

**SHIRE OF TAMMIN  
LOCAL PLANNING SCHEME NO.2**



**NOTICE OF PUBLIC ADVERTISEMENT OF PLANNING PROPOSAL**

*Planning and Development Act 2005*  
Shire of Tammin

The local government has received an application to use and/or develop land for the following purpose and public comments are invited.

Property Address: Lot 12334 on Deposited Plan 225111 Cubbine Road, South Tammin

Proposal: Construction and use of proposed new telecommunications infrastructure on the abovementioned property to improve broadband internet coverage throughout the locality.

Details of the proposal are available for inspection at the Shire Administration Centre, 1 Donnan Street, Tammin and Public Notices section of Shire's website ([www.tammin.wa.gov.au](http://www.tammin.wa.gov.au)).

Comments on the proposal are now invited and can be emailed to [ceo@tammin.wa.gov.au](mailto:ceo@tammin.wa.gov.au) or posted to the Shire's Chief Executive Officer at PO Box 53 TAMMIN WA 6409.

All submissions must be lodged by no later than **Wednesday 2 August 2023** and include the following information:

- Your name, address and contact telephone number;
- How your interests are affected; whether as a private citizen, on behalf of a company or other organisation, or as an owner or occupier of property;
- Address of property affected (if applicable); and
- Whether your submission is in support of, or objecting to the proposal and provide any arguments supporting your comments.

All submissions received may be made public at a Council meeting and included in a Council Agenda, which will be available on the Shire's website, unless a submission specifically requests otherwise.

**Joanne Soderlund**  
**Chief Executive Officer**  
**Shire of Tammin**

12 July 2023



<b>Prepared for:</b>	Shire of Tammin
<b>Attention:</b>	<u>CEO:</u> Joanne Soderlund <u>Consultant Planner</u> – Joe Douglas
<b>Date:</b>	5 July 2023
<b>Site Location:</b>	<u>Site reference:</u> RCP2-011-K (Wilson Site) <u>Address:</u> Lot 12334 on DP225111 (accessed off Cubbine Road), Tammin

# Vision Statement

To be the first choice for broadband internet in regional Western Australia by providing first class infrastructure with a consistent focus on excellent customer service and ongoing regional community consultation to ensure our program meets the needs of country WA.

## Background

CRISP Wireless is a Network owner/operator licensee for Wireless Broadband services in Western Australia.

We provide a unique telecommunications solution that utilises Point to Point secured wireless connectivity between sites as well as community wireless services and subscriber broadband.

## Quality Information

### Prepared for:

Wilson Site (RCP2-011-K)

### Prepared by:

**CRISP Wireless Pty Ltd**

Address: PO Box 1004, Narrogin WA 6312

Email: [lballard@crispwireless.com.au](mailto:lballard@crispwireless.com.au)

### Document number:

Revision	Revision Date	Details	Authorisation		
			Prepared By	Reviewed By	Authorised By
A	05/07/2023	Proposal	Heidi Cowcher	Leigh Ballard	Leigh Ballard



# Proposal

CRISP Wireless proposes extending our fixed wireless network across the Wheatbelt. We are proposing to build a 30m communications tower on Lot 12334 on DP225111 (accessed off Cubbine Road), Tammin. This proposed tower is part of a wider network across the region that is being established to improve the telecommunications connectivity for Wheatbelt based residents.

An agreement has been entered into with the landowner for the installation of this telecommunications infrastructure to be located on the subject land in the form of a 30m telecommunications tower; and a container to house the communication equipment with solar panels on top for power provision.

The development application is made in accordance with the *Planning and Development Act 2005* for assessment under the Shire of Tammin Town Planning Scheme 2. The subject land is located in the Rural Zone.

The proposed works shall be referred to as Telecommunications Infrastructure for the purposes of this development application. The site proposed will not affect, nor impact on, current farming practices. There is no need, or requirement, for the site to be fenced (except on request of the landowner).

Under the TPS, the Zoning tables specify the uses permitted in various zones. The permissibility of any use is determined by considering the zoning table and cross referencing it with the proposed works. Telecommunications Infrastructure is classified as 'D' under the zoning table and is therefore only permitted at the discretion of Council, as Council are required to determine the planning approval or otherwise.

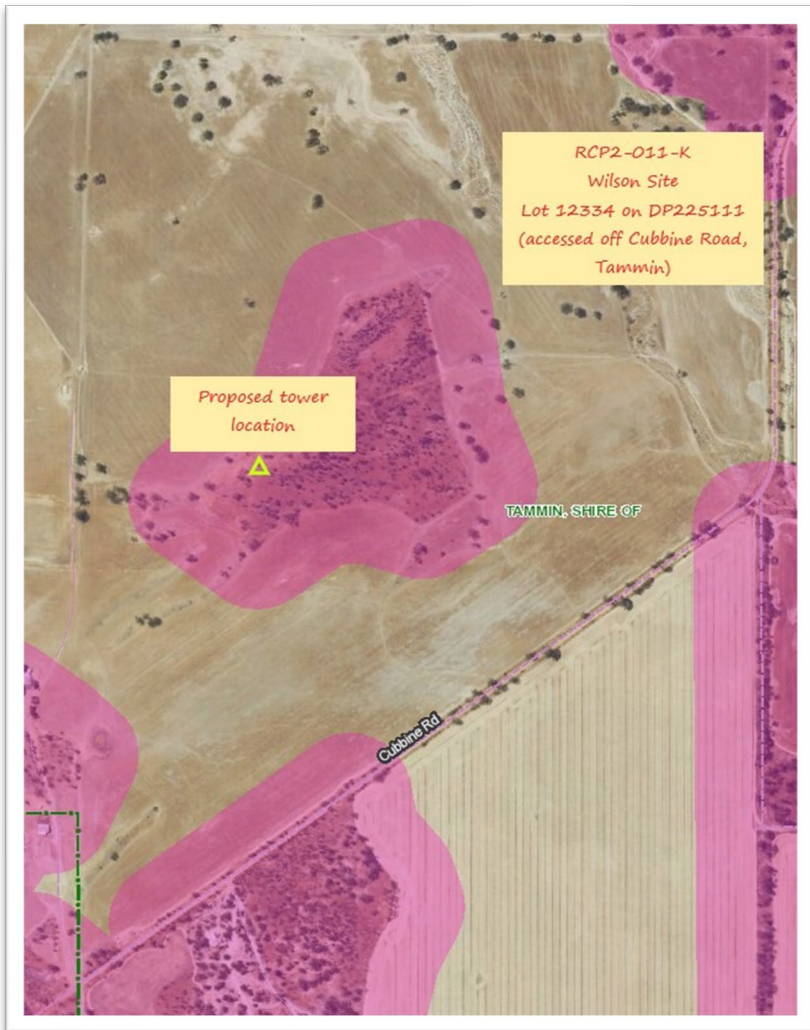
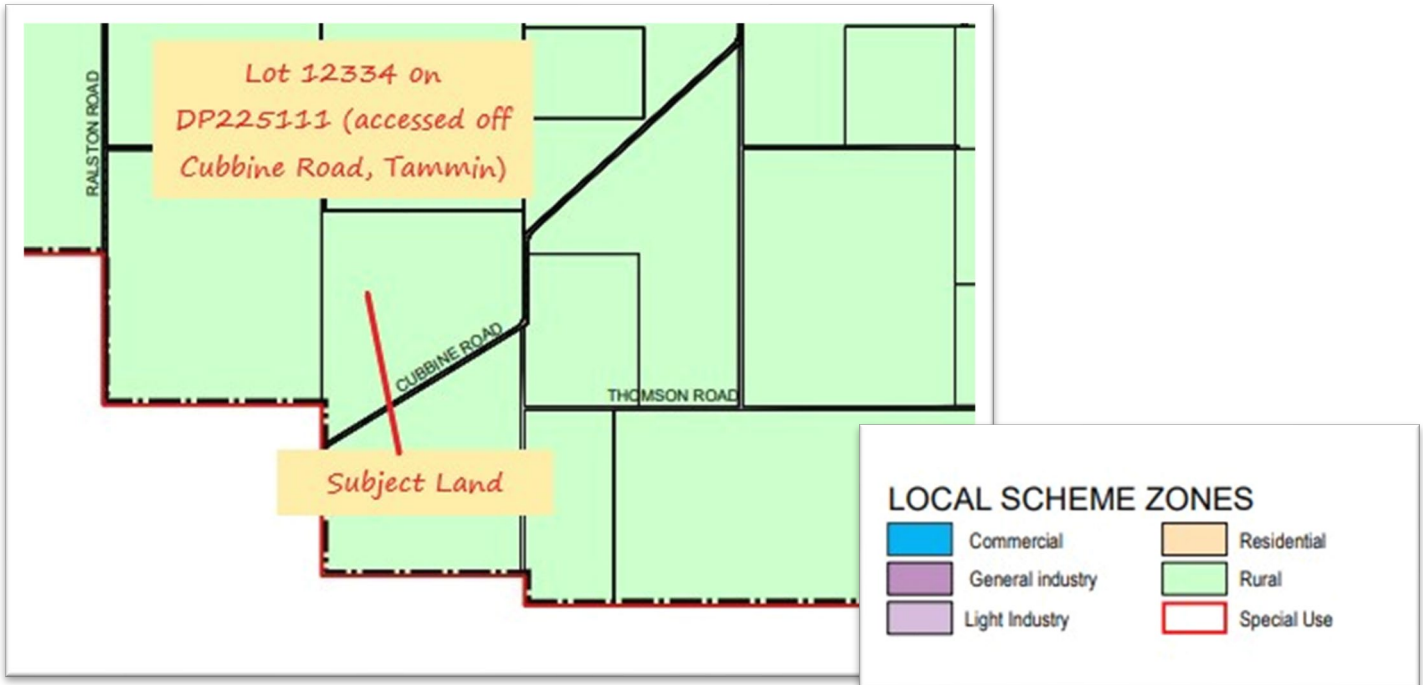
A summary of the subject land is provided in the below table:

Address of subject land	Lot 12334 on DP225111
Real Property Description	12334/DP225111
Area of Subject Land	129.4927 ha
Existing buildings on Subject Land	Farming related infrastructure
Road Frontages	Nil
Zone	Rural
Overlays	Bushfire Prone Area, Native Vegetation
Landowners	Benjamin Lloyd Wilson Ian Brownlie Wilson
Easements/Encumbrances	*O356845: Mortgage to Rabobank Australia Ltd (Registered 28/02/2020)

The site is highlighted on the following maps:



**Fig 1: Shire of Tammin Town Planning Scheme 2 – Map 3 – Tammin South (source Shire of Tammin)**



**Figure 2: Map of Bushfire Prone Area (Source: Landgate SLIP)**



Figure 3: Native Vegetation Extent (Source: DPIRD WA Remnant Vegetation Mapping)



The telecommunications infrastructure will consist of the following:

- A 30m steel tower as shown in **Attachment 5**.
- A combination of Dual Pole Parabolic Antennas (Dishes) and Sector Antennas as shown in **Attachment 6**.
- A sea container housing the communications equipment; and
- Solar panels to power the system on the roof of the sea container.

