ops Response*, 27 August 2026, at [3]

- [103] The existing regulatory framework should also inform the assessment of adverse economic effects. To the extent that the EMI condition reflects obligations that would apply irrespective of the designation, the associated development constraints should not be attributed wholly to the NoR. I acknowledge that Ms Spalding adopts this approach at, where she concludes that the refined EMI restrictions are unlikely to materially constrain anticipated activities and that their economic effects are likely to be negligible¹⁸. In my opinion, the same distinction between existing obligations and additional designation requirements should be maintained when assessing both benefits and adverse effects.
- [104] The horizon mask must therefore be assessed on its own additional benefits and adverse effects. Those include the protection it provides for the Ground Station's continued efficient operation and investment, alongside the additional assessment costs, uncertainty and potential constraints imposed on surrounding development. I accept that those adverse effects are not reduced merely because separate EMI controls already exist. Equally, the benefits of protecting against physical obstruction should not be discounted on that basis.
- [105] My assessment is consequently qualitative rather than a quantified economic cost-benefit assessment. My disagreement with Ms Spalding is not founded simply on the absence of quantified adverse effects. It concerns the weight attributed to those effects when considered alongside the operational benefits of horizon protection, the progressive nature of the horizon mask, and the revised approval pathway for compatible development.
- [106] In my opinion the revised approval pathway set out in conditions in this evidence materially reduces both development constraint and uncertainty. It identifies clearly which proposals require further assessment, sets out the information relevant to that assessment, establishes the substantive test to be applied, and provides a defined process for SpaceOps to reach a decision.

¹⁸ s42A Report, at [117]

[107] There is also a certainty effect. The designation provides future developers with early notice of the Ground Station's operational requirements before significant expenditure is committed to a particular building, turbine, mast or infrastructure design. That is preferable to potential incompatibility only being identified late in a design or consenting process.

[108] I therefore accept the potential for adverse economic effects, particularly for development involving unusually tall structures within the Industrial 4 Zone. However, I do not consider that those effects are of such a scale that the Industrial 4 Zone should be excluded from the designation. In my opinion they can be appropriately managed through the revised approval framework.

Positive Effects

[109] The NoR will also result in positive effects which need to be considered alongside the restrictions imposed on surrounding land.

[110] The primary positive effect is protection of the ongoing efficient operation of the Awarua Satellite Ground Station. The Ground Station is established nationally significant radiocommunications infrastructure and provides satellite communications and associated services extending beyond Invercargill and Southland. Council accepts that greater certainty regarding its future operation may support continued investment in the Ground Station and produce local and regional economic benefits¹⁹.

[111] In addition to the local and regional economic benefits identified above, the Ground Station is also internationally significant, as addressed in Mr McNeill's evidence. Mr McNeill details that Awarua's southern location, favourable radio environment, fibre connectivity and low horizon make it an important location within international satellite ground-station networks²⁰.

[112] The designation provides greater certainty that future physical development will not unknowingly compromise the low elevation

¹⁹ s42A Report at [115]

²⁰ McNeill Evidence at [67]

environment on which the Ground Station depends. It also provides a transparent planning mechanism through which potentially incompatible proposals can be identified and assessed before they are established.

[113] It will also make the relevant constraints more readily visible to landowners, developers and infrastructure providers through the District Plan. That has a positive planning effect because future investment and site-design decisions can take the Ground Station into account at an early stage.

[114] The economic benefits of the existing Ground Satellite Station are substantial, as is existing investment. Mr McNeill estimates that the hosted antenna installations represent approximately NZ\$50 million of direct overseas investment. There are 11 full-time SpaceOps staff and nine additional staff associated with GlobalStar and Lockheed Martin in Invercargill, together with approximately three people providing consulting services. There is also a NZ\$4.55 million headquarters development under construction. These figures provide context for the scale of the existing infrastructure resource²¹.

[115] The horizon protection provides a certain form of protection that is not otherwise available through RSM. This protection will provide SpaceOps with the ability to continue to invest in the site with a high level of certainty.

[116] Overall, the NoR would result in substantial positive benefits for the continued operation of the Ground Satellite Station.

Existing Activities

[117] The designation is intended principally to manage new activities and changes to existing activities. It is not intended to retrospectively prohibit lawfully established activities simply because they pre-date the RSM decision or the designation.

[118] I recommend that the final condition set make this sufficiently clear for future plan users.

²¹ McNeill Evidence at [158]-[163]

Effects Taking Account of the Revised Conditions

- [119] It is important that the final effects assessment is undertaken against the revised conditions, rather than solely against the form of the NoR as originally notified.
- [120] The principal concern raised through submissions and the s42a Report was that the horizon mask could operate as a blunt height restriction and that any penetration would be dependent on an uncertain private approval process. Submitters sought clearer technical criteria, greater transparency and a practical pathway for potentially compatible development.
- [121] The revised conditions now set out in my evidence materially respond to those concerns. Development below the limitation surface does not require SpaceOps approval. A penetration above the surface triggers an assessment rather than an automatic refusal.
- [122] The revised conditions also provide a substantive approval test. Where a penetration will not materially compromise the ability of the Ground Station to acquire, track or communicate with spacecraft, or where the effect can be appropriately mitigated, approval is to be available. Written reasons and a defined process improve certainty for landowners and developers.
- [123] The result is that the designation does not reserve all airspace above the 5 degree surface exclusively for SpaceOps. Rather, it identifies the airspace within which there is sufficient potential for operational conflict that further assessment is required.
- [124] Overall, I consider that effects associated with the NoR are mitigated by the conditions of the designation to an acceptable degree.

Relevant Planning Provisions

- [125] Section 171(1)(a)(i-iv) requires a Territorial Authority to have particular regard to any relevant provisions of:
- A national policy statement:

- A NZ coastal policy statement:
- A regional policy statement or proposed regional policy statement:
- An infrastructure design solution:
- A Plan or proposed plan.

National Policy Statement for Infrastructure 2025

[126] The National Policy Statement for Infrastructure 2025 (NPS-I) came into force on 15 January 2026. It applies to infrastructure activities other than renewable electricity generation and electricity network activities, which are addressed through their own national policy statements.

Objective – National Policy Statement for Infrastructure

[127] The single objective of the NPS-I contains five related outcomes. It seeks to:

- provide for the national, regional and local benefits of infrastructure;
- enable infrastructure to support social, economic and cultural wellbeing and health and safety;
- enable infrastructure to support the changing needs of urban and rural environments;
- ensure infrastructure is well-functioning, resilient and, as far as practicable, compatible with other activities; and
- ensure infrastructure is delivered efficiently while managing adverse effects both from and on infrastructure.

[128] I consider all of these elements relevant. The Ground Station is established infrastructure that provides satellite communication services relied on by a range of users, including international space agencies. The ongoing operation of the Ground Station provides strategic infrastructure benefits extending beyond the District and Region.

- [129] Of particular significance is the fourth limb of the objective. It does not seek only the continued existence of infrastructure. It expressly seeks infrastructure that is well-functioning and compatible, as far as practicable, with other activities. The fifth limb is similarly two-sided: adverse effects *from* infrastructure are to be managed, but so are adverse effects *on* infrastructure.
- [130] In my opinion, that distinction is important in considering the horizon mask. Physical obstruction can delay or prevent satellite acquisition, reduce communication windows and compromise the operational capability of the Ground Station. The relevant outcome is therefore not simply whether the Ground Station could continue to operate in some form despite future obstruction. The NPS-I expressly seeks to ensure that infrastructure remains well-functioning.
- [131] I agree with Ms Spalding that the NoR is consistent with the objective of the NPS-I²². Where I differ is in the consequences of that finding for the Industrial 4 Zone. In my opinion, completely removing the horizon protection from the area in which the District Plan provides for the greatest potential consent to be sought for substantial building and structure heights gives insufficient weight to the express direction to manage adverse effects on existing infrastructure. The revised penetration approval pathway provides a more appropriate means of achieving compatibility between the two activities.

Policy 1 – Providing for the Benefits of Infrastructure

- [132] Policy 1 requires decision makers to ensure that the national, regional or local benefits of infrastructure, relative to any localised adverse effects on the environment, are recognised and provided for. The policy identifies benefits including economic and social wellbeing, supporting well-functioning environments, providing services important to economic activity, and recognising the consequences where infrastructure services are compromised.

²² s42A Report at [150]

- [133] I consider that formulation particularly relevant to this NoR because it expressly recognises that infrastructure may provide wider benefits while generating localised effects.
- [134] I acknowledge the localised adverse effects of the horizon mask, particularly the additional development consideration it introduces over the Industrial 4 Zone. I do not consider those effects should be minimised. However, they need to be assessed relative to the benefits of protecting an established Ground Station which provides strategic infrastructure benefits extending well beyond New Zealand.
- [135] The revised conditions are material to that balance. A penetration of the 5 degree surface would no longer amount to an automatic inability to develop above that surface. It would trigger an assessment of the actual effect of the particular penetration, with approval available where Ground Station operations will not be materially adversely affected or effects can be appropriately mitigated.
- [136] In my opinion this substantially reduces the localised adverse effect while retaining the wider infrastructure benefit. I therefore consider the NoR, subject to the revised conditions, to be consistent with this policy.

Policy 2 – Operational or Functional Need for Particular Locations and Environments

- [137] Policy 2 requires decision-makers to recognise that infrastructure may have an operational or functional need to operate , or be located in, or traverse, particular locations and environments. The policy recognises that those needs may arise from the requirement to provide services efficiently, connect to particular physical resources or other infrastructure, and locate where infrastructure services are required.
- [138] This policy is directly relevant to the Ground Station. It is an existing facility and cannot realistically be treated as location-neutral. The Awarua location was selected because of its low horizon, flat topography, southerly position and lack of surrounding obstruction²³.

²³ McNeill Evidence at [81]

[139] The operational need is also not confined to the physical footprint occupied by antennas. For a satellite Ground Station, the surrounding radiofrequency environment and the ability to maintain line of sight to spacecraft form part of the environment within which the infrastructure must operate effectively. The fact that the relevant adverse effect physically originates outside the Ground Station property does not remove that operational relationship.

[140] Ms Spalding accepts in the s42a (albeit under the ICC objectives and policies assessment) that the low horizon, relatively undeveloped setting and lack of interference are fundamental to effective operation and cannot readily be replicated through alternative design measures²⁴. I agree.

[141] Overall, I consider the NoR to be consistent with this policy.

Policy 3 – Considering Spatial Planning

[142] Policy 3 requires decision-makers to have regard to the extent to which infrastructure is identified within strategic planning documents and to consider relevant infrastructure-provider spatial or master plans, while expressly recognising that not all infrastructure can be spatially identified in advance.

[143] I have not relied on any separate strategic planning document or SpaceOps master plan in reaching my conclusions. The Ground Station is already established.

[144] In my opinion Policy 3 is of limited relevance to the determination of this NoR.

Policy 4 – Enabling Efficient and Timely Operation and Delivery of Infrastructure Activities

[145] Policy 4 contains a strong enabling direction. Among other matters, decision-makers must enable efficient and timely infrastructure activities, provide flexibility for new technologies, enable more effective use of existing infrastructure and enable upgrades that maintain or improve

²⁴ s42A Report at [161]

levels of infrastructure service. The policy also recognises that it is the infrastructure provider's role to identify its preferred location.

