

- **An assessment of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.**

The total amount of earthworks associated with the establishment of the facility will not exceed 450m³. The following is an assessment of the NESCS.

Regulation	Compliance Assessment
<p><i>Regulation 8(3)(a) – Disturbing Soil</i></p> <p><i>(3)Disturbing the soil of the piece of land is a permitted activity while the following requirements are met:</i></p> <p><i>(a)controls to minimise the exposure of humans to mobilised contaminants must—</i></p> <ul style="list-style-type: none"> • <i>(i) be in place when the activity begins:</i> • <i>(ii) be effective while the activity is done:</i> • <i>(iii) be effective until the soil is reinstated to an erosion-resistant state:</i> 	<p>Controls to minimise exposure will be undertaken by Fortysouth before work commences.</p>
<p><i>Regulation 8(3)(b) – Disturbing Soil</i></p> <p>the soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done:</p>	<p>Complies</p>
<p><i>Regulation 8(3)(c) – Disturbing Soil</i></p> <p>the volume of the disturbance of the soil of the piece of land must be no more than 25 m³ per 500 m²:</p>	<p>Complies</p> <p>The area of the site is 240998m² as identified in the Certificate of Title.</p> <p>To be permitted under the NESCS the earthworks must not exceed 12,049.9m².</p>

	<p>The proposed earthworks for the foundations and trenches to connect power from the road to the lease area, will not exceed the permitted amount.</p>
<p><i>Regulation 8(3)(d) – Disturbing Soil</i></p> <p>soil must not be taken away in the course of the activity, except that,—</p> <ul style="list-style-type: none"> • (i) for the purpose of laboratory analysis, any amount of soil may be taken away as samples: • (ii) for all other purposes combined, a maximum of 5 m³ per 500 m² of soil may be taken away per year: 	<p>Complies</p> <p>The amount of soil taken off site will not exceed 96m³. Soil will be back filled in service trenches and any material beyond 96m³ limit will remain on site in an erosion proof state and away from any carpark or road area.</p> <p>Please note that the total earthworks associated with the facility will not be greater than approximately 450m³.</p>
<p><i>Regulation 8(3)(e) – Disturbing Soil</i></p> <p>soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:</p>	<p>Complies</p>
<p><i>Regulation 8(3)(f) – Disturbing Soil</i></p> <p>the duration of the activity must be no longer than 2 months:</p>	<p>Complies</p>
<p><i>Regulation 8(3)(g) – Disturbing Soil</i></p> <p>the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.</p>	<p>Complies</p>



31st July 2025

Far North District Council
Private Bag 752
KAIKOHE 0440

Attention: Team Leader Resource Consents

Dear Madam:

**RESOURCE MANAGEMENT ACT 1991 – CERTIFICATE OF COMPLIANCE APPLICATION
VODAFONE NEW ZEALAND LIMITED, INSTALLATION OF A TELECOMMUNICATIONS
FACILITY 42 TURNER STREET, KAE0 (FORTYSOUTH REFERENCE: N1KOT).**

Enclosed for your further action is a copy of the above application.

The documentation in support of the application is as follows:

1. A description of the activity for which the consent is sought;
2. An analysis of the National Environmental Standards for Telecommunications Facilities 2008;
3. An analysis of the provisions of the Plan, which are relevant to the application;
4. Plans and elevations; and
5. Associated specialist reports.

the appropriate deposit fee (\$1535) has been paid on lodgement. We look forward to hearing from you in respect of this matter.

Fortysouth

Colin Clune
(021) 0292 9905
colin.clune@fortysouth.co.nz

**APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88
OF THE RESOURCE MANAGEMENT ACT 1991**

TO: **Far North District Council**

One New Zealand applies for a resource consent as described below:

2. The general location and legal description covered by this application is Part Allotment 71 Parish of Kaeo NA15D/993, at the following location:
 - 42 Turner Street, Kaeo
2. The type of resource consent sought is a **Certificate of Compliance – National Environmental Standards for Telecommunication Facilities 2016**
3. A description of the activity to which the application relates is:

The establishment and operation of a 25m telecommunications facility, at 42 Turner Street, Kaeo

The activity is more fully described in the attached annexure.

4. There are no additional resource consents required in relation to the proposed activity.
5. The attached annexure forms part of this application and provides a full description of any effects on the environment in accordance with the Fourth Schedule to the Resource Management Act 1991.
6. No other information is required by the District Plan or regulations.

Address for service of applicant:

Colin Clune
Fortysouth
Level 1, AA Building
46 Sale Steet
AUCKLAND 1142
Mobile: 021 0292 9905
colin.clune@fortysouth.co.nz

.....
Colin Clune on behalf of One New Zealand

Date:

Annexure: A description of the proposed activity in accordance with the Fourth Schedule to the Act.

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1. Introduction

BACKGROUND

- 1.1 Aotearoa Towers Group (ATG) trading as Fortysouth is undertaking a project to modernise their network throughout Auckland City. As part of the project, existing telecommunications facilities require the upgrade of antennas and in some instances, the establishment of new telecommunication facilities.
- 1.2 This application pertains to the establishment of a new standalone telecommunication facility. Required for network modernisation and resilience.

NATIONAL ENVIRONMENTAL STANDARDS

- 1.3 The National Environmental Standards 2016 (NESTF) for telecommunication facilities came into force on the 1st of January 2017. These regulations substitute the previous NESTF 2008 and existing District Plan rules for telecommunications structures in the road reserve. Activities that do not qualify as regulated activities, under the regulations of the NESTF, are to be assessed through the relevant District Plan under the Resource Management Act 1991.
- 1.4 This report contains the following information:
 - i. A description of the proposed activity
 - ii. A description of the site and surrounding locality
 - iii. An analysis of the provisions of the Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2016 which are relevant to the application
 - iv. An analysis of the provisions of the District Plan that are relevant to the application.

SALE BY VODAFONE NEW ZEALAND LIMITED OF MOBILE TOWER INFRASTRUCTURE TO AOTEAROA TOWERS GROUP LP

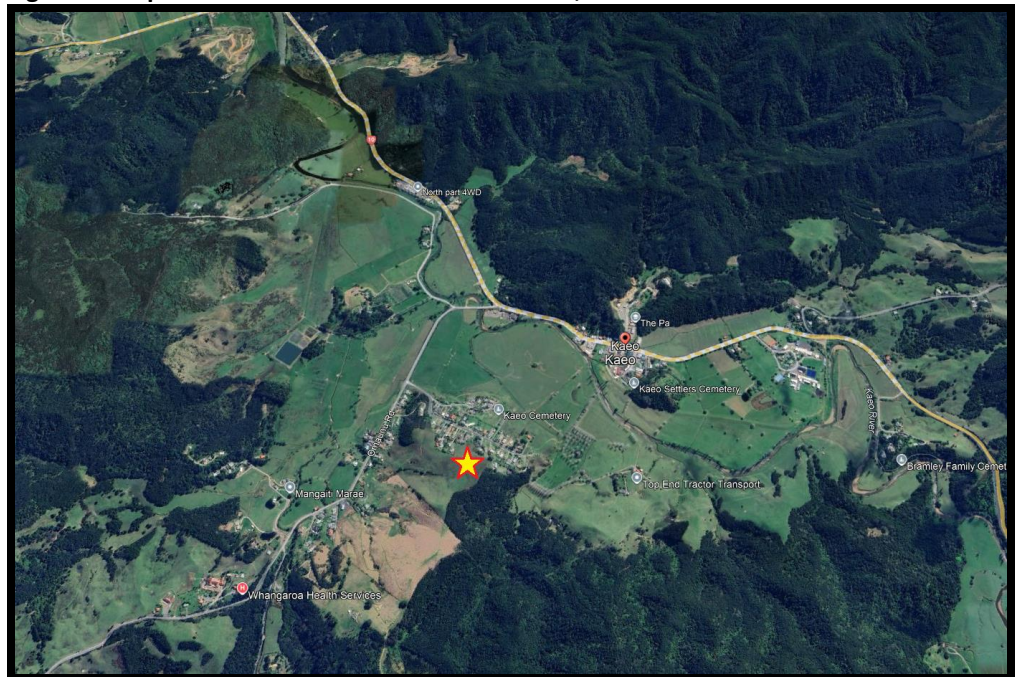
- 1.5 Vodafone (rebranded to One NZ on 1 April 2023) sold its passive mobile tower infrastructure business to Aotearoa Towers Group (ATG), trading as Fortysouth, an entity owned by funds managed by leading global investors

InfraRed Capital Partners and Northleaf Capital Partners. The creation of ATG follows the establishment of numerous passive mobile tower infrastructure businesses or tower companies that have been seen around the world. One NZ is upgrading its infrastructure on this ATG asset.

2. Site and Location

- 2.1 The subject site is located at 42 Turner Street, Kaeo. The property is rural farmland, consisting of open plan held in pasture. The section of land is undulating, with elevated hilltops. The site is characterised by rolling hills with sections native bush and scrub on the eastern side of the property. Access to the proposed facility will be provided off Turner Street.
- 2.2 The surrounding land use is rural in nature, consisting of grassed paddocks with areas of native bush. The town of Kaeo zoned residential is located surrounding Turner street, located approximately 150m further to the north. Greater surrounding land uses include the township of Kaeo located approximately 860m to the northeast. Whangaroa Harbour is located approximately 4km further to the northwest.

Figure 1: Proposed Pole Location – 42 Turner Street, Kaeo



3. The Proposal

- 3.1 The proposed facility will provide an important component of the One NZ Network. Maintaining resilient mobile coverage and increase coverage for mobile telephone users throughout the surrounding area of Kaeo.
- 3.2 Details of the specific changes for the sites are summarised in the following table and demonstrated in the application drawings within **Appendix 2**.

Table 1 Proposed Works	
Site	Proposal
Kaeo Township (N1KOT): 42 Turner Street, Kaeo.	<ul style="list-style-type: none"> • The establishment of a standalone monopole measuring 25m in height and 1.2mØ diameter at the base. • One antenna headframe measuring 4.5m width will be attached to a max height of 25m. • The headframe will have 18 panel antennas attached and remote radio head units (RRH's) considered ancillary equipment. • The establishment of a new telecommunications equipment cabinet, measuring approximately 2.0m height (measured from the concrete plinth), 3.85m length and 0.80m depth. Covering a total area of 3.08m². The whole cabinet array will be finished in a recessive grey shade. • The establishment of a security fence and gate around the compound of the facility. • Attachment of a GPS antenna to side of the pole.

4. National Environmental Standards for Telecommunication Facilities 2016

- 4.1 An assessment of the proposal against the relevant provisions of the National Environmental Standards for Telecommunication Facilities 2016 (NESTF) is attached as **Appendix 3**.
- 4.2 This NESTF assessment has demonstrated that the proposed telecommunication facility is a permitted activity complying with the following Subparts of the NESTF 2016.
- Subpart 5 – Application of District & Regional Rules
 - Subpart 7 – Radiofrequency Regulations
 - Subpart 1 – Cabinets
 - Subpart 2 – Antennas
 - Subpart 6 – Earthworks
- 4.3 The proposed telecommunication facility will be a permitted activity, complying with the NESTF Regulations.

5. Timing of the Activity

- 5.1 Section 125 of the Act provides for resource consents to be valid for the timeframe specified on the consent or, if no timeframe is specified, for five years. In this instance, we are seeking a time period of 5 years to give effect to the resource consent. Whilst it is anticipated that the facility will be installed in a relatively short time frame, the programmed rollout of mobile phone technology is subject to change in response to a number of company exigencies.

6. Conclusion

- 6.1 Based on the above assessment we consider that the proposal complies with the regulations and conditions of NESTF. The proposal can be considered as a Permitted Activity and therefore the Council can issue a Certificate of Compliance in accordance with section 139 of the Resource Management Act 1991.