The tower is proposed to be placed relatively central within the subject land as shown in the Site Plan in **Attachment 4**. The tower and associated infrastructure will occupy an area of approximately 400m<sup>2</sup>. There is no fencing proposed as part of the development, unless specifically requested by the individual landowner.

The subject location, whilst within the mapped remnant vegetation, no vegetation clearing is required for the construction of the tower as it will be constructed in an already cleared area.

Access to the site will be directly from Cubbine Road, via an internal all-weather farm access track through the property as shown in the Site Plan. Access to the site during construction will amount to one semi-trailer accessing the site on one occasion (total of two 'movements' – one in and one out); followed by one six-wheeler Hiab accessing the site on one occasion (total of two 'movements' – one



in and one out); and then lastly one commercial ute on two occasions (total of four 'movements' – two in and two out) – with construction anticipated to take two days.

At the completion of construction, it is highly unlikely that the applicant will be required to access the site for ongoing maintenance as much can be undertaken via the remote access software by our experienced and qualified technicians. However, if a need arises, it will be by a light vehicle (commercial ute) and would be on one occasion (total of two 'movements' – one in and one out). It is not proposed to establish formalised parking given the very infrequent nature of the access required to the tower once construction is complete and the tower is 'live'.



Please refer to attached Site Plan in **Attachment 4** showing the location of the proposed tower and associated infrastructure, proposed access location and the access pathway.

As the proposed tower is for wireless broadband only and does not transmit electromagnetic waves/fields to mobile phones, therefore it does not emit electromagnetic radiation and does not require an Environmental EME (Electromagnetic Energy) Report to be prepared or provided to support the development application.

**Figure 4: Photo of Tower and Communication Hut (Source: CRISP Wireless)**

## Planning Scheme and other Legislation

### The Planning Scheme

The proposed use will be assessed against the Shire of Tammin Town Planning Scheme 2 (*the Planning Scheme*).

The Planning Scheme provides a definition for the proposed use as follows:

***“telecommunications infrastructure: means premises used to accommodate the infrastructure used by or in connection with a telecommunications network including any line, equipment, apparatus, tower, antenna, tunnel, duct, hole, pit or other structure related to the network.***

The proposed telecommunications tower and associated infrastructure is consistent with the definition.

The subject land is located in the Rural Zone and the Zoning Table in the Planning Scheme designates Telecommunications Infrastructure installations as 'A', a discretionary use requiring local government approval. Additionally, it also means that the use is not permitted unless the local government has exercised its discretion by granting development approval after advertising the application in accordance with clause 64 of the deemed provisions.

[Section 64 of Schedule 2 Deemed provisions for local planning schemes of the Planning and Development (Local Planning Schemes) Regulation 2015 requires advertising of complex applications for development approval]



Under Schedule 2 – *Additional Site and Development Requirements* – Clause 1 (1) refers to setbacks and Clause 3 (4) states that all proposals for development in the Rural zone must have regard to both on-site and off-site impacts and, where deemed necessary by the local government, such proposals should be accompanied by information addressing the following:

- Environmental values and any environmental risks

**Response:** The proposed telecommunications facility is to be erected on an unusable, rocky outcrop, that will have minimal, to no impact on the environmental values and does not pose any environmental risks to the area.

- The potential for land use conflict.

**Response:** The proposed telecommunications facility does not affect the continuation of broad acre farming on the subject land. The facility will be located outside of the usable cropping land on the property and will not interfere with farming processes.

- The potential impacts and restrictions on approved uses on adjacent or nearby locations.

**Response:** The proposed telecommunications facility does not affect the continuation of broad acre farming on the subject land. The facility will be located outside of the usable cropping land on the property and will not interfere with farming processes.

- The separation distances and/or buffers relating to a potentially incompatible land use which need to be provided on-site. Setbacks in the rural zone shall be Front = 20m; Rear = 20m; Sides = 20m.

**Response:** The proposed telecommunications facility is to have the following setbacks (approx.): Front (south) = 600m; Rear (North) = 725m; Sides (West & East): 300m and 800m respectively. No buffers are required as this is not considered an incompatible land use with the current land use (broadacre farming).

We have addressed the proposal against the objectives of the Rural Zone under Part 3, 16 (2) of the Planning Scheme as follows:

- To provide for the maintenance or enhancement of specific local rural character.

**Response:** The proposed telecommunications facility will not adversely impact the specific local rural character. It is to be located in such a position, that even though it is high in the landscape, it will not adversely impact on the rural amenity as is no different to other towers/power poles that are found within the man-made landscape.

- To protect broad acre agricultural activities such as cropping and grazing and intensive uses such as horticulture as primary uses, with other rural pursuits and rural industries as secondary uses in circumstances where they demonstrate compatibility with the primary use.

**Response:** The proposed telecommunications facility is considered compatible with the primary use of the area (broadacre agriculture) and will not affect, nor impact on it. The telecommunications facility will be of benefit to the landowners in the District due to the significant enhancement and improvements in the provision of internet connectivity and reliability.

- To maintain and enhance the environmental qualities of the landscape, vegetation, soils and water bodies, to protect sensitive areas especially the natural valley and watercourse systems from damage.





**Response:** The current environmental qualities of the landscape, vegetation, soils and water bodies will not be adversely impacted, nor will the natural valley or watercourse systems. The proposed location of the tower is on a rocky outcrop that is currently an unusable part of the lot as far as broadacre agriculture is concerned. No clearing is required in the construction works. The proposed location is also outside of the mapped remnant vegetation areas as can be seen in Figure 3 above.

- To provide for the operation and development of existing, future and potential rural land uses by limiting the introduction of sensitive land uses in the Rural zone.

**Response:** The proposed telecommunications facility is not considered a sensitive land use and therefore will not impact on the operation of any existing, future or potential rural land uses.

- To provide for a range of non-rural land uses where they have demonstrated benefit and are compatible with surrounding rural uses.

**Response:** The proposed telecommunications facility is considered a non-rural land use and it is one that will definitely have a demonstrated benefit to the District – with improvements in digital connectivity to be provided as part of the provision of the installation.

#### State Planning Policy 5.2 – Telecommunications Infrastructure

The intent of State Planning Policy 5.2 – Telecommunications Infrastructure is to “balance the need for effective telecommunications services and effective roll-out of networks, with the community interest in protecting the visual character of local areas”.

As stated in the Policy, adequate and reliable telecommunications are essential for all aspects of contemporary community life, from supporting the State’s economy to creating and maintaining connected and cohesive social networks. Contact between emergency services and the community increasingly relies on the telecommunications networks. The importance of telecommunications services in Western Australia is recognised in the Western Australian Planning Commission’s (WAPC’s) State Planning Strategy 2050 (2014), which advocates for the provision of an effective state-wide telecommunications network. This network includes both above and below ground infrastructure to support both fixed line and wireless telecommunications.

The proposed development provides a wireless broadband network through line-of-site towers and complies with the intent of the Policy. Sites for telecommunications facilities are chosen for elevation, distance to other towers and ease of access. In this case, the facility is set well away from roads and sensitive receptors and is unlikely to affect visual amenity.

Therefore, the proposal is consistent with the principles set out in the Policy and can be balanced with the need for effective telecommunications services.

#### State Planning Policy 3.7 – Planning in Bushfire Prone Areas

Part of the subject land, and the location of the proposed telecommunications facility, has been identified in the SLIP mapping as being within a Bushfire Prone Area, as shown in Figure 2 above.

The intent of the SPP is “to implement effective, risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure”. Sites for telecommunications facilities are chosen for elevation, distance to other towers and ease of access.

While the proposed facility is to be located within a bushfire prone area, the development does not result in an increase of residents or employees, nor does it increase the bushfire threat. Further, access is provided through areas that are not affected by the overlay mapping.

Accordingly, a bushfire assessment has not been carried out given the above.



## Conclusion

The proposed development of a telecommunications facility will provide a much-needed service to the local community. The location of the proposed tower is set well back from the road and will not impact on the privacy or visual amenity of the local residents.

The proposed location of the facility is outside of native vegetation mapping and does not require vegetation clearing.

The subject land is suitable for a telecommunications tower for the following reasons:

- ✓ The site has direct line of site to other proposed towers in the region and across the network.
- ✓ The site has safe access, and the development will not create a nuisance to current traffic volumes and usage.
- ✓ The subject land is not flood prone.
- ✓ The development will not increase the threat of bushfire or put lives in danger.
- ✓ The proposed location has not been identified as containing native vegetation or Aboriginal artefacts. Search of Aboriginal Cultural Heritage has been conducted and there are no reports of ACH at this location.
- ✓ The proposed facility will not interfere with agricultural land; and
- ✓ Potential impacts are low.

Therefore, Council can be confident in approving the telecommunications facility as it will satisfy an essential community need.