[146] I consider the requirement to enable more effective use of existing infrastructure particularly relevant. Significant investment has already occurred at Awarua. The NoR seeks to protect the operational environment required to make continuing efficient use of that established infrastructure, rather than requiring relocation or duplication elsewhere.

[147] The Ground Station is also a technology dependent activity. Its future operation is likely to change as satellite technology, antenna systems and customer requirements develop.

[148] This does not justify unlimited protection. The conditions must still be appropriately targeted. The revised horizon pathway achieves that by maintaining a readily understood 5 degree screening surface while allowing individual penetrations to be assessed against actual operational effects.

[149] Overall, I consider the NoR to be consistent with this policy.

Policy 5 – Infrastructure Supporting Activities

[150] Policy 5 requires decision makers to recognise and provide for activities needed to directly support infrastructure activities.

[151] The NoR is principally concerned with protecting the operation of the Ground Station itself rather than authorising a distinct infrastructure supporting activity. I therefore consider Policy 5 to be of limited direct relevance.

Policy 6 – Māori Interests

[152] Policy 6 requires Māori interests in infrastructure to be recognised and provided for and specifically requires decision-makers to take into account the outcome of tangata whenua engagement in relation to a notice of requirement.

[153] Consultation has occurred with Te Ao Mārama relating to the Ground Satellite Station as a whole. Mr Miller attended a hui with Te Ao Mārama

and I had several discussions with them. Te Ao Mārama were supportive of the application provided public/conservation land be removed from the application. This subsequently occurred.

[154] Overall, the NoR is consistent with this policy.

Policy 7 – Assessing and Managing Effects of Proposed Infrastructure Activities

[155] Policy 7 provides a detailed framework for effects management. Decision makers must have regard to effects avoided, remedied or mitigated through route, site or method selection; consider technical and operational constraints; take account of differences between the proposed and existing infrastructure effects; consider relevant recognised standards and methodologies; and ensure mitigation measures and conditions are proportionate to the scale of adverse effects.

[156] I consider Policy 7 particularly important to the issues raised in the s42a report.

[157] The location of the Ground Station is existing. Relocation is not simply an alternative location for a future project. It would require replacement of an established facility selected for specific operational characteristics, and it could be extremely difficult for SpaceOps to acquire another site that has the same characteristics that the current site has. As also detailed, onsite mitigation measures do not provide equivalent protection of the low horizon.

[158] The policy expressly requires consideration of technical and operational requirements and constraints. In the case of the horizon mask, the relevant constraint is that an obstruction cannot be corrected through filtering or other radiofrequency mitigation. Once a physical obstruction occupies part of the acquisition and tracking envelope, it can delay acquisition or reduce the communication window.

[159] The policy's requirement for proportionate mitigation is now even further addressed by the amendments now proposed. The revised conditions respond directly to the concerns raised. It has been made clear that the

horizon mask is a trigger point for further assessment. A penetration of the horizon mask does not itself establish an unacceptable effect.

- [160] The same proportionality approach has been applied to EMI. The EMI condition is limited to terrestrial radiocommunication services at the relevant protected frequencies rather than purporting to regulate ordinary electrical equipment merely because it may produce incidental electromagnetic emissions.
- [161] In relation to recognised standards, the EMI component is tied to the RSM regulatory framework and the relevant protected frequencies. For the horizon component, I do not rely on the 5 degree surface as though it were itself a mandatory New Zealand technical standard. Rather, it is an operational screening envelope supported by SpaceOps' corporate and expert evidence, with the revised case specific approval mechanism dealing with the actual effect of individual penetrations.
- [162] I therefore consider the NoR to be consistent with Policy 7. The revised conditions also materially answer the proportionality concern underlying Ms Spalding's recommendation to remove the Industrial 4 Zone from the horizon mask.

Policy 8 – Operation, Maintenance and Minor Upgrade of Existing Infrastructure

- [163] Policy 8 directs decision makers to enable the efficient operation, maintenance and minor upgrading of existing infrastructure, provided adverse effects are avoided, remedied or mitigated where practicable.
- [164] This is directly applicable to Awarua because the Ground Station is existing, lawfully established infrastructure. The NoR is fundamentally directed at maintaining the environmental conditions required for its continued efficient operation.
- [165] The reference to efficient operation is important. A reduction in satellite acquisition capability or communication windows is relevant even if the Ground Station remains physically capable of performing some functions. Such a reduction reduces the efficient operation of the Ground Station.

[166] Overall, I consider the NoR to be consistent with this policy.

Policy 9 – New Infrastructure and Major Upgrades

[167] Policy 9 requires new infrastructure and major upgrades to be enabled in all environments, subject to the relevant framework for section 6 environments and to adverse effects otherwise being avoided, remedied or mitigated where practicable.

[168] The designation will support a framework within which future upgrades can occur, noting that the Ground Station itself is designated.

[169] Overall, I consider the NoR to be consistent with this policy.

Policy 10 – Planning for and Managing the Interface and Compatibility of Infrastructure with Other Activities

[170] Policy 10 is specifically concerned with the interface between infrastructure and surrounding activities. It seeks infrastructure and other activities to be as compatible as practicable. It also seeks to ensure that the safe, efficient and effective operation and upgrading of existing and planned infrastructure is not compromised by adverse effects from other activities. It contemplates methods including buffers, design standards, special purpose zoning and other spatial planning layers.

[171] Ms Spalding places particular reliance on this policy. She considers that it recognises the use of buffers, design standards and other planning mechanisms to protect infrastructure from incompatible activities and concludes that the designation is a recognised planning tool for managing the interface between the Ground Station and surrounding land uses²⁵. I agree with Ms Spalding's assessment in this regard.

[172] In my opinion, the NoR closely reflects the compatibility based approach anticipated by this policy. It does not seek to prevent all development surrounding the Ground Station. The EMI condition identifies the particular terrestrial radiocommunication activity capable of causing harmful interference. In addition, the horizon mask identifies structures with the potential to obstruct low elevation communications, while the

²⁵ s42A Report at [149]

revised approval pathway distinguishes between actual incompatibility and a penetration that can coexist with the Ground Station.

[173] This is particularly important in the Industrial 4 Zone. Compatibility does not mean that either the Ground Station or industrial development must be given an absolute priority. The appropriate planning response is to identify potential conflicts and provide a practical mechanism for determining whether the two activities can coexist.

[174] That is where I differ from Ms Spalding's ultimate recommendation. Having accepted that Policy 10 supports the use of planning mechanisms to protect infrastructure from incompatible activities, I do not consider complete removal of the horizon mask from the Industrial 4 Zone to be the most appropriate response. A revised assessment pathway better implements the direction that infrastructure and other activities be as compatible as practicable.

Policy 11 – Assessing and Managing the Interface Between Infrastructure and Other Activities

[175] Policy 11 addresses the same infrastructure interface through planning instruments. Among other matters, it establishes the general principle that primary responsibility for managing adverse effects rests with the new activity, while allowing flexibility for site and project specific circumstances.

[176] I consider the latter element relevant. The Ground Station is an established activity. Future industrial buildings, wind turbines, communications infrastructure or other structures capable of affecting it will generally be the later activity. Policy 11 supports an approach under which the compatibility of that new activity with existing infrastructure is addressed at the time it is proposed.

[177] Equally, the reference to site and project specific flexibility weighs against an assumption that every penetration of the horizon surface will necessarily have an unacceptable effect. The revised approval pathway directly responds to that aspect of the policy.

[178] Subject to the same point identified above regarding the specific reference to planning instruments, I consider the revised NoR to be consistent with the direction of Policy 11.

Overall – NPS-I Assessment

[179] I agree with Ms Spalding's conclusion that the NoR is consistent with the NPS-I²⁶.

[180] In particular, Policies 1, 2, 4, 7 and 8 provide important direction to recognise the wider benefits of infrastructure, recognise its operational and functional requirements, make effective use of existing infrastructure, assess effects having regard to technical constraints, ensure conditions are proportionate, and enable the efficient operation of existing infrastructure

[181] Compatibility and proportionality are central themes. I also acknowledge that the notified horizon condition was capable of operating as a relatively blunt restriction, particularly over the Industrial 4 Zone.

[182] That concern has, in my opinion, been substantially addressed by the revised conditions. The 5 degree surface operates as an assessment trigger rather than an absolute prohibition. Development below the surface proceeds without SpaceOps approval. Development penetrating the surface can still proceed where it demonstrates that it will not materially adversely affect those operations or that effects can be appropriately mitigated.

[183] I consider that approach better implements the NPS-I than excluding the Industrial 4 Zone altogether. It recognises the nationally significant benefits and operational requirements of the existing Ground Station while providing the project-specific flexibility and proportionality required to enable surrounding industrial and other activities where they are compatible.

²⁶ s42a Report at [150]

[184] Overall, I consider the NoR, subject to the revised conditions, to be consistent with the objective and relevant policies of the National Policy Statement for Infrastructure 2025.

National Policy Statement for Renewable Electricity Generation

[185] The amended NPS for Renewable Electricity Generation (NPS-REG) also came into force on 15 January 2026. It recognises the national, regional and local benefits of renewable electricity generation and seeks substantial increases in renewable electricity capacity and output.

[186] Of particular relevance are Policies B and C, which recognise cumulative gains in generation capacity, seek to avoid practicable losses of renewable generation potential, and recognise that renewable resources have locational and functional requirements.

[187] I therefore accept that the effect of the horizon mask on potential wind generation is a relevant planning effect and should not be dismissed merely because a wind turbine is unusually tall compared with an industrial building. However, it is noted that any such proposal will require at least a restricted discretionary consent and potentially a more stringent activity status.

[188] The designation does not prohibit renewable electricity generation as an activity. Solar generation and its associated inverters are not intended to be regulated under Condition 3 merely because they comprise electrical equipment. Wind generation below the limitation surface would similarly not require SpaceOps approval under the height control. Where a particular turbine penetrates the surface, the proposed approval pathway provides for the site-specific effect of that penetration to be assessed.

[189] In my opinion that approach better reconciles the NPS-REG with the NPS-I than either an absolute prohibition on tall renewable generation or the absence of any protection for SpaceOps.

National Policy Statement for Electricity Networks

[190] The National Policy Statement for Electricity Networks 2008, as amended in December 2025, applies to both transmission and distribution networks and took effect in its amended form from 15 January 2026. It recognises the national significance of electricity networks and requires their timely and efficient operation, maintenance and development.

[191] This is relevant to Council's submission concerning the proposed 11kV PowerNet network upgrade.

[192] I do not consider it appropriate for the designation to prevent ordinary electricity distribution infrastructure where it does not penetrate the limitation surface. I also support a mechanism to ensure that, where an overhead solution would penetrate the surface and SpaceOps cannot approve that penetration, the resulting issue is addressed practically rather than simply leaving the network operator or Council with an unfunded additional constraint. I discuss a potential condition later in my evidence.

National Policy Statement for Highly Productive Land

[193] This NPS is not deemed a relevant consideration.

