DELTA
THINK.INFRASTRUCTURE

9 March 2016

Dunedin City Council
PO Box 4055
DUNEDIN 9058

Attention: Jeremy Grey

Dear Jeremy

APPLICATION FOR RESOURCE CONSENT - TELECOMMUNICATIONS AND RADIOCOMMUNICATIONS EQUIPMENT, BERWICK SUBSTATION, DUNEDIN

Further to our meeting on Friday 4 March, please find attached a resource consent to install, operate and maintain telecommunications and radiocommunications equipment at Berwick Substation, Maungatua Road, Dunedin.

I understand that the deposit fee for a Resource Consent is $1,300.00. If possible can you please send me an invoice for the deposit fee (quoting Purchase Order Number: 4500235678).

If you require any further information or clarification on the submission do not hesitate to contact me either by phone on (03) 471 6783 or email joanne.dowd@thinkdelta.co.nz.

Yours sincerely

Joanne Dowd

Joanne Dowd
Network Policy Manager

Encl

DUNEDIN CITY COUNCIL

Application Form for a Resource Consent

50 The Octagon, PO Box 5045, Moray Place
Dunedin 9058, New Zealand
Ph 477 4000
www.dunedin.govt.nz

Application Details

I/We Aurora Energy Limited (must be the FULL name(s) of an individual or an entity registered with the New Zealand Companies Office. Family Trust names and unofficial trading names are not acceptable: in those situations, use the trustee(s) and director(s) names instead) hereby apply for:

☑ Land Use Consent ☐ Subdivision Consent

Brief description of the proposed activity:

Install, operate and maintain an 18 metre high telecommunications mast and one 800mm dish antenna and associated activities.

Have you applied for a Building Consent? ☐ Yes, Building Consent Number ABA _____ ☑ No

Site location/description

I am/We are the: (owner, occupier, lessee, prospective purchaser etc) of the site

Street Address of Site: 613A Maungatua Road, Dunedin

Legal Description: Section 58 Block I Maungatua Survey

Certificate of Title: Title OT410/35

Address for correspondence (this will be the first point of contact for all communications for this application)

Name: Aurora Energy Limited (applicant/agent (delete one))

Address: PO Box 1404, Dunedin Postcode: 9054

Phone (daytime): 03 471 6783 Fax: _____ Email: joanne.dowd@thinkdelta.co.nz

Address for Invoices or Refunds (if different from above)

Name: As above

Address: _____

Bank Account Name _____

Account Number: | | Bank Branch | | | | | Account Number | | | | | | | | Suffix |

Ownership of the site

Who is the current owner of the site? Aurora Energy Limited

If the applicant is not the site owner, please provide the site owner's contact details:

Address: _____ Postcode: _____

Phone (daytime): _____ Fax: _____ Email: _____

Monitoring of your Resource Consent

To assist with setting a date for monitoring, please estimate the date of completion of the work for which Resource Consent is required. Your Resource Consent may be monitored for compliance with any conditions at the completion of the work. (If you do not specify an estimated time for completion, your Resource Consent, if granted, may be monitored three years from the decision date).

December 2016 (month and year)

Monitoring is an additional cost over and above consent processing. You may be charged at the time of the consent being issued or at the time monitoring occurs. Please refer to City Planning's Schedule of Fees for the current monitoring fee.

Detailed description of proposed activity

Please describe the proposed activity for the site, giving as much detail as possible. Where relevent, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please provide proposed site plans and elevations.

See attached AEE

Description of site and existing activity

Please describe the existing site, its size, location, orientation and slope. Describe the current usage and type of activity being carried out on the site. Where relevant, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please also provide plans of the existing site and buildings. Photographs may help.

See Attached AEE

(Attach separate sheets if necessary)

District plan zoning

What is the District Plan zoning of the site? Rural

Are there any overlaying District Plan requirements that apply to the site e.g. in a Landscape Management Area, in a Townscape or Heritage Precinct, Scheduled Buildings on-site etc? If unsure, please check with City Planning staff.

Designation D234

Breaches of district plan rules

Please detail the rules that will be breached by the proposed activity on the site (if any). Also detail the degree of those breaches. In most circumstances, the only rules you need to consider are the rules from the zone in which your proposal is located. However, you need to remember to consider not just the Zone rules but also the Special Provisions rules that apply to the activity. If unsure, please check with City Planning staff or the Council website.

See attached AEE

Affected persons' approvals

I/We have obtained the written approval of the following people/organisations and they have signed the plans of the proposal:

Name: See Attached AEE

Address: _____

Name: _____

Address: _____

Please note: You must submit the completed written approval form(s), and any plans signed by affected persons, with this application, unless it is a fully notified application in which case affected persons' approvals need not be provided with the application. If a written approval is required, but not obtained from an affected person, it is likely that the application will be fully notified or limited notified.

Assessment of Effects on Environment (AEE)

In this section you need to consider what effects your proposal will have on the environment. You should discuss all actual and potential effects on the environment arising from this proposal. The amount of detail provided must reflect the nature and scale of the development and its likely effect. i.e. small effect equals small assessment.

You can refer to the Council's relevant checklist and brochure on preparing this assessment. If needed there is the Ministry for the Environment's publication "A Guide to Preparing a Basic Assessment of Environmental Effects" available on www.mfe.govt.nz. Schedule 4 of the Resource Management Act 1991(RMA) provides some guidance as to what to include.

See Attached AEE

(Attach separate sheets if necessary)

The following additional Resource Consents from the Otago Regional Council are required and have/have not (delete one) been applied for:

☐ Water Permit ☐ Discharge Permit ☐ Coastal Permit ☐ Land Use Consent for certain uses of lake beds and rivers ☑ Not applicable

Declaration

I certify that, to the best of my knowledge and belief, the information given in this application is true and correct.

I accept that I have a legal obligation to comply with any conditions imposed on the Resource Consent should this application be approved.

Subject to my/our rights under section 357B and 358 of the RMA to object to any costs, I agree to pay all the fees and charges levied by the Dunedin City Council for processing this application, including a further account if the cost of processing the application exceeds the deposit paid.

Signature of Applicant/Agent (delete one): Joanne Dowd Date: 09/03/2016

Privacy – Local Government Official Information and Meetings Act 1987

You should be aware that this document becomes a public record once submitted. Under the above Act, anyone can request to see copies of applications lodged with the Council. The Council is obliged to make available the information requested unless there are grounds under the above Act that justify withholding it. While you may request that it be withheld, the Council will make a decision following consultation with you. If the Council decides to withhold an application, or part of it, that decision can be reviewed by the Office of the Ombudsmen.

Please advise if you consider it necessary to withhold your application, or parts of it, from any persons (including the media) to (tick those that apply):

☐ Avoid unreasonably prejudicing your commercial position

☐ Protect information you have supplied to Council in confidence

☐ Avoid serious offence to tikanga Maori or disclosing location of waahi tapu

What happens when further information is required?

If an application is not in the required form, or does not include adequate information, the Council may reject the application, pursuant to section 88 of the RMA. In addition (section 92 RMA) the Council can request further information from an applicant at any stage through the process where it may help to a better understanding of the nature of the activity, the effects it may have on the environment, or the ways in which adverse effects may be mitigated. The more complete the information provided with the application, the less costly and more quickly a decision will be reached.

Fees

Council recovers all actual and reasonable costs of processing your application. Most applications require a deposit and costs above this deposit will be recovered. A current fees schedule is available on www.dunedin.govt.nz or from Planning staff. Planning staff also have information on the actual cost of applications that have been processed. This can also be viewed on the Council website.

Further assistance

Please discuss your proposal with us if you require any further help with preparing your application. The Council does provide pre-application meetings without charge to assist in understanding the issues associated with your proposal and completing your application. This service is there to help you.

Please note that we are able to provide you with planning information but we cannot prepare the application for you. You may need to discuss your application with an independent planning consultant if you need further planning advice.

City Planning Staff can be contacted as follows:

In Writing: Dunedin City Council, PO Box 5045, Moray Place, Dunedin 9058
In Person: Customer Services Centre, Ground Floor, Civic Centre, 50 The Octagon
By Phone: (03) 477 4000
By Email: planning@dcc.govt.nz

There is also information on our website at www.dunedin.govt.nz.

Information requirements (two copies required)

- [x] Completed and Signed Application Form
- [x] Description of Activity and Assessment of Effects
- [x] Site Plan, Floor Plan and Elevations (where relevant)
- [x] Certificate of Title (less than 3 months old) including any relevant restrictions (such as consent notices, covenants, encumbrances, building line restrictions)
- [ ] Written Approvals
- [x] Forms and plans and any other relevant documentation signed and dated by Affected Persons
- [ ] Application Fee (cash, cheque or EFTPOS only; no Credit Cards accepted)

In addition, subdivision applications also need the following information

- [ ] Number of existing lots.
- [ ] Number of proposed lots.
- [ ] Total area of subdivision.
- [ ] The position of all new boundaries.

In order to ensure your application is not rejected or delayed through requests for further information, please make sure you have included all of the necessary information. A full list of the information required for resource consent applications is in the Information Requirements Section of the District Plan.

OFFICE USE ONLY

Has the application been completed appropriately (including necessary information and adequate assessment of effects)?

☐ Yes ☐ No

Application: ☐ Received ☐ Rejected

Received by: ☐ Counter ☐ Post ☐ Courier ☐ Other: _____

Comments: _____

_____

_____

_____

(Include reasons for rejection and/or notes to handling officer)

Planning Officer: _____ Date: _____

Aurora Energy Limited

Proposed Transmission Level Microwave Link – Berwick Substation

Assessment of Environmental Effects

9 March 2016

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LIST OF APPENDICES

1.0 INTRODUCTION

This assessment is provided in accordance with the requirements of Section 88 of the Resource Management Act 1991 (**"the RMA"** or **"the Act"**) and the Fourth Schedule to the Act. It is in support of a land use resource consent application by Aurora Energy Limited (**"Aurora"** or **"the Applicant"**) to install, operate and maintain a Transmission Level Microwave Link and associated monopole at the Berwick Substation. A site location plan is attached as **Appendix A**.

Specifically the proposal involves the construction, operation and maintenance of a transmission level microwave link which incorporates a new 18m steel monopole, lightening arrester; 1 x 800mm dish antenna; and ancillary facilities and works (including earthworks).

Aurora is New Zealand's sixth largest electricity distribution company, supplying eastern and central Otago. Corporatized in 1990, Aurora carries on the business activities commenced in 1904 when the Waipori Falls Hydroelectric Company Limited began construction of the Waipori power scheme. The company was acquired by the Dunedin City in 1907 and the City then commenced electricity distribution, operating as an arm of local government. Aurora's distribution network annually delivers around 1,330GWh of electricity, from five Transpower Grid Exit Points and six local power generation supply points, to over 83,600 homes and businesses.