Appendix 1

Certificate of Title

Appendix 2

Application Drawings

Appendix 3

NESTF Assessment

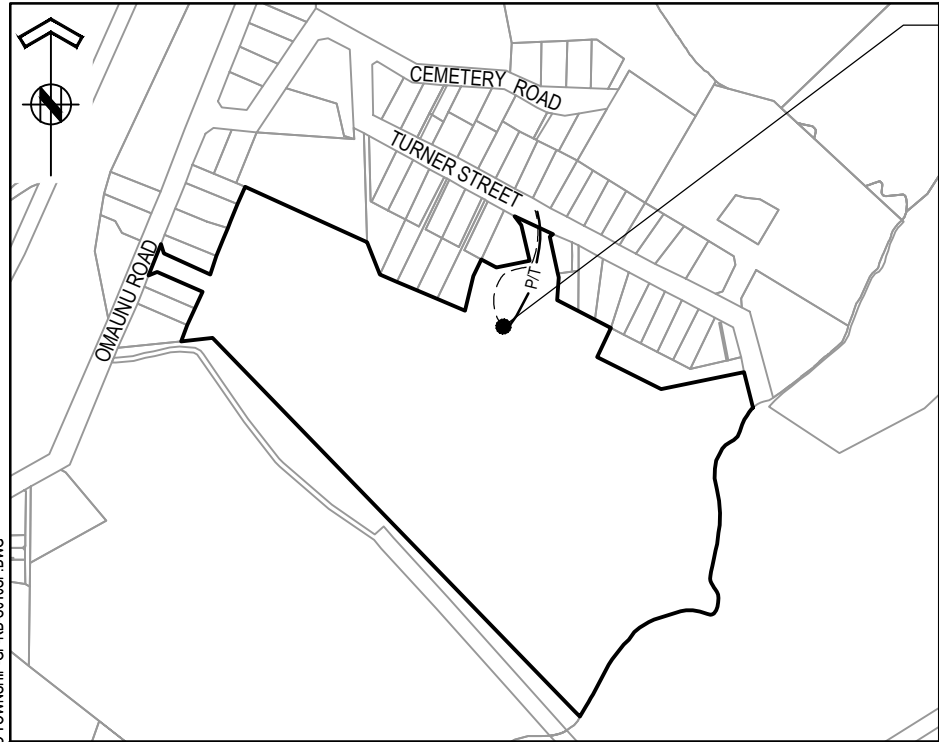
Appendix 4

Radiofrequency Statement of Compliance

Appendix 5

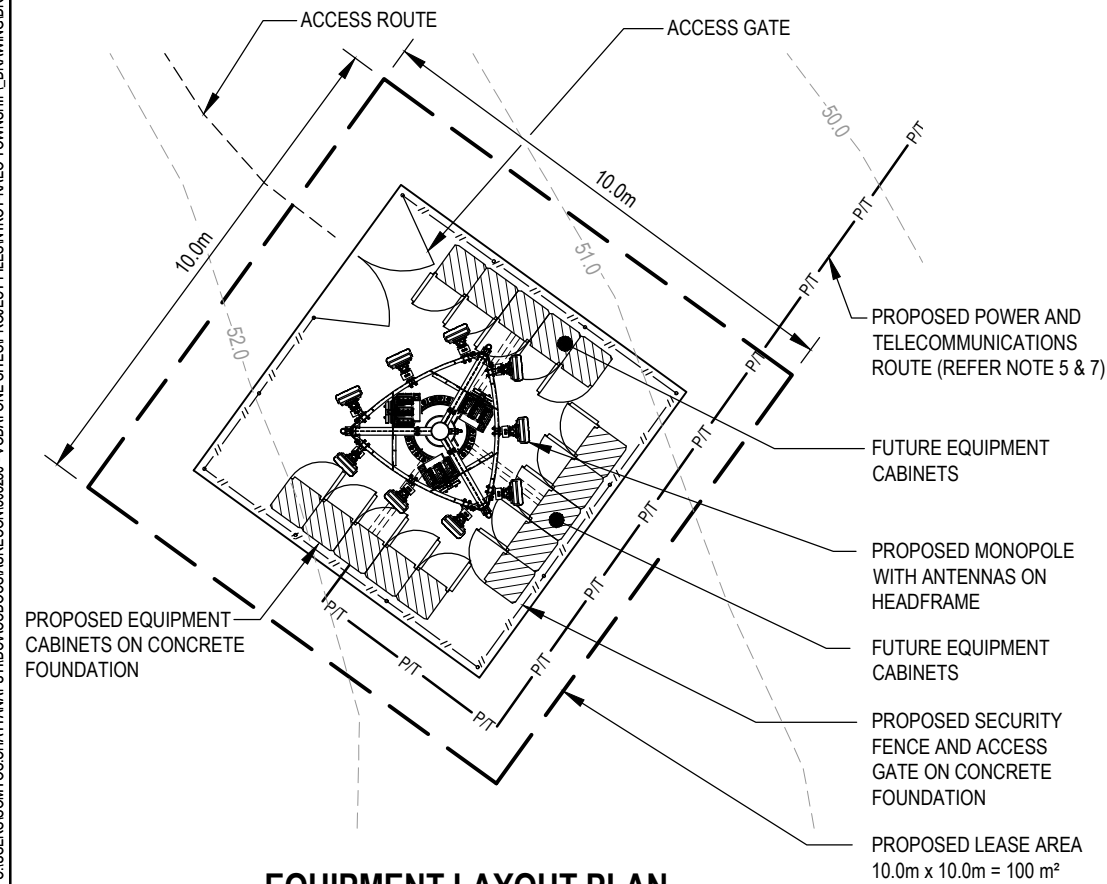
Cabinet Acoustic Report

Filename: C:\USERS\SOMYOSCHATTANAPUTIDACC\CSAURECON\509280 - VODAFONE SITES\PROJECT FILES\N1KOT-KAEO TOWNSHIP_DRAWING\DRG\N1KOT-KAEO TOWNSHIP_SF-RD-S010SP.DWG
Office: THBK
Plot Date: 23/7/2025 1:57:35 PM



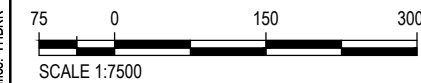
LOCALITY MAP

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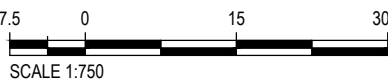


EQUIPMENT LAYOUT PLAN

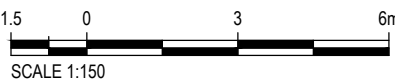
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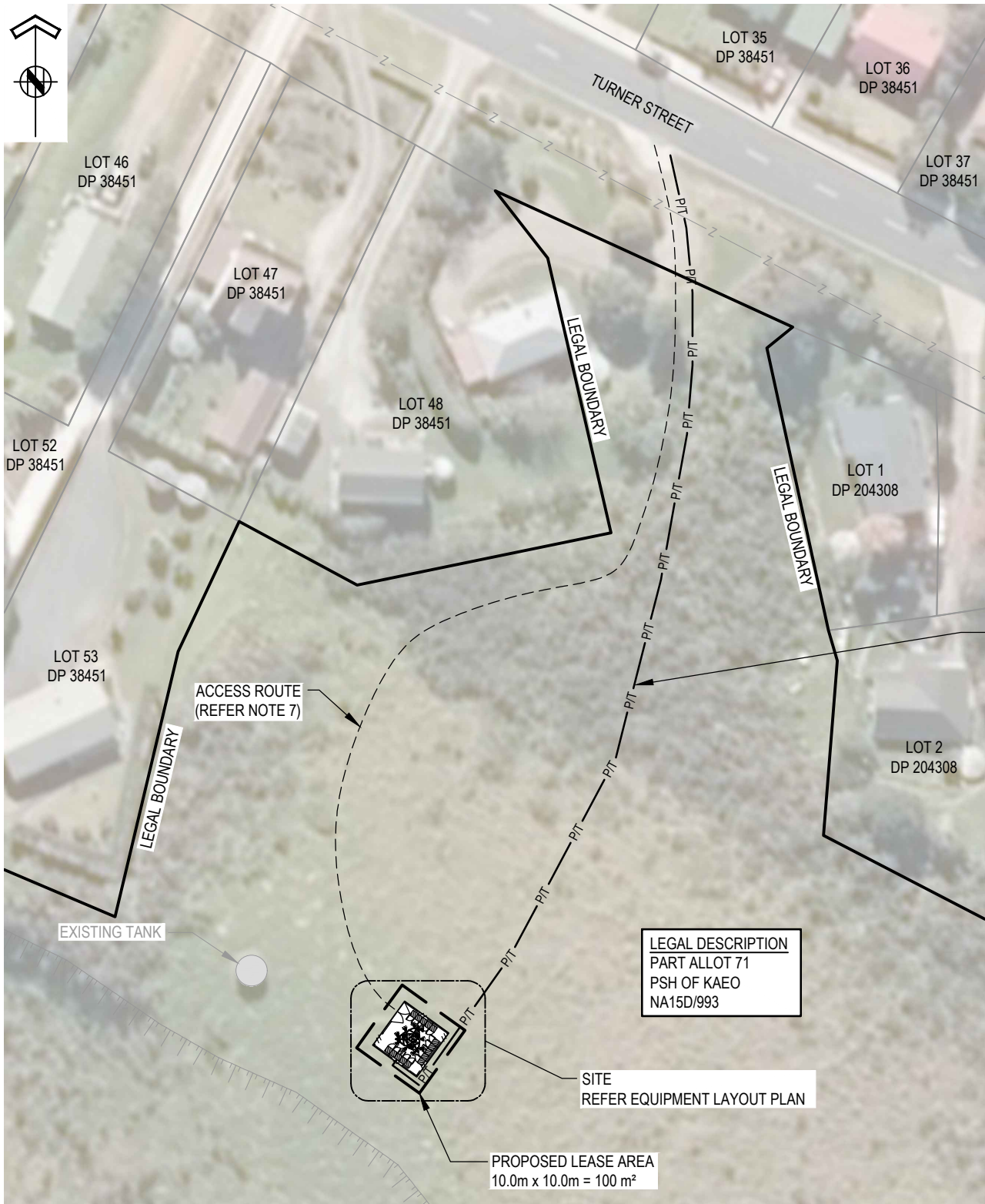


SCALE 1:750



SCALE 1:150

SITE
PART ALLOT 71
PSH OF KAEO
NA15D/993
N: 6677016 (NZMG)
E: 2581348 (NZMG)



SITE LAYOUT PLAN

1: 750

IMAGE : SOURCE FROM THE LINZ DATA SERVICE

NOTES :

- ACCESS TO SITE FROM TURNER STREET AS SHOWN.
- THE NORTH POINT IS INDICATIVE ONLY.
BOUNDARIES, BEARINGS AND DISTANCES SHOWN ARE APPROXIMATE AND SUBJECT TO SURVEY.
LEVELS GIVEN ARE FROM GROUND LEVEL AND ARE APPROXIMATE ONLY.
- ALL EXISTING SURFACES AND FEATURES SHALL BE FULLY REINSTATED TO THEIR ORIGINAL CONDITION.
- EXISTING SERVICES INFORMATION HAS BEEN OBTAINED AND PLOTTED FROM LOCAL AUTHORITY AND SERVICE PROVIDERS RECORDS. WHILE EVERY ENDEAVOUR HAS BEEN MADE TO INDICATE ALL KNOWN SERVICES ON PLANS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES IN THE VICINITY OF THE SITE. THESE SERVICES HAVE NOT BEEN CONFIRMED ON SITE. ANY DAMAGE TO EXISTING SERVICES SHALL BE MADE GOOD AT THE CONTRACTOR'S EXPENSE.
- ROUTE TO BE CONFIRMED FOR POWER AND TELECOMMUNICATION ROUTE.
- REFER TO FORTYSOUTH STANDARD SIGNS AS REQUIRED.
- THE WIDTH OF PROPOSED POWER, TELECOMMUNICATION AND ACCESS ROUTES SHOULD BE 3m WIDE.