Southland Regional Policy Statement

Objective RURAL.1 – Sustainable Use of Rural Land Resource

[194] Objective RURAL.1 seeks the sustainable use of Southland's rural land resource in relation to agriculture and primary production, subdivision and development, earthworks and vegetation clearance, soil resources, mineral extraction and wastewater systems. Importantly, the explanation expressly confirms that use and development activities include infrastructure activities. The purpose of the objective is therefore not simply to preserve rural land for primary production, but to sustainably manage the range of activities occurring within rural areas while maintaining or enhancing the productive capacity of the rural resource.

[195] The designation does not remove the surrounding Rural Zoned land from productive use. Farming and other primary production activities can

continue, and no subdivision, soil disturbance or physical development is authorised by the NoR. The principal additional restriction arises from the horizon mask, but at heights ordinarily anticipated by the Rural Zone this affects only a relatively small area close to the Ground Station.

[196] I consider that the NoR is consistent with Objective RURAL.1.

Objective RURAL.2 – Life-Supporting Capacity of Soils

[197] Similar to the above objective assessment, the NoR will not directly impact productive use of rural land. As such, the proposal is consistent with Objective RURAL.2.

[198] The NoR does not authorise earthworks, soil disturbance, removal of productive soil or a change in the physical use of the soil resource. Neither the horizon mask nor the EMI limitation affects the life-supporting capacity or health of soils.

Policy RURAL.1 – Social, Economic and Cultural Wellbeing

[199] Policy RURAL.1 recognises that use and development of Southland's rural land resource enables people and communities to provide for their social, economic and cultural wellbeing. The explanation expressly identifies farming, forestry, energy generation, industry, tourism and other activities as uses of rural land contributing to wellbeing, while requiring adverse environmental effects to be sustainably managed.

[200] I consider this policy requires recognition of both sides of the NoR. The productive and economic benefits associated with surrounding rural land are relevant, but so too are the social and economic benefits associated with the continued efficient operation of the Ground Station.

[201] The designation does not prevent the surrounding rural properties from continuing to contribute through agricultural production. Conversely, protection of the operational environment of the Ground Station provides certainty for continued investment in established infrastructure which contributes to economic activity, resilience and connectivity within and beyond Southland.

[202] I consider the NoR to be consistent with Policy RURAL.1.

Policy RURAL.2 – Land Use Change and Land Development Activities

- [203] Policy RURAL.2 requires subdivision, land-use change and development within rural areas to be managed in a way that maintains or enhances rural amenity and character. The explanation specifically recognises existing rural industries and infrastructure as part of the rural environment and identifies the need to manage reverse sensitivity and incompatibility between new land uses and existing rural production and service activities, including infrastructure.
- [204] The NoR does not introduce new built form or urban development into the Rural Zone.
- [205] I agree with Ms Spalding's conclusion that the effects of the designation on rural character and productive use are limited. I therefore consider the NoR to be consistent with Policy RURAL.2.

Objective INF.1 – Southland's Infrastructure

- [206] Objective INF.1 seeks an outcome where Southland's regionally significant, nationally significant and critical infrastructure is secure, operates efficiently and is appropriately integrated with land use activities and the environment. The explanation identifies four characteristics of significant infrastructure: its contribution to wellbeing, substantial financial investment, difficulty of replacement or duplication, and the need for integrated management with other resources. It expressly states that recognition of infrastructure's importance means greater weight should be given to its requirements and that the location and form of surrounding development should be managed to reduce incompatibility and conflict.
- [207] Ms Spalding finds that the Awarua Satellite Ground Station is both regionally and nationally significant infrastructure under the SRPS²⁷. She identifies its contribution to regional wellbeing, national and international communications, economic activity, resilience and connectivity. I agree with that assessment. I would also consider the Ground Station to be an

²⁷ s42A Report at [155]

internationally significant piece of infrastructure due to it being essential for international space customers.

- [208] In my opinion, the NoR responds directly to the three components of Objective INF.1. It seeks to secure the Ground Station against incompatible future activities; to maintain the conditions necessary for it to operate efficiently; and to provide a planning mechanism for integrating its operational requirements with surrounding land uses.
- [209] The efficient operation component of the objective needs particular attention paid to it. In my opinion it is not sufficient, in assessing this objective, simply to establish that the Ground Station could continue operating at some reduced level if its satellite acquisition windows were obstructed. Protecting its ability to operate efficiently is itself an express outcome of the Regional Policy Statement.
- [210] I consider that this objective provides stronger support for retaining the horizon protection across the Industrial 4 Zone than is reflected in the ultimate s42A recommendation, noting Ms Spalding states the proposed designation is generally consistent with the infrastructure objectives and policies of the SRPS²⁸.

Policy INF.2 – Infrastructure and the Environment

- [211] Policy INF.2 requires the adverse effects of infrastructure on the environment to be avoided, remedied or mitigated where practicable. In determining practicability, it expressly requires consideration of the functional, operational and technical constraints applying to significant infrastructure, reasonably practical alternative designs or locations, and good-practice approaches.
- [212] I consider this policy important because the designation does have effects on the development flexibility of third party land. Those effects should not be discounted merely because the designation is restrictive rather than involving physical works.

²⁸ s42A Report at [158]

[213] However, the policy does not require adverse effects to be avoided irrespective of the consequences for the infrastructure. It expressly provides for consideration of functional, operational and technical constraints and practical alternatives.

[214] In this case, the Ground Station is existing and has a particular operational dependence on a low and unobstructed horizon. Relocation is not a reasonably practicable means of addressing the effect. A less restrictive 5 degree horizon has been selected rather than the lower elevations that would provide greater operational benefit to SpaceOps but would impose substantially wider constraints on surrounding land. The revised conditions also provide a pathway for individual penetrations where their actual effects on the Ground Station are acceptable.

[215] I also consider the revised conditions materially improve the response to Policy INF.2. The Horizon Mask Airspace Limitation Surface is no longer appropriately characterised as an absolute prohibition on development above the surface. It operates as a trigger for a case specific assessment. That reduces unnecessary constraints while retaining the operational protection sought.

[216] I consider that the NoR is consistent with Policy INF.2.

Policy INF.3 – Infrastructure Protection

[217] Policy INF.3 directs the protection of regionally significant, nationally significant and critical infrastructure, particularly from new incompatible land uses and activities under, over or adjacent to infrastructure. The accompanying explanation confirms that protection is required from land-use and development changes that may affect infrastructure or create reverse sensitivity issues. It further states that local authorities are to take account of the benefits of existing infrastructure and constraints arising from its technical and operational requirements.

[218] In my opinion, this is one of the most directly relevant provisions of the SRPS. The Ground Station is existing significant infrastructure, and the effects the designation seeks to manage arise from future activities on surrounding land.

- [219] Both the EMI limitation and horizon mask respond directly to this policy. A terrestrial radiocommunication service capable of harmful interference is an incompatible activity in the relevant circumstances. Similarly, a sufficiently tall building, structure or vegetation that materially obstructs low-elevation satellite acquisition is incompatible with the efficient operation of the Ground Station.
- [220] Excluding the Industrial 4 Zone entirely would mean that the area where the District Plan anticipates the greatest building and structure heights would have no designation mechanism requiring potentially obstructing development to be assessed against the Ground Station's operational requirements.
- [221] I do not consider that outcome sits comfortably with the directive to protect significant infrastructure from new incompatible activities. The revised approval pathway provides a more balanced response because compatible penetrations can proceed while genuinely incompatible penetrations remain controlled. I therefore consider retaining the horizon mask across the Industrial 4 Zone to be consistent with and supported by Policy INF.3.

Policy INF.5 – Development, Subdivision and Land Use

- [222] Policy INF.5 requires management of development, subdivision and land use so that development does not adversely affect the efficient operation, use, maintenance and development of infrastructure, and so that the efficient and effective functioning and ability to develop and upgrade infrastructure is retained.
- [223] The explanation identifies the precise resource management issue arising here: uncoordinated subdivision and development can result in undesirable effects on infrastructure, and land-use change therefore needs to be coordinated with infrastructure planning
- [224] In my opinion, the NoR is strongly aligned with this policy. The Horizon Mask Airspace Limitation Surface identifies development with the potential to adversely affect efficient operation of the Ground Station and provides a mechanism for managing that effect before the development

occurs. The EMI limitation performs the same function in relation to terrestrial radiocommunication services.

- [225] The revised penetration approval pathway is also consistent with INF.5 because it does not unnecessarily prevent development. It distinguishes development that actually compromises infrastructure from development that, despite penetrating the geometric surface, can coexist with the Ground Station.
- [226] I consider the NoR to be consistent with Policy INF.5. In my opinion, this policy also supports retaining an assessment mechanism over the Industrial 4 Zone and is an additional reason why I disagree with the Council recommendation to remove that zone from the horizon mask entirely.

Objective ENG.3 – Generation and Use of Renewable Energy

- [227] Objective ENG.3 seeks an increase in the generation and use of renewable energy resources. The explanation recognises wind, solar and other renewable resources and anticipates significant development of renewable electricity generation to increase renewable supply.
- [228] While renewable energy generation is a permitted activity in the Industrial 4 Zone, all buildings within the zone still require resource consent.
- [229] I acknowledge that the horizon mask has the potential to constrain the location or design of some renewable electricity generation infrastructure, particularly tall wind turbines. There is therefore some inconsistency between the NoR and this objective.
- [230] That inconsistency does not, in my opinion, make the NoR contrary to ENG.3. The NoR does not prohibit renewable electricity generation within the designated area as a class of activity. Solar generation and renewable generation structures beneath the horizon surface are not restricted by the horizon condition, while a structure penetrating the surface has a pathway for approval where it will not materially adversely affect Ground Station operations.

[231] I therefore consider the NoR to not be contrary to Objective ENG.3, while recognising that the objective weighs in favour of retaining practical opportunities for renewable generation.

Objective ENG.4 – National Significance of Renewable Electricity Generation

[232] Objective ENG.4 requires recognition and provision for the national significance of renewable electricity generation activities.

[233] I do not consider the nationally significant status of the Ground Station means renewable electricity generation should automatically be subordinated to SpaceOps' operational interests.

[234] The revised horizon conditions are important in that respect. They do not establish a blanket exclusion of wind turbines or other renewable generation structures. Instead, they provide a mechanism to determine whether a particular penetration would materially compromise the Ground Station and whether effects can be avoided or mitigated.

[235] I consider there is an element of inconsistency with this objective, but the NoR is not contrary to it. The NoR recognises the possibility of renewable generation while managing incompatibility with another nationally significant infrastructure resource.

Policy ENG.2 – Benefits of Renewable Energy

[236] Policy ENG.2 requires recognition and provision for renewable energy development and its benefits, including electricity generation capacity, security of supply, diversification of generation and reduced reliance on finite resources, while also requiring adverse effects to be appropriately addressed.

[237] I acknowledge these benefits. In particular, the proposed horizon mask should not be interpreted or administered on the basis that penetration by renewable electricity generation infrastructure is inherently unacceptable.

[238] The policy itself, however, does not require renewable generation to proceed irrespective of effects on other infrastructure or resources. Its direction expressly includes appropriate management of adverse

effects. The revised approval process provides the mechanism for undertaking that site-specific assessment.

[239] I therefore consider the NoR to be consistent with this policy.