Background

Aurora is commencing a major upgrade of telecommunications link services for its network which will involve the deployment of 13 microwave radio links of 250Mbps capacity from Dunedin through to Frankton in Queenstown. These links will provide primary inter-control room and control room to substation services to the wider Aurora network.

The Aurora Asset Management Plan (**"AMP"**) and Supervisory, Control, Communication and Protection (**"SCCP"**) development plan outlined that modern communication links that provide compatible, secure and cost effective communication interface is essential for Aurora to operate the network through Supervisory, Control and Data Acquisition (**"SCADA"**), protection, load control, etc. The SCCP3 project therefore seeks to develop the long term communication strategy for Aurora to build high speed communication networks between Dunedin and Central Otago. It is proposed to install high speed Microwave (**"MW"**) links from Halsey Street - Master Station Primary (**"MSP**) to Cromwell - Master Station Tertiary (**"MST"**) and the Frankton Grid Exit Point (**"GXP"**). It is also proposed to install MW links to Mosgiel, Outram and Berwick from one of the repeater stations. The backbone link between Dunedin and Central Otago will also provide a high speed data tunnel for key Aurora sites currently interfaced to the repeater stations between the two ends. This is a cost effective solution to combine the inter-control room link and substation traffic in one physical tunnel but virtually separated by applying IT traffic prioritization control.

Several other options have been considered when developing the final solution for this project. This included consideration of utilising third party links, for example utilising existing structures owned by Chorus. However, this was discounted as it would prove to be uneconomic for such a large scale long distance and multi-point application. In

addition, due to the nature and importance of protection traffic, a dedicated communication circuit is required instead of sharing traffic with other companies, which has an extremely high cost implication to Aurora. As a result, installing Aurora owned communication links have been justified on this basis.

In addition, much of the existing Aurora secondary equipment systems are at the end of their operating life and more importantly, they are unable to meet long term network requirements due to issues around compatibility, security, reliability and performance.

This application relates to the establishment of telecommunications equipment at the subject site. A full description of the precise equipment for this particular site is provided under the proposal description later in this application.

2.0 DESCRIPTION OF THE PROPOSAL

2.1 SITE AND LOCALITY

The application site is located at 613A Maungatua Road Outram and is legally described as Section 58 Block I Maungatua Survey held in Certificate of Title OT410/35. The main substation buildings and equipment is legally described as Lot 1 Deposited Plan 9194 and is held in Certificate of Compliance OT409/83. Copies of both titles are included at **Appendix B** for completeness. The site is zoned Rural in the Operative Dunedin City District Plan ("the Operative Plan") and is shown on Map 53.

The site is occupied by an existing electricity substation which includes a range of external switching gear, transformers and overhead lines and support structures. There is also an existing control room. Access to the site is from Maungatua Road and the compound is fenced. Within the compound there is a range of hardstand parking and grassed areas.

Surrounding Environment

The application site is located within a rural environment. There are a number of scattered residential dwellings and farm holdings located in the area. The closest residential dwelling is located approximately 90m to the south east; and 109m to the south. Both properties are screened by existing trees and vegetation. The nearest dwelling to the north is located 250m. The surrounding areas is characterised by undulating rural land incorporating a range of land uses and with shelterbelt planting throughout the area. The area is also characterised by other linear structures including power lines owned by Transpower and Aurora. Refer to the photographs of the existing environment and application site attached as **Appendix C.**

2.2 PROPOSAL

Aurora is therefore proposing to construct, operate and maintain a transmission level microwave link on the subject site at 613A Maungatua Road, as part of its SCADA Upgrade project. The proposed facility will comprise the following:

- The erection of a new 18000mm high galvanised steel mast with a diameter of 570mm and a 2000mm lightening arrester. The mast can be painted a natural

colour to match the existing buildings on site; and

- The installation of one new 800mm dish antenna.

The existing control room has the capacity to accommodate the electrical equipment required to power the telecommunication facility. Therefore no further buildings or structures are required for this purpose.

The existing access to the site via Maungatua Road will be maintained. Power and fibre for the facility will also be sourced from existing facilities on the site. No tracking or earthworks, other than for the foundation for the pole and the laying of the underground cable, are proposed. **Appendix D** includes plans and elevations of the proposed equipment and its layout on the subject site.

3.0 NATIONAL ENVIRONMENTAL STANDARDS

3.1 The Resource Management (National Environmental Standards for Telecommunications Facilities) Regulations 2008

The Resource Management (National Environmental Standards for Telecommunications Facilities) Regulations 2008 (the 'NES') were gazetted on 11 September 2008 and came into force on 9 October 2008.

These regulations substitute existing District Plan rules for telecommunications structures in the road reserve. Activities that do not qualify as permitted activities under the regulations are to be assessed through the existing rules in the relevant District Plan under the Resource Management Act 1991 (the 'Act').

The NES also introduces regulations that substitute existing District Plan rules for radiofrequency emissions from all telecommunications facilities, irrespective of the location of the telecommunications facility.

3.1.1 Radiofrequency Exposure

Regulation 4 of the National Environmental Standards for Telecommunications Facilities provides for radiofrequency emissions as a permitted activity where the facility compiles with three conditions.

The first condition set out in Regulation 4(3) is that the facility is operated in accordance with NZS 2772: Part 1: 1999 Radiofrequency Fields Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz.

The second condition set out in Regulation 4(4) requires that the following information is also to be provided to the local authority before the facility becomes operational:

(a) written or electronic notice of where the facility is; and

(b) a report that:-

i. is prepared in accordance with NZS 6609.2:1990 Radiofrequency Radiation: Part 2: Principles and Methods of Measurement 300 kHz to

100 GHz; and

ii. *takes account of exposures arising from other telecommunications facilities in the vicinity; and*

iii. *predicts, whether the radiofrequency field levels at places that are reasonably accessible to the general public will comply with NZS 2772:1999.*

This application for resource consent forms notice of the facility location under Regulation 4(a) of the National Environmental Standards.

The proposed facility has been planned and will be operated in accordance with NZS 2772.1:1999. The Statement of Compliance attached as **Appendix E** illustrates the exposure levels for the proposed antenna based on NZS 2772. 1:1999, using the methodology outlined in NZS 6609.2: 1990. The Statement of Compliance confirms that the proposal has been designed to comply with NZS 2772.1:1999, which will minimize radiofrequency exposure to the general public.

Given that the bottom of the dish antenna will be mounted at least 17.5m above ground level compliance is achieved with Regulation 4(4) of the National Environmental Standards, as the New Zealand Standard will not be exceeded at any point where the public can reasonably gain access.

Regulation 4(b)(ii) relates to exposures from other telecommunication facilities within the area. There are no other telecommunication facilities in the surrounding environment.

Regulation 4(b)(iii) of the National Environmental Standard only applies if the prediction of radiofrequency levels in places where the public could reasonably gain access will reach or exceed 25% of the maximum level permitted by NZS2772.1. In this instance, the exposure levels do not exceed 25% therefore this aspect of the National Environmental Standard is not applicable.

It has been demonstrated that the proposed telecommunication facility complies with both Regulations 4(3) and 4(4) and that Regulation 4(5) does not apply. Therefore, the proposal is a Permitted Activity under Regulation 4(2) and is not required to meet the remaining standards of Regulation 4.

3.2 Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

The NES applies to land that currently has, or historically had, an activity or industry undertaken on it that is included in the Hazardous Activities and Industries List (HAIL). The site is located on land that lies adjacent to an existing substation. Substations fall within activities covered by HAIL activities. The area of the site to be utilized for the telecommunications structure has not been used for substation activities.

Nonetheless, the NES includes a series of rules specifically related to soil sampling, soil disturbance, fuel systems removal, subdivision, and land use change. For this

proposal, the "soil disturbance" rules are applicable. Disturbance of small volumes of soil (less than $25m^3$ per $500m^2$ of land) requiring less than $5m^3$ of soil to be removed from a HAIL site is a Permitted Activity under Regulation 8(3) of the NES, subject to conditions. Disturbance or removal of greater volumes of soil on a HAIL site requires a resource consent.

The NES also provides a set of chemical specific soil contaminant thresholds (or soil contaminant standards (SCSs)) that define an adequate level of protection for human health for a range of differing land uses in New Zealand. The land use selected for this assessment is "commercial/industrial outdoor worker (unpaved)". For the purpose of this telecommunications site, it is likely that some soil disturbance will be required. Any excavations/soil disturbance will be less than $50m^3$ and will comply with clause 8.3, the permitted activity criteria of the NES.

4.0 CONSENTS REQUIRED

4.1 Operative District Plan

The Dunedin City District Plan (**"the Operative Plan"**) was made operative in 2009. In terms of the Operative Plan the site is situated within the Rural Zone as depicted on Planning Map 53. The site is designated D234 Berwick Zone Substation – Electricity Purposes. The land is not located in an area of landscape conservation and there are no notable trees shown on Planning Map 53. There are no other notable features shown on the District Planning Maps relevant to this site.

When the *Notice of Requirement* for a designation was submitted, the proposed work was described as follows:

> *The construction and operation of a ground mounted electricity substation and associated equipment including associated buildings and storage of electrical equipment.*

While it is debateable where telecommunications is provided for under the designation purpose, Aurora has opted to apply for resource consent under the Utility Rules of the District Plan.

4.1.1 Definition of Activity

The definition of "Utility" under the Operative Plan means:

> *means the systems, services and networks associated with:*
> - *the supply of electricity;*
> - *community water supply and drainage;*
> - *the transmission and distribution of natural or manufactured gas;*
> - *telecommunications and radiocommunications;*
> - *navigational aids;*
> - *meteorological facilities;*
> - *river flow recording facilities.*

"*Telecommunications*" is defined as:

> *Means the conveyance from one device to another of any sign, signal, impulse, writing, image, sound, instruction, information, or intelligence of any nature, whether for the information of any person using the device or not.*

"*Radiocommunication*" is defined as:

> *Means any transmission, emission or reception of signs, signals, writing, images, sounds, or intelligence of any nature by electromagnetic waves or frequencies between 9 kilohertz and 3000 gigahertz, propagated in space without artificial guide.*

The proposed development falls within the remit of *"telecommunications and radiocommunications"* and therefore falls within the definition of a *Utility* and as such *Section 22 – Utilities* of the Operative Plan is relevant.

Rule 22.5 states:

> *Except as otherwise provided within Rule 22.5.2, the following Utility rules are not subject to the District Plan zone rules. However these Utility rules are subject to Sections 4, 5, and 13 to 21 (other than Rules 22.5.2(ii)(e)(i) to 22.5.2(ii)(e)(vii) relating to the upgrading, maintenance and replacement of existing lines which are only subject to Sections 4, 5, and 17 to 21).*

As the proposal is considered to be identified as a utility, the utility rules of Section 22 of the Operative Plan will take precedence over rules relevant to the Rural Zone.