PROPOSED POWER AND TELECOMMUNICATIONS ROUTE (REFER NOTE 5 & 7)

LEGEND

— P —	POWER
— P/T —	POWER AND TELECOMMUNICATIONS
— T —	TELECOMMUNICATIONS
— T —	TELECOMMUNICATION - CHORUS
— G —	GAS
— W —	WATER
— E-UG —	POWER - UNDER GROUND
— Z —	POWER - OVERHEAD
— FO —	FIBRE OPTIC
— SW —	STORMWATER
— S —	SEWER
— D —	DRAINAGE
— F —	FENCE
— A —	ACCESS ROUTE
— L —	LEGAL BOUNDARY
— M —	MANHOLE



1	ISSUE FOR INFORMATION	SC	23.07.25		
REF	REVISION DETAILS	BY	DATE		

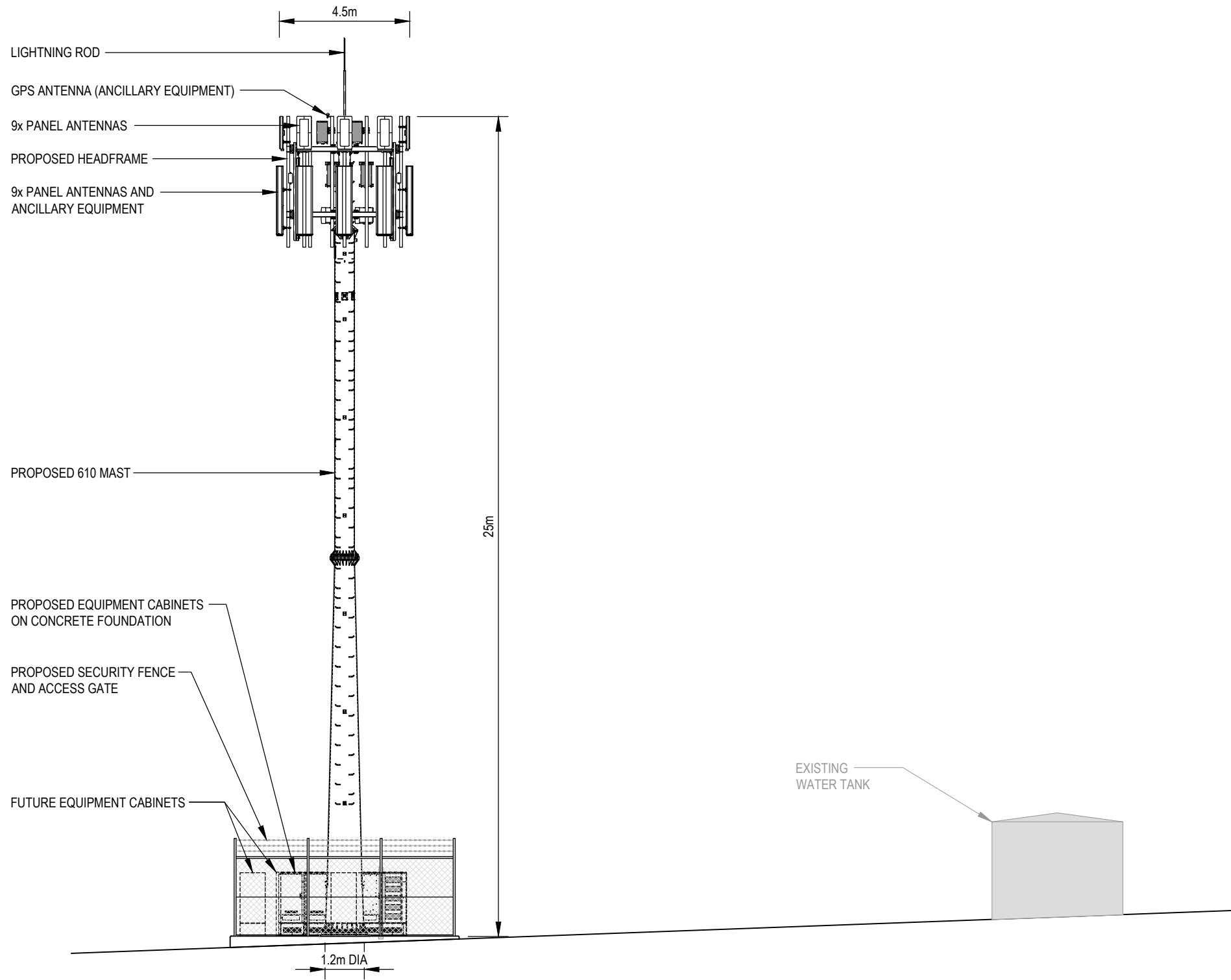
Drawn	SB	Date	25.11.24		
Designed	SB	Date	25.11.24		
Checked	DB	Date	25.11.24		
Approved	DB	Date	25.11.24		
Checked		Date			
Approved		Date			

Project:	
KAEO TOWNSHIP (N1KOT)	
42 TURNER STREET	
KAEO	

Drawing Title:	
EQUIPMENT LAYOUT PLAN	
CONFIDENTIAL DO NOT COPY	A person using Fortysouth drawings and other data accepts the risk of: 1. Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions 2. Using the drawings or other data for any purpose not agreed to in writing by Fortysouth

Status	PLANNING
Site Code	N1KOT
Scale	AS SHOWN
Site Type	GREENFIELD
Drawing No.	S-010-LP
Rev.	1

Filename: C:\USERS\SOMYOS.CHATTANAPUTIDACCDOCS\AURECON\508280 - VODAFONE SITES\PROJECT FILES\N1KOT-KAEO TOWNSHIP_DRAWING\DRG\N1KOT-KAEO TOWNSHIP-GF-RD-S011SE.DWG
Office: THBK
Plot Date: 23/7/2024 2:09:42 PM

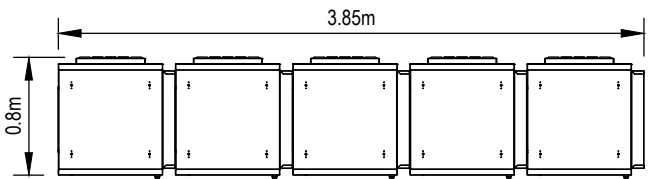


PROPOSED NORTH EAST ELEVATION

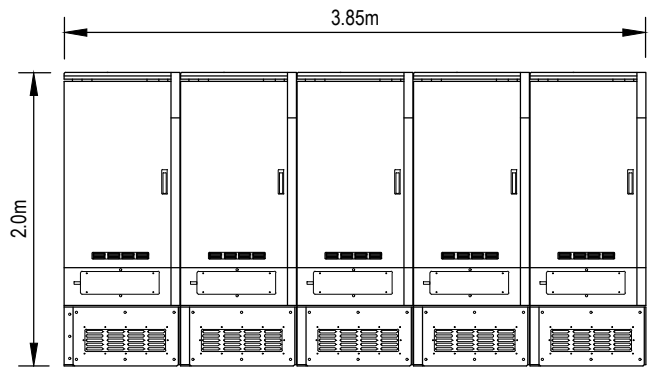
1: 150

NOTES :

1. REFER NOTES IN S-010-SP.
2. ANTENNA HEIGHTS ARE MEASURED FROM GROUND LEVEL.
3. ANTENNAS TO BE ACCESSIBLE VIA CLIMBING RUNGS.



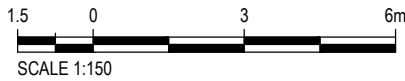
PLAN



ELEVATION

EQUIPMENT CABINET DETAILS

1:50



1	ISSUE FOR INFORMATION	SC	23.07.25		
REF	REVISION DETAILS	BY	DATE		

Consultant	Drawn	SB	Date	25.11.24
	Designed	SB	Date	25.11.24
	Checked	DB	Date	25.11.24
	Approved	DB	Date	25.11.24
	Checked		Date	
Client	Approved		Date	

Project:	KAEO TOWNSHIP (N1KOT) 42 TURNER STREET KAEO
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Drawing Title:	
ELEVATION	
CONFIDENTIAL DO NOT COPY	A person using Fortysouth drawings and other data accepts the risk of:
	1. Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions
	2. Using the drawings or other data for any purpose not agreed to in writing by Fortysouth



RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy




R.W. Muir
Registrar-General
of Land

Identifier **NA15D/993** **Part-Cancelled**

Land Registration District **North Auckland**

Date Issued 02 December 1968

Prior References

NA12B/1005

Estate	Fee Simple
Area	24.0998 hectares more or less
Legal Description	Lot 1 Deposited Plan 44741 and Lot 70 Deposited Plan 38451 and Part Lot 71 Deposited Plan 38451

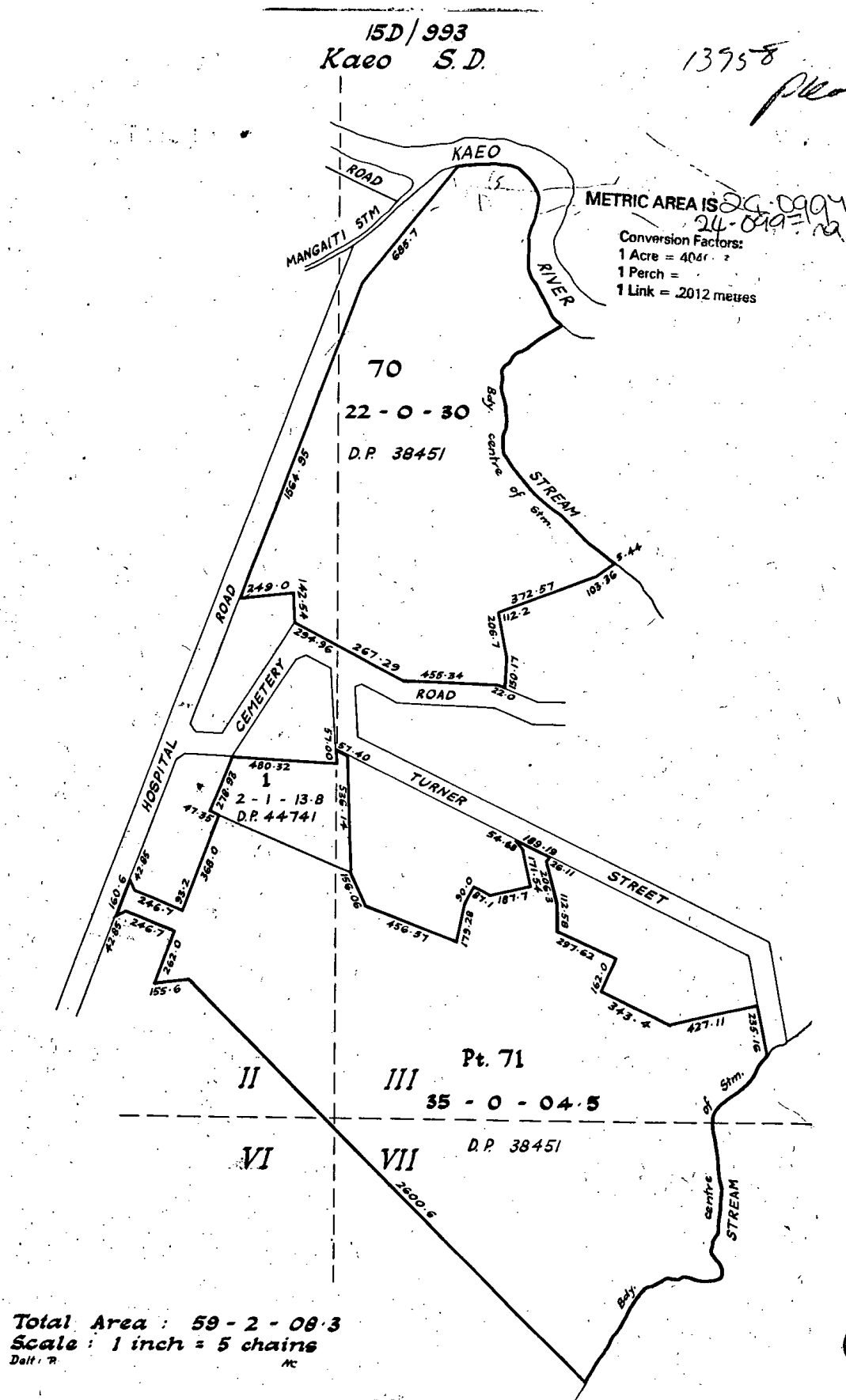
Registered Owners

Te Taha Maori Property Trust

Interests

K60304 Building Line Restriction (affects part Lot 71 DP 38451)

C503242.1 Gazette Notice (N.Z. Gazette 22.7.1993 No 110 p 2096) declaring parts of the within land (2454m²) to be road and parts of the adjoining river (272m²) to be road and vesting in The Far North District Council and further declaring part herein (2170m²) to be taken and vested in The Far North District Council - 2.8.1993 at 12.00 pm



1. National Environmental Standards for Telecommunication Facilities 2016

- 1.1 The proposed facility is subject to the provisions of the National Environmental Standards for Telecommunication Facilities 2016 (NESTF). The NESTF regulations provide for the development of different telecommunication facilities, both within and outside the road reserve.