## Attachments

Attachment 1	Application for Local Government Development Approval
Attachment 2	Landowner's Consent
Attachment 3	Certificate of Title
Attachment 4	Site Plan
Attachment 5	Tower Technical Drawings
Attachment 6	Antenna Infrastructure




# ATTACHMENT 1: APPLICATION FOR LOCAL GOVERNMENT DEVELOPMENT APPROVAL

## SHIRE OF TAMMIN TOWN PLANNING SCHEME NO.1



### FORM 1 - APPLICATION FOR DEVELOPMENT APPROVAL

Landowner Details		
Name/s: Benjamin Lloyd Wilson and Ian Brownlie Wilson		
ABN (if applicable): N/a		
Postal Address: 155 Wilson Road, Quairading WA		Postcode: 6383
Work Phone:	Fax:	E-mail: bwilson.wilo@gmail.com
Home Phone:		
Mobile Phone: 0437 452 001		
Contact Person for Correspondence: Ben Wilson		
Signature: Please refer to attached Landowner consent		Date: 07/07/2023
Signature: Please refer to attached Landowner consent		Date: 07/07/2023
<b>NOTES:</b>		
<p>i) Use and attach a separate copy of this page where there are more than two (2) landowners.</p> <p>ii) The signature/s of all registered owner(s) as listed on the land's Certificate of Title is required. This application cannot proceed without the required signature/s. For the purposes of signing this application an owner includes the persons referred to in the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2 clause 62(2). Land owned by an incorporated body (i.e. a company) must be signed by:</p> <ul style="list-style-type: none"> <li>- 1 director of the company, accompanied by the company seal; or</li> <li>- 2 directors of the company; or</li> <li>- 1 director and 1 secretary of the company; or</li> <li>- 1 director if a sole proprietorship company.</li> </ul> <p>Print the full names and positions of company signatories underneath the signatures.</p> <p>iii) A copy of the Certificate of Title for all land the subject of this application must be provided and can be purchased through Landgate directly if required.</p> <p>iv) Development Applications relating to Unallocated Crown Land, Unmanaged Crown Reserves, land under management order to the Shire of Tammin where the development is not consistent with the reserve's purpose, or is used for commercial purposes, or land which is subject to a lease issued under the Land Administration Act 1997 need to be referred to the Lands Division of the Department of Planning, Lands and Heritage for consideration and signing.</p>		
Applicant Details (if different from owner)		
Name/s: CRISP Wireless Pty Ltd		
Address: PO Box 1004, Narrogin WA		Postcode: 6312


Work Phone: 6809 2100 Home Phone: Mobile Phone:	Fax:	E-mail: lballard@crispwireless.com.au
Contact Person for Correspondence: Leigh Ballard		
Signature: 	Date: 07/07/2023	
<b>NOTES:</b>		
<p>i) Failure to provide a suitably completed development application form, a copy of the relevant Certificate/s of Title, sufficient plans and other supporting information and/or the correct application fee may result in the application being returned or placed on hold.</p> <p>ii) The application fee payable will be confirmed by the local government following receipt of the application. Processing of the application will not commence until the fee is paid in full.</p> <p>iii) As per Schedule 2 clause 64 of the Planning and Development (Local Planning Schemes) Regulations 2015 the information and plans provided with this application may be made available by the local government for public viewing in connection with the application.</p> <p>iv) If public advertising of the application is required by the local government an additional fee in accordance with the local government's adopted schedule of fees and charges will be payable by the applicant. Further processing of the application following completion of public advertising will not proceed until the additional fee is paid in full.</p> <p>v) The original of this application and supporting information and plans will be retained by the local government for its records and will not be returned to the applicant/landowner following final determination.</p>		
<b>Property Details</b>		
NOTE: The details provided must match those shown on the relevant Certificate/s of Title.		
Lot No: 12334	House/Street No:	Location No:
Survey Diagram or Plan No: 225111	Certificate of Title Volume No: 1060	Certificate of Title Folio No: 743
Title encumbrances (e.g. easements, restrictive covenants etc. as listed on the Second Schedule of the relevant Certificate/s of Title):		
<ol style="list-style-type: none"> <li>Title excludes the land shown on S.O Diagram 57767</li> <li>O356845: Mortgage to Rabobank Australia Ltd (Registered 28/02/2020)</li> </ol>		
Street name: accessed off Cubbine Road	Suburb: Tammin	
Nearest street intersection: Ralston Road		
<b>Proposed Development:</b>		
Nature of development: <input type="checkbox"/> Works (New construction works with no change of land use) <input type="checkbox"/> Use (Change of use of land with no construction works) <input checked="" type="checkbox"/> Works and Use NOTE: If the proposal involves advertising signage the Additional Information for Development Approval for Advertisements form (i.e. a Form 2) must be completed and submitted with this application.		
Is an exemption from development claimed for part of the development? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
If yes, is the exemption for: <input type="checkbox"/> Works <input type="checkbox"/> Use		
Description of proposed works and/or land use: Telecommunications Infrastructure - Communication Repeater Point - Wireless Broadband		

Description of exemption claimed (if relevant): Nil
Nature of any existing buildings and/or land use: General Farming - Agriculture - Extensive (ie: cropping, grazing and associated improvements)
Approximate cost of proposed development (excluding GST): \$30,000
<b>OFFICE USE ONLY</b>
Date application received: Received by: Application reference number: Application fee payable: \$ Date of receipt of application fee from applicant: Receipt number for application fee:

## ATTACHMENT 2: LANDOWNER CONSENT

I, Benjamin Llyod Wilson and Ian Brownlie Wilson, being the registered landowners of the premises identified as Lot 12334 on DP 225111, consent to the submission of an application for Development Approval by CRISP Wireless Pty Ltd on the premises described above for the purpose of a Telecommunications Tower and associated infrastructure.

**SIGNED**

DocuSigned by:  


6C8CDD4C59364E3...

**Benjamin Lloyd Wilson**

Date 28/6/2023 | 9:05:20 PM AWST

**SIGNED**

DocuSigned by:  


0EEBA07ECBA3468

**Ian Brownlie Wilson**

Date 6/7/2023 | 8:26:55 AM AWST

# ATTACHMENT 3: CERTIFICATE OF TITLE

WESTERN



AUSTRALIA

REGISTER NUMBER <b>12334/DP225111</b>	
DUPLICATE EDITION <b>3</b>	DATE DUPLICATE ISSUED <b>4/1/2019</b>

## RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 1060 FOLIO 743

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

*BGRoberts*  
REGISTRAR OF TITLES



### LAND DESCRIPTION:

LOT 12334 ON DEPOSITED PLAN 225111

### REGISTERED PROPRIETOR: (FIRST SCHEDULE)

BENJAMIN LLOYD WILSON OF 155 WILSON ROAD QUAIRADING WA 6383

IN 51/102 SHARE

IAN BROWNLIE WILSON OF 119 MCLENNAN STREET QUAIRADING WA 6383

IN 51/102 SHARE

AS TENANTS IN COMMON

(T 0059532 ) REGISTERED 21/12/2018

### LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

- TITLE EXCLUDES THE LAND SHOWN ON S.O.DIAGRAM 57767.
- \*O356845 MORTGAGE TO RABOBANK AUSTRALIA LTD REGISTERED 28/2/2020.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.  
\* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.  
Lot as described in the land description may be a lot or location.

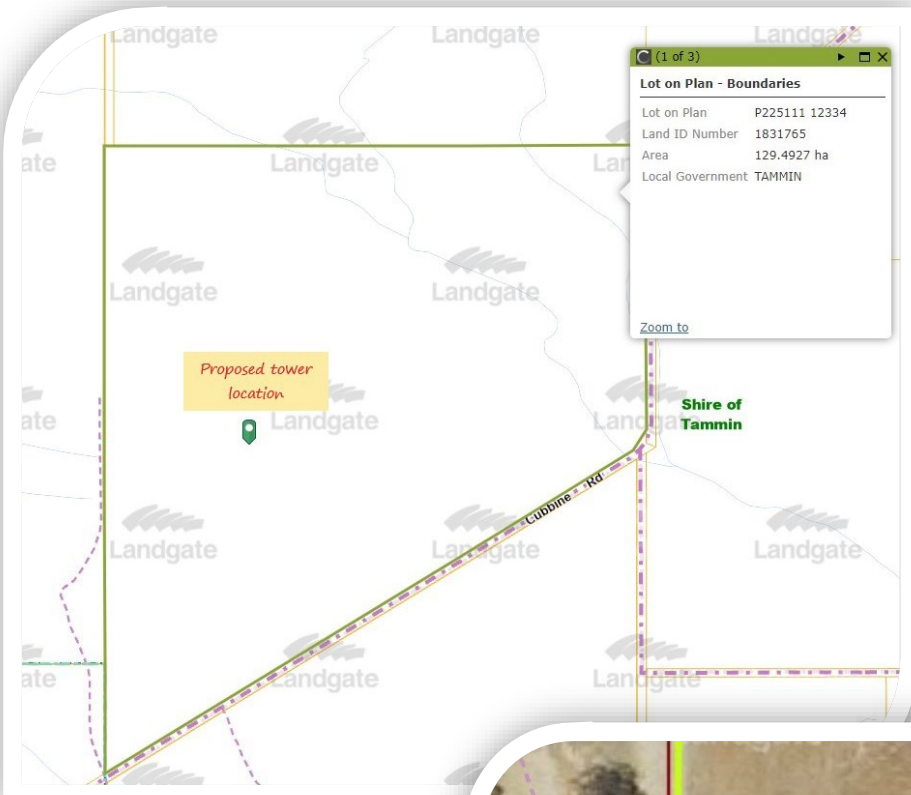
-----END OF CERTIFICATE OF TITLE-----

### STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1060-743 (12334/DP225111)  
PREVIOUS TITLE: 1052-810  
PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.  
LOCAL GOVERNMENT AUTHORITY: SHIRE OF TAMMIN