The establishment of utilities in the Rural General zone are an anticipated activity, but only where they comply with the permitted, controlled, discretionary and non-complying rules identified in Section 22 of the Operative Plan.

Rule 22.5.1 relates to *Permitted Activities* and includes the construction, operation and upgrading of utilities including:

> *(ix) Masts, aerials, and antennas associated with radiocommunication and telecommunications*

subject to compliance with the conditions in Rule 22.5.2.

The assessment below considers the proposal against the relevant Performance Standards in Rule 22.5.2.

Rule 22.5.2 Conditions Attaching to Permitted Activities

Rule	Comment
Masts Permitted by Rule 22.5.1(ix):	
(a) No tubular mast shall be greater than 1.5 m in diameter up to the maximum height for buildings in the zone in which it is located, and no greater than 0.75 m in diameter from that point to the top of the mast. Any calculation of mast diameter shall exclude any head array or aerials or antennas fixed to the outer face of the mast. Any base or foundation structure required for masts is also exempt from any diameter control. Any mast located in the Industrial 1 and Port 2 Zones is exempt from any diameter control.	The diameter of the mast will be 570mm. This standard is **complied** with.
(b) The diameter of any head array (consisting of support structures and an array of aerials and/or antennas) shall not exceed 7 m in all zones with the exception of Residential Zones and the Major Facilities (Mercy Hospital) Zone in which case the diameter of the head array shall not exceed 3.5 m. The diameter of the head array is to be based on a circle concentric with the centreline of the mast. [Amended by Plan Change 17, 2 September 2013]	No head array is proposed. The monopole is slender in design and the proposed antenna are small in diameter and as such the overall diameter of the proposed development will not exceed the 7m limited. This condition is **complied** with.
(c) No lattice mast shall be greater than 4 m2 in cross-sectional area up to half the maximum height for buildings in the zone in which it is located, and no greater than 2.5 m2 in cross sectional area from that point to the top of the mast.	No lattice mast is proposed. This standard is **complied** with.
(d) No mast shall exceed a height greater than 2 m above the maximum height for buildings in any Residential Zone, the Rural Residential Zone, the Local Activity 1 and 2 Zones, the Port 1 Zone, the Industrial 2 Zone, or the Campus Zone. Within the Major Facilities (Mercy Hospital) Zone, either no mast shall be more than 2m higher than the section of building to which it is attached or no mast shall be more than 11m, whichever is the highest. In calculating height, no account shall be taken of lightning rods, aerials or antennas (except dish antenna). Amended by Plan Change 1: 18/7/05 and Plan Change 17, 2 September 2013]	The subject site is located within the Rural Zone. This condition is not applicable.
(e) No mast shall exceed a height greater than 5 m above the maximum height for buildings in any Rural Zone, the Central Activity Zone, Harbourside Zone or the Large Scale Retail Zone. In calculating height, no account shall be taken of lightning rods, aerials or antennas (except dish antenna). [Amended by Plan Change 7, 29/5/2012]	The maximum height for buildings within the Rural Zone is 10m. The proposed mast is 18m (excluding the lighting Arrester). The dish antenna

	will be mounted such that the overall 10m height limit will not be exceeded. This condition <u>will not</u> be compiled with.
(f) In the Airport, Industrial 1 and Port 2 Zones no height limitation shall apply.	The subject site is located within the Rural Zone. This condition is not applicable.
(viii) Height of Aerials (including Panel Antennas) permitted by Rule 22.5.1(ix): *No aerial (including panel antenna) shall at its highest point, be higher than 1 m above the maximum height for masts for the zone in which it is located, except for omni-directional (or whip) antenna or aerial with a maximum diameter of 100mm which shall at its highest point, be no higher than 4 m above the maximum height for masts for the zone in which it is located. In the Airport, Industrial 1 and Port 2 Zones no height limitation shall apply. [Amended by Plan Change 3, 1/9/2008]*	No aerials or panel antenna are proposed. This standard will be **compiled** with.
(ix) Size of Aerials and Antenna dishes permitted by Rule 22.5.1(ix): *The maximum size for any aerial or antenna shall be:* *Maximum Diameter – Dish Antenna* *Rule Zone – **1.2 metres***	One 800mm dish antenna is proposed. This standard will be **compiled** with.
(x) Radio frequency emissions from antennas, aerials and any other frequency generating devices: *Radio frequency emissions from aerials, antenna dishes and other communication facilities as measured within any area or location accessible to the public shall comply with AS/NZS 2772.1 1999 or any new standard which is designed to replace this standard.*	As highlighted above and in the report attached as **Appendix E** radio frequency emissions will comply with *AS/NZS 2772.1 1999.* This standard will be **compiled** with.
(xi) Buildings accessory to permitted activities permitted by Rule 22.5.1(xi): *All buildings accessory to permitted activities shall comply with the zone standards and performance standards for accessory buildings for the zone in which they are located or, where there is no provision for accessory buildings within a specific zone, shall comply with the zone standards and performance standards for buildings for the zone in which they are located.*	There are no accessory buildings required as part of this proposal. This standard will be **compiled** with.

As condition 22.5.2(e) is not compiled with, resource consent is required as a *Discretionary Activity (Restricted)* under Rule 22.5.3(i).

The utility rules are subject to Sections 4, 5, and 13 to 21. Section 4 relates to Sustainability and section 5 relates to Manawhenua. The proposal does not raise any issues that would conflict with the objectives and policies of these sections of the District Plan.

Sections 13, 14, 15, 16, 18, 19 and 20 are not relevant to the current proposal.

Rules included in Section 17 Hazards, Hazardous Substances and Earthworks include Rule 17.7.2 (i) which provides for permitted earthworks associated with utilities activities which are compliant with Rule 22.5.1 and associated performance standards.

The proposed development will comply with the noise provisions provided under Section 21 Environmental Issues relating to Noise (Rule 21.5).

Overall, resource consent is required as a ***Discretionary Activity (Restricted)***.

4.2 SECOND GENERATION DISTRICT PLAN 2015

On the 26 September 2015, the Dunedin City Council notified its Second Generation District Plan 2015 (**"2GDP"** or **"Proposed Plan"**). Submissions closed on 24th November 2015 and further submissions closed on 34rd March 2016. A number of provisions relating to rural subdivision and clearance of indigenous vegetation have been given immediate effect. These are not relevant to the current proposal. The remaining provisions will not be given legal effect until decisions have been made on submissions which are not appealed.

5.0 STATUTORY CONTEXT

5.1 RESOURCE MANAGEMENT ACT 1991

Section 87A describes the classes of activities in accordance with the RMA. This section was inserted as part of the Resource Management (Simplifying and Streamlining) Amendment Act 2009. Section 87A(3) sets out that if an activity is a discretionary activity (restricted), a resource consent is required for the activity and: -

> *(a) the consent authority's power to decline a consent, or to grant a consent and to impose conditions on the consent, is restricted to the matters over which discretion is restricted (whether in its plan or proposed plan, a national environmental standard, or otherwise); and*
>
> *(b) If granted, the activity must comply with the requirements, conditions, and permissions, if any, specified in the Act, regulations, plan, or proposed plan.*

Section 104 states when considering an application for a resource consent, the consent authority must, subject to Part 2, have regard to –

> *(a) any actual and potential effects on the environment of allowing the activity; and*
> *(b) any relevant provisions of—*
> *(i) a national environmental standard:*

(ii) other regulations:
(iii) a national policy statement:
(iv) a New Zealand coastal policy statement:
(v) a regional policy statement or proposed regional policy statement:
(vi) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

(2) When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.

6.0 ASSESSMENT AGAINST DISTRICT PLAN OBJECTIVES AND POLICIES

The relevant objectives and policies of the Operative Plan are listed and commented on in turn below.

6.1 OPERATIVE DISTRICT PLAN OBJECTIVES AND POLICIES

6.1.1 Objectives and Policies

Objective	Policies	Comment
Sustainability ***Objective 4.2.1 Enhance the amenity values of Dunedin*** ***Objective 4.2.3 Sustainably manage infrastructure***	***Policy 4.3.1*** *Maintain and enhance amenity values.* ***Policy 4.3.5*** *Require the provision of infrastructural services at an appropriate standard*	As discussed in Section xx below, the proposed telecommunication facility has been designed to maintain the existing rural character and amenity values within the Rural area as is possible for utilities of this kind, by proposing to paint the mast a low reflective colour which is derived from the background landscape. In addition, the components of the facility are positioned to minimise the visual effects of the structure, and the facility falls largely within the permitted baseline for such a facility. The permitted baseline provides for telecommunications structures up to 15 metres in the Rural area. The proposed mast will exceed this by 3 metres. The additional height is required to obtain line of sight from Berwick back to Saddle Hill. The structure will be located in an area that is already the subject of development, being within the substation compound, where other utilitarian structures can be found. Surrounding properties are

		located at least 90m away from the facility and benefit from existing vegetation which will ensure views of the structure are minimised and amenity values protected. Overall it is considered that the proposed development will not be contrary to these objectives and policies.
Utilities ***Objective 22.2.1*** ***Provide for the safe and efficient use and development of utilities within the City*** ***Objective 22.2.2*** ***Ensure that any adverse environmental effects of the construction, operation and upgrading of utilities in the City are avoided, remedied or mitigated.***	***Policy 22.3.1*** *Allow the construction, operation and upgrading of those utilities which have no more than minor adverse effects.* ***Policy 22.3.2*** *Require consideration on a case by case basis of the construction, operation and upgrading of utilities with more than minor adverse effects on the environment.* ***Policy 22.3.3*** *Encourage the grouping of utilities.*	The District Plan recognises the importance of utilities stating that *"Utilities are a physical resource that play an integral role in ensuring the successful functioning of the City and in enabling people to provide for their wellbeing, health and safety".* The District Plan recognises and supports the establishment of utilities in Objective 1 and seeks to avoid, remedy or mitigate adverse effects on the surrounding environment. For the reasons discussed elsewhere in this Assessment of Effects, the proposal is consistent with the relevant objectives and policies of the District Plan. The proposed telecommunications site has been designed to meet Aurora' technical objectives, and is located to minimise the visual effects of the structure. The proposed development will be co-sited with other existing utility structures in an area of the site where the natural character of the area has already been altered. Overall, given the low key nature and design of the proposed development, it is considered that the proposed development will not be contrary to this objective and associated policies.