Policy ENG.3 – Small and Community-Scale Distributed Generation

[240] Policy ENG.3 encourages and makes provision for small and community-scale distributed renewable electricity generation.

[241] The revised EMI condition does not control solar panels, inverters or other electrical generation equipment merely because they produce incidental electromagnetic emissions. Small-scale solar installations are therefore not constrained by the EMI condition on that basis. The horizon mask would only become relevant where a generation structure physically penetrates the limitation surface.

[242] Given the increasing height of the surface with distance from the Ground Station and the availability of an approval pathway for individual penetrations, I do not consider small or community-scale generation to be materially constrained. The NoR is therefore generally consistent with this policy.

Policy ENG.4 – Potential Renewable Electricity Generation Sites

[243] Policy ENG.4 requires provision for the investigation, identification and assessment of potential sites and energy sources for renewable electricity generation.

[244] The NoR does not prevent investigation or assessment of renewable resources within the Industrial 4 or Rural Zones. Nor does the policy require that every site identified as having renewable generation potential must ultimately be available for development irrespective of other effects.

[245] The existence of the horizon mask would instead become one of the operational and planning constraints relevant to assessment of a particular site. Where a proposed structure penetrates the surface, the revised conditions allow its actual effect to be assessed.

[246] I therefore consider the NoR to be consistent with this policy.

Overall Conclusion – Southland Regional Policy Statement

[247] Overall, I agree with Ms Spalding's conclusion that the NoR is generally consistent with the Southland Regional Policy Statement²⁹. In particular, I agree that the Ground Station is significant infrastructure and that the SRPS provides clear policy support for protecting its efficient ongoing operation from incompatible future land uses.

[248] In my opinion, Objective INF.1 and Policies INF.3 and INF.5 are particularly important. The SRPS does not simply recognise the existence of significant infrastructure. It seeks its efficient operation, directs its protection from incompatible surrounding land uses and requires development to be managed so that the efficient functioning of infrastructure is retained.

[249] I accept that those provisions must be balanced against the adverse effects of the designation, the sustainable use of rural land and the regional direction supporting renewable electricity generation. I also accept that the designation should not impose controls that are wider than reasonably required to protect the Ground Station.

[250] In my opinion, however, that balance is better achieved through the revised penetration approval pathway than by excluding the Industrial 4 Zone altogether. The 5 degree surface identifies potentially incompatible development but does not predetermine that a penetration is unacceptable. This provides for surrounding rural, industrial and renewable-energy activities to continue where compatible, while retaining a mechanism to protect the efficient operation of the Ground Station where an actual conflict arises.

[251] On that basis, I consider that retaining the horizon mask across the full proposed area, subject to the revised conditions, is generally consistent with the relevant objectives and policies of the SRPS when read as a whole.

²⁹ s42A Report at [158]

Invercargill City District Plan

Infrastructure Chapter

[252] The District Plan's Infrastructure Chapter is particularly relevant.

[253] INF-O1 seeks secure and efficient local, regional and national infrastructure. INF-O2 provides for infrastructure to operate, be maintained and upgraded while meeting functional, locational, technical and operational requirements.

[254] INF-P1 provides for the continued operation, maintenance and upgrading of existing infrastructure. INF-P3 seeks to protect infrastructure from incompatible subdivision, land use and development under, over or adjacent to infrastructure.

[255] INF-P6 expressly recognises that infrastructure may have a functional, technical or operational need for a particular location.

[256] In my opinion these provisions provide substantial support for protecting the established operational environment of the established Ground Station.

Industry Overview

[257] I have considered both the Industry Overview provisions and the more specific provisions applying to the Industrial 4 (Awarua) Zone in the operative Invercargill City District Plan. The District Plan expressly states that regard is to be had to both District wide and area specific objectives and policies when considering activities.

[258] The Industry Overview recognises the economic importance of industrial activity to Invercargill. It identifies maintaining economic "critical mass" and employment as an important component of the community's future wellbeing and explains that industrial zoning is intended to provide for a variety of short and long term growth opportunities. For Awarua specifically, the Plan records that the land has been zoned for large industry in anticipation of development and identifies its proximity to Invercargill, Bluff Port, State Highway 1 and the Bluff Branch railway as contributing to its industrial potential.

[259] The Industrial 4 Zone must be treated as land genuinely intended for future industrial development. I do not assess the land on the basis that its presently undeveloped state will continue indefinitely.

[260] IND-O1 seeks to maintain the hierarchy of industrial areas, IND-O2 seeks the location and grouping of industries in the appropriate zones, IND-O3 seeks maintenance of critical mass within industrial groupings, and IND-O4 seeks to avoid dispersal of industrial activity. Those provisions collectively support retaining the Industrial 4 Zone as a viable location for the type and scale of industrial activity for which it was established.

[261] Of particular relevance is IND-P2, which applies to industrial activities outside the built up urban area. This policy states:

To minimise restrictions on industrial activities located outside the District's built-up urban areas whilst having regard to the need to maintain the amenity anticipated for activities within neighbouring zones

[262] The explanation makes clear that large industries requiring extensive sites should generally be able to operate without unnecessary restrictions.

[263] I accept that the Horizon Mask Airspace Limitation Surface creates some tension with IND-P2 because it introduces an additional consideration for some industrial buildings and structures. In my opinion, however, IND-P2 does not direct that industrial activities are to be free of all constraints. The Plan itself contains numerous controls on activities within the Industrial 4 Zone, including controlled activity status for buildings and structures, a 35m height standard, a restricted discretionary pathway above that height, Concept Plan requirements, and controls directed at the effects of development.

Industrial 4 Zone

Objective IND4Z-O1 – Availability of Industrial Land

[264] IND4Z-O1 seeks to ensure sufficient land is available for future development of large industrial, warehousing and service activities

which, because of their scale, are encouraged to locate outside the urban area.

- [265] If the designation were to materially sterilise the Industrial 4 Zone or prevented it from fulfilling its strategic industrial purpose, the NoR would be difficult to reconcile with IND4Z-O1. Ms Spalding considers the NoR to be contrary to this objective³⁰.
- [266] In my opinion, the s42A Report places too much weight on the geographical extent of the horizon mask and insufficient weight on its actual effect on development capacity of the zone as a whole.
- [267] Approximately 4ha of the Stewart Family Assets landholding lies within the area where a 35m building would penetrate the Horizon Mask Airspace Limitation Surface and would therefore require SpaceOps' written consent. The balance of the Industrial 4 Zone is not necessarily prevented from being developed for large-scale industrial purposes as anticipated by the District Plan by the 5 degree surface. There are also several other considerations that must be given to development on the Industrial 4 land, including compliance with the Structure Plan which identifies wetland areas, and a maximum building coverage of 25% of the net site area.
- [268] The revised conditions are also important to this assessment. A penetration of the 5 degree plane would not equate to an automatic prohibition. Rather, it would trigger an assessment of the particular structure, including its location, azimuth, elevation, distance and dimensions (even if the simplified condition wording is added). If the penetration would not materially adversely affect operation of the Ground Station, or its effects can be appropriately mitigated, approval can be given. Such an assessment pathway is already available under s176 of the RMA, however the revised conditions will make this pathway certain and clear.
- [269] As such, it is clear that there is a level of inconsistency with IND4Z-O1, but I do not consider the NoR is contrary to that objective. In my opinion sufficient land remains available for the large-scale industrial

³⁰ s42A Report at [170]

development contemplated by IND4Z-O1 and the revised approval mechanism maintains development flexibility where individual penetrations can be demonstrated to be compatible with SpaceOps' operations.

Objective IND4Z-O2 – Amenity Values

[270] IND4Z-O2 seeks the identification, maintenance and enhancement of the amenity values of the Industrial 4 Zone.

[271] The NoR does not authorise physical development within the Industrial 4 Zone and does not itself give rise to adverse amenity effects. I therefore consider IND4Z-O2 to be generally neutral to the NoR.

[272] The objective does, however, demonstrate that industrial enablement is not the sole outcome sought for the zone. Development is anticipated to occur while recognising and maintaining the amenity values identified for the Industrial 4 Zone.

Objective IND4Z-O3 – Landscape, Ecological and Heritage Values

[273] IND4Z-O3 seeks to manage development within the Industrial 4 Zone so that landscape, ecological and heritage values are protected and enhanced.

[274] As with IND4Z-O2, the objective reinforces that the District Plan does not contemplate industrial development occurring irrespective of other identified resource management values and constraints.

Objective IND4Z-O4 – Infrastructure

[275] IND4Z-O4 seeks infrastructure to be provided to the standard required by future landowners within the Industrial 4 Zone.

[276] The horizon mask could potentially interact with some infrastructure, particularly overhead electricity infrastructure in close proximity to the Ground Station.

[277] However, ordinary infrastructure beneath the limitation surface remains unaffected, and infrastructure penetrating the surface would have access to the revised approval pathway. The separate position proposed

in relation to the PowerNet/ICC water supply infrastructure also provides a means of addressing additional undergrounding or relocation requirements where these arise solely from the designation.

[278] I therefore consider the NoR consistent with IND4Z-O4.

Objective IND4Z-O7 – Reverse Sensitivity

[279] IND4Z-O7 seeks to avoid reverse sensitivity effects on permitted and lawfully established activities within or adjacent to the Industrial 4 Zone arising from future subdivision or land-use activities within the zone.

[280] In assessing this objective, I distinguish reverse sensitivity from direct adverse effects on an existing activity. As described in the s42A Report, reverse sensitivity conventionally arises where a new activity establishes near an existing lawfully established activity and subsequently seeks to constrain that existing activity because of its actual or perceived adverse effects³¹. The principal concern in this case is different. Future development within the Industrial 4 Zone could itself adversely affect the Ground Station through physical obstruction or interference with satellite communications. I consider these to be direct adverse effects of new development within the Industrial 4 Zone on existing infrastructure.

[281] Ms Spalding describes the NoR as “reverse sensitivity in action”³². However, she also concludes that the designation does not introduce a new sensitive activity, increase the scale or intensity of Ground Station activities, or itself create actual or potential reverse sensitivity effects³³. I agree with those latter findings.

[282] In my opinion, IND4Z-O7 is relatively broad, however I consider it to be of limited relevance to the NoR. The direct effects of future development on the Ground Station (including associated transmission of radiowaves), and the appropriateness of managing those effects, are more appropriately assessed under the infrastructure provisions and the

³¹ s42a Report at [123]

³² s42A Report at [171]

³³ s42A Report at [129]-[130]

other relevant industrial provisions addressed elsewhere in my evidence.

Policy IND4Z-P1 – Industrial 4 Zone

[283] IND4Z-P1 seeks to establish and implement the Industrial 4 Zone and enable its use by industrial activities.

[284] I accept that the designation creates a level of inconsistency with this policy because some development will be subject to an additional approval requirement.

[285] However, I do not agree with the s42A conclusion that the horizon mask is therefore contrary to IND4Z-P1³⁴. The policy enables the zone to be used by industrial activities; it does not require every conceivable building or structure to be able to establish at every location and height.

[286] Industrial development remains enabled throughout the zone and the revised horizon-mask conditions provide a pathway for structures penetrating the surface where their actual effects on the Ground Station are acceptable. Overall, I consider there are elements of inconsistency with IND4Z-P1, but the NoR is not contrary to this policy.