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING  
O356845



**Attachment 4: Site Plan**

**RCP2-011-K**

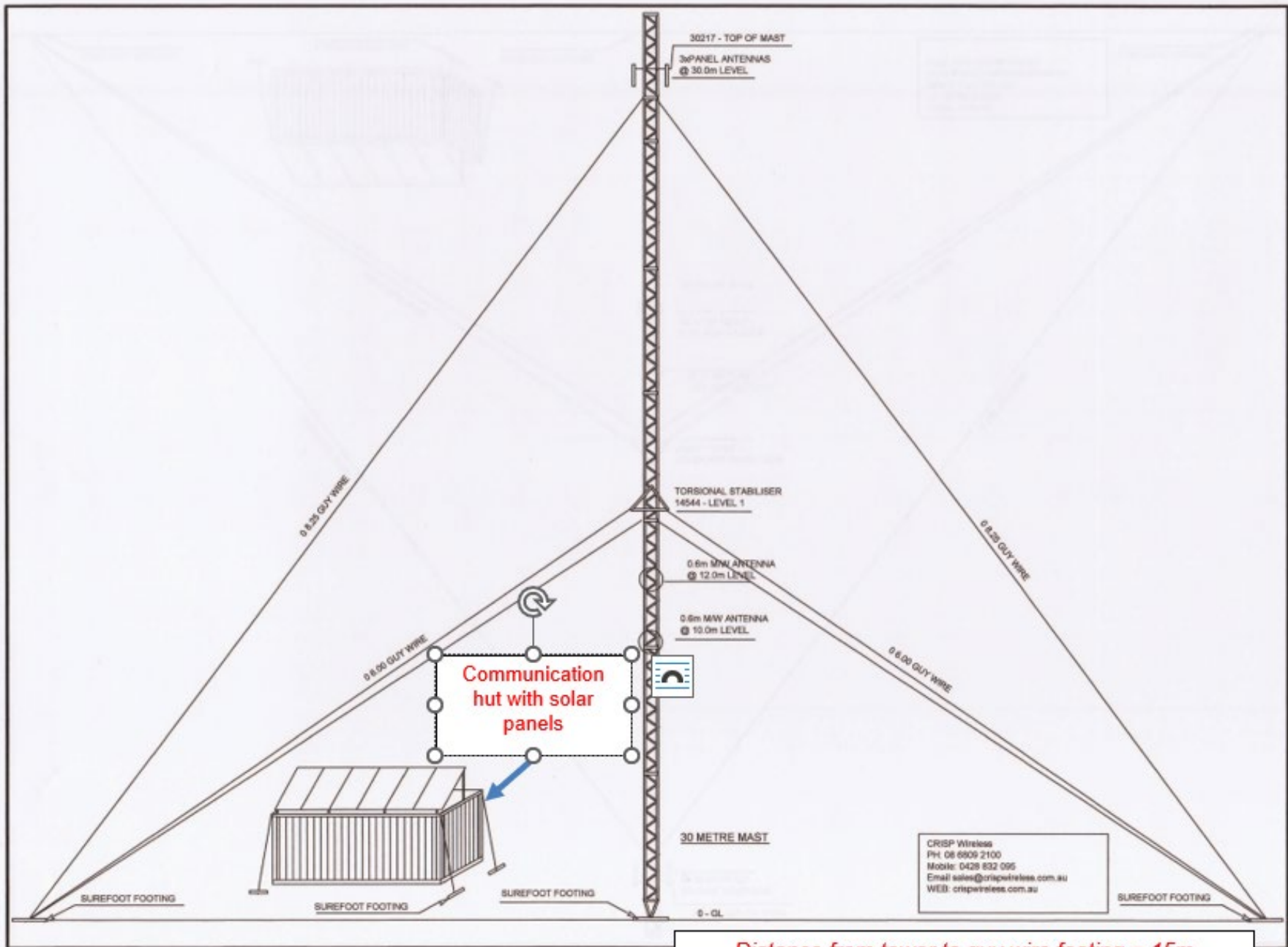
**Wilson Site**

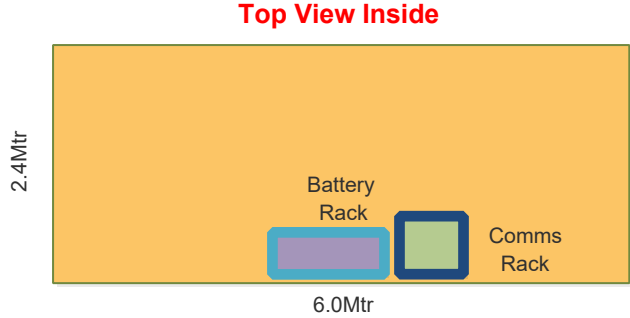
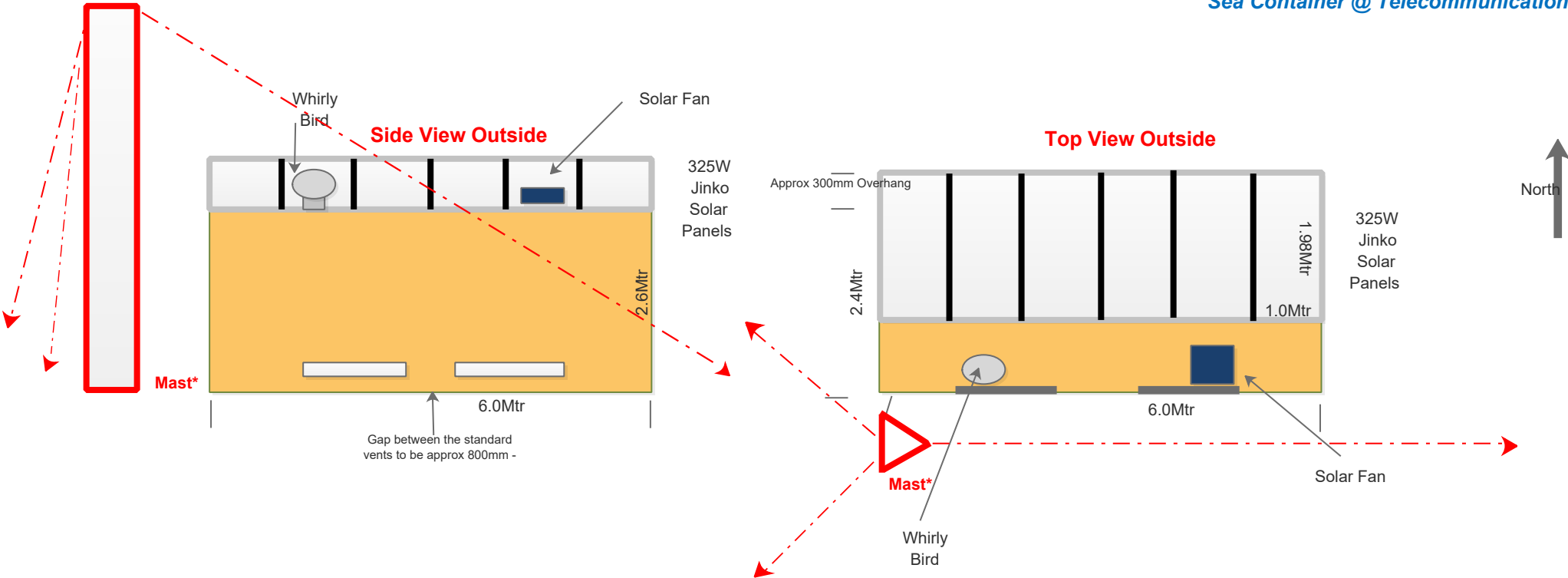
**Lot 12334 on DP225111**

**accessed off Cubbine Road, Tammin**



# ATTACHMENT 5: TOWER TECHNICAL DRAWINGS

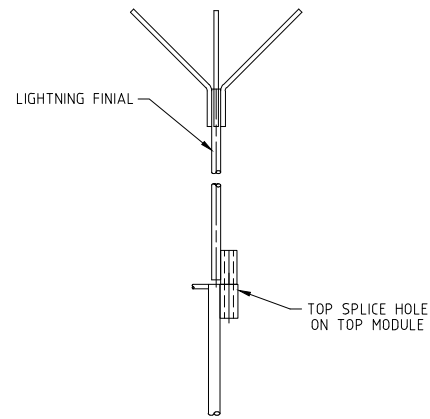




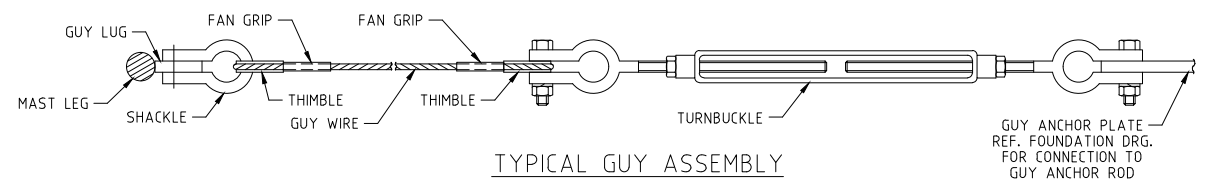
**Contents of Sea Container**

- \* Switching cabinet suitable for indoor use only
- \* 12 x 130amp Deep Cycle Batteries
- \* 4 x 24w 300-watt solar panels (mounted on roof)
- \* 48v 3000-watt inverter
- \* Wiring, switch, battery monitors
- \* TUPS Controlled Black Box

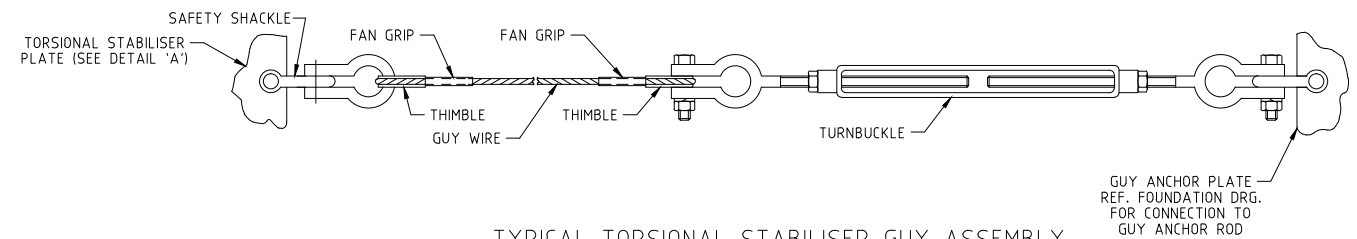
\*Distance between mast and sea container not to scale.