6.2 PROPOSED SECOND GENERATION DISTRICT PLAN OBJECTIVES AND POLICIES

6.2.1 City-Wide Activities – Section 5 – Network Utilities and Energy Generation

The objectives and policies of the Proposed Plan are a relevant consideration to this proposal. The application has therefore been assessed against the relevant objectives and policies of the Proposed Plan found in section 5 Network Utilities and Energy

Generation as described below:

Objective	Policies	Comment
Objective 5.2.1 *Network utilities activities including renewable energy generation activities, are able to operate efficiently and effectively, while minimising, as far as practicable, any adverse effects on the amenity and character of the zone; and, where located in an overlay zone, scheduled site, or mapped area, meeting the relevant objectives and policies for those areas.*	***Policy 5.2.1.5*** *Require network utilities structures to be of a scale, size, design and location that enables the provision of network utilities while:* *a) minimising, as far as practicable, adverse effects on the amenity and character of the zone;* *b) maintaining a high level of pedestrian amenity in pedestrian street frontages.* ***Policy 5.2.1.7*** *Require network utilities structures are located, designed, and operated to ensure any risk to health and safety is no more than minor.* ***Policy 5.2.1.11*** *Only allow network utility structures - large scale, regional scale energy generation in the rural zones, network utilities poles and masts - small scale (other than in the rural, rural residential or industrial zones), community scale energy generation, biomass generators - stand-alone, and biomass energy generation on-site energy generation and energy resource investigation devices (other than in the rural and industrial zones) where the activity is designed and located to avoid any significant adverse effects and minimise adverse effects, as far as practicable, including:*	The proposal recognises the need to ensure that it avoids, remedies or mitigates any adverse effects that utilities can have on amenity values by ensuring that it is not visually dominant by being positioned away from residential dwellings and co-located within the existing substation compound with other utiiiitarian structures. The proposed facility will comprise of a monopole mast which will be painted a recessive colour to assist in minimising potential visual effects. In addition, the report at **Appendix E** confirms that the proposed development will not present any risk to health and safety. As such, the proposed development is considered to align with the relevant Objective and associated policies of the Proposed Plan.

	a) *effects on visual amenity and the character of the zone in which the activity is located; and* b) *effects on the amenity of any surrounding residential activities.*	

6.3 SUMMARY OF OPERATIVE AND PROPOSED DISTRICT PLAN OBJECTIVES AND POLICIES

The above assessments demonstrate that the proposed transmission level microwave link is consistent with the relevant objectives and policies of the Operative and Proposed District Plans.

7.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

Rule 22.5.3 relates to Discretionary Activities (Restricted) and states that discretion will be restricted to the following:

- the conditions in Rule 22.5.2 with which the activity does not comply
- design and external appearance
- bulk, location and siting of buildings and structures.

This dictates the assessment of effects below.

7.1 Permitted Baseline

Section 95D(b) states that a consent authority may disregard an adverse effect of an activity if a rule or national environmental standard permits an activity with that effect. In this case, the proposal is not located within the road reserve therefore the permitted activity standards in the NES for Telecommunication Facilities do not apply. The application site is located within the Rural Zone. Telecommunication masts are permitted within this zone so long as they are no greater than 15m in height, no greater than 1.5m in diameter up to 10 metres and 0.75m above 10 metres; any dish antenna is less than 1.2m in diameter and they comply with the radio frequency emissions.

Earthworks for permitted utilities are also a permitted activity, therefore the earthworks proposed fall within the permitted baseline.

7.1 VISUAL AND AMENITY EFFECTS

Height of Mast

The proposed mast will be 18 metres in height, which is 3 metres above the 15 metre height limit within the Rural Zone. The height of the mast is dictated by technical and operational requirements, as line of sight is necessary from the proposed antenna at the subject site, back to the proposed equipment at Saddle Hill. Given the distance between the two locations and the presence of intervening vegetation, the 18 metre

mast height is necessitated.

Design and External Appearance

The mast will be slimline in profile, constructed of galvanished steel, with a diameter of 570mm. There will be a 2 metre lightning arrestor on top of the mast. It is proposed that the mast will be painted a non-reflective recessive colour to ensure it blends into the surrounding environment.

Bulk, Location and Siting of Buildings and Structures

The structures associated with the proposed transmission level microwave link are shown in the plans and elevations contained in **Appendix C** to this application. The proposal seeks to construct, maintain and operate a new transmission level microwave link to support enhanced SCADA communications between Dunedin and Queenstown. This site has been specifically selected as the equipment will be contained on a site where utility buildings and structures already exist, which meets the technical and operational requirements of Aurora and which will reduce the visual impact of the development . The equipment located at the top of the mast is as small as practical. The bulkiest item is the dish antenna which is 800mm in diameter. It is not considered that these items in themselves will impact upon the surrounding landscape or visual amenity values. In addition, as noted above, the mast will be painted a recessive colour to reduce visual impact of the structure upon the surrounding landscape.

For the above reasons, it is not considered that the utility will impact either upon the visual outlook of the application site from adjoining properties or areas of public space which are remote from the site. Any adverse visual effects are considered less than minor and the values associated with the subject environment will not be detrimentally affected for the following reasons:

- Aurora has elected to use a pole that is 18m at the highest point, is slimline, with one dish antenna. Any associated equipment will be contained within the existing buildings located on the site. Accordingly, the facility will present little visual bulk.
- The pole is to be constructed of galvanised steel and painted a recessive colour that is consistent with the natural backdrop of the subject site, ensuring that the monopole will blend with the host environment. The antenna will be grey/white in colour.
- The siting of the facility has been selected to locate the structure within the existing substation compound where it will be seen in the context of other utilitarian utility structures. The site is located in a relatively flat rural area and existing residential dwellings are located at least 90 metres away and are subject to existing mature planting which will screen views to the structure.
- Any telecommunications cables will be located underground.

8.0 PART 2 ASSESSMENT

The purpose of the Resource Management Act 1991 is to promote the sustainable management of natural and physical resources. Section 5(2) of the Act defines sustainable management as:

"... *managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment."

Section 5 in Part 2 identifies the purpose of the RMA as being the sustainable management of natural and physical resources. This means managing the use of natural and physical resources in a way that enables people and communities to provide for their social, cultural and economic wellbeing while sustaining those resources for future generations, protecting the life supporting capacity of ecosystems, and avoiding, remedying or mitigating adverse effects on the environment. In this case, the activity will have no more than minor adverse effects on the wider environment in relation to visual quality and amenity values, and complies with the District Plan in relation to radiofrequency emissions and construction effects. The proposal will provide and maintain telecommunication and radiocommunication services to Aurora's electricity assets without detracting from the qualities of the locality, or detracting from the safety and convenience of the adjacent land uses. Therefore the proposal is consistent with Section 5 of the RMA in that it provides for the economic wellbeing of people while avoiding, remedying or mitigating adverse effects on the environment.

Section 6 of the Act requires for the following matters of national importance to be recognised and provided for:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

(f) the protection of historic heritage from inappropriate subdivision, use, and development:

(g) the protection of protected customary rights.

Section 6 of the RMA outlines matters of national importance that all persons shall have regard to in using, managing, developing and protecting natural and physical resources. The proposed development will not offend any section 6 matters.

Section 7 of the Act requires:

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—*
>
> *(a) kaitiakitanga:*
> *(aa) the ethic of stewardship:*
> *(b) the efficient use and development of natural and physical resources:*
> *(ba) the efficiency of the end use of energy:*
> *(c) the maintenance and enhancement of amenity values:*
> *(d) intrinsic values of ecosystems:*
> *(e) [Repealed]*
> *(f) maintenance and enhancement of the quality of the environment:*
> *(g) any finite characteristics of natural and physical resources:*
> *(h) the protection of the habitat of trout and salmon:*
> *(i) the effects of climate change:*
> *(j) the benefits to be derived from the use and development of renewable energy.*

Section 7 identifies a number of "other matters" to be given particular regard by a council in the consideration of any assessment for resource consent, including the efficient use of natural and physical resources, and the maintenance and enhancement of amenity values. As discussed in this assessment, it is considered that the proposal will not adversely affect the overall character and amenity values of the area.

The subject site has already been modified by the introduction of the existing telecommunication structures. Locating the new mast and associated antennas on the same site, is considered to be an efficient use of natural and physical resources (7b). In addition, the slim line nature of the monopole together with the small antennas and the distance from publicly accessible areas, will ensure that amenity values can be maintained (7c). It is therefore considered that the proposed development provides for the relevant matters of section 7 of the Act.

Section 8 requires Council to take into account the principles of the Treaty of Waitangi. No issues are raised by this proposal with respect to the Articles of the Treaty. Overall the application achieves the purpose of the RMA through sustainable management of natural and physical resources, and as a result satisfies Part II of the RMA.

9.0 ALTERNATIVE LOCATIONS

In this instance, given there is an existing facility, which meets the technical and operational requirements of Aurora, alternative sites in the area were not considered. It makes environmental, economic and technical sense to locate the new monopole in close proximity to other existing assets rather than investigate the possibility of

establishing a new site. The existing site already has an equipment cabinet and power connections which have the capacity to accommodate the further development required as part of this proposal.

10.0 CONSULTATION AND NOTIFICATION

Consultation has been undertaken with the Dunedin City Council – Resource Consents team to confirm the need for consent for the proposed activity. No dwellings or sensitive activities are located nearby the proposed site. Therefore there are not considered to be any persons likely to be adversely affected by the proposal from whom written approval is required or with whom consultation is considered necessary.

11.0 CONCLUSION

The proposed telecommunications asset is a well-designed facility, built to engineering specifications for safety and efficiency. The proposed site development will meet technical requirements while mitigating adverse effects. Accordingly, it is concluded that the proposal is not contrary to the objectives and policies of the Operative or Proposed District Plan, or Part II (Purpose and Principles) of the Resource Management Act 1991, and that consent can be granted on a non-notified basis.