Policy IND4Z-P5 – Electrical Interference

[287] IND4Z-P5 seeks to avoid nuisance from electrical interference.

[288] I agree with Ms Spalding that the EMI component of the designation is consistent with IND4Z-P5³⁵.

Policy IND4Z-P11 – Height of Structures

[289] IND4Z-P11 seeks to enable the height of buildings within the Industrial 4 Zone to meet the operational requirements of activities in the zone, while having regard to relevant landscape considerations.

[290] I accept that this policy weighs against an inflexible height control that would prevent buildings from achieving heights genuinely required for

³⁴ s42A Report at [170]

³⁵ s42A Report at [170]

their industrial operation. However, the District Plan itself does not provide unrestricted height. A 35m maximum height applies before restricted discretionary consent is required and buildings under this height, as well as other industrial activities that do not require large buildings, could still establish in the 4ha impacted by the area of the horizon mask that would require structures to be less than 35m (unless approval is provided by SpaceOps).

[291] The revised approval pathway is also important. The Horizon Mask Airspace Limitation Surface does not operate as an absolute height cap. Where an industrial activity would be proposed to penetrate the surface, the actual effect of that penetration can be assessed and approved where it will not materially compromise Ground Station operations.

[292] Overall, I consider the proposal does have elements of inconsistency with this policy, but the NoR is not contrary to this policy.

Policy IND4Z-P24 – Reverse Sensitivity

[293] IND4Z-P24 directs activities to be located and designed to avoid reverse sensitivity effects on permitted and lawfully established activities on or adjacent to the Industrial 4 Zone

[294] I disagree with Ms Spalding's conclusion that the NoR is contrary to IND4Z-P24.

[295] For the same reasons addressed in relation to IND4Z-O7, I consider this policy to have limited direct relevance to the effects which the NoR seeks to manage. The principal concern is that future development within the Industrial 4 Zone could directly affect the operation of the existing Ground Station through physical obstruction or interference with satellite communications. I consider those to be direct adverse effects of the new activity on existing infrastructure, rather than reverse sensitivity effects.

[296] Overall, I do not agree that the NoR is contrary to IND4Z-P24. Equally, I do not rely on the policy as providing material support for the horizon mask. I consider the policy to be neutral in the overall assessment. The direct effects of future development on the Ground Station (including associated transmission of radiowaves), and the appropriateness of

managing those effects, are more appropriately assessed under the infrastructure provisions and the other relevant industrial provisions addressed elsewhere in my evidence.

Rural Zone

[297] Ms Spalding considers that that the NoR is generally consistent with the Rural Zone objectives and policies³⁶. I agree with this. The designation will not materially affect the ability of surrounding landowners to continue undertaking productive rural activities and that adequate flexibility remains for ongoing farm management and development.

[298] I acknowledge that the horizon mask introduces an additional constraint on the height of buildings, structures and vegetation close to the Ground Station. However, the practical effect on Rural Zoned land is limited. The District Plan permits buildings to a height of 10m, and a 10m building would comply with the horizon mask once approximately 91.4m from the Ground Station boundary. The two adjoining Rural Zoned properties are approximately 392ha and 304ha respectively. The designation would constrain the otherwise permitted 10m building height represents a very small proportion of those properties and would not materially constrain their productive use. Properties further away are subject to a horizon height substantially above the height ordinarily anticipated for rural development.

[299] I also consider the revised pathway for approval of penetrations is relevant here. A rural building, structure or vegetation penetrating the surface would not necessarily be prevented. Rather, its actual effect on Ground Station operations could be assessed.

[300] The revised EMI condition is similarly relevant because ordinary agricultural machinery and electrical equipment producing incidental electromagnetic emissions are not subject to that control merely by virtue of their use.

³⁶ s42A Report at [169]

[301] Overall, productive rural use remains the dominant and available use of the surrounding land. I therefore consider the proposal is consistent with the objectives and policies of the Rural Zone.

Alternative Sites, Routes and Methods

[302] Because the designation affects land in which SpaceOps does not hold a sufficient interest, consideration of alternatives is required under s171(1)(b).

Alternative Location of the Ground Station

[303] The Ground Station is existing and has been for approximately two decades. The Ground Station has been lawfully established by land use consents and has recently been confirmed by a designation (MIC/2026/19). Relocation is therefore materially different from selecting the site of a new facility.

[304] The site which the ground satellite station was on was selected following a search of Southland because of its low horizon, southerly location, unobstructed terrain, fibre connectivity, access and ability to support polar-orbit spacecraft.

[305] Mr McNeill identifies a combination of requirements for a modern LEO Ground Station, including suitable land, a low horizon, telecommunications connectivity, reliable power, a suitable radio environment, access and community acceptance. He describes the limited capacity of the Lochiel site and the unsuccessful investigation of a complementary station at Ruakaka³⁷. These examples do not establish that no other site could ever be suitable, but they demonstrate the difficulty of identifying an operationally comparable location. Relocation would also require consideration of the substantial established infrastructure at Awarua.

[306] Those characteristics are not simply matters of convenience. They are directly related to the function of the infrastructure. The ability to communicate with spacecraft at low elevations is dependent upon

³⁷ McNeill Evidence at [155]-[157]

unobstructed line of sight, while the southerly location is particularly important for polar-orbiting spacecraft.

[307] Relocating the Ground Station would therefore not simply involve moving a conventional land use activity to another available property. It would require finding another location which provides the necessary combination of latitude, horizon characteristics, radiofrequency environment, telecommunications connectivity, access and technical support, and then replacing substantial existing infrastructure

[308] Ms Spalding nevertheless observes that the Industrial 4 Zone was introduced in 2009 and that SpaceOps would have been aware of its development potential before subsequent expansion of the Ground Station in 2019 and 2023³⁸. She considers that the absence of development on that land could not be assumed to continue indefinitely.

[309] I also agree with that proposition to a point. The Industrial 4 Zone forms part of the existing planning environment and the alternatives assessment cannot proceed on the assumption that it will remain undeveloped. The planning framework applying to adjoining land must inform the design of the designation, but it does not remove the functional characteristics that led to the selection and subsequent establishment of the Awarua site.

[310] It is acknowledged that SpaceOps could have sought additional planning protection at the time Invercargill City Council undertook its most recent District Plan review. However, this did not occur. SpaceOps have since sought professional advice and have proceeded with its Requiring Authority status and NoR applications to protect their operations.

[311] For those reasons, I do not consider relocation of the Ground Station to be a realistic alternative method of achieving the objectives of this NoR.

Alternative of No Designation

[312] I have considered whether the existing regulatory framework could be relied upon without the additional restrictive designation.

³⁸ s42A Report at [178]

- [313] In relation to EMI, there is already a relevant regulatory framework. The RSM decision establishes a 2km protection area at Awarua and specifies an interference threshold for terrestrial services within the protected frequencies. That is an important part of the existing environment and is why the revised EMI condition has been closely aligned with that framework. However, it is considered more efficient and effective to also introduce this framework into the District Plan under the RMA to create certainty for landowners, and to ensure that SpaceOps can rely on District Plan provisions. It is noted that the current windfarm application makes no specific reference to EMI. Regardless of whether the designation is in place or not, this is a real effect that should be assessed. If EMI has not been assessed as part of the windfarm application, it is a risk that future applications will also not include an appropriate assessment.
- [314] The position is substantially different for physical obstruction. The Radiocommunications Act, associated regulations and RSM protection arrangements address radiocommunication and interference issues. They do not provide a land use mechanism controlling a building, turbine, mast, crane or vegetation that physically obstructs the line of sight between a Ground Station antenna and a spacecraft. Council's engineering reviewer expressly acknowledges that physical obstruction is outside that regulatory framework.
- [315] The District Plan also does not provide equivalent protection. In particular, the Industrial 4 Zone provides for buildings up to 35m through a controlled activity framework and enables consideration of structures exceeding 35m as restricted discretionary activities. There is no general District Plan airspace surface around the Ground Station which ensures that the operational effect of a penetration into the low elevation satellite envelope is assessed.
- [316] I therefore consider that the status quo, without an additional planning mechanism, would not reliably achieve SpaceOps' objective of maintaining an unobstructed low horizon.

Onsite Engineering and Operational Mitigation

- [317] Council's engineering review raised whether effects could instead be addressed through mitigation at the Ground Station, including filtering, shielding, antenna elevation and equipment upgrades. I consider it appropriate that those alternatives have been examined.
- [318] In relation to EMI, SpaceOps has confirmed that appropriate receiver hardware, equipment configuration and operational management form part of its normal activities and that the designation is not intended to replace reasonable onsite mitigation.
- [319] There are nevertheless technical limitations to those options. SpaceOps advises that filtering cannot remove interference that occurs within the same frequency as the desired satellite signal. Shielding cannot be applied in a manner that excludes terrestrial signals without also potentially obstructing the desired low-elevation satellite signal. Raising antennas does not usefully preserve low-angle visibility and may increase exposure to more distant interference sources as well as creating structural and operational implications.
- [320] More fundamentally, those measures do not address physical obstruction. If a structure physically occupies the relevant line of sight, filtering or receiver upgrades cannot recreate that line of sight. SpaceOps advises that such an obstruction may delay or prevent acquisition, reduce the available communication window and compromise Ground Station capability.
- [321] I therefore consider onsite mitigation to be complementary to, rather than a substitute for, an appropriate planning mechanism managing physical obstruction.

Alternative Elevation Angles

- [322] The elevation angle itself is another alternative that has been considered.
- [323] A low elevation angle does provide greater operational benefit.
- [324] A 0.5 or 3 degree surface would therefore provide greater protection to SpaceOps. However, it would also extend the resulting land use

restriction substantially further across surrounding properties. SpaceOps has expressly rejected those lower surfaces because their effects on surrounding land would be too far reaching.

[325] Conversely, a steeper surface would reduce effects on adjoining land but would also leave part of the 5 degree low-elevation operational envelope unprotected. Given the technical evidence that the 5 degree envelope has operational value, I do not consider a steeper surface to achieve the same level of protection sought by SpaceOps.

[326] I therefore consider the 5 degree surface to reflect a deliberate compromise: it does not seek the greatest operational protection that SpaceOps could usefully benefit from, but instead limits the protected envelope in recognition of effects on surrounding land.

Alternative Starting Height

[327] SpaceOps has also considered the point at which the surface commences. Rather than beginning at ground level at the designation boundary, the proposed surface commences at 2m.

[328] A 2m starting height avoids an impractical ground level restriction and recognises that ordinary low level uses, fencing, stock and vegetation should not be affected. It also provides a practical reference height for mapping the surface.

[329] In my opinion, this is another feature demonstrating that the form of the designation has been selected to avoid unnecessary restrictions rather than simply maximise protection of the Ground Station.

Alternative Geographic Extent

[330] The 3km outer extent is also capable of being treated as an alternative method issue.

[331] The surface does not impose the same height restriction throughout that radius. It rises progressively with distance. The information supplied following the engineering review records that the Rural Zone's 10m height can be achieved at approximately 90m from the Ground Station, while the Industrial 4 Zone's 35m height can be achieved at

approximately 377m. At greater distances, only particularly tall structures such as large wind turbines, major masts or very tall stacks are likely to penetrate the surface.