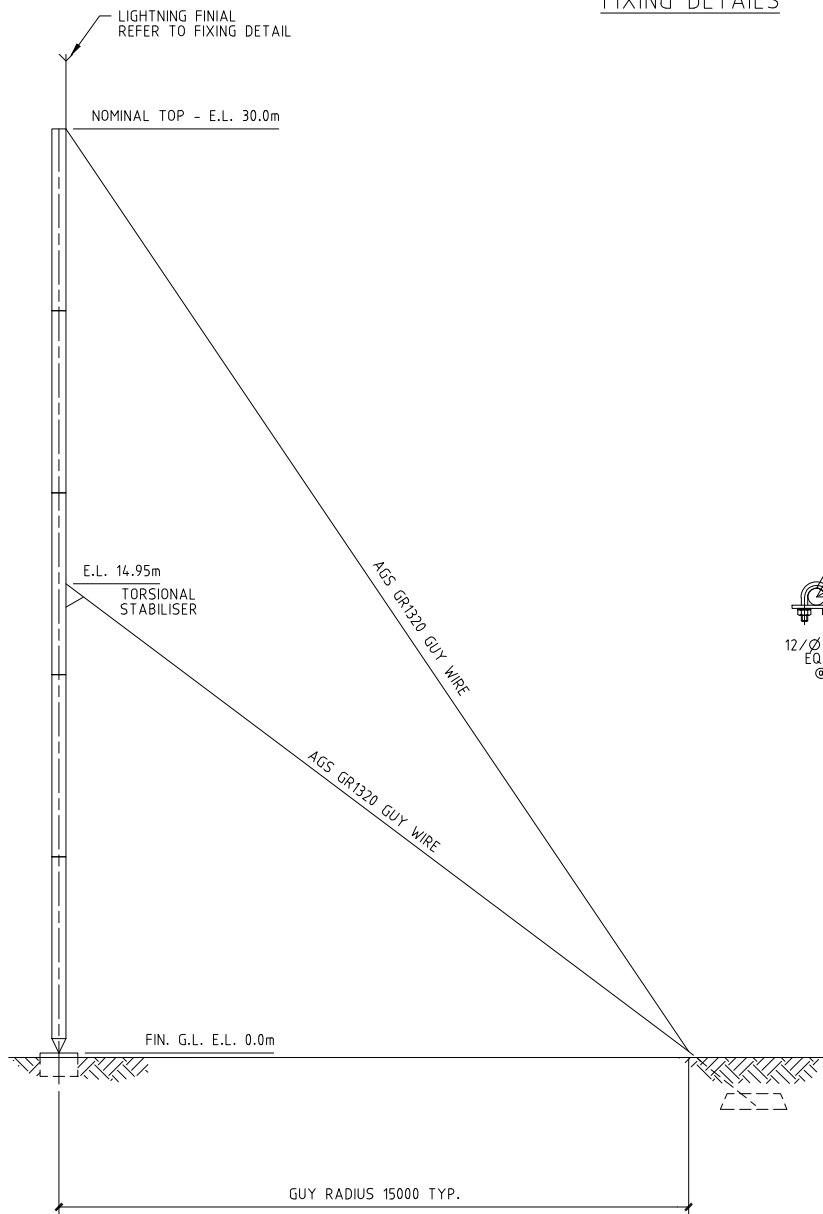
LIGHTNING FINIAL  
FIXING DETAILS



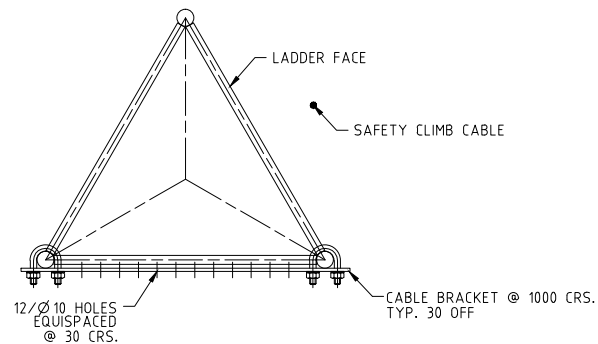
TYPICAL GUY ASSEMBLY



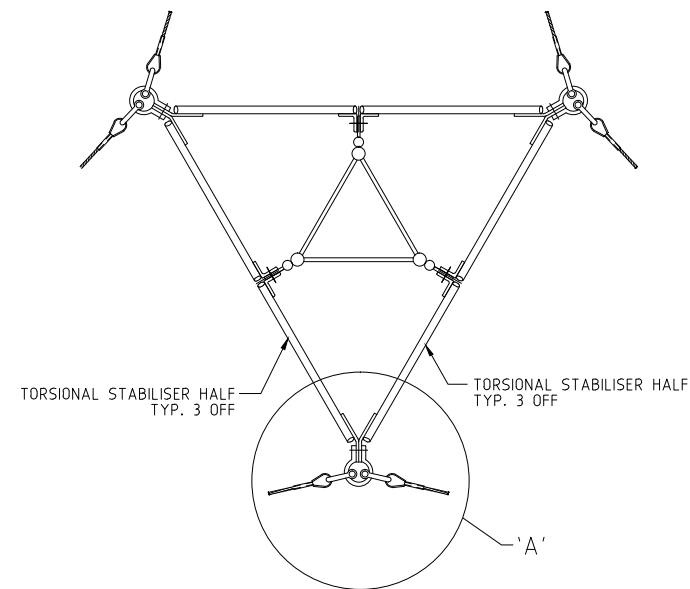
TYPICAL TORSIONAL STABILISER GUY ASSEMBLY



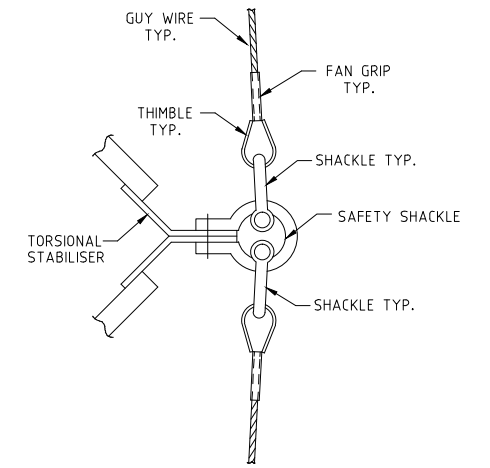
MAST ELEVATION



TYPICAL PLAN



PLAN AT TORSIONAL



DETAIL 'A'

GENERAL NOTES

1. REFER TO FEC STANDARD NOTES F1/1/SN.

DRG. No.	Mk. No.	ITEM No.	No. OFF	DESCRIPTION	CUT LG.	MATERIAL/DRG. No.
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MATERIAL LIST

This design or drawing is not sold but lent. It remains the property of this company and is subject to recall. Its contents must not be communicated to any person whatsoever without the written consent of FEC.

**FUTURE ENGINEERING & COMMUNICATION PTY LTD**  
 29 Spencer Street, Cockburn Central WA 6164  
 Ph: +61 8 9417 4999 - Fax: +61 8 9417 5666  
 Email: admin@futureau.com.au

DRAWN: MP	ENG:	30m F450 GUYED MAST GENERAL ARRANGEMENT
CHECKED:	APPV.:	
DATE: 17-10-18	REV.:	SCALE: NTS
DATE:	APPV.:	DWG No.: Q7436-F450
DATE:	APPV.:	A1

INFORMATION ONLY  
NOT TO BE USED  
FOR CONSTRUCTION

F1/1/SN	FEC STANDARD NOTES	REF	REVISION	DATE	APPV.
REFERENCE DRAWINGS					



Future Engineering and Communication Pty Ltd ACN 050 840 321 as trustee  
for the Future Engineering & Communication Unit Trust ABN 73 037 646 279  
7 Tamara Drive Cockburn Central Western Australia 6164  
Phone: +61 8 9417 4999 Facsimile: +61 8 9417 5666  
Email: admin@futureau.com.au Web: www.futureau.com.au

## STRUCTURE DESIGN CERTIFICATION

### Structure Data

<b>Structure Type:</b>	FEC Guyed Mast	<b>Job Number:</b>	J3903/3
<b>Height:</b>	30m	<b>Date:</b>	31/08/2022
		<b>Client:</b>	Crisp Wireless

### Site Details

Site Name						
Site ID						
Latitude	-32.5696°	-33.0971°	-32.59062°	-32.67218°	-32.10918°	-33.08859°
Longitude	118.9336°	118.11816°	118.17027°	117.22746°	116.89119°	118.5201°

### Site Parameters

<b>Wind loading standard:</b>	AS1170.2-2021	<b>Terrain Category:</b>	2.00*
<b>Wind region:</b>	A1*	<b>Topographical Multiplier, <math>M_t</math>:</b>	1.17*
<b>Wind return period:</b>	500 years*	<b>Wind Direction Multiplier, <math>M_d</math>:</b>	1.00*

### Structural design standards:

AS4100-2020, AS3995-1994 & AS3600-2018/Amdt1

### Serviceability Criteria:

Maximum microwave rotation < 1° @ 27m/s

### Antenna Loading Data (Height is measured from base of structure to centre line of antenna)

ID	Height AGL (m)	Antenna Type	Azimuth (°)	Effective area (m <sup>2</sup> )	Feeder cable	Status (P/E)	Carrier
1	31.00	Lightning Finial	-	0.100*	-	P	-
2	30.00	4 x 800mm x 150mm Panels	-	0.720*	-	P	-
3	28.00	1 x Omni	-	0.100*	-	P	-
4	27.00	Future Allowance	-	0.500*	-	P	-
5	18.00	1 x Ø600mm M/W	-	0.503*	-	P	-
6	17.00	1 x Ø600mm M/W	-	0.503*	-	P	-
7	16.00	1 x Ø600mm M/W	-	0.503*	-	P	-

### Ancillary Loading Data

<b>Tower Access:</b>	Climbing on mast face c/w safety climb.
<b>Feeder Arrangement:</b>	External feeder brackets on mast face.



Future Engineering and Communication Pty Ltd ACN 050 840 321 as trustee  
for the Future Engineering & Communication Unit Trust ABN 73 037 646 279  
7 Tamara Drive Cockburn Central Western Australia 6164  
Phone: +61 8 9417 4999 Facsimile: +61 8 9417 5666  
Email: admin@futureau.com.au Web: www.futureau.com.au

**Work covered by this certificate:**

Design & certification of 6 x 30m guyed masts and associated guy attachments.  
Design & certification of 1 x new antenna mount.  
Foundation design by others and excluded from this certification.

**Work Specified on the following document's:**

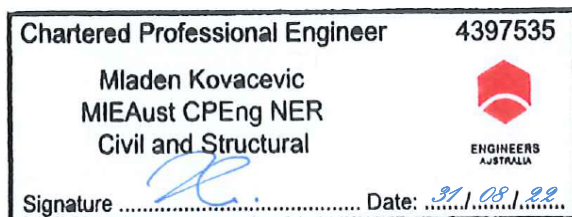
FEC Drawings: J3903/1/3  
J3903/2/AM

**Foundation Reactions:**

**Mast Base:** Compression = 85.35 kN  
Shear = 4.04 kN  
**Guy Anchors:** Horizontal = 38.63 kN  
Uplift = 30.00 kN

**Prepared by:** Tom Wang

**Approved by:**



On behalf of: Future Engineering & Communication Pty Ltd.