APPENDIX A

APPENDIX A - SITE LOCATION

APPENDIX B

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

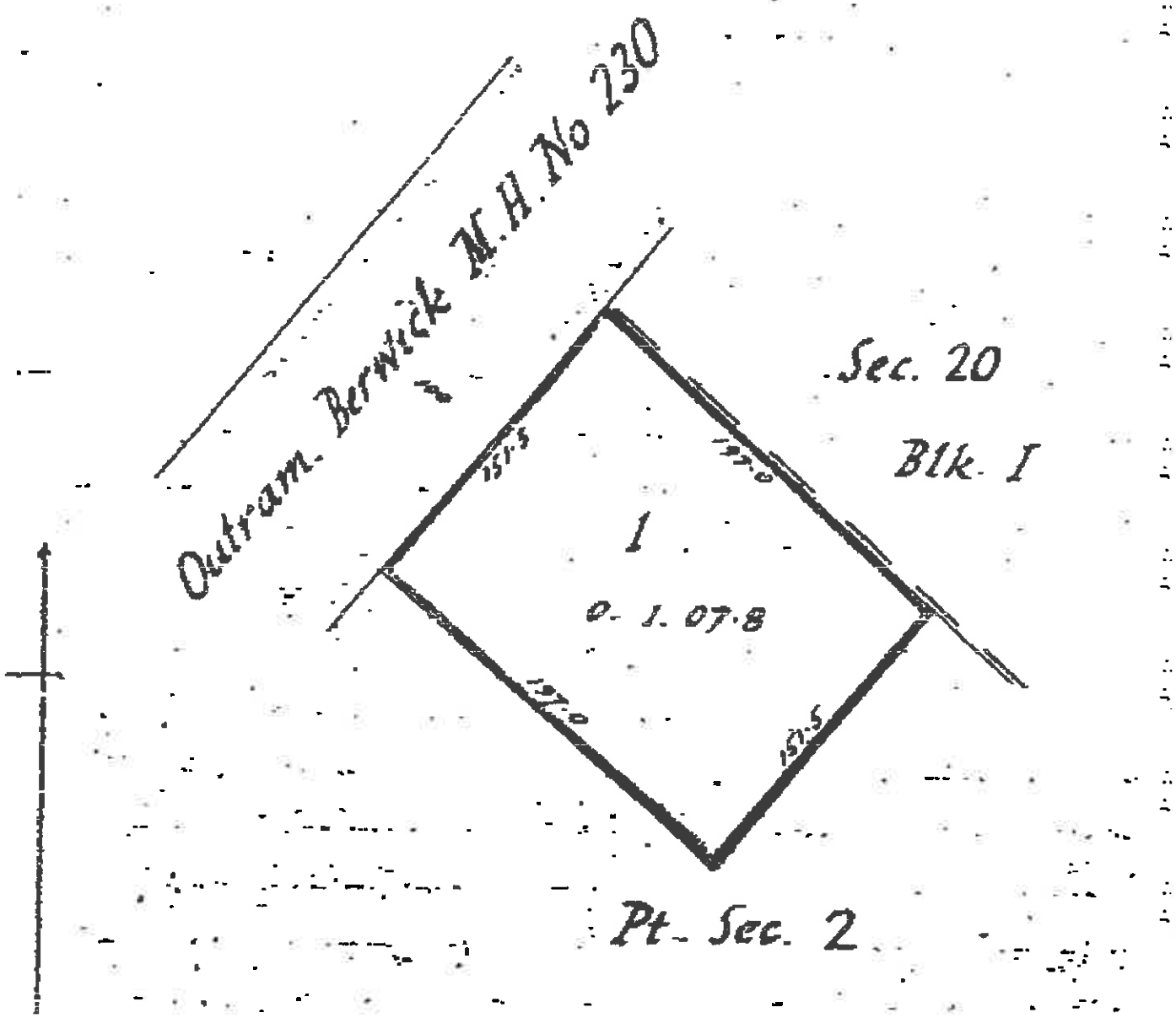
Identifier	**OT409/83**
Land Registration District	**Otago**
Date Issued	05 May 1959

Prior References
OT267/171

Estate	Fee Simple
Area	1209 square metres more or less
Legal Description	Lot 1 Deposited Plan 9194

Proprietors
Aurora Energy Limited

Interests


Outram Berwick M.H. No 230
Sec. 20
Blk. I
151.5
197.0
1
0. 1. 07.8
197.0
151.5
Pt. Sec. 2

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT410/35**
Land Registration District	**Otago**
Date Issued	19 June 1959

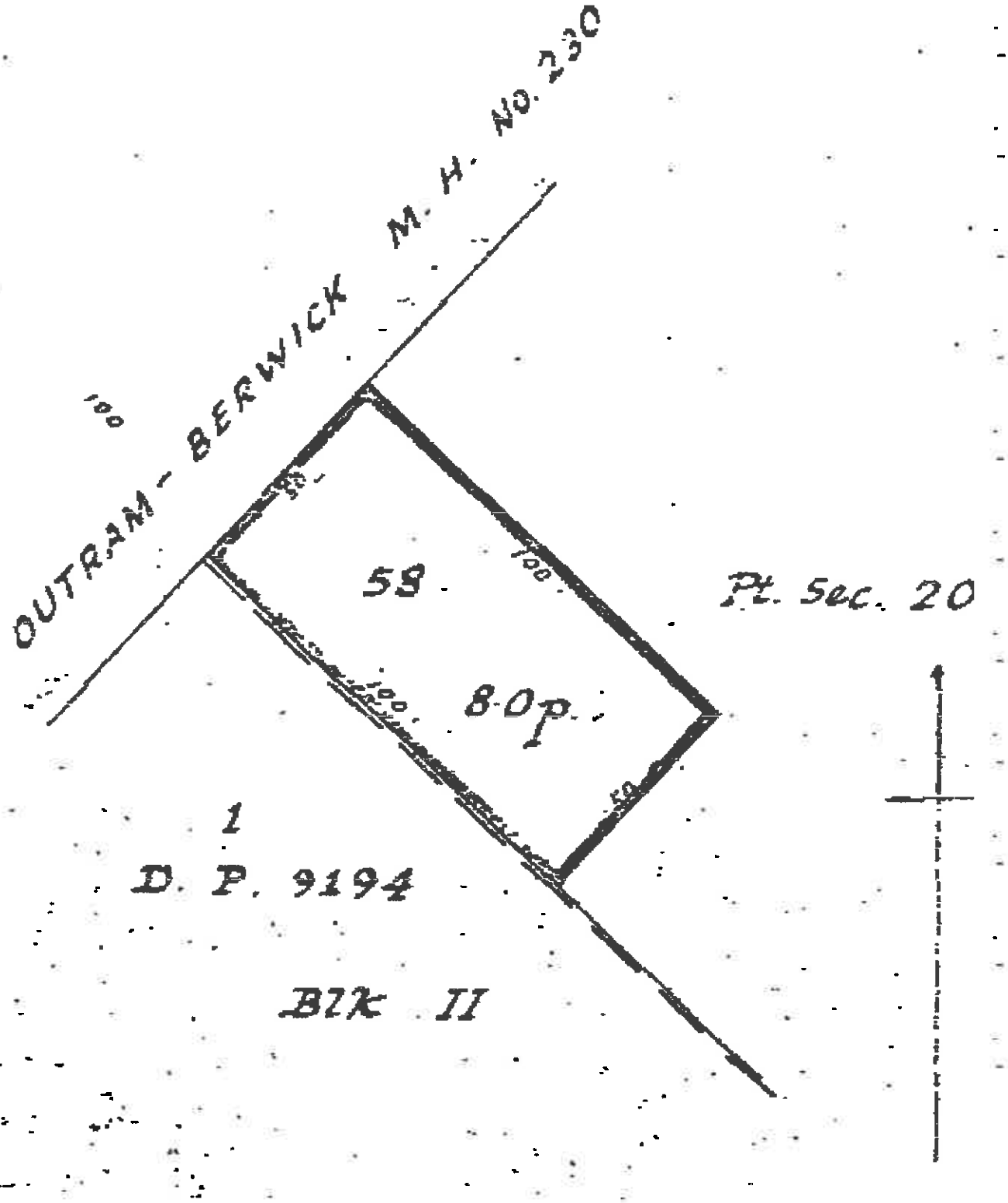
Prior References
OTPR28/79

Estate	**Fee Simple**
Area	202 square metres more or less
Legal Description	Section 58 Block I Maungatua Survey District