The NESTF regulations applying to this application have been assessed in a sequential order, applicable to the activity, land use, radio frequency and development as follows:

- Subpart 5 – Application of District & Regional Rules
- Subpart 7 – Radiofrequency Regulations
- Subpart 1 – Cabinets
- Subpart 2 – Antennas
- Subpart 6 – Earthworks

Subpart 5 – Application of District & Regional Rules

- 1.2 Subpart 5 of the NESTF requires that all regulated telecommunication facilities comply with specific district wide controls for land use and with Regional Rules of relevance. The following provides an assessment of the proposed telecommunications facility upgrade in context with the applicable District & Regional Plan Rules.

Subpart 5 – Application of District and Regional Rules

Regulation 44: Trees and Vegetation in the Road Reserve

Conditions

(1) This regulation applies to a regulated activity if—

(a) the activity is carried out at a place that is in a road reserve and within the drip line of a tree or other vegetation; and

(b) In the absence of these regulations, the relevant district plan or proposed district plan would require the facility operator to obtain a resource consent for the regulated activity.

(2) This regulation is complied with if the regulated activity is carried out in accordance with the district rules about the protection of trees and other vegetation that apply at that place.

Site Location

42 Turner Street, Kaeo

Comments

The existing pole is not located in the road reserve.

N/A

Subpart 5 – Application of District and Regional Rules

Regulation 45: Protection of Significant Trees

Conditions

(1) This regulation applies to a regulated activity if the activity is carried out at a place that—

(a) is not in a road reserve; and

(b) is within the dripline of a tree that is, or is in a group of trees that are, identified in the relevant district plan or proposed district plan as being subject to the tree protection rules.

(2) This regulation is complied with if the regulated activity is carried out in accordance with the tree protection rules that apply in relation to that tree.

In this regulation, **tree protection rules** means the district rules about the protection of trees that are identified in that plan as being of special significance.

Site Location	Comments
42 Turner Street, Kaeo	The existing pole is not located within the dripline of any tree.
	N/A

Subpart 5 – Application of District and Regional Rules

Regulation 46: Historic heritage values

Conditions

(1) This regulation applies to a regulated activity if it is carried out at a place identified in a district plan or proposed district plan as being subject to the historic heritage rules.

(2) This regulation is complied with if the regulated activity is carried out in accordance with the historic heritage rules that apply to that place.

(3) In this regulation, historic heritage rules means the district rules about the protection of historic heritage values .

Site Location	Comments
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42 Turner Street, Kaeo	<p>The proposed site location is not located within any listed or identified heritage place, item, site surround or extent of place setting.</p> <p>Complies</p>
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Subpart 5 – Application of District and Regional Rules	
Regulation 47: Visual amenity landscapes	
Conditions	
<p><i>(1) This regulation applies to a regulated activity if it is carried out at a place identified in the relevant district plan or proposed district plan as being subject to visual amenity landscape rules.</i></p> <p><i>(2) This regulation is complied with if the regulated activity is carried out in accordance with the visual amenity landscapes rules that apply to that place.</i></p> <p><i>(3) In this regulation, visual amenity landscapes rules means district rules about the protection of landscape features (such as view shafts or ridge lines) identified as having special visual amenity values.</i></p>	
Site Location	Comments
42 Turner Street, Kaeo	<p>The subject site is not located within any identified visual amenity landscape overlay or feature.</p> <p>Complies</p>

Subpart 5 – Application of District and Regional Rules	
Regulation 48: Significant habitats for indigenous vegetation	

Conditions	
<p><u>(1) This regulation applies to a regulated activity if it is carried out at a place identified in the relevant district plan or proposed district plan as being subject to the significant vegetation rules.</u></p> <p><i>(2) This regulation is complied with if the regulated activity is carried out in accordance with the significant vegetation rules that apply at that place.</i></p> <p><i>(3) In this regulation, significant vegetation rules means the district rules about the protection of significant habitats for indigenous vegetation (however described).</i></p>	
Site Location	Comments
42 Turner Street, Kaeo	<p>The proposed facility will not be located within any listed place or overlay. Identified as being subject to any vegetation (significant vegetation or otherwise) overlay or rules in the District Plan.</p> <p>Complies</p>

Subpart 5 – Application of District and Regional Rules	
Regulation 49: Significant habitats for indigenous fauna	
Conditions	
<p><u>(1) This regulation applies to a regulated activity if it is carried out at a place identified in the relevant district plan or proposed district plan as being subject to the significant fauna rules.</u></p> <p><i>(2) This regulation is complied with if the regulated activity is carried out in accordance with the significant fauna rules that apply to that place.</i></p>	

<i>(3) In this regulation, significant fauna rules means district rules about the protection of significant habitats for indigenous fauna (however described).</i>	
Site Location	Comments
42 Turner Street, Kaeo	The proposed site location is not located within any listed place or overlay. Identified as being subject to District Plan rules/overlays for the protection of significant habitats for indigenous fauna.
	Complies

Subpart 5 – Application of District and Regional Rules	
Regulation 50: Outstanding natural features or landscapes	
Conditions	
<i><u>(1) This regulation applies to a regulated activity if it is carried out at a place identified in the relevant district plan or proposed district plan as being subject to the outstanding natural places rules.</u></i>	
<i>(2) This regulation is complied with if the regulated activity is carried out in accordance with the outstanding natural features or landscape rules that apply to that place.</i>	
<i>(3) In this regulation, outstanding natural features or landscapes rules means the district rules about the protection of outstanding natural features or landscapes (however described).</i>	
Site Location	Comments
42 Turner Street, Kaeo	The proposed site location is not located within any Outstanding Natural Landscape Overlay.
	Complies

Subpart 5 – Application of District and Regional Rules

Regulation 51: Places adjoining coastal marine area

Conditions

- (1) ***This regulation applies to a regulated activity if it is carried out at a place identified in the relevant district plan or proposed district plan as being subject to coastal protection rules.***
- (2) *This regulation is complied with if the regulated activity is carried out in accordance with the coastal protection rules that apply at that place.*
- (3) *In this regulation, **coastal protection rules** means district rules that regulate the carrying out of activities in places adjoining the coastal marine area for the purpose of protecting the coastal marine area.*

Site Location	Comments
42 Turner Street, Kaeo	The proposed site is not located adjoining the coastal marine area or within any coastal protection setback or margin.
	Complies

Subpart 5 – Application of District and Regional Rules

Regulation 52: Rivers and lakes

Conditions

- (1) *This regulation applies to a regulated activity if it is carried out over a river or lake (as referred to in regulation 8(2)).*
- (2) *This regulation is complied with if the regulated activity is carried out in accordance with the applicable regional rules about carrying out that activity over the river or lake.*

Site Location	Comments
42 Turner Street, Kaeo	The proposed site is not located adjoining any river or lake.
	Complies

- 1.3 An assessment of the NESTF Subpart 5 Regulations above has shown that the proposed replacement pole is a regulated activity, complying with all applicable District Plan overlays.

Subpart 7 - Radiofrequency Fields

- 1.4 Subpart 7 of the NESTF provides the permitted standards for radiofrequency emissions, where the activity complies with the following conditions.

Subpart 7 - Radiofrequency fields
Conditions
<p><u>(1) This Regulation applies to an RFG facility.</u></p> <p><u>(2) This regulation is complied with if—</u></p> <p><u>(a) The facility must be installed and operated in accordance with NZS 2772.1;and</u></p> <p><u>(b) Before the facility becomes operational, the facility operator gives the local authority-</u></p> <p><u>(i) Written notice of the facility's location; and</u></p> <p><u>(ii) A pre-commencement report that complies with subclause (3); and</u></p>

(c) either —

- (i) The facility operator gives the local authority a post-commencement report that complies with subclause (4) within 3 months after the facility becomes operational; or
- (ii) Under subclause (5), the facility operator is not required to give a post-commencement report.

(3) A pre-commencement report must—

- (a) be prepared in accordance with AS/NZS 2772.2; and
- (b) take into account exposures arising from other telecommunication facilities in the vicinity of the facility; and
- (c) predict whether the radiofrequency field levels at places in the vicinity of the facility that are reasonably accessible to the general public will comply with NZS 2772.1.

(4) A post-commencement report must—

- (a) be prepared in accordance with AS/NZS 2772.2; and
- (b) provide evidence that the actual radiofrequency field levels at places in the vicinity of the facility that are reasonably accessible to the general public comply with NZS 2772.1.

(5) The facility operator is not required to give a post-commencement report if the prediction referred to in subclause (3)(c) was that the radiofrequency field levels will not reach 25% of the maximum level authorised by NZS 2772.1 for exposure of the general public.

(6) In this regulation, —

AS/NZS 2772.2 means AS/NZS 2772.2:2016 Radiofrequency fields - Part 2:
Principles and methods of measurement and computation - 3 kHz to 300 GHz

NZS 2772.1 means NZS 2772.1:1999 Radiofrequency fields - Maximum exposure levels - 3 kHz to 300 GHz.

Site Location	Comments
---------------	----------

42 Turner Street, Kaeo	<p>The bottom of the proposed panel antennas will be approx. 21m above ground level, clear of any area reasonable accessible by the general public. Therefore, NZS 2772.1 will not be exceeded at any point.</p> <p>Radio frequency exposures arising from all other telecommunication facilities in the immediate vicinity, have been taken into consideration in calculating the Radiofrequency statement of compliance reports.</p> <p>The radiofrequency field levels are not predicted to reach 25% of the maximum levels authorised by NZS 2772.2 at a point where the public can reasonably gain access.</p> <p>Confirmation of compliance with the radiofrequency standards are detailed in the Radiofrequency statement of compliance report, provided by One NZ's Radio Engineer. The statement of compliance report is attached as Appendix 3 of this report.</p> <p>Complies</p>
------------------------	--

Subpart 1 – Cabinets

- 1.5 Subpart 1 of the NESTF provides for telecommunications cabinets as a permitted activity, where the cabinets comply with the following conditions.

Subpart 1 Cabinets
Regulation 19: Regulated activity and standard
Conditions
<i>(1) The installation and operation of a cabinet by a facility operator is a regulated activity.</i>

(2) The standard for the activity is that -

(a) Regulation 20 or 21, as applicable, must be complied with; and

(b) If the cabinet is in a road reserve, -

(i) Regulation 22 must be complied with (subject to regulation 23); and

(ii) Regulation 24 must be complied with; and

(c) If the cabinet is not in a road reserve, regulation 25 must be complied with; and

(d) Each regulation in subpart 5, if it applies, must be complied with; and

(e) If the activity includes earthworks, regulation 54 must be complied with; and

(f) If the cabinet is an RFG facility, regulation 55 must be complied with

Site Location	Comments
42 Turner Street, Kaeo	The proposed cabinet will be located outside the road reserve, on private property at 42 Turner Street, Kaeo. Regulation 25, 54 and 55 are assessed further in this report.

Subpart 1 Cabinets

Regulation 20: Cabinet not servicing antenna on building

Conditions

(1) This regulation applies to any cabinet other than one to which regulation 21 applies.

(2) This regulation is complied with if –

*(a) **The height, footprint, and grouping rules in subclause (3) are complied with; and***

(b) One of the following applies:

(i) The cabinet's equipment does not require power;

(ii) Power for the cabinet's equipment is provided by a self-contained power unit;

*(iii) **The power supply for the cabinet's equipment is connected under the ground or inside the cabinet.***

*(3) The **height, footprint, and grouping rules** are as follows:*

(a) If the cabinet is in a road reserve that is in, or adjoins, a residential zone, -

(i) The height of the cabinet must not be more than 1.8m; and

(ii) The footprint of the cabinet must not be more than 1.4m²; and

(iii) The group rules in regulation 22 must be complied with (subject to regulation 23):

(b) If the cabinet is in any other road reserve -

(i) The height of the cabinet must not be more than 2m; and

(ii) The footprint of the cabinet must not be more than 2m²; and

(iii) The group rules in regulation 22 must be complied with (subject to regulation 23):

(c) If the cabinet is not in a road reserve and is in a residential zone, -

(i) The height of the cabinet must not be more than 2m; and

(ii) *The footprint of the cabinet must not be more than 2m²;*

(d) *If the cabinet is not in a road reserve and is not in a residential zone, -*

(i) *The height of the cabinet must not be more than 2.5m; and*

(ii) *The footprint of the cabinet must not be more than 5m².*

*(4) In this regulation, part of a road reserve **adjoins** a residential zone if that part of the road reserve adjoins, and is on the same side of the road as, land that is in a residential zone.*

Site Location	Comments
42 Turner Street, Kaeo	The proposed cabinet is located outside the road reserve on land zoned rural production. The proposed cabinet model measures approximately 2.0m height and covers a total area of 3.08m ² (3.85m length and 0.80m depth = 3.08m ²). The cabinet will be finished in a recessive grey tone Complies

Subpart 1 Cabinets

Regulation 25: Noise limits for cabinet not in road reserve

Conditions

(1) This regulation applies to a cabinet not located in a road reserve.