**Note**

- Analysis is based on information provided in client supplied data unless shown by "\*\*". See FEC Basis of Structural Review Document FE275 attached.
- This certificate does not Cover anything other than the structure and foundation described above. Eg. Existing headframe, mounting frames, antenna mounts, cable trays, etc. are not covered

# ePMP™ 3000 Sector Antenna

## ATTACHMENT 6: ANTENNA INFRASTRUCTURE



Cambium Networks has deployed more than five million radios around the world achieving unparalleled degrees of scalability. Continuing the tradition of designing and manufacturing industry leading antenna solutions, the ePMP 3000 4X4 sector antenna encompasses all the key differentiations of the Cambium Antenna line and adds 4X4 Multi User MIMO Capability. Designed to work in 5 GHz spectrum and 90 degree coverage, the antenna is an integral part of the ePMP 3000 Access Point and allows for Multi User MIMO Operation.

### KEY DEPLOYMENT ADVANTAGES

- **Frequency Re-use:** Designed for ABAB channel re-use (two channels covering four sectors), the sector antenna has a minimum 30 dB front to back ratio over a wide rear facing aperture.
- **Channel Flexibility:** Consistent gain from 4.9 to 6.0 GHz allows the operator to select a channel anywhere in the band and achieve the expected performance.
- **Consistent Coverage:** Excellent null fill capabilities of the antenna allow for broad geographical coverage within a sector even near the base of the tower and the edges of the sector.
- **Designed for the Installer:** Small, compact design, integrated ePMP radio mount and GPS antenna integration.
- **Predictable Performance:** The sector antenna is integrated into Cambium Networks LINKPlanner. The 3D model shows coverage at all elevations and across the azimuth.

### KEY SPECIFICATIONS:

- 17 dBi gain
- 4.9 to 5.97 GHz spectrum
- 30 dBi front to back ratio
- IP 65 ruggedization

## SPECIFICATIONS

### ePMP 3000 SECTOR ANTENNA

Model Number	C050910D301A
Frequency Range	4.9 GHz to 5.97 GHz
Gain	17 dBi
3 dB Beamwidth - Azimuth	70 degrees
3 dB Beamwidth - Elevation	6 degrees
Electrical Downtilt	-2 degrees
Polarization	2X Horizontal, 2X Vertical

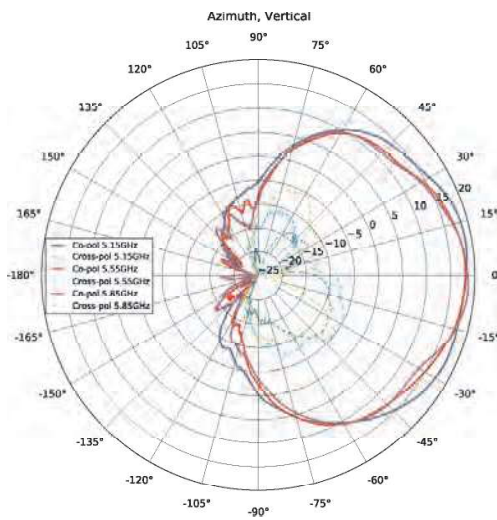
# SPECIFICATIONS

## ePMP 3000 SECTOR ANTENNA

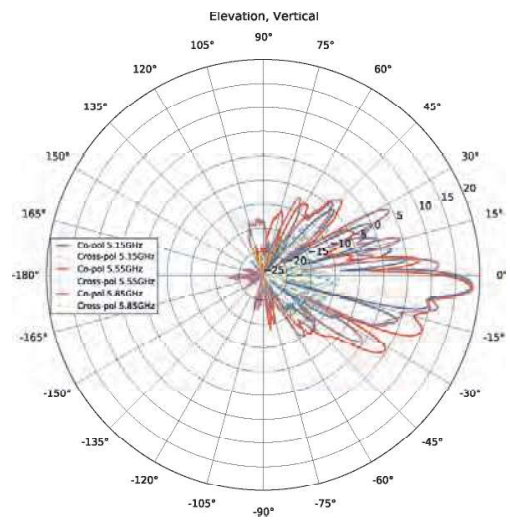
Model Number	C050910D301A
Port-to-Port Isolation	> 20 dB
Front-to-Back Ratio	30 dB
Maximum Input Power	5 W
Input Impedance	50 ohms
Mounting Connectors	4 x RP SMA
Mounting Hardware	Included for mounting to mast diameters 2" to 4" (5 cm to 10 cm) -10 to +5 degree tilt Hardware included to connect ePMP access point to back of antenna body
Physical Dimensions	Antenna Body: 23.4" (H) x 9.6" (W) x 3.25" (D) (594 mm x 157 mm x 110 mm)
Weight	Antenna Body: 8.0 lbs, 3.7 kg w/ ePMP 3000 Access Point and Mounting Brackets: 13.8 lbs, 6.3 kg
Environmental	IP65
Radome Material	UV Protected ABS
Operating Temp	-40°C to 60°C (-40°F to 140°F)

## ANTENNA PATTERNS

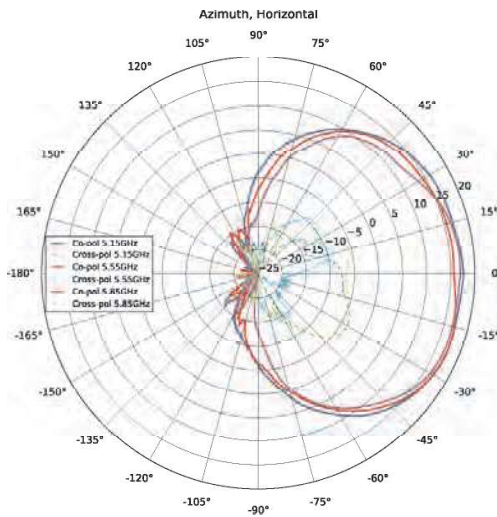
Channel 0 Vertical Polarization Azimuth



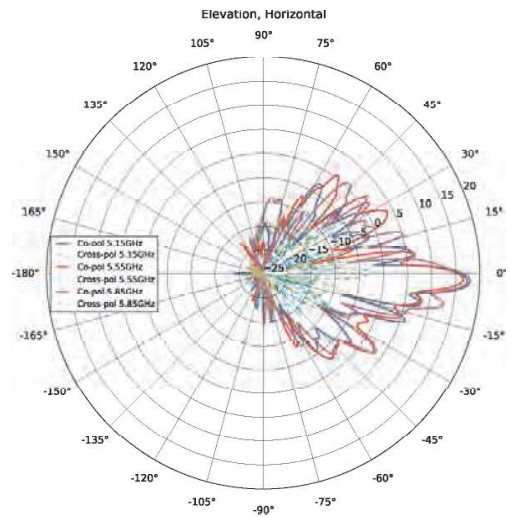
Channel 0 Vertical Polarization Elevation



Channel 1 Vertical Polarization Azimuth

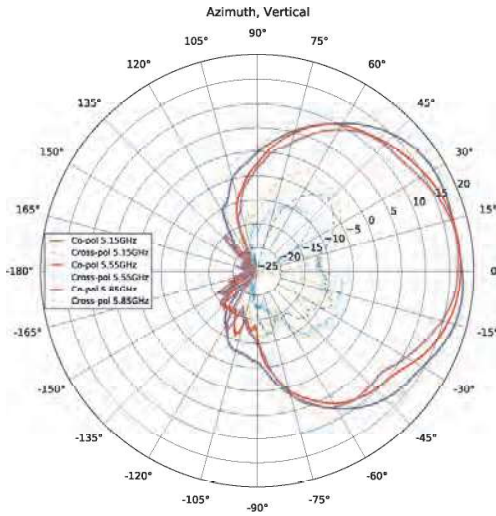


Channel 1 Vertical Polarization Elevation

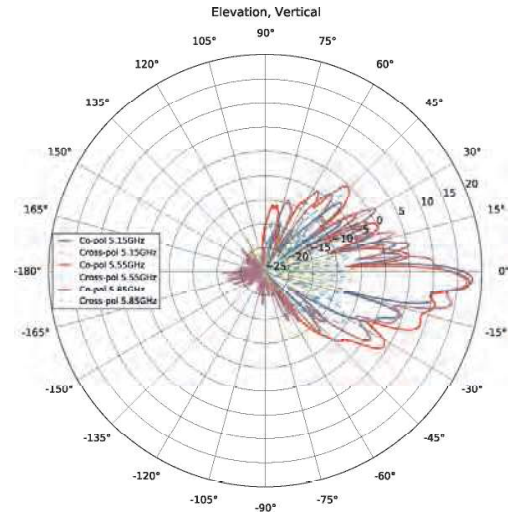


# ANTENNA PATTERNS

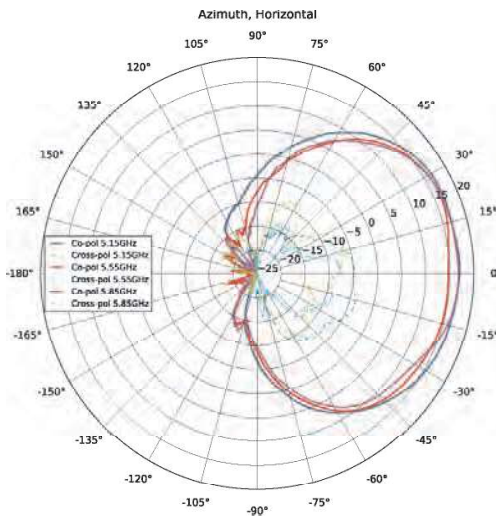
Channel 2 Vertical Polarization Azimuth



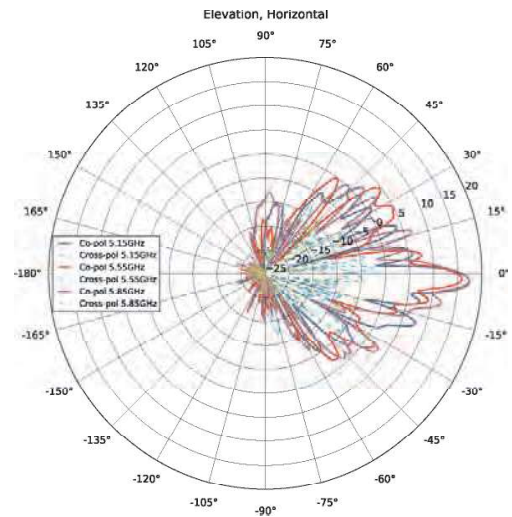
Channel 2 Vertical Polarization Elevation



Channel 3 Vertical Polarization Azimuth



Channel 3 Vertical Polarization Elevation







# 5.25 - 5.85 GHz High Performance Dual Pole Parabolic Reflector Antenna

High Performance Dual Pole Parabolic Reflector Antennas from Cambium Networks are well-suited for deployment with any of the sub-6 GHz PTP products. They are engineered to provide ETSI class 2/3 radiation pattern performance as well as excellent gain. Field-proven preassembled antennas and robust pole mounts ensure “set and forget” installation with minimal post installation maintenance. The included radome ensures robust and reliable performance under the most challenging conditions.