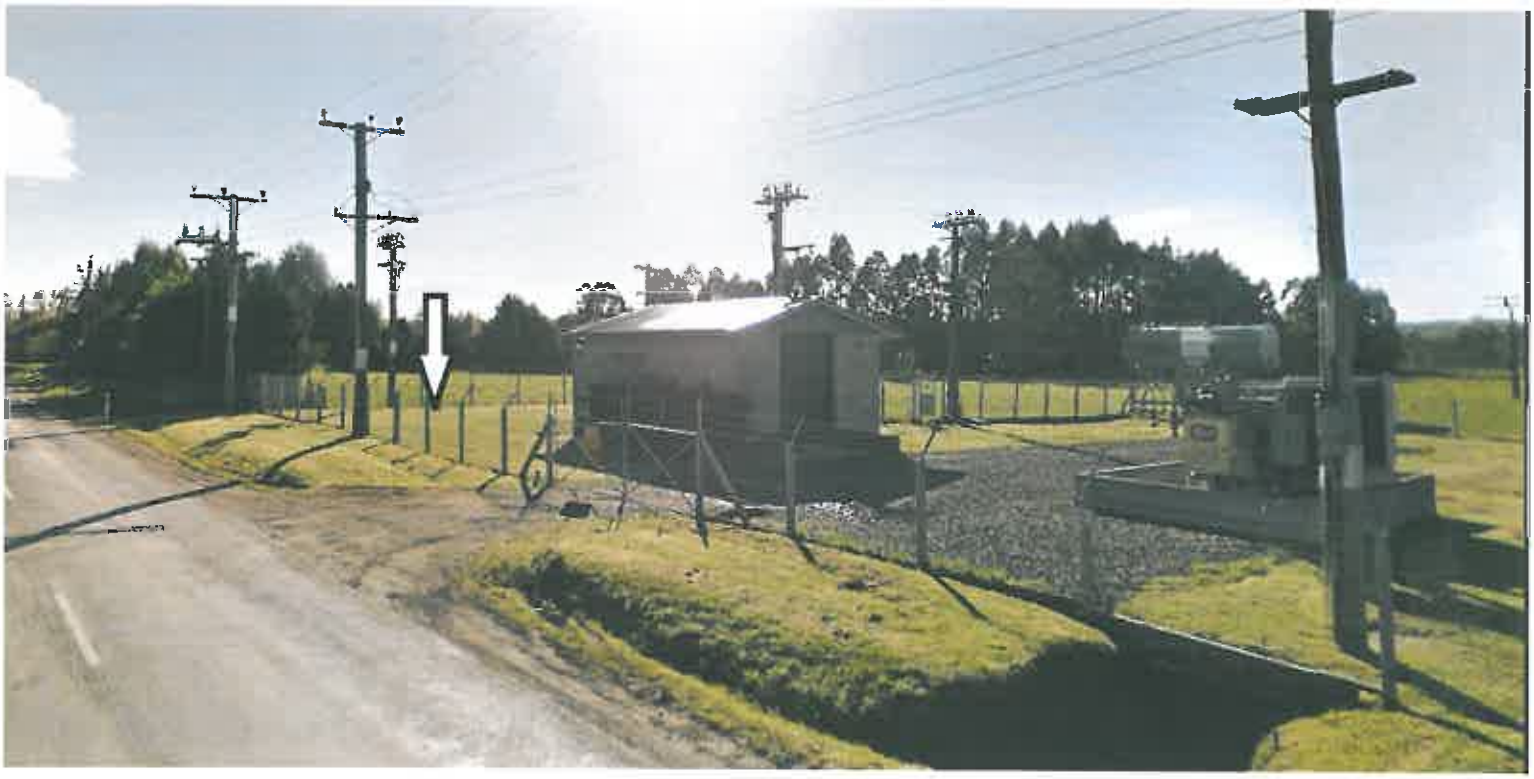
Proprietors
Aurora Energy Limited

Interests

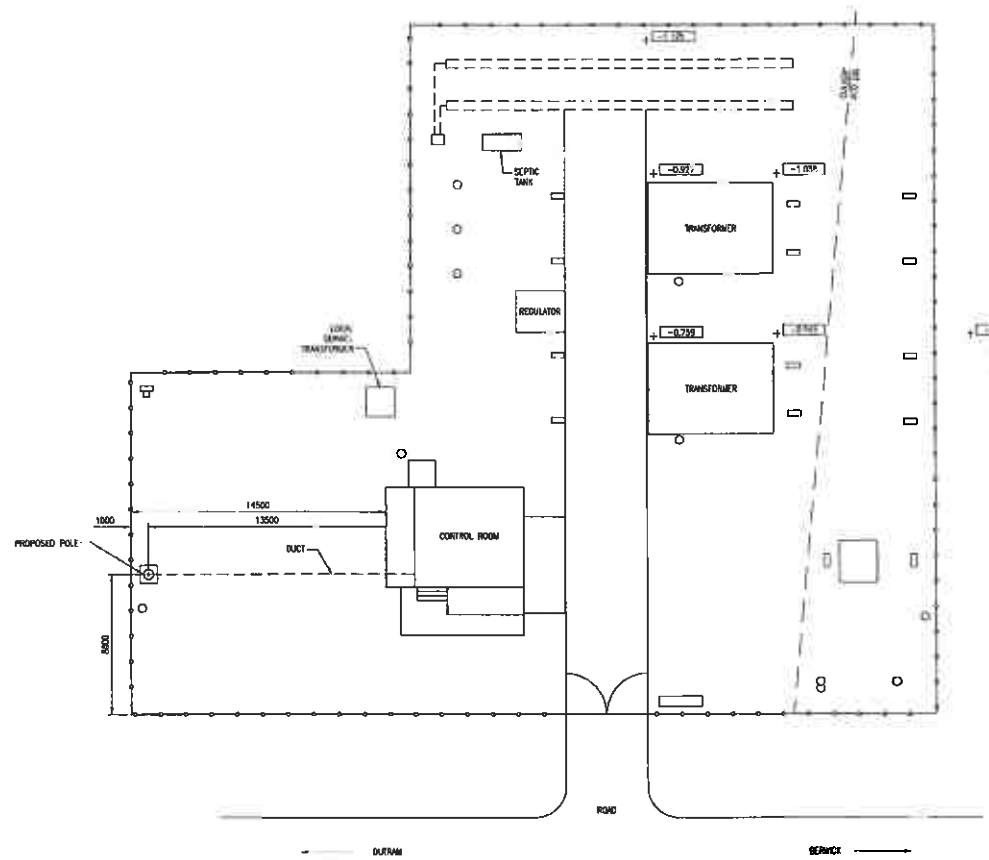
Subject to Section 59 Land Act 1948


OUTRAM - BERWICK M. H. NO. 230
66'
58
100
100
50
80p.
Pt. Sec. 20
1
D. P. 9194
Blk II

APPENDIX C



APPENDIX D



Reference drawings:

3555-BWK-001_1 Antenna Pole Load Diagram
3555-BWK-001_3 Warning Signs

Site Legal Description: Lot 1 DP 8194

REV	DESCRIPTION	DRN	CHK	CLIENT APP'D	DATE

Tesla Consultants
Specialist Consultants to the Electric Power Industry
PO Box 645, Hamilton
Phone (07) 834 8480, Web www.tesla.co.nz

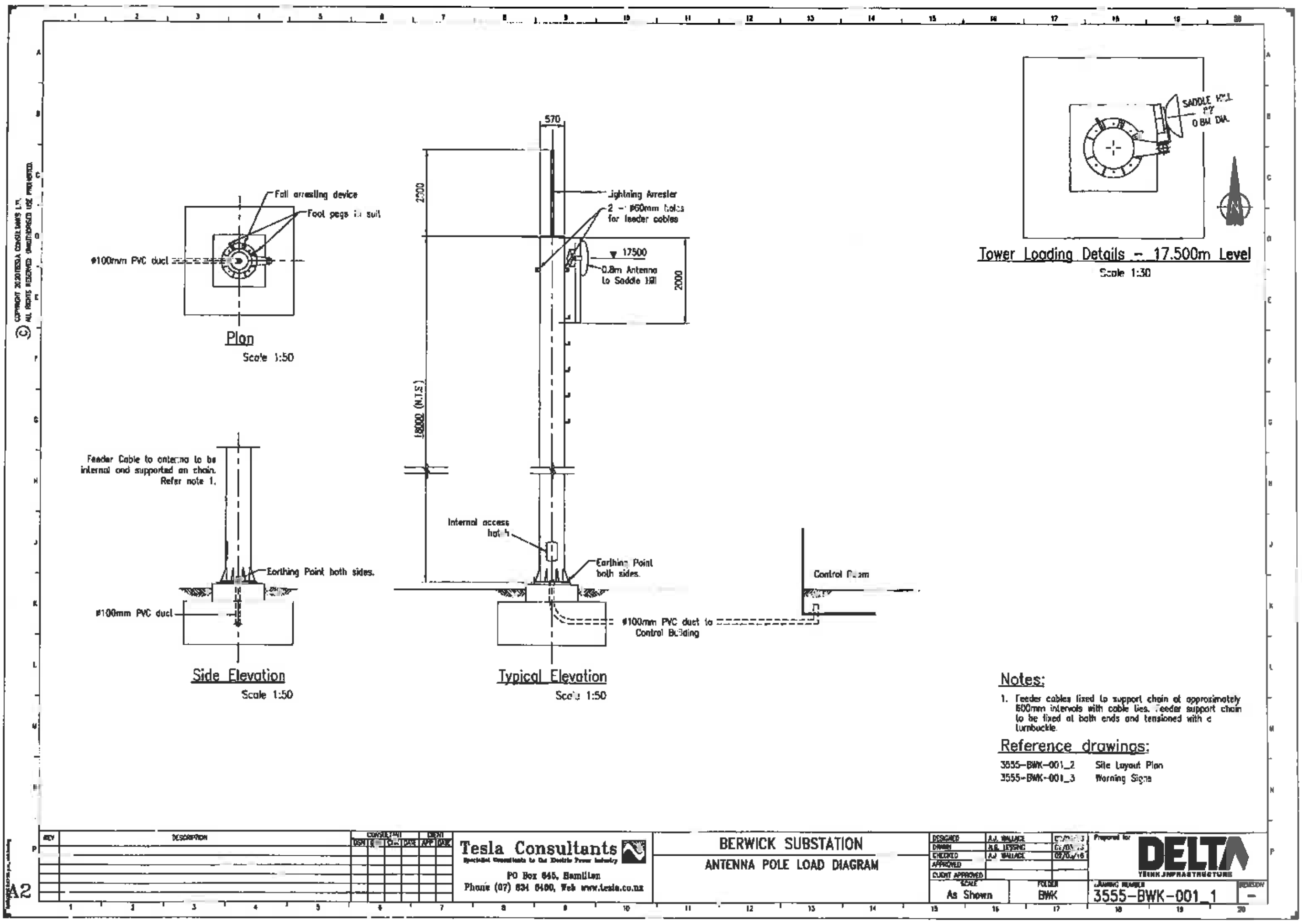
BERWICK SUBSTATION
SITE LAYOUT PLAN

DESIGNED	A.J. WALLACE	17/11/16
DRAWN	R.C. DESCHAMPS	18/11/16
CHECKED	A.J. WALLACE	02/12/16
APPROVED		
CLIENT APPROVED		

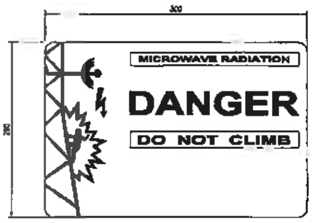
SCALE 1:100
FOLDER BWK
DRAWING NUMBER 3555-BWK-001_2
REVISION -

Prepared for DELTA

A1



Fall arresting device
Foot pegs to suit
ø100mm PVC duct
Plan
Scale 1:50
570
2300
Lightning Arrester
2 - ø60mm holes for feeder cables
17500
0.8m Antenna to Saddle Hill
2000
18000 (N.T.S)
Internal access hatch
Earthing Point both sides.
ø100mm PVC duct to Control Building
Control Room
Typical Elevation
Scale 1:50
Feeder Cable to antenna to be internal and supported on chain. Refer note 1.
Earthing Point both sides.
ø100mm PVC duct
Side Elevation
Scale 1:50
SADDLE HILL
0.8M DIA.
Tower Loading Details - 17.500m Level
Scale 1:30
Notes:
1. Feeder cables fixed to support chain at approximately 600mm intervals with cable ties. Feeder support chain to be fixed at both ends and tensioned with a turnbuckle.
Reference drawings:
3555-BWK-001_2 Site Layout Plan
3555-BWK-001_3 Warning Signs
Tesla Consultants
PO Box 645, Hamilton
Phone (07) 834 6400, Web www.tesla.co.nz
BERWICK SUBSTATION
ANTENNA POLE LOAD DIAGRAM
DESIGNED A.J. WALLACE
DRAWN A.B. LESSING
CHECKED A.J. WALLACE
APPROVED
CLIENT APPROVED
SCALE As Shown
FOLDER BWK
Prepared for DELTA
DRAWING NUMBER 3555-BWK-001_1
REVISION -
A2



Reference drawings:

3555-BWK-001_1 Antenna Pole Load Diagram
3555-BWK-001_2 Site Layout Plan

Tesla Consultants
Specialist Consultants to the Electric Power Industry
PO Box 646, Hamilton
Phone (07) 834 6460, Web www.tesla.co.nz

BERWICK SUBSTATION
WARNING SIGNS

DESIGNED	A.J. WALLACE	02/03/15
DRAWN	N.G. LESSING	02/03/15
CHECKED	A.J. WALLACE	02/03/15
APPROVED		
CLIENT APPROVED		

Prepared for DELTA THINK.INFRASTRUCTURE

SCALE 1:2 | FOLDER BWK | DRAWING NUMBER 3555-BWK-001_3 | REVISION –

REV | DESCRIPTION | DSN | DRN | CHK | APPR. | DATE

A1

APPENDIX E

3rd March 2016

Ref: 3555 – 009

1. INTRODUCTION

This report summarises results of Electromagnetic Radiation (EMR) calculations carried out in relation to Aurora's proposal to install and operate a microwave radio link terminal at Berwick Substation. The requirement is to demonstrate compliance, or otherwise, of this overall installation with the Resource Management (National Environmental Standards for Telecommunications Facilities) Regulations 2008.