(2) This regulation is complied with if the cabinet is installed and operated in accordance with the district rules about noise from a facility at the place where the cabinet is located.

Site Location	Comments
---------------	----------

<p>42 Turner Street, Kaeo</p>	<p>The subject site is located on land zoned Rural Production in the Operative and Proposed District Plans.</p> <p>The proposed cabinet is located approximately 40m from the nearest property boundary (34A Turner Street).</p> <p>The proposed cabinet is a FCOA - greenfield model cabinet. At a distance of 12m the proposed cabinet will emit a maximum of 46dBA during the day and 39dBA at night (page 10 of the FCOA Marshall Day acoustic report).</p> <p>The cabinet will therefore comply with the noise levels listed in Noise S1 of the Proposed District Plan.</p>
-------------------------------	--

	NOISE-S1	Maximum noise levels - zone specific
	General Residential zone Rural Residential zone Kororāreka Russell Township zone Hospital zone	<p>Noise generated by any activity shall not exceed the following noise limits at any point within any other site in the General Residential, Kororāreka Russell Township zone or Rural Residential zone:</p> <p>a. 7.00am to 10.00pm - 50 dB L_{Aeq} (15min); b. 10.00pm to 7.00am - 40 dB L_{Aeq} (15 min); and c. 10.00pm to 7.00am - 70 dB L_{AFmax}.</p>
	Rural Production zone Rural Lifestyle zone Māori Purpose zone Horticulture zone Moturoa Island zone Kauri Cliffs zone Ngawha Innovation and Enterprise Park zone	<p>Noise generated by any activity shall not exceed the following limits within the notional boundary of any noise sensitive activity in the Rural Production, Rural Lifestyle or Māori Purpose zones:</p> <p>a. 7.00am to 10.00pm - 55 dB L_{Aeq} (15min); b. 10.00pm to 7.00am - 40 dB L_{Aeq} (15 min); and c. 10.00pm to 7.00am - 70 dB L_{AFmax}.</p>
	Complies.	

Subpart 2 – Antennas

- 1.6 Subpart 2 of the NESTF provides for the replacement of antennas on existing poles outside the road reserve as a permitted activity, where the facility can comply with the following conditions.

Subpart 2 Antennas - Antennas on new poles not in road reserve and in rural zone

Regulation 34: Regulated activity and standard

Conditions

34 Regulated activity and standard

- (1) *The installation and operation of an antenna (**antenna E**) by a facility operator is a regulated activity if, —*
- (a) *before work to install antenna E begins, a pole (**pole E**) is to be erected—*
- (i) *at a location that—*
- (A) **is not in a road reserve; and**
- (B) **is in a rural zone; and**
- (ii) **for the purpose of installing antenna E (whether alone or with 1 or more other antennas) on pole E; and**
- (b) **the new pole is not a replacement for an existing pole.**
- (2) *The standard for the activity is that—*
- (a) **regulation [35](#) must be complied with; and**
- (b) *each regulation in subpart [5](#), if it applies, must be complied with; and*
- (c) *if the activity includes earthworks, regulations [53](#) and [54](#) must be complied with; and*
- (d) *if the antenna is an RFG facility, regulation [55](#) must be complied with.*

Site Location

42 Turner Street, Kaeo

Comments

The proposed site is located outside the road reserve on land zoned rural and will have more than one antenna attached.

Subpart 5 and Regulation 55 has been assessed. Regulation 53 and 54 are assessed further in this report.

	Complies
--	----------

Subpart 2 Antennas - Antennas on a existing pole in road reserve

Regulation 35: Antenna on a new pole not in road reserve and in a rural zone

Conditions

- (1) This regulation applies to the regulated activity described in regulation 34.*
- (2) This regulation is complied with if, at the time antenna E is installed, —*
- (a) the height of pole E and all antennas is not more than 25 m; and*
 - (b) the width of pole E is not more than 6 m; and*
 - (c) if pole E has a headframe, the width of the headframe is not more than 6 m; and*
 - (d) pole E is at least 50 m away from any building used for residential or educational purposes; and*
 - (e) if antenna E is a panel antenna, the width of the panel is not more than 0.7 m; and*
 - (f) if antenna E is a dish antenna, the diameter of the dish is not more than 1.2 m.*

Site Location	Comments
42 Turner Street, Kaeo	<p>The proposal involves the establishment of a telecommunications facility on rural zoned land. The proposed facility will comprise of the following.</p> <ul style="list-style-type: none"> • A telecommunication mast not exceeding 25m complying with Reg35(2)(a) • A telecommunication mast not exceeding 1.2m width complying with Reg35(2)(b) • The proposed pole has a headframe not exceeding 4.5m complying with Reg35(2)(c) • The proposed pole will not be located within 50m of any dwelling, or any building used for educational purposes complying with Reg35(2)(d). The nearest dwelling being 34A Turner Street, is located approximately 55m to the west. • The proposed facility will have attachment panel antennas not exceeding 0.7m width complying with Reg35(2)(e)

	<ul style="list-style-type: none"> The proposed facility will have attachment dish antennas complying with Reg35(2)(f) <p>Summary The proposed facility will comply with all development standards in Regulation 35.</p> <p>Complies</p>
--	---

Subpart 6 – Earthworks

- 1.7 Subpart 6 of the NESTF provides for earthworks associated with telecommunication facilities as a permitted activity, where the facility can comply with the following conditions.

Subpart 6 – Earthworks
Regulation 53: Earthworks associated with certain antennas
Conditions
<p><i>(1) This regulation applies to a regulated activity if it—</i></p> <ul style="list-style-type: none"> <i>a) is a regulated activity under regulation 30, 32, or 34; and</i> <i>b) includes earthworks (as referred to in regulation 5(1)(d)).</i> <p><i>(2) This regulation is complied with if—</i></p> <ul style="list-style-type: none"> <i>a) all special place earthworks are carried out in accordance with the district rules about earthworks that apply to earthworks carried out at that place; and</i> <i>b) each time rural earthworks are carried out in relation to the facility,—</i> <ul style="list-style-type: none"> <i>(i) the volume of the earthworks is not more than 450 m³; and</i> <i>(ii) the management plan requirements in subclause (3) are complied with.</i>

(3) The **management plan requirements** are that—

- a) before commencing the earthworks, the facility operator must prepare a management plan in accordance with subclauses (4) and (5); and
- b) the earthworks must be carried out in accordance with that management plan; and
- c) **the facility operator must give a copy of the management plan to the local authority if requested by the local authority at any time before the expiry of 6 months from the completion of the earthworks.**

(4) An earthworks management plan must set out the following:

- a) where the earthworks will be carried out;
- b) the nature and scale of the earthworks;
- c) when the earthworks will be started and completed;
- d) the measures that will be taken to ensure that the earthworks do not, as far as practicable, cause or contribute to any of the following:
 - (i) sediment run-off from the site;
 - (ii) soil or debris from the works entering any water body or the coastal marine area;
 - (iii) instability or subsidence of a slope or another land surface;
 - (iv) erosion of the bed or bank of a water body or the coastal marine area;
 - (v) drainage problems, flooding, or the diversion of overland flow paths;
 - (vi) dust problems on adjoining land;
- e) the measures that will be taken to complete the earthworks in a way that will, as far as practicable,—
 - (i) restore the site to its previous condition; and
 - (ii) stabilise the site against subsequent erosion.

(5) The management plan must be set out in a level of detail that is reasonable and proportionate having regard to the matters referred to in subclause (4)(a) to (c).

(6) The measures referred to in subclause (4)(d) and (e) must be—

- a) designed to minimise the effect on the environment of the earthworks; and
- b) reasonable and proportionate having regard to the matters referred to in subclause (4)(a) to (c).

- (7) In this regulation,— rural earthworks means earthworks that—
- a) are carried out in a rural zone and not in a road reserve; and
 - b) are not special place earthworks

special place earthworks means earthworks that are carried out at a place referred to in regulation [45\(1\)](#), [46\(1\)](#), [47\(1\)](#), [48\(1\)](#), [49\(1\)](#), [50\(1\)](#), or [51\(1\)](#).

Site Location	Comments
42 Turner Street, Kaeo	<p>The total quantity of earthworks required to establish the facility will not exceed 450m³. An earthworks management plan will be submitted within 6 months of completion of the earthworks.</p> <p>Complies</p>

Subpart 6 – Earthworks

Regulation 54: Earthworks regional rules apply

Conditions

- (1) This regulation applies to a regulated activity if it includes earthworks (as referred to in regulation 5(1)(d)).
- (2) This regulation is complied with if the earthworks are carried out in accordance with any applicable regional rules about earthworks.

Site Location	Comments
42 Turner Street, Kaeo	<p>The proposed earthworks complies with Regulation 5(1)(d).</p> <p>The proposed earthworks will not infringe any regional earthwork standards.</p> <p>Complies</p>

1.8 NESTF Regulation Assessment Summary

The NESTF assessment has demonstrated that the proposed new pole, antennas and cabinet located outside the road reserve on land zoned rural, will comply with all applicable Regulations.



Notice and Report-Statement of Compliance

Submitted in accordance with Reg 55 of the Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2016.

Site Code: N1KOT
Site Name: Kaeo Township
Site Address: 42 Turner Street, Kaeo.

Author:	Craige Pote – RF Design Engineer
Approved By:	Brett 'O Brien – RF Design Engineer
Date:	10/10/2024

National Environmental Standards Compliance Distance Calculation

RF Human Exposure Limits

The New Zealand Government has produced a national standard for exposure to RF transmissions.

This is encompassed in the New Zealand Standard NZS2772.1.1999 which permits a maximum exposure level to Radio Frequency Fields 3 KHz to 300 GHz.

Compliance Certification

One New Zealand is performing technical work to this cell site.

After the technical work, the site will still operate in compliance with the New Zealand Standard.

The calculations used to confirm compliance were made in accordance with the requirements described in the new Australian/New Zealand Standard AS/NZS2772.2.2016.

The location and the site type ensure that there is no area in front of the face of the antenna that is accessible to the public. Therefore the associated radio frequency fields, including any cumulative effects, are not expected to reach or exceed 25% of the maximum level authorized by NZS2772.1.1999 in areas accessible to general public.

In addition, this report has been prepared in accordance with NZS AS/NZS 2772.2 Radiofrequency Radiation: Part 2: Principles and Methods of Measurement 3 KHz to 300 GHz, and as such meets Reg 55(3)(a) of the NES 2016.

Compliance with NZS 2772.1.:1999

One New Zealand confirms that the cell site is designed, installed and operated in accordance with NZS 2772.1.1999. Compliance with Clause 10 of this Standard is achieved through careful site planning and design, and following best industry practices.

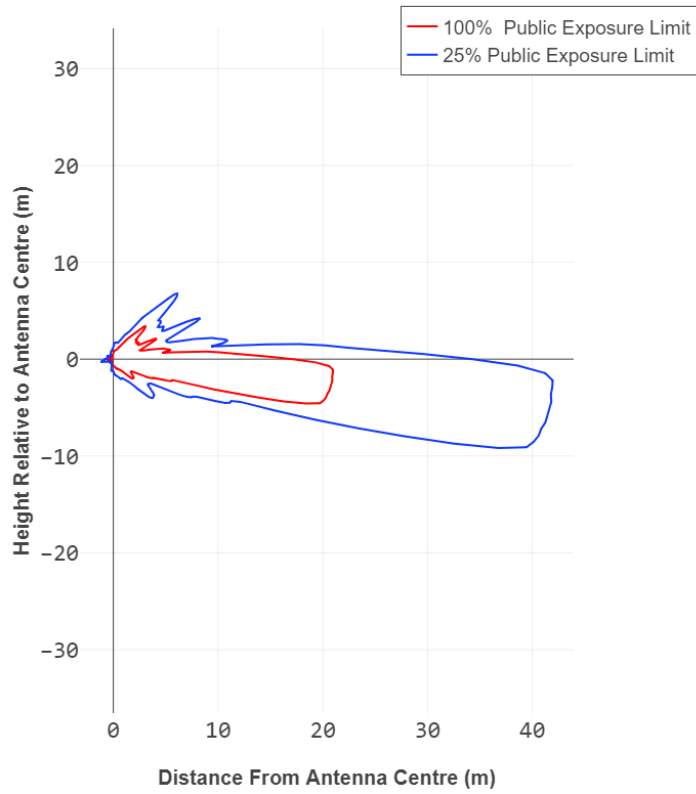
RF warning signs, access control measures, and safe working procedures will be in place. One New Zealand engages contractors who are certified industrial professionals, with extensive health and safety training as required under the Health and Safety at Work Act.