[332] By the 3km outer boundary the surface is approximately 260m above the commencement elevation. The fact that a property falls within the 3km designation does not itself mean that ordinary development on that property is restricted. Such an approach is very similar to Obstacle Limitation Surfaces adjacent to airports.

[333] SpaceOps' reason for retaining the 3km extent is that exceptionally tall structures can still physically enter the low elevation envelope at greater distances. The 3km boundary therefore provides an identifiable outer limit beyond which SpaceOps does not seek to control physical obstruction.

[334] I consider a shorter radius would reduce the geographic extent of the designation. However this may end up excluding potentially obstructing structures once they fall beyond the selected distance. In my opinion, the better means of reducing potential effects is to retain the progressive surface and ensure that only development which actually penetrates that surface requires further consideration.

Narrow or Slender Structure Exemption

[335] One possible alternative raised through submissions is an exemption for narrow structures such as cranes or turbines on the basis that their physical profile is limited.

[336] I do not consider a blanket exemption of that nature appropriate. The technical advice accepted into the s42a is that even relatively narrow structures can interfere with Ground Station reception³⁹. Whether they do so depends upon factors including their azimuth, elevation, distance, size and construction.

³⁹ s42A Report at [103]

[337] Those factors support individual assessment rather than a categorical exemption based solely on width or structural form. The same exists for temporary penetrations such as cranes.

Directional or Sector-Based Horizon Protection

[338] The principal alternative method identified by Council's engineering reviewer is a more directional approach. As identified earlier in this evidence, Dr Sathyendran advises that actual obstruction depends upon the azimuth, elevation, distance, dimensions and construction of a structure and the directions and elevations the Ground Station actually relies upon. He considers that a case by case assessment would better match the actual effect than assuming every penetration has the same consequence.

[339] Ms Spalding relies on that advice to conclude that adequate consideration has not been given to alternative methods and considers that a more detailed assessment of directional sensitivities should have been undertaken instead of applying a uniform 3km restriction in all directions⁴⁰. It is noted that conservation land and the coastal marine area are not included in the proposed designated area.

[340] I agree with the underlying concern identified by Dr Sathyendran, that penetration of the 5 degree surface should not automatically be equated with an unacceptable operational effect.

[341] Where I differ from Ms Spalding is the planning response to that concern.

[342] In my opinion there are two distinct steps involved.

- (a) The first is identifying development with sufficient potential to affect the low elevation envelope that technical consideration is warranted.
- (b) The second is determining whether the particular proposal would actually materially compromise Ground Station operations.

⁴⁰ s42A Report at [185]

- [343] The 5 degree surface performs the first function. It provides a clear, mapped and readily understood screening threshold. The revised approval condition performs the second function by requiring consideration of the particular characteristics and the effects these have on the Ground Station.
- [344] I consider that approach responds directly to the engineering advice. It retains the administrative certainty of a defined surface without assuming that every penetration has the same effect.
- [345] A purely case by case system without any mapped screening surface would create a different difficulty in my opinion as there would be no trigger point, and potentially no legal requirement to undertake an assessment if it is not included as part of a designation. Landowners and Council would need some means of identifying which proposals warrant technical assessment in the first place. A defined surface provides that threshold and means that development beneath it can proceed without further SpaceOps involvement.
- [346] A pre-mapped directional or sector-based surface is also not demonstrated by the information presently before me to provide a more robust planning method. It would require a technically defensible basis for determining in advance which directions could safely be left unprotected, and it creates considerable uncertainty for the future. As mentioned previously, Dr Sathyendran's advice identifies the relevant variables and favours case by case assessment. I therefore consider the revised condition to be a more direct response to that advice than simply deleting predetermined sectors from the designation.
- [347] Mr McNeill's evidence provides site-specific examples of why operational sensitivity cannot be reduced to a single fixed direction. He explains how observed passes vary with orbital inclination and successive ground tracks, and provides actual sky track plots for AWA-1⁴¹. In my opinion, that information weighs against excluding the north-western sector solely by reference to the Industrial 4 zoning boundary. It does not establish that every azimuth is used equally or that every

⁴¹ McNeill Evidence Figures 23 and [109]

penetration has the same consequence, which reinforces the need for case-specific assessment.

Alternative of Excluding the Industrial 4 Zone

[348] Ms Spalding ultimately recommends that the Airspace Limitation Surface be removed from the Industrial 4 Zone. She accepts that some form of airspace protection is reasonably necessary but considers that applying the horizon mask over Industrial 4 land imposes significant development effects which outweigh the additional Ground Station protection obtained⁴².

[349] There is an obvious benefit to that alternative. It would remove the potential additional height constraint from land specifically zoned for large scale industrial development. I agree that this would avoid the potential development effects identified by Ms Spalding throughout the s42A Report.

[350] The difficulty is that it would also remove physical obstruction protection from the area where the District Plan could provide a consenting pathway for some of the greatest building and structure heights in the surrounding environment. The Industrial 4 Zone provides for buildings up to 35m through the controlled activity framework, structures exceeding that height can be considered, and a proposal involving wind turbines of approximately 200m has already demonstrated that very tall structures are a possibility to be advanced in this location.

[351] Retaining EMI protection alone over that land does not address this issue. As set out above, EMI and physical obstruction are separate effects. A structure may cause no harmful radiofrequency emission whatsoever but still physically obstruct part of the Ground Station's acquisition and tracking envelope.

[352] I therefore do not consider that the fact that SpaceOps would retain a "meaningful level of protection"⁴³ in other directions answers whether exclusion of the Industrial 4 Zone is an adequate alternative for achieving the requiring authority's objectives. Ms Spalding records that physical

⁴² s42A Report at [208(c)]

⁴³ s42A Report at [192]

obstruction can reduce the Ground Station's efficiency or shorten communication windows. Protection of other sectors does not remove the potential effect of an obstruction occurring within an unprotected sector.

[353] In my opinion, the concern which underpins Ms Spalding's recommendation is better addressed by modifying how penetrations are assessed, rather than removing the ability to assess them altogether.

[354] The revised conditions included in my evidence allow industrial development beneath the surface to proceed without SpaceOps approval and enables development above the surface where the particular penetration does not materially compromise Ground Station operations or where its effects can appropriately be mitigated. That is a more proportionate alternative than complete exclusion of the Industrial 4 Zone.

Alternative Approval and Assessment Mechanisms

[355] Submitters have sought an objective, transparent and timely process for assessing penetrations, including clear technical criteria and reasons for decisions. The s42a also considers it appropriate for the designation to provide more information about the s176 approval process.

[356] I agree. In my opinion, reliance on an undefined discretion to approve or decline every penetration would create unnecessary uncertainty.

[357] I have proposed two alternative formulations of Condition 2. Option A specifies the information requirements, assessment matters, substantive approval test and processing timeframes. Option B adopts a simpler approach based on existing airport designation conditions, relying on an independent technical assessment and SpaceOps' written approval.

[358] This is particularly important because it changes the practical effect of the horizon mask. The plane is no longer appropriately understood as the final determination of what can be built. The horizon mask is the trigger for assessment, not the effect itself.

[359] This is a material refinement arising from the submissions and Council's engineering advice and should form part of the alternatives assessment under s171(1)(b)(i).

Alternative Methods for EMI

[360] Alternative methods have also been considered for the EMI component.

[361] The primary alternative method would be relying solely on the RSM Decisions. RSM Decisions are not within the District Plan and adherence to these Decisions are often reactive.

Overall Assessment of Alternatives

[362] The alternatives assessment needs to extend beyond the question of relocating the Ground Station. The extent and form of the designation, onsite mitigation and the method by which individual penetrations are assessed are all relevant alternatives.

[363] I agree with further Council engineering advice that physical obstruction will interfere with the reception of electromagnetic signals, especially at low levels, and a case by case assessment would be better matched⁴⁴. This is what is now proposed.

Reasonable Necessity of the Designation

[364] Section 171(1)(b)(ii) requires particular regard to whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority.

[365] The approval of SpaceOps to become a Requiring Authority reads:

Space Operations New Zealand Limited is approved as a requiring authority under section 167 of the Resource Management Act 1991 for its network utility operation of constructing, upgrading, maintaining and operating the Awarua Satellite Ground Station based in Awarua, Southland to the extent that this station undertakes radiocommunication

⁴⁴ Dr A Sathyendran, Additional Memo, at [3]

activities as defined in section 2(1) of the Radiocommunications Act 1989.

[366] The Minister's decision on an application to become a Requiring Authority has to meet the s167(4) thresholds:

(4) *The Minister shall not issue a notice under subsection (3) unless he or she is satisfied that—*

(a) *the approval of the applicant as a requiring authority is appropriate for the purposes of carrying on the project, work, or network utility operation; and*

(b) *the applicant is likely to satisfactorily carry out all the responsibilities (including financial responsibilities) of a requiring authority under this Act and will give proper regard to the interests of those affected and to the interests of the environment.*

[367] It is responsible for SpaceOps, as, Requiring Authority, to take steps to ensure that its operations are not unreasonably impeded. The objective is to give effect to the Requiring Authority status in respect of its acknowledged network utility operations, and for the District Plan to reflect that through the designation process so that there is proper regard to the interests of affected persons

[368] SpaceOps' primary objective, as stated in its request to become a Requiring Authority, is to deliver modern, efficient and reliable antenna infrastructure to the space community. To achieve this ultimate objective, SpaceOps' objectives for this designation are as follows:

- Ensure that the satellite Ground Station can continue to run in an efficient manner by sending and receiving radiotelecommunications as defined in the Radiocommunications Act 1989;
- Ensure that activities on surrounding land do not interfere with the already established protection zone for space research, space operation and Earth exploration-satellite services; and

- Ensure that the District Plan is aligned with the RSM protection zone

[369] Ensure that the District Plan is aligned with the RSM protection zone. I consider it useful to distinguish the two components of the designation when assessing reasonable necessity. The EMI component principally gives land use recognition to the existing RSM protection framework. The Airspace Limitation Surface addresses a separate issue of physical obstruction, which is not managed through that framework. The first objective, concerning the continued efficient operation of the Ground Station, is therefore particularly relevant to the necessity of the Airspace Limitation Surface.

[370] Ms Spalding accepts that the designation will achieve SpaceOps' objectives and that it will provide protection allowing the Ground Station to operate at an optimal level without physical obstruction or harmful EMI⁴⁵. She also accepts that some degree of horizon protection is reasonably necessary. Her concern is with the extent of that protection, particularly its application to the Industrial 4 Zone.

[371] Ms Spalding records the relevant legal threshold as falling between something that is merely expedient or desirable and something that is essential⁴⁶. I have approached the assessment on that basis. In my opinion, the fact that the Ground Station could continue to undertake some operations if part of its horizon became obstructed does not establish that the designation is not reasonably necessary.

[372] This distinction is important because one of SpaceOps' express objectives is the efficient operation of the Ground Station. Ms Spalding accepts that physical obstruction may result in reduced efficiency or shorter communication windows. In my opinion, an outcome under which the Ground Station remains capable of some operation, but with reduced efficiency, does not fully achieve that objective.