Section 4 of these regulations applies to telecommunication facilities generating radiofrequency fields, like those at Berwick Substation. Under these regulations, a telecommunication facility is a permitted activity as far as radiofrequency fields are concerned if the network operator plans and operates the telecommunication facility in accordance with *NZS2772: Part 1:1999 Radiofrequency Fields – Maximum Exposure Levels – 3 kHz to 300 GHz (NZS2772.1.1999)*. These regulations further require presentation of a report prepared in accordance with *NZS 6609.2: 1990 Radiofrequency Radiation: Part 2: Principles and Methods of Measurement 300 kHz to 100 GHz,* which takes account of other telecommunication facilities in the immediate vicinity, and predicts whether the radiofrequency field levels at places in the vicinity of the facility that are reasonably accessible to the general public will comply with *NZS2772.1.1999.*

Radio frequency (RF) transmissions are one of many, man-made and natural, sources of EMR we are constantly exposed to. Exposure limits based on extensive scientific and medical research include large safety margins (greater than 50 in the NZ standard), have been embodied in standards by administrations worldwide. These limits recognise the existence of both "controlled" environments (where energy levels can be accurately determined and everyone in the vicinity is aware of the presence of those electromagnetic fields), and "uncontrolled" environments (where the energy levels are not known or some persons in the vicinity may not be aware of the electromagnetic fields). Exposure limits for "uncontrolled" environments are specified at lower levels because personnel can't reasonably be expected to take precautionary action to minimise their exposure. These exposure limits are also frequency dependent, because EMR absorption by the human body is not uniform across all frequencies, with body resonance effects resulting in the lowest exposure limits established over a range of 10 to 300 Megahertz (MHz).

2. OVERALL EMR LEVELS

2.1 Berwick Substation Radio Site

Aurora Energy are planning to establish a new radio link from Berwick Substation to Saddle Hill repeater. This will consist of a new 18 metre steel monopole, at a location of Latitude 170 8.01534 S, Longitude 45 55.59564 E.

2.2 Service Classification

Radio transmitters in New Zealand are licensed by the Radio Spectrum Management division of the Ministry for Business, Innovation and Employment, and characteristics of transmissions from this site have been extracted from their Spectrum Management And Registration Technology (SMART) database. This is a publicly accessible database of radio licence information. A review of this database shows there are no other licenses near the location of the proposed Aurora antenna.

Aurora have not yet completed licensing for its new microwave radio to be installed in this site, however the spectrum to be used has been selected, and details are included within Appendix 1.

Radio spectrum is a precious resource, so the process of licensing each radio transmitter at a particular site takes account of maximising possible re-use of any assigned frequency through specifying in the radio licence the maximum power level permitted to operate that particular service. This figure has been referenced as 'Licence Power' in Appendix 1, and is expressed on a logarithmic scale relative to 1 Watt (dBW).

The service to be operated from the Berwick Substation site by Aurora falls into the following category:

> **Point to point radio links**, with antennas dedicated to each link, producing a narrow uni-directional beam aimed at the far end of the radio link path. The proposed Aurora service operates on frequencies above 1 Gigahertz (1000MHz), and as Appendix 1 shows, the antenna produces a 'half-power beamwidth' of less than 2.1 degrees at these frequencies.

The calculated power in the specific heading is a reference figure to indicate the total power density falling within a particular arc of azimuth.

3. MINIMUM SAFE DISTANCE (MSD) CALCULATIONS

The closest approach point to a transmitting antenna where the Power Flux Density (PFD) of its EMR field remains below a specified level can be calculated as the Minimum Safe Distance. **Minimum Safe Distance** is the distance from an antenna (in the focus of its primary field while transmitting), within which the EMR field may exceed the exposure limit specified for that frequency in the applicable New Zealand Standard, *NZS2772.1.1999*. Exposure limits used in compiling this report are at the lowest level applicable to an "uncontrolled" environment.

EMR calculations carried out for this report presents the proposed new installation for Aurora as submitted by Tesla Consultants Ltd, Hamilton, to assess the impact on the overall levels.

The power density specified in *NZS2772.1.1999* (Table 6) is for exposure averaged over 6 minutes. In these calculations, it is assumed each radio link is transmitting continuously at its licensed (maximum) power level.

Appendix 2 calculates the MSD for the dish antenna to be associated with Aurora's new point-to-point link license. The maximum power density radiated from this antenna will be at 82° azimuth. The antenna will be tilted up a small amount (0.8 degrees) and tilting slightly upward draws its main lobe higher above the ground from the antenna

height of 17.5 metres, so no member of the public can approach anywhere near that zone in front of this antenna.

The MSD towards Saddle Hill from Berwick Substation is summarised below:

Table 1: **MINIMUM SAFE DISTANCES FROM BERWICK SUBSTATION ANTENNA**

centre line Azimuth of antenna / sector beam	Number of licenses included	Aggregated Power Level (maximum)	Maximum allowable Power Flux Density*	Minimum Safe Distance * (on axis)
82° (proposed)	1	1,000 Watts	10 W/m²	2.9 metres

* Per NZS2771.1:1999, Table 6

The extremely focussed nature of the antenna focused a narrow 'beam' of 2.1° width well above the ground, EMR exposure for anyone standing on the ground (head height 1.5m AGL) in the vicinity of the Berwick Substation is 0.0031% or less of the allowable *NZS2772.1.1999* as calculated in Appendix 3.

4. COMPLIANCE WITH THE EXPOSURE LIMITS

Section 10 of *NZS2772.1.1999* (p.29) provides criteria for **"Protection – General Public Exposure"**, listing measures to be satisfied to meet the requirements of this standard. This section applies to the "uncontrolled" category outlined in the introduction of this report, and therefore references the lowest exposure limits. Each clause from this section is quoted in *italics* below, with responses applicable to this proposed installation immediately underneath.

10. PROTECTION – GENERAL PUBLIC EXPOSURE

Measures for the protection of members of the general public who may be exposed to RF fields due to their proximity to the antennas or other RF sources shall include the following:

(a) Determination of the boundaries of areas where general public exposure limit levels may be exceeded.

Minimum Safe Distance calculated for the transmitting antenna establishes this boundary. The distance is 2.82m in the specific beam direction for the dish, but at 17.5m above ground, so there is no possibility of the general public encroaching within that potentially "unsafe" zone.

(b) Restriction of public access from these areas where the general public limits may be exceeded.

The station is on private property, with a 2m high security fence between it and Maungatua Road. There are signs at the entry to the site advising the public not to enter. Public access near the pole in the direction of signal requires entry to private farmland, by crossing a fence to the area behind the substation so is likely to be attempted by very few people. The Aurora equipment introduces no area of public risk at ground level, so there is no identified need to take further steps to restrict public access.

(c) Appropriate provision of signs or notices complying with AS1319.

Aurora will erect suitable signage compliant with AS1319 on the new pole at the Substation.

(d) Minimising, as appropriate, RF exposure which is unnecessary or incidental to achievement of service objectives or process requirements, provided that this can be readily achieved at modest cost.

Maximum radiated power from the antenna is specified in the radio licence for this installation, and is specified at the lowest level necessary to meet service objectives while permitting a modest margin for signal fading over the planned radio path. Aurora's use of highly directional antennas along with these design and licensing requirements ensures compliance with this clause.

(e) Demonstration that installations are planned and operated in accordance with appropriate industry best contemporary practice.

Covered in response to (d) above.

(f) Notification of the competent authority, as required, in the event of the exposure exceeding the relevant limits.

Very small Minimum Safe Distance exclusion zones resulting from use of lowest necessary transmitter power, together with use of a directional antenna means it will not be possible for the proposed installation to exceed the exposure limits at any position accessible to the general public.

5. CONCLUSIONS

Aurora's proposed new radio link between Berwick Substation and Saddle Hill Repeater will operate well within the safety guidelines set out in *NZS2772.1.1999*, as supported by the following:

a) As shown in Table 1 and appendix 2, transmitter powers will keep the Minimum Safe Distance (MSD) in front of each antenna to no more than 2.9 metres at 17.5 metres above ground. As a consequence, there will be no possibility of public access within these 'exclusion' zones.

b) Incidental RF radiation from the tower will be minimised as all radio frequency equipment is mounted on the pole and attached to the rear of the antenna (at least 17m above ground), so there is no additional RF energy generated or cabled near areas of public access.

c) With existing and proposed new antennas maintaining strictly controlled EMR envelopes above the surrounding ground, this Aurora site will continue to comply with the strictest requirements (lowest level limits) of the NZ standard.

**** END ****

APPENDICES:

1 Point-to-Point planned Licence Summary.

2 MSD Calculation for Proposed Saddle Hill link.

3 PFD Calculation for Proposed Saddle Hill link.

REFERENCES:

1. Resource Management (National Environmental Standards for Telecommunications Facilities) Regulations 2008,

2. NZS2772: Part 1:1999 Radiofrequency Fields – Maximum Exposure Levels – 3 kHz to 300 GHz (NZS2772.1.1999),

3. "National Guidelines for managing the effects of radiofrequency transmitters" – Published by The Ministry for the Environment December 2000, ME number 377, ISBN 0-478-240009-0,

4. Radio Licences issued by Ministry for Business, Innovation and Employment; viewable in their SMART database.

BERWICK SUBSTATION RADIO LICENCE SUMMARY

Licence No.	Channel Allocation	Nominal Frequency	Tower	Polarisation	Tx Azimuth	Beam Width*	Licence Power (dBW)	Radiated Power (Watts)	NZS2772 W/m²	MED (Metres)	Notes:
-	11G xx	10900	New pole	Vertical	82	2.1	30	1,000		2	Link to Saddle Hill (proposed)
						Site Total envelope e.i.r.p.=		1,000			

* Estimated maximum

Key

New Licence

Definitions:

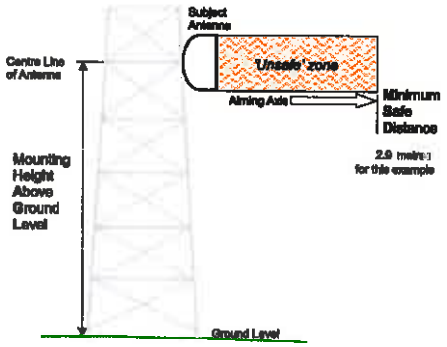
Tx Azimuth = direction in which the transmitting antenna is pointed (True heading)
Beam Width = assessed width (in degrees) of the transmitting antenna's forward lobe
Licence Power (dBW) = maximum radiated power permitted by the licence
Radiated Power (Watts) = Licence Power converted to Watts
Sector Power (Watts) = total power radiated within a sector's aggregated beamwidth
NZS2772 PFD W/m² = Maximum Allowable Flux Density per NZS2772.1:1999 Table 8 for that frequency
MED (Metres) = Minimum Safe Distance, within which the specified Flux Density may be exceeded
= sqrt([Radiated Power in Watts] / [Specified Flux Density in W/m² * 4 * Pi])