National Environmental Standards Compliance Distance Calculation

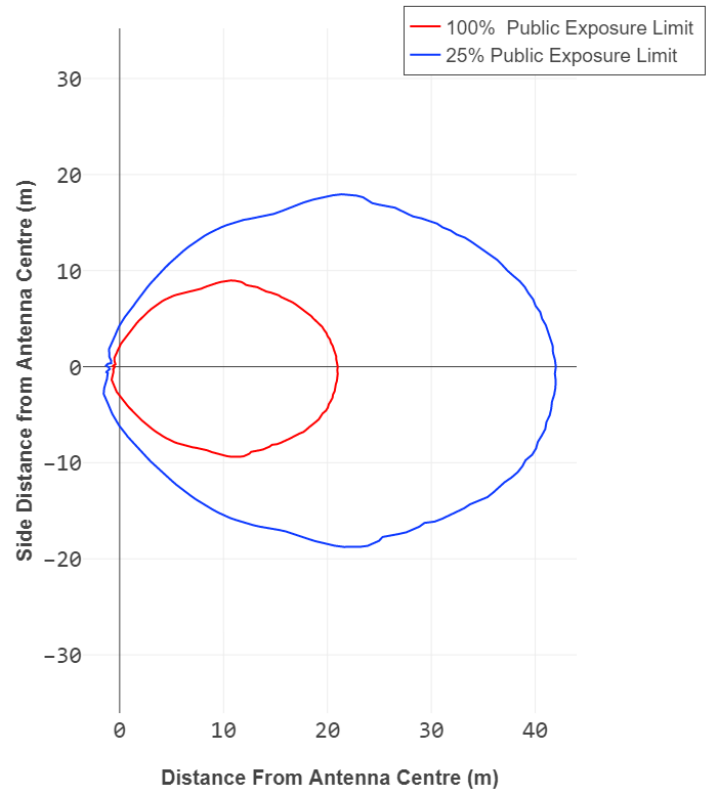
Frequency Band (MHz)	Antenna Model/Element	Max Cabinet/RRU Power (W)	Antenna Gain (dBi)	Feeder Loss/Attenuation (dB)	Mechanical Tilt (Degrees)	Allowed Power Density Public 100% (W/m2)	Allowed Power Density Public 25% (W/m2)	M-MIMO Actual Power Factor (%)
1800	KKZZV4-65D-R8_1850MHz**	160.0	17.4	0.7	0.0	9.00	2.25	
2100	KKZZV4-65D-R8_2020MHz**	160.0	18.8	0.7	0.0	10.00	2.50	
2600	KKZZV4-65D-R8_2690MHz**	160.0	17.6	0.7	0.0	10.00	2.50	
3500	AQQL-Envelope_L4	200.0	24.9	0.5	0.0	10.00	2.50	25%
700	KKZZV4-65D-R8_776MHz**	160.0	15.8	0.5	0.0	3.50	0.88	

Plumes are shown from antenna centre (0,0)

Vertical Plume

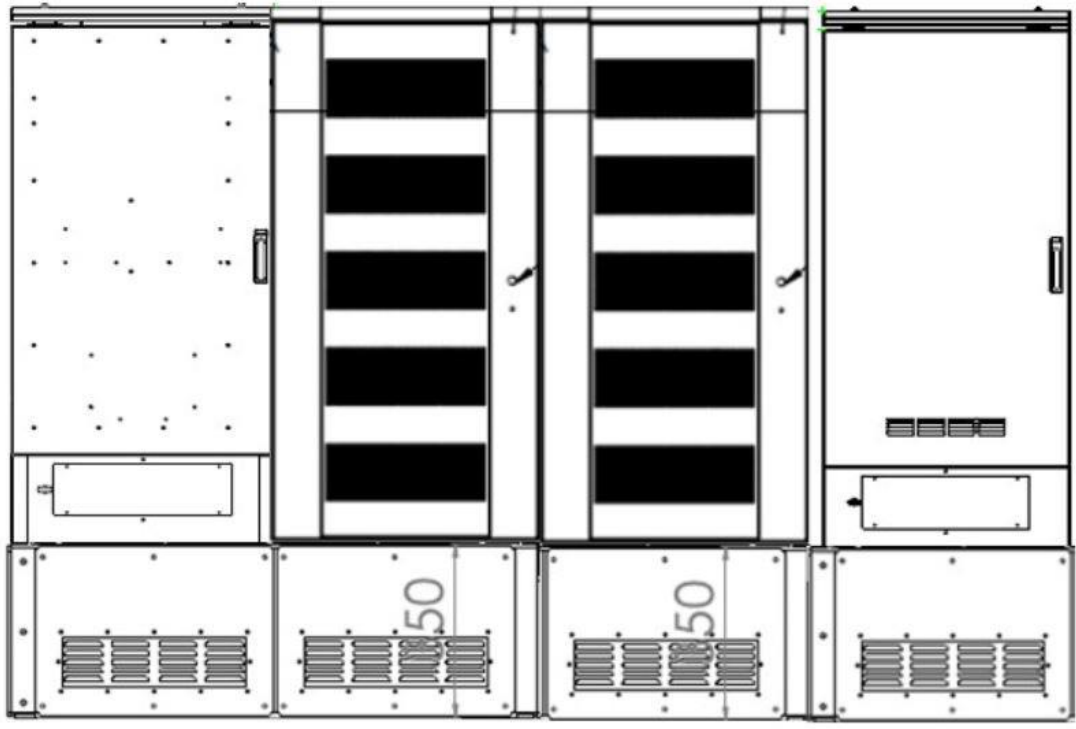


Horizontal Plume



Compliance Distance Vertical (Public 100%)	4.59 [m]
Compliance Distance Vertical (Public 25%)	9.17 [m]

Compliance Distance Horizontal (Public 100%)	20.97 [m]
Compliance Distance Horizontal (Public 25%)	41.95 [m]



Project: **VODAFONE GREENFIELD CABINETS**
Sound Level Distance Tables

Prepared for: **Vodafone New Zealand Limited**
Private Bag 92143
Auckland 1142
New Zealand

Attention: **Rikard Eriksson / Colin Clune**

Report No.: **Rp 003 20201028**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Approved	-	For client issue	4 Mar 2021	K. Prosée	C. Robinson

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APPENDIX A GLOSSARY OF TERMINOLOGY

APPENDIX B SOUND LEVEL DISTANCE TABLE – GREENFIELD CABINET ARRAY

1.0 INTRODUCTION

Marshall Day Acoustics Limited (MDA) has been engaged by Vodafone New Zealand Limited (Vodafone) to provide predicted L_{Aeq} sound emission data in relation to Vodafone's *Greenfield* mobile phone telecommunications cabinet array.

The *Greenfield* cabinet array incorporates older existing cabinets and a new EC26 – FCOA HEX cabinet.

The L_{Aeq} sound data presented in this report is intended for use in relation to measurement and assessment criteria in New Zealand Standards NZS 6801:2008 *Acoustics – Measurement of environmental sound* and NZS 6802:2008 *Acoustics – Environmental Noise*.

A glossary of terminology is included in Appendix A.

2.0 GREENFIELD CABINET ARRAY

2.1 Configuration

The *Greenfield* cabinet array comprises three individual cabinets mounted next to each other on a common plinth as follows:

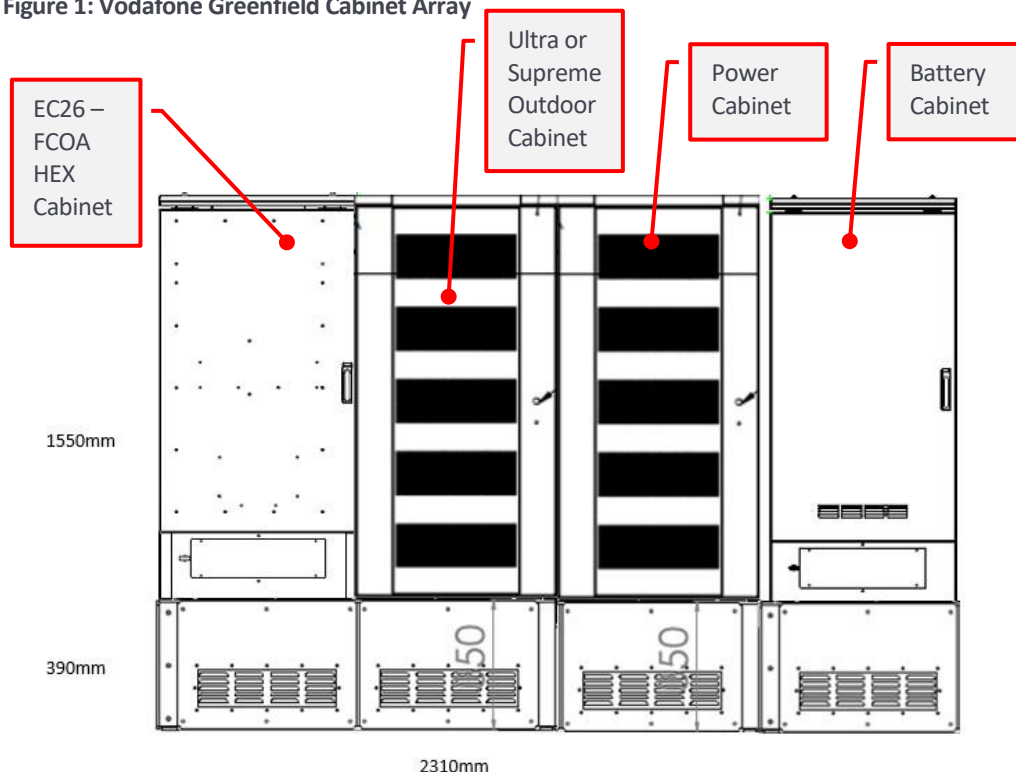
- 1 x EC26 – FCOA HEX cabinet with *Greenfield* setup
- Either: 1 x Ultra Outdoor cabinet (2G) or 1 x Supreme Outdoor cabinet (3G)
- 1 x Power Cabinet

The *Ultra Outdoor* and *Supreme Outdoor* cabinets and *Power Cabinet* are older existing 2G/3G designs that have been in use within the Vodafone network for many years. All the above cabinets generate noise emission from forced fan cooling systems.

An optional *Battery cabinet* may be added to the above array if required, determined on a site-by-site basis. The battery cabinet does not produce any noise.

Figure 1 shows a typical configuration including a battery cabinet.

Figure 1: Vodafone Greenfield Cabinet Array



2.2 Installations

2.2.1 New sites

The *Greenfield* cabinet array (as described in Section 2.1) will be installed at new Vodafone sites.

2.2.2 Existing sites

Existing sites will be upgraded by Vodafone so that the cabinet arrangement matches that of the *Greenfield* cabinet array. In some cases, there may be more cabinets existing on a Vodafone site than are needed to provide the same arrangement as the *Greenfield* cabinet array. In this regard, any cabinets not needed would be decommissioned/disconnected, but left in place.

Accordingly, the resulting noise emission from any upgraded site would be the same as that installed for any new site.

3.0 EC26 – FCOA HEX CABINET

3.1 Overview

The EC26 – FCOA HEX is a new cabinet developed by Vodafone which accommodates all mobile frequency bands i.e., 2G, 3G, 4G and 5G.

The design includes a removable rear cover (sound cover) which reduces noise emission from the rear of the cabinet where the heat exchanger cooling vents are located.

Photos and pictorial views of the new EC26 – FCOA HEX cabinet are shown in Figures 2 and 3.

