Appendix [A] – Proposed Conditions

Condition 1: Detailed Technical Assessment Pathway

1. The designation comprises the following:

    a. **Electromagnetic Interference Limitation Area:** all land and airspace within a 2 km radius measured from any point of the boundary of Designation 97 – Awarua Satellite Ground Station and Ancillary Operations, being Lot 1 DP 483454, Lot 1 DP 524692 and Lot 2 DP 524692, as it relates to electromagnetic interference from terrestrial radiocommunication services.
    b. **Horizon Mask Airspace Limitation Surface:** all airspace above a surface commencing at a height of 2 m at the boundary of Designation 97 and extending outward at an angle of 5 degrees for a horizontal distance of 3 km.
    c. Land within the coastal marine area and public conservation land is excluded from the designation.

Condition 2 (Option A): Penetration of Horizon Mask

2. No new building, structure or temporary object, no extension or increase in height of an existing building or structure, and no vegetation may penetrate the Horizon Mask Airspace Limitation Surface unless prior written approval has been obtained from Space Operations New Zealand Limited under section 176(1)(b) of the Resource Management Act 1991 in accordance with this condition.

    Information Requirements:

    2.1 An application for written approval must include, to the extent relevant to the proposed penetration:
        a. a site plan identifying the location of the proposed penetration relative to Designation [Insert Number];
        b. the existing ground level, maximum height or reduced level of the proposed object, and the maximum vertical extent of penetration above the Horizon Mask Airspace Limitation Surface;
        c. the dimensions, physical form, profile, construction materials and any moving or rotating components of the proposed object;
        d. whether the penetration is permanent or temporary and, if temporary, its proposed duration, frequency and timing;
        e. any alternative siting, design or mitigation measures that have been considered; and
        f. a technical assessment prepared by a suitably qualified and experienced person addressing the matters in Condition 2.2, unless SpaceOps advises in writing that such an assessment is not reasonably necessary given the nature and scale of the penetration.

    Technical assessment:

    2.2 In determining whether to provide written approval, SpaceOps must consider, to the extent relevant:

a. the location, azimuth or direction, elevation and distance of the penetration relative to the Ground Station;
b. the height and extent of penetration above the Horizon Mask Airspace Limitation Surface;
c. the dimensions, width, bulk, profile, construction materials and other relevant physical characteristics of the object;
d. whether the object is static, moving or rotating;
e. whether the penetration is permanent or temporary and, for temporary penetrations, its duration, frequency and timing;
f. the satellite acquisition, tracking, telemetry, command and communication requirements of the Ground Station within the affected sector;
g. the effect of the penetration on the ability of the Ground Station to acquire, track and communicate with spacecraft, including any effect on available communication windows;
h. any existing or approved penetrations within the affected sector where these are relevant to determining the operational effect of the proposal; and
i. any measures proposed to avoid or mitigate the operational effects of the penetration, including changes to location, height, dimensions, timing or duration.

Approval:

2.3 SpaceOps must grant written approval where it is satisfied that, either as proposed or subject to reasonably necessary mitigation measures, the penetration will not materially compromise the ability of the Awarua Satellite Ground Station to acquire, track or communicate with spacecraft within the affected sector.

2.4 Written approval may be subject to conditions where those conditions are reasonably necessary to avoid or mitigate the operational effects of the penetration on the Ground Station.

Processing:

2.5 Within **10 working days** of receiving an application, SpaceOps must advise the applicant whether:

a. sufficient information has been provided to assess the application; or
b. further information is reasonably necessary, identifying the information required and the reason it is necessary.

2.6 SpaceOps must determine an application within **20 working days** after sufficient information has been provided, unless a longer period is agreed in writing between SpaceOps and the applicant.

2.7 Where approval is declined, or approval is granted subject to conditions, SpaceOps must provide written reasons for its decision.

Independent Technical Review:

2.8 Where a material technical disagreement remains between SpaceOps and the applicant concerning the effect of a proposed penetration, the applicant may request that the matter be independently peer reviewed by a suitably qualified and experienced person who is independent of both parties.

2.9 The independent reviewer is to be agreed between SpaceOps and the applicant. If agreement cannot be reached within 5 working days, the reviewer may be nominated by the President of Engineering New Zealand, or their nominee.

2.10 SpaceOps must have regard to the conclusions of the independent peer review before making or reconsidering its decision under Condition 2.3. For the avoidance of doubt, the peer review informs, but does not replace, SpaceOps' statutory decision under section 176(1)(b).

Temporary Penetrations:

2.11 Applications for temporary penetrations, including cranes, construction machinery or other temporary equipment, must be processed on an expedited basis.

2.12 SpaceOps must determine an application for a temporary penetration within **10 working days** of receiving sufficient information, unless otherwise agreed with the applicant.

2.13 An approval for a temporary penetration may include reasonable requirements relating to maximum height, location, timing and duration where necessary to avoid or mitigate effects on Ground Station operations.

Condition 2 (Option B): Penetration of Horizon Mask

2. No new building or structure, extension or increase in height of an existing building or structure, or vegetation that penetrates the Horizon Mask Airspace Limitation Surface shall be established or permitted except where:

   a. the party on whose land the object is located, or who is otherwise responsible for the object, has provided to Space Operations New Zealand Limited a technical assessment prepared by a suitably qualified and independent person which determines that the penetration will not materially compromise the efficient operation of the Awarua Satellite Ground Station;
   b. that technical assessment has been accepted by Space Operations New Zealand Limited; and
   c. Space Operations New Zealand Limited has provided its written approval under section 176(1)(b) of the Resource Management Act 1991 to the penetration

2.1. A temporary short-term penetration of the Horizon Mask Airspace Limitation Surface by a crane, construction machinery or other temporary equipment may occur where it has been authorised in writing by Space Operations New Zealand Limited.