## FEATURES AND BENEFITS:

- High Performance ETSI Class 2/3\* Parabolic Antennas - Excellent performance for a wide range of applications
- Fully Preassembled at the Factory - Simplifies installation on site and guarantees “factory tested” quality
- Industry leading 7year warranty
- Suitable for deployment with PTP 650, PTP 670, PTP 700 and PTP 450i connectorized radios.
- Fully supported in LINKPlanner™ providing accurate predictions of PTP link performance and availability. LINKPlanner™ is available at no charge from the support website at [cambiumnetworks.com](http://cambiumnetworks.com).

\*ETSI Class depends on frequency band



## SPECIFICATIONS

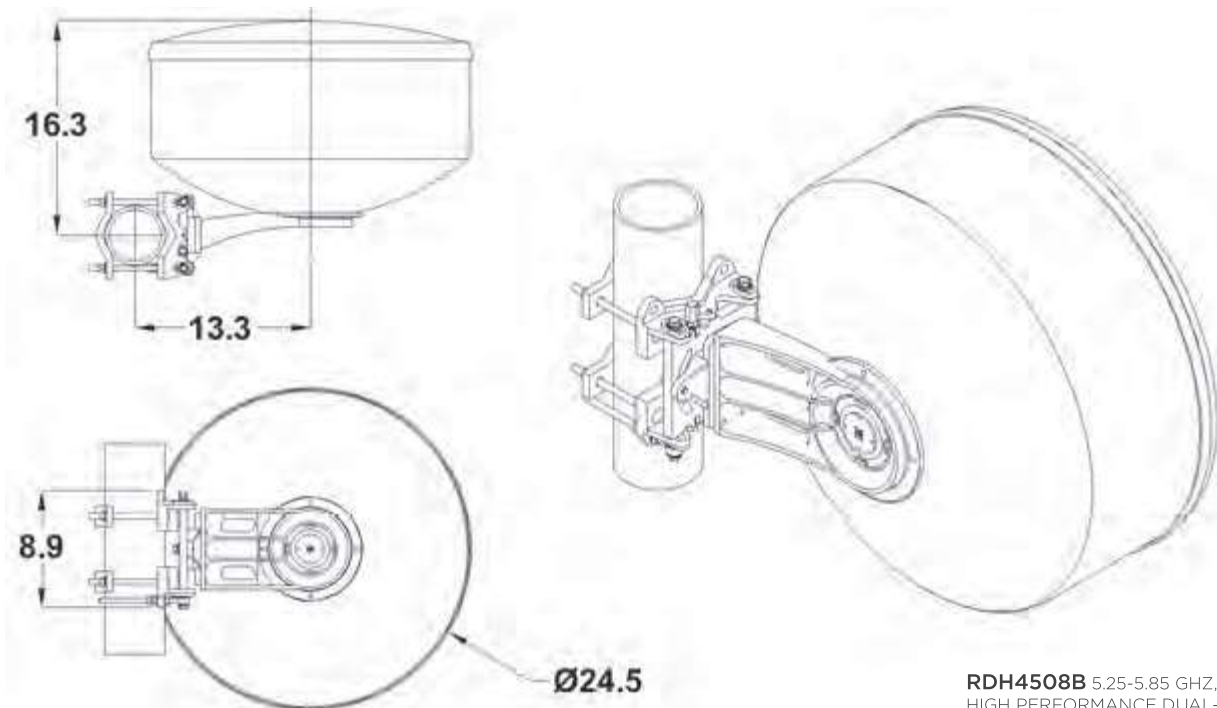
### GENERAL

Antenna Type	High Performance Parabolic Reflector Antenna
Size, nominal	2 ft (0.6 m); 3 ft (0.9 m); 4 ft (1.2 m)
Polarization	Dual
Standard RF Connector Type	N-Female

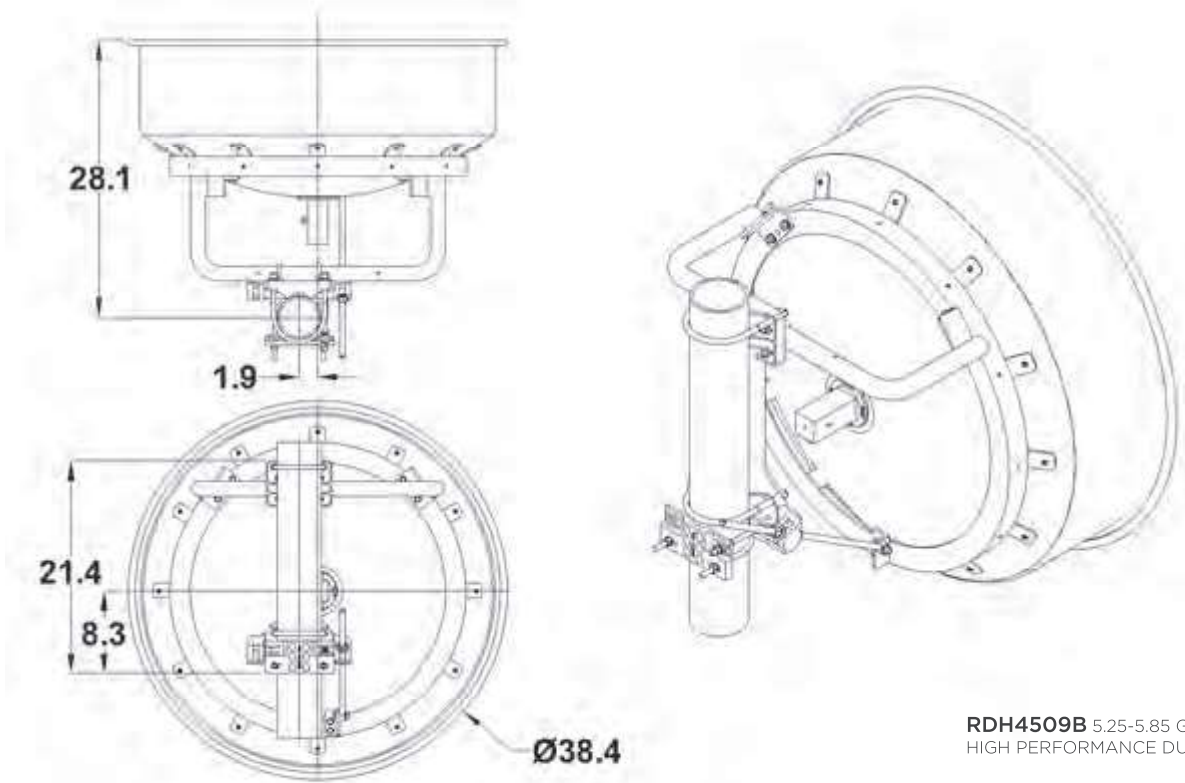
## SPECIFICATIONS

<b>ELECTRICAL</b>	<b>2 FT (0.6 M)</b>	<b>3 FT (0.9 M)</b>	<b>4 FT (1.2 M)</b>
Model Number	RDH4508B	RDH4509B	RDH4510B
Description	5.25-5.85 GHZ, 2-FT (0.6M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 3-FT (0.9M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 4-FT (1.2M), HIGH PERFORMANCE DUAL-POL
Operating Frequency Band	5.25 - 5.85 GHz	5.25 - 5.85 GHz	5.25 - 5.85 GHz
Half Power Beamwidth, Horizontal	6.1 degrees	4.2 degrees	3 degrees
Half Power Beamwidth, Vertical	6.1 degrees	4.2 degrees	3 degrees
Cross-Polarization Discrimination	28 dB	30 dB	30 dB
Front to Back Ratio (F/B)	44 dB	46 dB	49 dB
Gain, Low Frequency	28.3 dB	31.8 dB	34.2 dBi
Gain, Mid Frequency	28.8 dB	32.3 dBi	34.7 dBi
Gain, High Frequency	29.3 dB	32.8 dBi	34.7 dBi
VSWR	1.5:1	1.5:1	1.5:1
Return Loss	-14 dB	-14 dB	-14 dB
<b>MECHANICAL</b>	<b>2 FT (0.6 M)</b>	<b>3 FT (0.9 M)</b>	<b>4 FT (1.2 M)</b>
Model Number	RDH4508B	RDH4509B	RDH4510B
Description	5.25-5.85 GHZ, 2-FT (0.6M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 3-FT (0.9M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 4-FT (1.2M), HIGH PERFORMANCE DUAL-POL
Fine Azimuth Adjustment	+/- 10 degrees	+/- 10 degrees	+/- 10 degrees
Fine Elevation Adjustment	+/- 30 degrees	+/- 25 degrees	+/- 25 degrees
Mounting Pipe Diameter, Min	2 inch   5.08 cm	4.5 inch   11.4 cm	4.5 inch   11.4 cm
Mounting Pipe Diameter, Max	4.5 inch   11.4 cm	4.5 inch   11.4 cm	4.5 inch   11.4 cm
Net Weight	27 lbs   12.3 kg	50 lbs   12.3 kg	85 lbs   38.3 kg
Wind Velocity Operational	90 mph   145 km/h	90 mph   145 km/h	90 mph   145 km/h
Wind Velocity Survival Rating	125 mph   201 km/h	125 mph   201 km/h	125 mph   201 km/h
Axial Force (FA)	202 lbs   899 N	403 lbs   1972 N	737 lbs   3278 N
Side Force (FS)	100 lbs   445 N	200 lbs   890 N	365 lbs   1623 N
Twisting Moment (MT)	194 ft-lbs   263 Nm	344 ft-lbs   466 Nm	784 ft-lbs   1063 Nm
Operating Temperature Range	-40 to +60 C	-40 to +60 C	-40 to +60 C
Max Pressure, PSIG, (if waveguide interface)	5	5	5
<b>REGULATORY COMPLIANCE</b>			
RoHS-compliant	Yes	Yes	Yes
<b>SHIPPING INFORMATION</b>	<b>2 FT (0.6 M)</b>	<b>3 FT (0.9 M)</b>	<b>4 FT (1.2 M)</b>
Model Number	RDH4508B	RDH4509B	RDH4510B
Description	5.25-5.85 GHZ, 2-FT (0.6M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 3-FT (0.9M), HIGH PERFORMANCE DUAL-POL	5.25-5.85 GHZ, 4-FT (1.2M), HIGH PERFORMANCE DUAL-POL
Package Type	Cardboard	Wood Crate	Wood Crate
Gross Weight	48 lbs   28.7 kg	143 lbs   69.8 kg	196 lbs   88.9 kg
Dimensions, L x W x H	31 x 31 x 25in   79 x 79 x 64 cm	47 x 28 x 48in   119 x 71 x 122 cm	59 x 35 x 60in   180 x 89 x 152 cm
Shipping Volume	13.9 cu ft   0.39 cu m	36.56 cu ft   1.04 cu m	71.7 cu ft   2.03 cu m