Figure 2: EC26 – FCOA HEX Photos

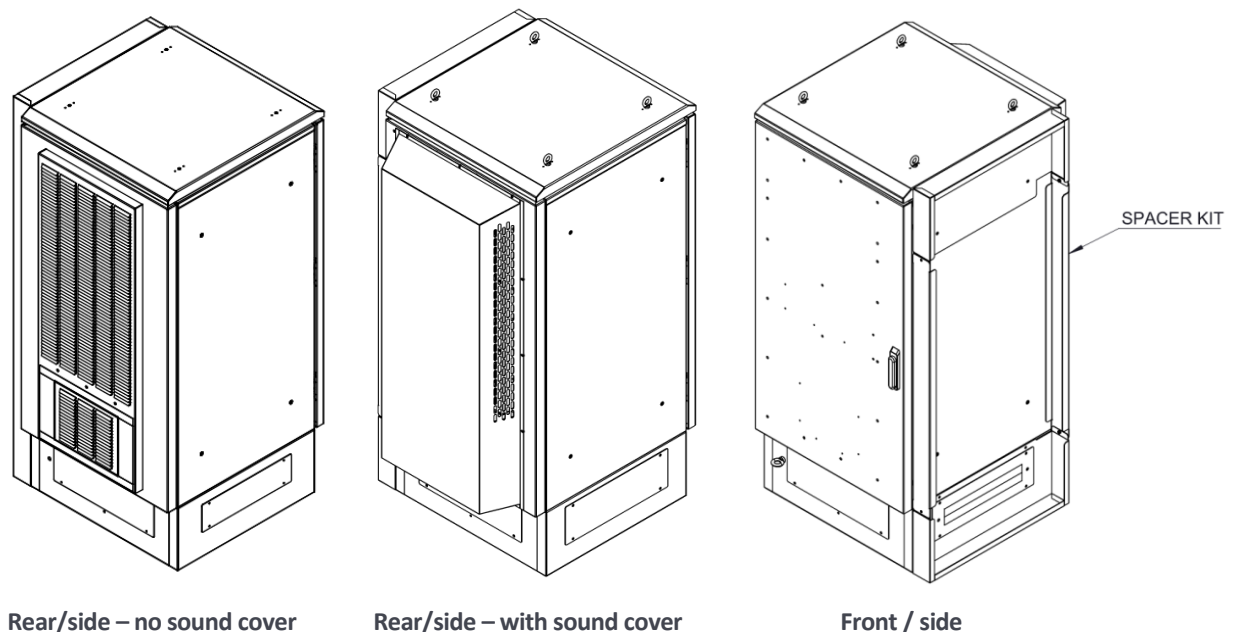


Front / side view



Rear view with sound cover

Figure 3: EC26 – FCOA HEX cabinet pictorial views



The overall dimensions are:

- Height: 1550 mm
- Width: 770 mm
- Depth: 770 mm without sound cover / 875 mm with sound cover

The principal sound source from the cabinet is from the cooling fans/heat exchanger system used to maintain the internal temperature within manufacturer's specified temperature limits. The cooling fan sound is generally constant in nature.

The cooling requirement for the cabinet is controlled by altering the fan voltage setting, which in turn controls the fan speed. A higher fan speed results in more cooling and generally higher noise emission.

3.2 Measured sound levels

Sound emission levels for the EC26 – FCOA HEX cabinet were measured by the College of Engineering Acoustics Research Group from the University of Canterbury (UC) in Christchurch.

Test results are documented in UC Report No. 479 *Eaton EC26 – FCOA Telecommunications Cabinet: Noise Emission*, dated 10 February 2021 (Eaton Report).

Measurements were undertaken at 3 metres from the centre of all four sides of the cabinet (at a height of 1.2 metres) for four different fan supply DC voltage settings; 2.5, 5, 7.5 and 10 Volts.

The measurements at each of the four voltage settings were completed both with and without the sound cover fitted on the rear of the cabinet.

Inspection of the measured sound pressure levels in the Eaton Report indicates that noise emission was highest from the rear of the cabinet in all cases.

The sound emission levels from the Eaton Report (rounded to the nearest decibel) are summarised in Table 1.

Table 1: Sound pressure levels at 3 metres (from Eaton Report) for tested fan voltage settings

Orientation	Measured sound pressure levels (dB L _{Aeq 5min} @ 3 metres)							
	Sound cover removed				Sound cover fitted			
	2.5 Vdc	5 Vdc	7.5 Vdc	10 Vdc	2.5 Vdc	5 Vdc	7.5 Vdc	10 Vdc
Front	41	50	56	59	36	43	49	51
Left	45	55	59	62	40	47	51	53
Rear	49	59	63	67	42	49	53	56
Right	43	53	58	61	37	47	51	52

3.3 Greenfield setup

The setup used for the Greenfield EC26 – FCOA HEX cabinet is detailed in Table 2.

Table 2: Setup for Greenfield EC26 – FCOA HEX cabinet

EC26 – FCOA HEX Setup	Fan Speed Voltage Setting - Volts dc		Sound Cover
	Daytime Operation	Night-time Operation	
Greenfield	10	5	Fitted

4.0 NOISE DATA

The sound pressure level (or noise level) generated by the cabinets at a given distance is calculated from a sound power level (dB L_{WA}). The sound power level represents the total sound power radiated from the cabinet(s). Sound power levels for individual cabinets and for the *Greenfield* cabinet array are detailed below.

4.1 Older cabinet designs

Table 3 presents the sound power levels for the older existing 2G/3G cabinets and power cabinet (referred to in Section 2.1). This data was provided to Vodafone by Nokia, the manufacturer of the cabinets.

Table 3: Sound power levels for older cabinet designs

Cabinet	Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Ultra Outdoor or Supreme Outdoor	65	60
Power cabinet	65	60

4.2 EC26 – FCOA HEX cabinet

Table 4 presents the sound power levels for the *Greenfield* setup. They are based on the sound pressure levels measured from the rear of the cabinet as presented in Table 1.

Table 4: Sound power levels for Greenfield EC26 – FCOA HEX cabinet only

EC26 – FCOA HEX Setup	Calculated Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Greenfield	75	68

4.3 Greenfield cabinet array

The overall sound power levels for the *Greenfield* cabinet array (for all cabinets combined as described in Section 2.1) are shown in Table 5.

Table 5: Overall sound power levels for Greenfield cabinet array

Cabinet Array	Calculated Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Greenfield	76	69

5.0 SOUND LEVEL TABLE

The predicted sound levels at various distances between 1 and 50 metres for the *Greenfield* cabinet array have been calculated for daytime and night-time operation based on the sound power levels in Table 5. The results are presented in Appendix B.

All calculated sound levels are “time average levels” symbolised by L_{Aeq (t)}, where (t) is the representative sample period (typically 15 minutes).

The L_{Aeq (t)} may also be referred to as “LEQ” (Table 1, NZS6802:2008).

6.0 DISCUSSION

Sound from the cooling units is generally constant, so for the purpose of environmental acoustic assessment, the L_{max} can be assumed to be similar to the L_{eq} and both can be derived from the sound power level data.

The tables in Appendix B are based on receiver locations with a clear line of site to the cabinets. Screening provided by solid fences, bunds or buildings would reduce the received sound level. Large solid surfaces behind or to the side of the sound source may reflect sound thereby increasing the received sound level.

Table 6 presents the setback distance (in metres) at which compliance can be generally achieved with common noise limits without screening.

If the cabinet combination is located within the compliance distance, mitigation such as acoustic screening must be considered.

Table 6: Compliance distances in metres – Greenfield cabinet array (without screening)

Cabinet Array	Period	Common Noise Limits dB L _{Aeq}				
		40	45	50	55	60
Greenfield	Daytime	n/a	14 m	7 m	4 m	2 m
	Night-time	12 m	6 m	4 m	2 m	1 m

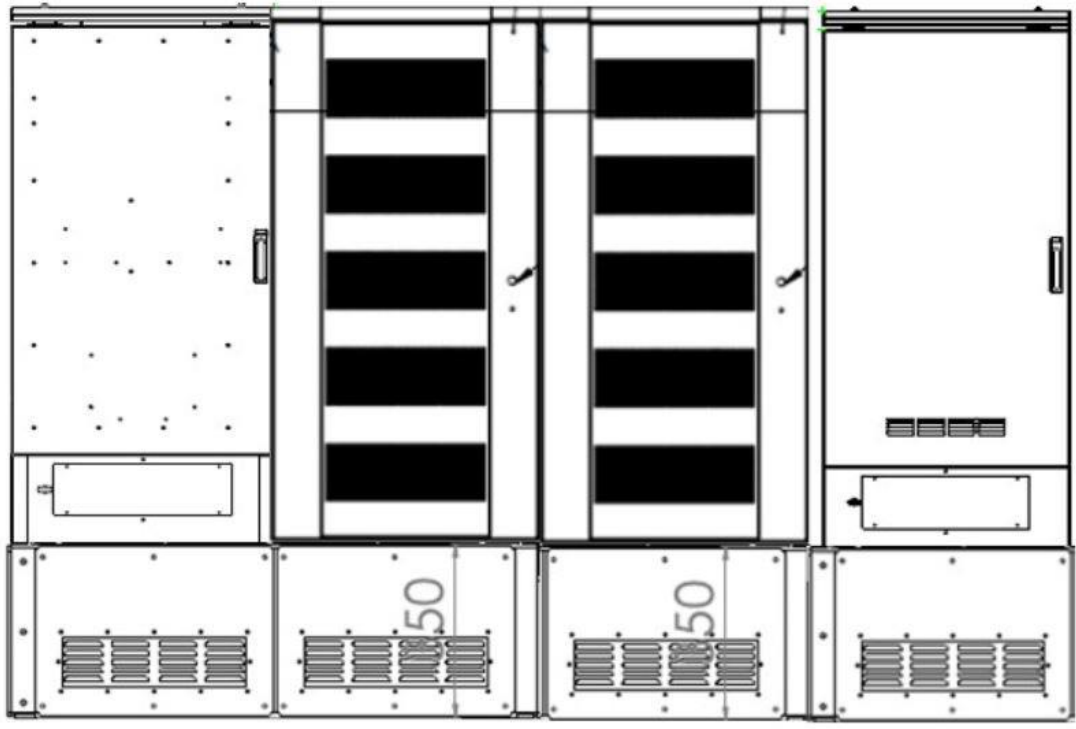
APPENDIX A GLOSSARY OF TERMINOLOGY

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SWL or L_{WA}	<u>Sound Power Level</u> A logarithmic ratio of the acoustic power output of a source relative to 10 ⁻¹² watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
dB	<u>Decibel</u> The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 µPa i.e. $dB = 20 \times \log(P/Pr)$
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
FCOA	Flexi Cabinet Outdoor (Version A)
HEX	Heat exchanger system fitted for cooling requirements
L_{Aeq} (t)	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Noise	A sound that is unwanted by, or distracting to, the receiver.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 "Acoustics – Measurement of environmental sound"
NZS 6802:2008	New Zealand Standard NZS 6802:2008 "Acoustics – Environmental Noise"

APPENDIX B SOUND LEVEL DISTANCE TABLE – GREENFIELD CABINET ARRAY

Distance (metres)	Sound level dB L _{Aeq} *	
	Daytime operation	Night-time operation
1	65	58
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10	47	41
12	46	39
14	45	38
16	44	37
18	43	36
20	42	35
25	40	33
30	38	32
35	37	30
40	36	29
45	35	28
50	34	27

* Expected sound level (dB L_{Aeq}) at a height of 1.2 metres above the ground at a distance of 'X' metres from the cabinet façade



Project: **VODAFONE GREENFIELD CABINETS**
Sound Level Distance Tables

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Report No.: **Rp 003 20201028**

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APPENDIX A GLOSSARY OF TERMINOLOGY

APPENDIX B SOUND LEVEL DISTANCE TABLE – GREENFIELD CABINET ARRAY

1.0 INTRODUCTION

Marshall Day Acoustics Limited (MDA) has been engaged by Vodafone New Zealand Limited (Vodafone) to provide predicted L_{Aeq} sound emission data in relation to Vodafone's *Greenfield* mobile phone telecommunications cabinet array.

The *Greenfield* cabinet array incorporates older existing cabinets and a new EC26 – FCOA HEX cabinet.

The L_{Aeq} sound data presented in this report is intended for use in relation to measurement and assessment criteria in New Zealand Standards NZS 6801:2008 *Acoustics – Measurement of environmental sound* and NZS 6802:2008 *Acoustics – Environmental Noise*.

A glossary of terminology is included in Appendix A.