Advice Note: The technical assessment may consider the location, azimuth, elevation, distance, size and physical characteristics of the proposed penetration and the Ground Station operations potentially affected

Condition 3 – Electromagnetic Interference Limitation Area:

3. Within the Electromagnetic Interference Limitation Area shown on the Designation Plan, no new individual terrestrial radiocommunication service established after [date of confirmation of designation] shall cause interference from that service within the 2200–2290 MHz protection frequency range to exceed -154 dBW/MHz at the Awarua Satellite Ground Station.

3.1 For the purposes of Condition 3, a terrestrial radiocommunication service means a service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes, other than any radiocommunication involving the use of one or more space stations, or the use of one or more reflecting satellites or other objects in space.

3.2 Terrestrial radiocommunication services include, but are not limited to:

a. radio and television broadcasting services;
b. cellular mobile networks and their base stations;
c. fixed wireless access and wireless broadband services;
d. point-to-point and point-to-multipoint microwave links;
e. land-mobile radio systems, including private and business radio, trunked radio and paging services;
f. radio telemetry, SCADA and other remote monitoring or control radio systems;
g. maritime and aeronautical mobile radio services;
h. radionavigation and radiolocation services, including radar; and
i. amateur radio services.

3.3 A terrestrial radiocommunication service does not include equipment which produces radiofrequency emissions only as an incidental by-product of its operation and not for telecommunication purposes.

3.4 For the avoidance of doubt, Condition 3 does not apply to buildings, structures, electrical infrastructure or electrical equipment that do not constitute, or contain as a component, a terrestrial radiocommunication service. This includes, without limitation:

a. wind turbines;
b. solar panels;
c. generators;
d. tranformers and substations;
e. motors and variable-speed drives;
f. inverters and switchgear;
g. battery energy storage systems;
h. pumps and treatment equipment; and
i. other industrial or agricultural equipment,

where any radiofrequency emissions are only an incidental by-produce of their operation.

3.5 Where an activity identified in Condition 3.4 incorporates a terrestrial radiocommunication service, including a microwave link, radio telemetry or radio-based SCADA system, Condition 3 applies only to that terrestrial radiocommunication component.

3.6 Condition 3 applies to each individual new terrestrial radiocommunication service and does not impose a cumulative interference standard by aggregating emissions from separate services.

3.7 Where clarification is required as to whether a particular service constitutes a terrestrial radiocommunication service, reference is to be made to Sections I and III of Article 1 of the ITU-R Radio Regulations.

Condition 4: Existing Lawfully Established Activities

4. Nothing in Conditions 2 or 3 requires the removal, cessation or modification of a building, structure, vegetation or terrestrial radiocommunication service lawfully established (including compliance with RSM Decisions) before the date this designation is confirmed solely because that activity does not comply with those conditions

Condition 5: Electricity Distribution Infrastructure Within Legal Road

5. Where new or upgraded electricity distribution infrastructure located within legal road inside the Horizon Mask Airspace Limitation Surface:

   a. would penetrate the Horizon Mask Airspace Limitation Surface; and
   b. SpaceOps does not provide written approval to the penetration under Condition 2,

   SpaceOps shall meet the reasonable additional cost directly attributable to the requirement to underground or relocate that infrastructure solely as a consequence of compliance with this designation.

   For the avoidance of doubt, SpaceOps shall not be responsible for:

   a. costs that would have otherwise been incurred in constructing, renewing or upgrading infrastructure;
   b. betterment or enhancement costs;
   c. additional capacity costs;
   d. costs not directly attributable to the Horizon Mask Airspace Limitation Surface.

Condition 6: Overlapping Designations

6. Where this designation overlaps:
   a. Designation 48 – State Highway 1; or
   b. Designation 55 – Railway Purposes,

   those existing designations shall be the primary designations and SpaceOps restrictive designation shall be secondary.

Advice Notes:

1. Meaning of objects:

   For the purposes of Condition 2, buildings, structures and temporary objects include, but are not limited to buildings, wind turbines, masts, poles, aerials, antennas, cranes, construction machinery and other equipment capable of penetrating the Horizon Mask Airspace Limitation Surface on either a temporary or permanent basis.

2. For initial screening purposes, the height of the Horizon Mask Airspace Limitation Surface may be calculated as:

   $H = 2 + d \times \tan(5°)$

   where:

   H = height of the limitation surface above the originating datum; and
   d = horizontal distance in metres from the boundary of Designation [Number Reference].

   As tan(5°) = approximately 0.08749, indicative heights are approximately 10.7 m at 100m, 23.9m at 250m, 45.7 m at 500 m, 89.5m at 1 km, 176.9m at 2km and 264.5m at 3km. The s42A report used the same calculation.

   Where precise compliance is material, the mapped/surveyed Horizon Mask Airspace Limitation Surface prevails over these indicative calculations.

3. Compliance with the underlying District Plan does not remove the requirement to obtain SpaceOps' written approval where Condition 2 is triggered. Conversely, no SpaceOps approval under Condition 2 is required where a proposed building, structure or vegetation remains wholly beneath the Horizon Mask Airspace Limitation Surface.