MINIMUM SAFE DISTANCE (MSD) CALCULATION

Site Name: Berwick Substation

Proposed 11GHz Link to Saddle Hill

Parameter		Calculations		Comments
Maximum Allowable RF Power Flux Density	S	10.00	W/m²	1000 µW/cm² (NZS2772, Table 5 exposure limit)
Additional Gain (beyond antenna)	AG	0.00	dBi	relative to isotropic
Additional Feed System Loss (beyond antenna)	FL	0.00	dB	Overall, from transmitter to antenna termination
Total Additional Gain; dB	Gd	0.00	dB	Gd = AG-FL
Total Additional Gain; Numeric	G	1.00		G = $\log^{-1}$ (Gd / 10)
Maximum Transmitter Power; dBm	Wd	60.00	dBm	Transmitter power permitted by license; dBm = dBW+30
equals Maximum Transmitter Power; Watts	W	1000	W	W = $\log^{-1}$ (Wd / 10) / 1000
Duty Factor	N	1.000		QAM carrier (worst case)
Equivalent Continuous Transmit Power	P	1000.00	W	P = W * N
Peak Effective Radiated Power, Watts	eirp	1000.00	W	eirp (Watts) = W * G
Peak Effective Radiated Power, dBW	eirp	30.00	dBW	eirp (dB relative to 1W) = 10 * $\log^{-1}$ (W * G)
Average Effective Radiated Power, dBW	eirp	30.00	dBW	eirp (dB relative to 1W) = 10 * $\log^{-1}$ (P * G)
Minimum Safe Distance (in front of antenna)	MSD	2.821	metres	MSD = sqrt(P * G) / (π * 4 * Pd)



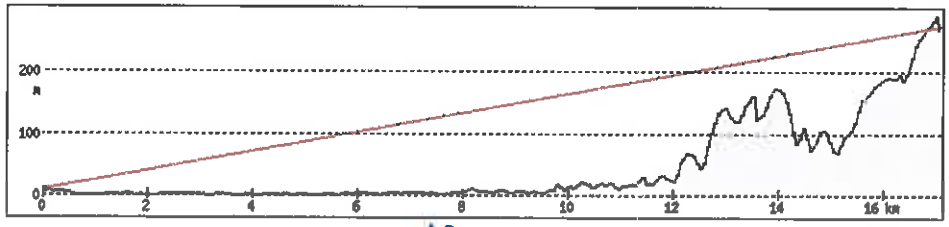
Concept of Minimum Safe Distance

CALCULATION OF POWER FLUX DENSITY AT NOMINATED DISTANCE

Site Name:	Berwick Substation		
Nominal Frequency	Proposed 11GHz Link to Saddle Hill		
Antenna Type:	0.8m dish		
Half Power Beamwidth H-Plane	2.1	degrees	
" " " E-Plane	2.1	degrees	
Direction of Maximum Power Density	62	degrees relative to Grid North	

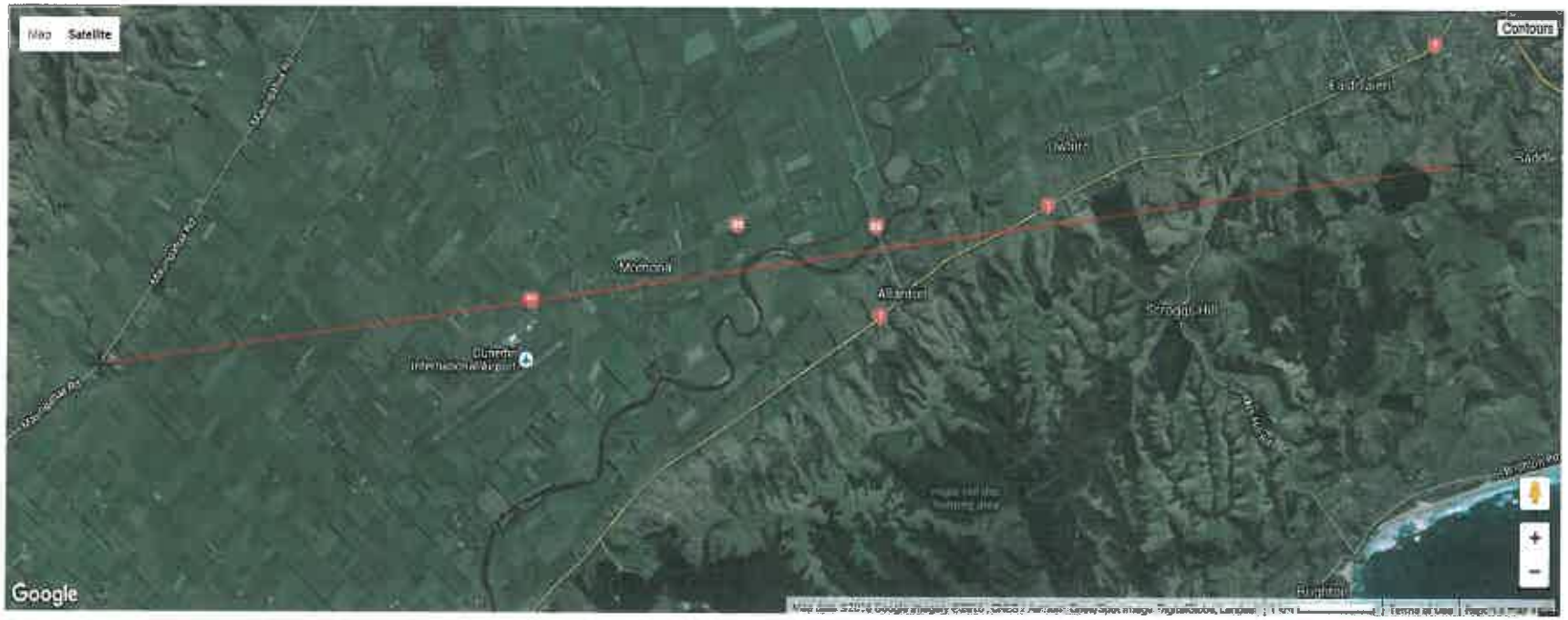
Parameter		Calculations		Comments
Maximum Allowable RF Power Flux Density	S	1000	µW/cm²	10 W/m² (NZS2772, Table 6) exposure limit
Antenna Gain, on primary axis	AG	38.00	dBi	relative to isotropic
Effective Radiated Power, Watts	eirp	1000	W	Total eirp (Watts) on Main Axis of Antenna
Effective Radiated Power, dBW	eirp	30.00	dBW	eirp (dB relative to 1W) = $10 * \log^{-1}$ (W)
Down Tilt, degrees below horizontal	DT	1.5	deg	
Height of Antenna above Ground	Ha	17.60	m	
Height of Sampling Point above Ground	Hs	1.50	m	Equivalent to head height
Distance to Sampling Point from tower base	D	2.00	m	Nearest public access in that direction from tower
Angle from Antenna axis to Sampling Point	A	82.87	deg	A = (Tan^{-1} (Ha - Hs) / D)
Slope Distance, Antenna to Sampling Point	SD	16.12	m	SD = sqrt($(Hs - Ha)^2 + D^2$)
Off Axis Antenna Gain at 81.34 degrees	Gd	5.50	dBi	E-Plane Offset Antenna Gain at (A - DT)
Off Axis Reduction of Antenna Gain	GRd	32.50	dB	Reduces eirp towards Sampling Point by this amount
Off Axis Reduction Antenna Gain, numeric	GRn	0.001		GR = 1/ ($\log^{-1}$ (Gd / 10))
Off Axis Effective Radiated Power, dBW	eirp S	-2.50	dBW	Power radiated towards Sampling Point
Off Axis Effective Radiated Power, Watts	PT	1	W	
Power Flux Density at Sampling Point	PD	**0.0308**	**µW/cm²**	PD = (PT * 0.08 / SD^2) * 100
located 2 metres from Tower Base	**equals**	**0.0031%**	**of allowable 1000µW/cm² limit**	

Berwick Substation Pathway Profile



Parameters

English Metric Decimal places (0-6) 0 DD.DDDDDD° DD° MM.MMMM' DD° MM' SS.SS"



Melissa Shipman

From: Joanne Dowd <Joanne.Dowd@thinkdelta.co.nz>
Sent: Tuesday, 3 May 2016 12:44 p.m.
To: Melissa Shipman
Subject: FW: LUC-2016-94 - Draft Notice

Hi Melissa,

The notice all seems in order.

I have confirmed the dimensions of the lightening arrestor. Our design engineer has confirmed that the arrestor can be lowered to 1m with the following dimensions: (500mm of tube 32mm outside diameter, and 500mm of rod 20mm diameter).

Regards

DELTA
THINK.INFRASTRUCTURE

JOANNE DOWD

NETWORK POLICY MANAGER

joanne.dowd@thinkdelta.co.nz

MOB 021610378

WEB THINKDELTA.CO.NZ

From: Alan Wallace [mailto:alan.wallace@tesla.co.nz]
Sent: Tuesday, 3 May 2016 10:37 a.m.
To: Joanne Dowd <Joanne.Dowd@thinkdelta.co.nz>
Cc: Reece Peters <reece.peters@tesla.co.nz>; Abdul Saboor <Abdul.Saboor@thinkdelta.co.nz>; Stuart Wright <Stuart@spunlite.co.nz>
Subject: RE: LUC-2016-94 - Draft Notice

Hi Joanne,

I have confirmed with Stuart of Spunlite that the 1metre lighting arrestor will be made up of 500mm of tube 32mm outside diameter, and 500mm of rod 20mm diameter.

Cheers
Alan

Alan Wallace
Principal Consultant

Tesla Consultants Limited | 1st Floor | 18 Von Tempsky St | PO Box 645 | Hamilton 3240
Ph + 64 7 834 6475 | Mob + 64 27 495 4006 | alan.wallace@tesla.co.nz | http://www.tesla.co.nz

From: Joanne Dowd [mailto:Joanne.Dowd@thinkdelta.co.nz]
Sent: Tuesday, 3 May 2016 10:26 AM
To: Alan Wallace
Cc: Reece Peters; Abdul Saboor
Subject: FW: LUC-2016-94 - Draft Notice

Hi Alan

Can you please confirm the diameter of the proposed lightening arrestor that will sit on top of the mast at Berwick.

Many thanks & regards

DELTA
THINK.INFRASTRUCTURE

JOANNE DOWD

NETWORK POLICY MANAGER

joanne.dowd@thinkdelta.co.nz

MOB 021610378

WEB THINKDELTA.CO.NZ

From: Melissa Shipman [mailto:Melissa.Shipman@dcc.govt.nz]
Sent: Tuesday, 3 May 2016 10:07 a.m.
To: Joanne Dowd <Joanne.Dowd@thinkdelta.co.nz>
Subject: LUC-2016-94 - Draft Notice

Joanne,

Please find attached a draft notice 'limited notified'. Could you let me know the lightning rod diameter – I realise it is exempt from the height definition but still helpful to know its width.

I'll be inserting the Berwick Substation Path Profile you provided in with the documentation to go with the notice.

Regards,

Melissa Shipman
Planner, City Planning
Dunedin City Council

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Email: melissa.shipman@dcc.govt.nz

DUNEDIN CITY