2.0 GREENFIELD CABINET ARRAY

2.1 Configuration

The *Greenfield* cabinet array comprises three individual cabinets mounted next to each other on a common plinth as follows:

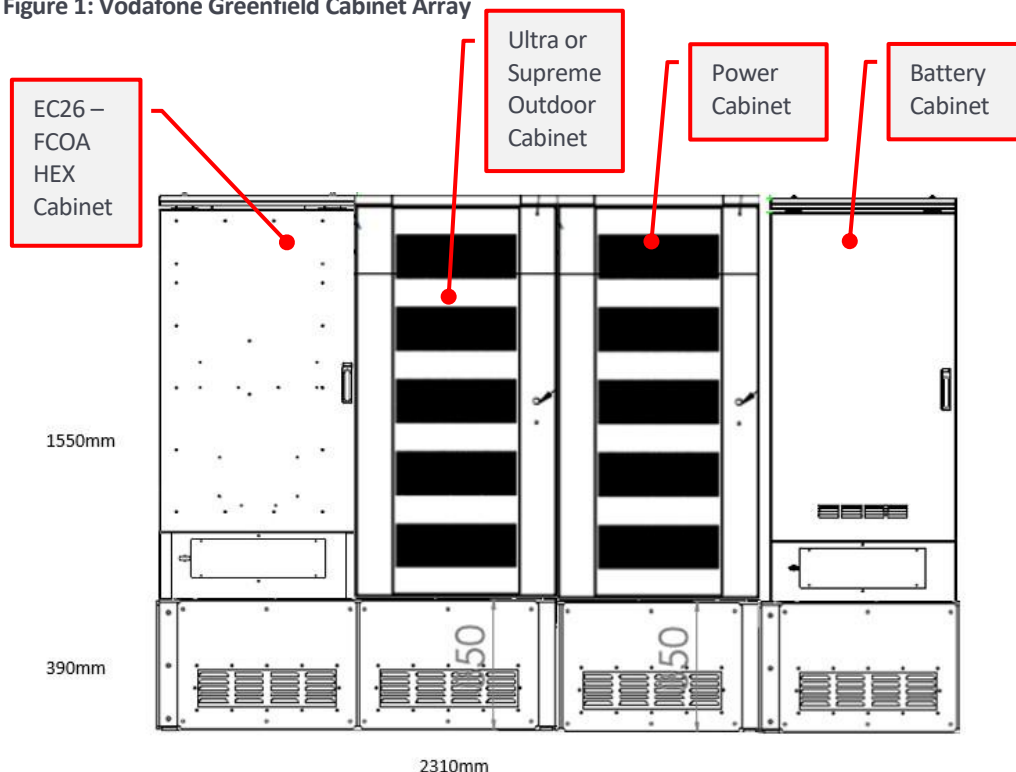
- 1 x EC26 – FCOA HEX cabinet with *Greenfield* setup
- Either: 1 x Ultra Outdoor cabinet (2G) or 1 x Supreme Outdoor cabinet (3G)
- 1 x Power Cabinet

The *Ultra Outdoor* and *Supreme Outdoor* cabinets and *Power Cabinet* are older existing 2G/3G designs that have been in use within the Vodafone network for many years. All the above cabinets generate noise emission from forced fan cooling systems.

An optional *Battery cabinet* may be added to the above array if required, determined on a site-by-site basis. The battery cabinet does not produce any noise.

Figure 1 shows a typical configuration including a battery cabinet.

Figure 1: Vodafone Greenfield Cabinet Array



2.2 Installations

2.2.1 New sites

The *Greenfield* cabinet array (as described in Section 2.1) will be installed at new Vodafone sites.

2.2.2 Existing sites

Existing sites will be upgraded by Vodafone so that the cabinet arrangement matches that of the *Greenfield* cabinet array. In some cases, there may be more cabinets existing on a Vodafone site than are needed to provide the same arrangement as the *Greenfield* cabinet array. In this regard, any cabinets not needed would be decommissioned/disconnected, but left in place.

Accordingly, the resulting noise emission from any upgraded site would be the same as that installed for any new site.

3.0 EC26 – FCOA HEX CABINET

3.1 Overview

The EC26 – FCOA HEX is a new cabinet developed by Vodafone which accommodates all mobile frequency bands i.e., 2G, 3G, 4G and 5G.

The design includes a removable rear cover (sound cover) which reduces noise emission from the rear of the cabinet where the heat exchanger cooling vents are located.

Photos and pictorial views of the new EC26 – FCOA HEX cabinet are shown in Figures 2 and 3.

Figure 2: EC26 – FCOA HEX Photos

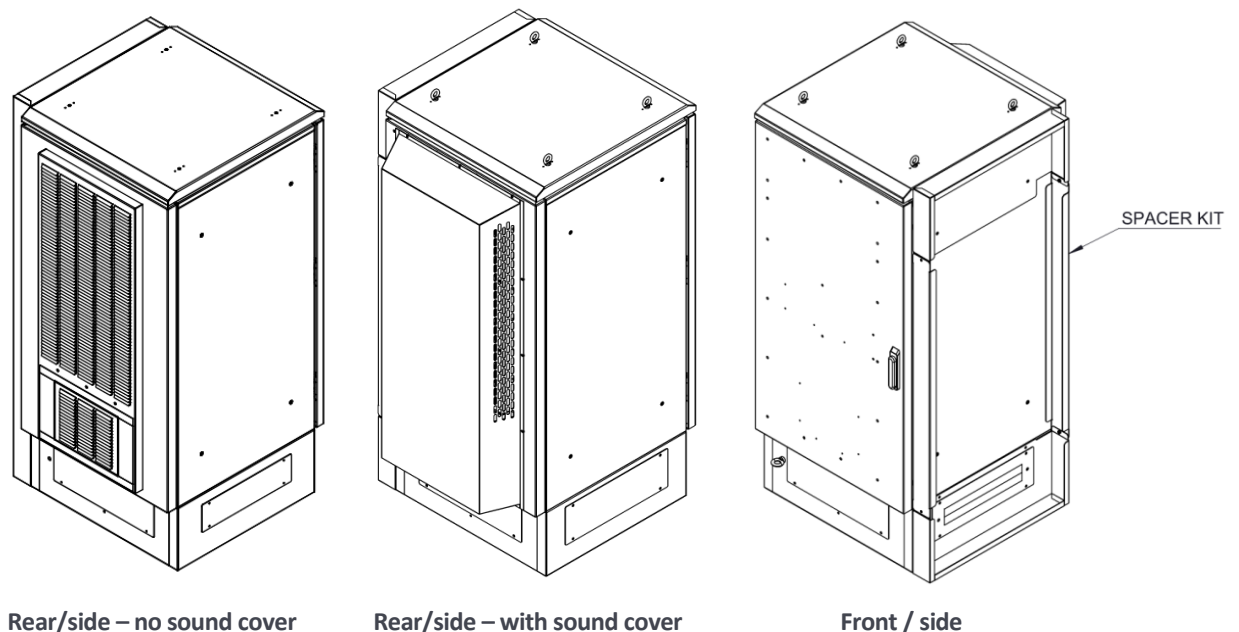


Front / side view



Rear view with sound cover

Figure 3: EC26 – FCOA HEX cabinet pictorial views



The overall dimensions are:

- Height: 1550 mm
- Width: 770 mm
- Depth: 770 mm without sound cover / 875 mm with sound cover

The principal sound source from the cabinet is from the cooling fans/heat exchanger system used to maintain the internal temperature within manufacturer's specified temperature limits. The cooling fan sound is generally constant in nature.

The cooling requirement for the cabinet is controlled by altering the fan voltage setting, which in turn controls the fan speed. A higher fan speed results in more cooling and generally higher noise emission.

3.2 Measured sound levels

Sound emission levels for the EC26 – FCOA HEX cabinet were measured by the College of Engineering Acoustics Research Group from the University of Canterbury (UC) in Christchurch.

Test results are documented in UC Report No. 479 *Eaton EC26 – FCOA Telecommunications Cabinet: Noise Emission*, dated 10 February 2021 (Eaton Report).

Measurements were undertaken at 3 metres from the centre of all four sides of the cabinet (at a height of 1.2 metres) for four different fan supply DC voltage settings; 2.5, 5, 7.5 and 10 Volts.

The measurements at each of the four voltage settings were completed both with and without the sound cover fitted on the rear of the cabinet.

Inspection of the measured sound pressure levels in the Eaton Report indicates that noise emission was highest from the rear of the cabinet in all cases.

The sound emission levels from the Eaton Report (rounded to the nearest decibel) are summarised in Table 1.

Table 1: Sound pressure levels at 3 metres (from Eaton Report) for tested fan voltage settings

Orientation	Measured sound pressure levels (dB L _{Aeq 5min} @ 3 metres)							
	Sound cover removed				Sound cover fitted			
	2.5 Vdc	5 Vdc	7.5 Vdc	10 Vdc	2.5 Vdc	5 Vdc	7.5 Vdc	10 Vdc
Front	41	50	56	59	36	43	49	51
Left	45	55	59	62	40	47	51	53
Rear	49	59	63	67	42	49	53	56
Right	43	53	58	61	37	47	51	52

3.3 Greenfield setup

The setup used for the Greenfield EC26 – FCOA HEX cabinet is detailed in Table 2.

Table 2: Setup for Greenfield EC26 – FCOA HEX cabinet

EC26 – FCOA HEX Setup	Fan Speed Voltage Setting - Volts dc		Sound Cover
	Daytime Operation	Night-time Operation	
Greenfield	10	5	Fitted

4.0 NOISE DATA

The sound pressure level (or noise level) generated by the cabinets at a given distance is calculated from a sound power level (dB L_{WA}). The sound power level represents the total sound power radiated from the cabinet(s). Sound power levels for individual cabinets and for the *Greenfield* cabinet array are detailed below.

4.1 Older cabinet designs

Table 3 presents the sound power levels for the older existing 2G/3G cabinets and power cabinet (referred to in Section 2.1). This data was provided to Vodafone by Nokia, the manufacturer of the cabinets.

Table 3: Sound power levels for older cabinet designs

Cabinet	Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Ultra Outdoor or Supreme Outdoor	65	60
Power cabinet	65	60

4.2 EC26 – FCOA HEX cabinet

Table 4 presents the sound power levels for the *Greenfield* setup. They are based on the sound pressure levels measured from the rear of the cabinet as presented in Table 1.

Table 4: Sound power levels for Greenfield EC26 – FCOA HEX cabinet only

EC26 – FCOA HEX Setup	Calculated Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Greenfield	75	68

4.3 Greenfield cabinet array

The overall sound power levels for the *Greenfield* cabinet array (for all cabinets combined as described in Section 2.1) are shown in Table 5.

Table 5: Overall sound power levels for Greenfield cabinet array

Cabinet Array	Calculated Sound Power Level dB L _{WA} (Re 10 ⁻¹² W)	
	Daytime operation	Night-time operation
Greenfield	76	69

5.0 SOUND LEVEL TABLE

The predicted sound levels at various distances between 1 and 50 metres for the *Greenfield* cabinet array have been calculated for daytime and night-time operation based on the sound power levels in Table 5. The results are presented in Appendix B.

All calculated sound levels are “time average levels” symbolised by L_{Aeq (t)}, where (t) is the representative sample period (typically 15 minutes).

The L_{Aeq (t)} may also be referred to as “LEQ” (Table 1, NZS6802:2008).

6.0 DISCUSSION

Sound from the cooling units is generally constant, so for the purpose of environmental acoustic assessment, the L_{max} can be assumed to be similar to the L_{eq} and both can be derived from the sound power level data.

The tables in Appendix B are based on receiver locations with a clear line of site to the cabinets. Screening provided by solid fences, bunds or buildings would reduce the received sound level. Large solid surfaces behind or to the side of the sound source may reflect sound thereby increasing the received sound level.

Table 6 presents the setback distance (in metres) at which compliance can be generally achieved with common noise limits without screening.

If the cabinet combination is located within the compliance distance, mitigation such as acoustic screening must be considered.

Table 6: Compliance distances in metres – Greenfield cabinet array (without screening)

Cabinet Array	Period	Common Noise Limits dB L _{Aeq}				
		40	45	50	55	60
Greenfield	Daytime	n/a	14 m	7 m	4 m	2 m
	Night-time	12 m	6 m	4 m	2 m	1 m

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FCOA	Flexi Cabinet Outdoor (Version A)
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