[373] Low Earth orbit spacecraft may only be visible from Awarua for a few minutes during each pass. The lower the elevation at which a spacecraft

⁴⁵ s42A Report at [190]

⁴⁶ s42A Report at [191]

can be acquired, the greater the available communication period. An obstruction can therefore delay or prevent acquisition, reduce the available communications window and compromise the operational capability of the Ground Station.

[374] Physical obstruction is also an effect which cannot subsequently be adequately addressed through measures at the Ground Station. Filtering, shielding and receiver upgrades may assist with some forms of electromagnetic interference, but do not restore a line of sight physically occupied by a building, turbine, mast or vegetation. SpaceOps' evidence is therefore that protection of the low horizon ultimately requires a land-use mechanism.

[375] I consider that some form of Airspace Limitation Surface is more than simply desirable. Without such a mechanism there is no reliable means of ensuring that future development which could materially obstruct the Ground Station is identified and assessed before it is established.

Extent of the Protection Sought

[376] The key issue is whether the particular extent of the Airspace Limitation Surface is reasonably necessary, including its application across the Industrial 4 Zone.

[377] I do not consider reasonable necessity requires SpaceOps to demonstrate that every individual penetration of the 5 degree plane would necessarily cause a material operational effect. Council's engineering reviewer has advised that the actual effect of a structure depends on matters including its azimuth, elevation, distance, dimensions and construction, together with the directions and elevations relied upon by the Ground Station. I agree that those factors are relevant.

[378] That technical advice is reflected in the revised conditions. The 5 degree surface now operates as a screening threshold, rather than a conclusion that every penetration is unacceptable. Where a proposal penetrates the surface, its actual effect is assessed against the operational requirements of the Ground Station. A penetration that does not materially compromise those operations, or whose effects can appropriately be mitigated, may be approved.

[379] In my opinion, that distinction is important to the reasonable necessity assessment. The question is not whether it is reasonably necessary to prohibit every structure above a 5 degree plane. That is no longer what is proposed. The question is whether it is reasonably necessary to retain a mechanism which identifies potentially obstructing development and allows its actual effect to be assessed before it establishes. I consider that it is reasonably necessary to require an assessment on the impacts of operations on the Ground Station should the horizon mask be penetrated.

[380] The 5 degree angle itself also represents a moderated level of protection. SpaceOps advises that lower elevation angles would provide additional operational benefit and that some activities can occur below 5 degrees. However, a 0.5 or 3 degree limitation surface would have substantially greater effects on surrounding land and has deliberately not been sought for that reason.

[381] The surface commences 2m above the Ground Station boundary and rises progressively with distance. It is therefore not a uniform height restriction across the 3km area. The degree of constraint reduces quickly with distance from the Ground Station.

Industrial 4 Zone

[382] Ms Spalding concludes that applying the horizon mask across the Industrial 4 Zone goes beyond what is reasonably necessary. She considers that SpaceOps would retain a "meaningful level of protection" through the horizon mask over the Rural Zone together with the EMI protection, even if the Industrial 4 Zone were excluded⁴⁷.

[383] I disagree with that conclusion.

[384] I do not consider the retention of a "meaningful level of protection" elsewhere to be the same as whether the designation is reasonably necessary to achieve SpaceOps' state overarching objective and objectives specific to this NoR. The first objective of the NoR is directed to the efficient operation of the Ground Station. Leaving a sector in which

⁴⁷ s42A Report at [192]

potentially obstructing development can establish without any assessment of its effect does not provide equivalent protection of that objective.

[385] The EMI limitation is not an alternative form of protection from physical obstruction. A building or wind turbine could comply fully with the EMI requirements while still occupying the line of sight between an antenna and a spacecraft. The fact that the EMI designation remains over Industrial 4 land therefore does not reduce the need to consider physical obstruction.

[386] The Industrial 4 Zone is the part of the surrounding environment where particularly tall structures are most realistically anticipated. Buildings up to 35m are a controlled activity and taller structures are a restricted discretionary activity. The wind farm proposal subject to a consent application in the early stages of processing, demonstrates the possibility for structures to be progressed that are substantially taller than conventional industrial buildings. The operational issue the Airspace Limitation Surface addresses is therefore capable of arising within that zone.

[387] I acknowledge that this is also why the effects on Industrial 4 land are greater and why particular care is required to ensure that the designation is proportionate. In my opinion, however, that weighs in favour of the revised case specific approval mechanism, rather than removing the zone from the designation altogether.

[388] Removing the Industrial 4 Zone would avoid the development constraint, but it would do so by removing any designation-based ability to assess physical obstruction within that sector. By comparison, the revised approach retains industrial development below the surface as unaffected by the designation and allows penetrations above it where their actual effects are acceptable.

[389] I consider that approach better reconciles the competing interests and is relevant to determining whether the designation is *reasonably*, rather than absolutely, necessary.

Existing Regulatory Mechanisms

[390] I have also considered whether the objectives can reasonably be achieved without the designation. The existing RSM framework provides an important basis for managing terrestrial radiocommunication interference and substantially informs the EMI component of the proposal. However, it does not regulate physical obstruction of the Ground Station's horizon.

[391] Nor does the underlying District Plan presently provide a specific mechanism ensuring that the effect of new tall structures on the Ground Station's satellite acquisition and tracking envelope is assessed. I therefore do not consider reliance on the existing regulatory environment alone would achieve SpaceOps' first objective.

Conclusion on Reasonable Necessity

[392] Overall, I agree with Ms Spalding that protection of the low horizon is reasonably necessary. I also agree that the extent of that protection must be proportionate and that the notified approach was capable of being refined.

[393] Where I disagree is with the conclusion that reasonable necessity requires the Industrial 4 Zone to be removed from the Airspace Limitation Surface. In my opinion, that conclusion places undue weight on whether the Ground Station could continue to operate at some reduced level and insufficient weight on SpaceOps' express objective of maintaining its efficient operation. The Council recommendation also places undue weight on the development of the Industrial 4 Zone, over SpaceOps' objectives.

[394] The revised conditions proposed in this evidence are important to my conclusions. They mean SpaceOps does not seek an absolute 5 degree exclusion zone. Instead, the designation provides a defined screening surface within which potentially obstructing development can be assessed having regard to its actual relationship with Ground Station operations.

Submissions

[395] Nine submissions were received. The matters raised can largely be grouped into effects on industrial and rural development, renewable energy, infrastructure, the extent of the horizon mask, the scope of the EMI restriction, the SpaceOps written approval mechanism, alternatives, property/compensation matters and procedural matters. Responses to each submission are provided below.

Jarvis Ag Limited

[396] Jarvis Ag opposes the NoR because of the restrictions affecting its land, potential constraints on future development, property value and its concern that the land could become incapable of reasonable use. It seeks withdrawal of the NoR and refers to acquisition under the Public Works Act.

[397] I acknowledge that a restrictive designation is a restriction on affected land. However, the designation does not prohibit farming or ordinary development beneath the limitation surface and, following clarification of Condition 3, does not regulate ordinary agricultural electrical equipment merely because it emits incidental EMI.

[398] I do not provide valuation evidence and therefore do not express an opinion on property value. Similarly, the statutory tests applying to any application under s185 are ultimately legal matters. From a planning perspective, however, I do not consider the designation removes reasonable use of the affected rural land noting that no concerns have been raised from the immediately adjoining operational farms which SpaceOps' have a good relationship with.

South Port New Zealand Limited

[399] South Port opposes the NoR in its present form. Its concerns include inconsistency with the Industrial 4 Zone, effects on port-related infrastructure, renewable generation and energy infrastructure, investment uncertainty, the SpaceOps approval mechanism, alternatives and procedural matters.

[400] South Port alternatively seeks a reduced designation, independent assessment, enablement of renewable infrastructure, objective and

time-bound approvals with independent review, and periodic review of the designation. It is noted that the South Port site is located at Bluff Harbour, with its land not covered by the designation sought.

[401] I consider several of those concerns have been substantially addressed through clarification of the EMI condition and the proposed amendments to Condition 2 set out in this evidence.

[402] I agree with South Port that the approval pathway should be clear and technically based. I therefore recommend that the condition specify the information that may be provided, the matters SpaceOps must consider, a response timeframe and written reasons where approval is declined.

[403] I do not support a mandatory periodic review condition at this stage. The operational requirement for a low horizon is ongoing rather than temporary, and periodic reopening of the designation would reduce the long-term certainty that the designation is intended to provide. I understand there are also statutory mechanisms for alteration or removal of a designation should its purpose cease or change materially.

Southland Business Chamber

[404] The Chamber is neutral and considers both SpaceOps and the Awarua Quadrant strategically important to Southland. Its central concern is achieving a negotiated, technically robust outcome that protects SpaceOps without unnecessarily constraining industrial and renewable-energy development.

[405] The Chamber also seeks objective and transparent approval pathways and recognition of renewable generation, storage and heavy-industrial development.

[406] In my view, the revised conditions are consistent with the outcomes sought by the Southland Business Chamber.

Environment Southland

[407] Environment Southland is neutral. It records that the NoR does not appear to materially affect its functions under s30 of the RMA and does not wish to be heard unless further regional issues emerge

[408] I agree that there are no material regional consenting or regional resource management effects identified.

George Rankin

[409] Mr Rankin is neutral. His land is currently used for forestry. He notes that the horizon surface is approximately 264.5m above the starting elevation at 3km and does not presently seek an amendment, although he identifies possible wind generation as a future use.

[410] The progressive nature of the limitation surface means that, at this distance, only very tall structures are likely to interact with the designation. Any future wind proposal would be capable of being assessed against the actual turbine dimensions and location at that time.

Adam Fuller

[411] Mr Fuller opposes the original Condition 2 because it does not explain how SpaceOps would assess a proposed penetration. He seeks an opportunity for a developer to use theory or testing to demonstrate that an object would not materially interfere with SpaceOps' signals.

[412] As stated elsewhere in my Evidence, I recommend the conditions could be expanded to provide a pathway for a penetration of the height surface.

[413] I note that a refusal or conditional approval under the statutory written-consent mechanism is itself subject to an appeal right under s179 of the RMA, which provides an independent statutory safeguard.

Herman Thys

[414] Mr Thys is concerned that the designation could impede increasingly technology-dependent farming, including virtual fencing and future solar or wind generation, and could affect property value.

[415] The clarified Condition 3 materially addresses the concern about agricultural technology. Virtual fencing and ordinary electrical equipment are not terrestrial radiocommunication services merely because they contain electronics.

[416] Solar generation is similarly not captured by the EMI condition merely because it incorporates inverters. Wind generation is relevant to the height condition only where the turbine penetrates the limitation surface.

[417] I do not provide valuation evidence and do not express an opinion on property devaluation.

Invercargill City Council – Water Services

[418] Council's Water Services Group is neutral but is concerned about its existing and future community water supply infrastructure, including pumping equipment, motor controllers, inverters, SCADA and the proposed 11kV electricity network upgrade.

[419] The clarified Condition 3 addresses pumps, VSDs, inverters and other ordinary electrical equipment. These are not terrestrial radiocommunication services simply because they generate incidental EMI.

[420] A radio-based SCADA telemetry system is different because the radio component may constitute a terrestrial radiocommunication service. Any new system would therefore need to be compatible with the applicable receive-protection requirements.

[421] I also understand Council's concern about overhead electricity infrastructure within Awarua Siding Road. I consider a specific condition or agreement addressing any additional cost caused solely by the horizon mask to be a reasonable means of resolving this issue.

[422] I recommend condition wording to the effect that, where new or upgraded electricity distribution infrastructure within legal road would penetrate the limitation surface and SpaceOps does not approve that penetration, SpaceOps meets the reasonable additional cost directly attributable to undergrounding or relocating the affected infrastructure, excluding renewal, betterment or capacity costs that would otherwise have arisen.

Stewart Family Assets Limited

- [423] Stewart Family Assets opposes the NoR in its entirety. Its principal grounds include conflict with the anticipated Industrial 4 environment, effects on its windfarm and future industrial development, alleged loss of reasonable use, insufficient consideration of alternatives, Part 2, and procedural matters.
- [424] I agree that the Industrial 4 Zone is an important part of the anticipated environment and I have expressly taken that into account.
- [425] I do not agree, however, that confirmation of the designation would prevent meaningful industrial development throughout the Awarua Quadrant. The actual constraint on the otherwise available 35m building envelope is concentrated close to the SpaceOps site. However, it is important to note that even within the 4ha that would be subject to SpaceOps' approval to establish a building greater than 35m, a building with a lesser height could still be established in this area. As noted throughout this evidence, there is a pathway to penetrate the horizon mask. It does not leave the land sterile. It is also worth noting the
- [426] I accept that tall wind turbines are a more significant interaction. That is a genuine adverse effect of the designation and is part of the planning balance. However, the NPS-REG does not mean that every possible wind turbine location must be protected irrespective of effects on other nationally significant infrastructure. Conversely, the NPS-I does not justify an automatic refusal of every turbine penetration.
- [427] I therefore favour the site-specific approval pathway described above with the horizon mask being a 'trigger point' for further technical assessment.
- [428] Stewart Family Assets also identified heavy electrical machinery, transformers, substations, welding equipment, batteries, solar panels and inverters as potentially affected by the EMI restriction.
- [429] The revised Condition 3 makes clear that those items are not themselves terrestrial radiocommunication services. This removes a substantial component of the effects initially perceived by the submitter.

[430] Stewart Family Assets' procedural concerns regarding the separate processing of notices, notification timing and SpaceOps' requiring authority status are not matters that are required to be addressed under this NoR and in any event, have been subsequently addressed by the recommendation and subsequent confirmation of the land NoR (MIC/2025/19).

Consultation Since Notification

[431] Following the close of submissions, I contacted those submitters who indicated that they wished to be heard, other than Stewart Family Assets, with whom separate discussions have occurred. SpaceOps has also continued to engage with Invercargill City Council regarding the matters raised in its Water Services submission. That engagement has assisted in clarifying the scope of the EMI restriction and the treatment of infrastructure within Awarua Siding Road. Mr Fuller did not respond to my contact.

Response to Council s42A

[432] I have addressed the findings of the s42A Report throughout my evidence. I therefore do not repeat those assessments here, but summarise the principal areas of agreement and disagreement.

[433] I agree with a number of the conclusions reached in the s42A, including that:

- a. the Awarua Satellite Ground Station is established nationally significant radiocommunications infrastructure;
- b. maintaining open sky visibility is a legitimate purpose of the designation;
- c. physical barriers can interfere with the reception of radiocommunication signals, including relatively narrow structures such as cranes and wind turbines;
- d. some form of horizon protection is reasonably necessary to achieve SpaceOps' objectives;

e. the proposed designation is generally consistent with the National Policy Statement for Infrastructure 2025 (NPS-I) and with the infrastructure objectives and policies of the Invercargill City District Plan; and

f. greater clarity around the s176 approval process is appropriate.

[434] My principal disagreement is with the recommendation to exclude the Industrial 4 Zone from the Airspace Limitation Surface.

[435] I accept that the designation creates an additional development consideration within land deliberately zoned for industrial development. However, for the reasons set out elsewhere in my evidence, I do not consider the resulting effects justify removing the Industrial 4 Zone from the horizon mask entirely.

[436] In particular, the 5 degree surface is progressive rather than a uniform height restriction. The full 35m Industrial 4 Zone building height can generally be achieved beyond approximately 377m from the SpaceOps boundary, and the area where that full height is potentially constrained is comparatively limited. Structures penetrating the surface are also not necessarily prevented from establishing.

[437] I agree with Dr Sathyendran that the actual effect of a penetration depends on matters such as its location, azimuth, elevation, distance, dimensions and physical characteristics. In my opinion, however, that advice clearly supports the revised case specific approval pathway rather than removal of the horizon protection. The 5 degree surface provides the trigger for assessment, while the revised conditions allow the actual operational effect of a penetration to be determined.

[438] Those conditions materially respond to the concerns raised by both Council and submitters. In particular, they make clear that penetration of the surface is not automatically unacceptable and provide a more transparent process and criteria for determining whether approval can be given.

[439] I also disagree with the suggestion that retaining horizon protection over the Rural Zone and retaining the EMI limitation provides sufficient

protection if the Industrial 4 Zone is excluded. EMI and physical obstruction are separate effects. Excluding the Industrial 4 Zone would leave the area where some of the tallest structures are possibly to be pursued, without a designation mechanism specifically directed at assessing physical obstruction of the Ground Station.

[440] Overall, I agree that an appropriate balance must be struck between protection of the Ground Station and the development expectations applying to the Industrial 4 Zone. In my opinion, that balance is better achieved through the revised penetration approval mechanism than through excluding the Industrial 4 Zone altogether.

[441] I therefore remain of the opinion that the Airspace Limitation Surface should be confirmed over the full area sought, including the Industrial 4 Zone, subject to the revised conditions attached to my evidence.

Proposed Designation Conditions

[442] As I have outlined throughout this evidence, I recommend a revised set of designation conditions. The conditions retain the substantive protection sought through the NoR but provide greater clarity as to how the designation will operate in practice.

[443] I have proposed two alternative formulations of Condition 2. Both provide a pathway for a penetration of the Horizon Mask Airspace Limitation Surface to be technically assessed and require SpaceOps' written consent. Option A specifies the information requirements, assessment criteria and processing timeframes, while Option B adopts a simpler approach based on existing airport designation conditions.

[444] Both options retain written approval for a proposed penetration of the horizon mask, but they provide different procedural safeguards. Option A explicitly identifies assessment requirements and processing timeframes. Option B uses a simpler independent assessment and written approval mechanism. From a planning perspective, I prefer Option A for its greater clarity on process and timing. Option B remains an alternative, but should not be described as providing equivalent time certainty.

[445] In summary, the conditions:

- define the 2km Electromagnetic Interference Limitation Area and the 3km, 5 degree Horizon Mask Airspace Limitation Surface;
- provide a pathway for buildings, structures, vegetation and temporary objects that penetrate the horizon surface to obtain SpaceOps approval under s176(1)(b), including through technical assessment where required;
- confine the EMI restriction to new terrestrial radiocommunication services within the relevant protected frequency range and expressly exclude ordinary electrical equipment producing only incidental emissions;
- clarify that lawfully established existing activities are not retrospectively prohibited;
- address the interaction with electricity distribution infrastructure near the Ground Station; and
- confirm the relationship with overlapping NZTA and KiwiRail designations.

[446] The principal change from the notified conditions is that penetration of the Horizon Mask Airspace Limitation Surface is treated as a trigger for assessment rather than an automatic prohibition. In my opinion, this provides a more proportionate and transparent means of protecting Ground Station operations while allowing compatible development to proceed.

Part Two Assessment

[447] Section 171(1) requires consideration of the NoR to be undertaken subject to Part 2 of the RMA. I agree with Ms Spalding that no matters of national importance under s6 are materially affected and that the proposal is consistent with s8.

[448] I also agree that the land affected by the designation and the Awarua Satellite Ground Station are both natural and physical resources for the

purposes of s5. The relevant issue is therefore whether the proposal enables the sustainable and efficient use of both resources.

[449] I acknowledge that the Airspace Limitation Surface imposes an additional constraint on development, particularly within the Industrial 4 Zone. However, I do not agree with Ms Spalding that this means the proposal is not wholly consistent with ss5 and 7(b).

[450] The revised conditions materially reduce those effects. The 5 degree surface rises progressively with distance, the full 35m Industrial 4 Zone height can be achieved from approximately 377m from the Ground Station boundary, and penetration of the surface is an assessment trigger rather than an absolute prohibition. Development can therefore continue where it is compatible with the operational requirements of the Ground Station.

[451] In terms of s7, I consider s7(b) to be particularly relevant. Efficient use and development applies both to the Industrial 4 land and to the substantial existing investment in the Ground Station. I also recognise the relevance of s7(g), given the finite characteristics of both resources, and s7(j), given the potential for the designation to affect tall renewable electricity generation structures.

[452] In my opinion, the revised approval pathway appropriately balances those matters by retaining industrial and renewable-energy development opportunities while managing development that would materially compromise the efficient operation of the Ground Station.

[453] Consultation with Te Ao Mārama also resulted in the exclusion of public conservation land and the coastal marine area from the designation, following which unconditional written approval was provided. I therefore agree that the proposal appropriately addresses s8.

[454] Overall, taking into account the effects of the requirement, the revised conditions, the continued ability to use and develop surrounding land, and the benefits of protecting established nationally significant infrastructure, I consider that confirmation of the NoR over the full proposed area promotes sustainable management and is consistent with Part 2 of the RMA.

Conclusion

- [455] Overall, I consider that the NoR, subject to the revised conditions, represents an appropriate and proportionate means of protecting the ongoing efficient operation of the Awarua Satellite Ground Station from EMI and physical obstruction.
- [456] I agree with Ms Spalding that the EMI component should be confirmed and that the Airspace Limitation Surface is appropriate over the surrounding Rural Zone.
- [457] Where I principally differ from Ms Spalding is her recommendation to exclude the Industrial 4 Zone from the Airspace Limitation Surface. I acknowledge that the designation will impose an additional development constraint within that zone, particularly for very tall structures. However, I consider those effects to be acceptable when the progressive nature of the 5 degree surface and the revised approval pathway are taken into account. Importantly, penetration of the surface is an assessment trigger rather than an absolute prohibition, allowing development to proceed where it is compatible with the operational requirements of the Ground Station.
- [458] I am also satisfied that adequate consideration has been given to alternative sites and methods. In my opinion, the revised approach appropriately responds to the technical advice that the effect of an individual penetration depends on its particular location and characteristics, while retaining a clear and readily administered screening surface.
- [459] Having considered the effects of the requirement, the relevant national and regional policy direction, the Invercargill City District Plan, and alternatives, I consider the NoR to be generally consistent with the relevant planning framework. In particular, it accords with the strong direction in the NPS-I and SRPS to provide for the efficient operation of established significant infrastructure and to manage incompatibility with surrounding activities.
- [460] For these reasons, I consider that the residual adverse effects of the NoR are acceptable and that the designation is reasonably necessary to

achieve SpaceOps' objectives. In my opinion, the NoR should therefore be recommended for confirmation over the full proposed area, including the Industrial 4 Zone, subject to the revised conditions set out in my evidence.

Dated: 14 September 2026



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Alex Dunn