# TECHNICAL DRAWINGS

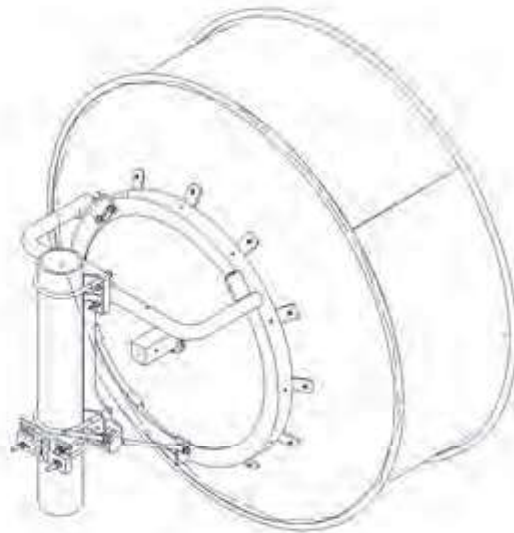
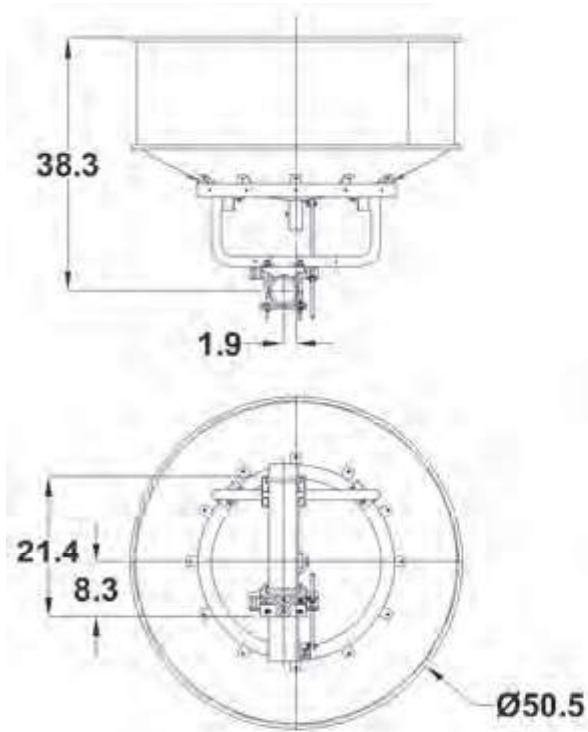


**RDH4508B** 5.25-5.85 GHZ, 2-FT (0.6M), HIGH PERFORMANCE DUAL-POL



**RDH4509B** 5.25-5.85 GHZ, 3-FT (0.9M), HIGH PERFORMANCE DUAL-POL

## TECHNICAL DRAWINGS



**RDH4510B** 5.25-5.85 GHz, 4-FT (1.2M),  
HIGH PERFORMANCE DUAL-POL

## TECHNICAL SPECIFICATIONS

	PTP 820S	PTP 820C + PTP 820C HP	PTP 820G	PTP 820F	PTP 820E	PTP 850E
Supported Frequency	6-38 GHz	6-38 GHz	6-38 GHz	6-38, 79%, 86-86 GHz	79%, 86-86 GHz	79%, 86-86 GHz
Use in the Network	Compact all outdoor multi-core	Compact all outdoor multi-core	Self Mount or all indoor, multi-carrier options	Self Mount or all indoor, multi-carrier options	Multi-band with PTP 820C/S	Multi-band with PTP 820C/S
Transport Technology	All packet	All packet	Hybrid and/or all packet	Hybrid and/or all packet	All packet	All packet
IDM Interface	None	16 x E1/T1	16 x E1/T1	16 x E1/T1	None	None
Modulation	QPSK to 2048 QAM w/ACM	QPSK to 2048 QAM w/ACM	QPSK to 4096 QAM w/ACM	QPSK to 4096 QAM w/ACM	8PSK to 1024 QAM w/ACM	8PSK to 312 QAM w/ACM
Channel Size	3.5 to 80 MHz	3.5 to 80 MHz	3.5 to 60 MHz	6.25-500 MHz 6-38 GHz, 14.4 to 17.1 MHz; 79-86 GHz, 62.5 to 5.0 MHz	62.5-500 MHz	250 MHz to 2 GHz
Capacity (Layer 2)	679 Mbps	126 Gbps	527 Mbps, 128 Gbps	542 Mbps, 128 Gbps	24 Gbps	10 Gbps
Capacity with Multi-Layer Compression	833 Mbps	1.67 Gbps	833 Mbps (1+0) 1.67 Gbps (2+0)	1.69 Gbps (1+0) 3.2 Gbps (2+0)	2.4 Gbps (1+0) 4.8 Gbps (2+0)	10 Gbps (1+0) 20 Gbps (2+0)
Configuration	1+0, 1+1 HSB, 2+0	1+0, 1+1 HSB, 2+0 (E1/T1), 2+0 VPLC, 2+0 HCS, 2+0 SD	1+0, 1+1 HSB, 2+0 (E1/T1), 2+0 VPLC, 2+0 HCS, 2+0 SD	1+0, 1+1 HSB, 2+0 (E1/T1), 2+0 VPLC, 2+0 HCS, 2+0 SD	1+0, 2+0	1+0, 2+0 (VPLC)
LOS/PMO	No	Yes, 4x4 or 2x2	No	No	No	No
VPLC	No	Yes	Yes	Yes	No	Yes
Ethernet Interface	1 x 10/100/1000Base-T and 2 x 1000Base-X or 10/100/1000Base-T	1 x 10/100/1000Base-T and 2 x 1000Base-X	4 x 1 Gbe (RJ-45/SFP) 1x 2.5T Gbps SFP	4 x 1 Gbe (RJ-45/SFP) 1x 2.5T Gbps SFP	1 x 10/100/1000Base-T PoE 1 x 10 Gbps SFP cage Optional 1 x 10/100/100 Base-T for 10 Gbps SFP cage	1x 2.5T Gbps SFP 1x 10 Gbps SFP 10 GE (SFP+) Optional QSFP+/40/100 GE or 1x40 or SFP+ (1x10 GE)
Management Interface	1 x 10/100 Base-T	1 x 10/100 Base-T	1 x 10/100 Base-T	1 x 10/100 Base-T	1 x 10/100/100 Base-T for management	1 x 1 GE RJ-45 for management
External Idem	None	1 x 089	1 x 089	None	None	None
Dimensions (HxWxD - mm)	250 x 235 x 98	PTP 820C: 250x233x98 PTP 820C HP: 315x284x107	EDU 44x48x185 EDU 44x48x185 RFU-D: 250x233x98 RFU-H: 319x286x107 RFU-S: 270x204x85 RFU-E: 220x98x75	EDU 44x48x185 EDU 44x48x185 RFU-D: 250x233x98 RFU-H: 319x286x107 RFU-S: 270x204x85 RFU-E: 220x98x75	270x98x75 43 dBm integrated antenna 280x280x110	372x227x86 43 dBm integrated antenna 341x270x103
Environmental	-35°C to +55°C (-45°C to +160°C extended)	-35°C to +55°C (-45°C to +160°C extended)	IDU: -5°C to +55°C (25°C to +65°C extended) RE-C: -35°C to +55°C (-45°C to +160°C extended) RFU-A: -5°C to +55°C (25°C to +65°C extended)	IDU: -5°C to +55°C (-45°C to +160°C extended); RE-C: -35°C to +55°C (-45°C to +160°C extended); RFU-A: -5°C to +55°C (25°C to +65°C extended)	-35°C to +55°C (-45°C to +160°C extended)	-35°C to +55°C (-45°C to +160°C extended)
Power Input	-48 VDC	-48 VDC	-48 VDC	-48 VDC	-48 VDC	-48 VDC
Power Injector Power Pool	-48 VDC or +24 VDC	PTP 820C ONLY: -48 VDC or +24 VDC	N/A	N/A	-48 VDC or +24 VDC	-48 VDC or +24 VDC
Maximum Power Consumption	6-11 GHz: 40W; 13-38 GHz: 35W	Multi-Core Operation: PTP 820C: 6 GHz: 65W; 7 GHz: 75W; 11 GHz: 85W; 13-38 GHz: 35W, 6 GHz: 45W; 7-9 GHz: 45W; 13-38 GHz: 35W PTP 820C HP: 135W	EDU E1H-only with single modem: 233W; addition for second modem: 289W, additional for 16 E1/T1: • RE-C: 6-38 GHz: 140 22W; 11 39W; 28-38 GHz: 10 25W; 11 43W • RFU-D: 130W/80W • RFU-S: 60W • RFU-E: 60W Medium Level: 53W / 27W Low Level: 43W / 17W Multi: 24W / 24W • H: 185/20 BBS High Level: 10W / 14W Medium Level: 77W / 97W Low Level: 67W / 71W Multi: 48W / 48W	IDU: 48W maximum RFU-D: 75W RFU-H: HP: 130W/80W RFU-S: 60W RFU-E: 60W	48W Active 35W Standby	58W Active 47W Standby

### US Headquarters

3800 Golf Road, Suite 360,  
Rolling Meadows, IL 60008 USA  
+1 888 663 5250

### San Jose Office

210 N. 1st Street, Suite 400  
San Jose, CA 95131 USA

### Thousand Oaks Office

2101 Corporate Center Dr # A  
Newbury Park, CA 91320 USA

### India Office

Cambium Networks Consulting Private Ltd  
5th Floor, Quadrant 1, Umija Business Bay, Tower 2,  
Outer Ring Road,  
Kadubenchalli, Marthur Hobli Road, Bangalore East  
Taluk, Bangalore- 560037  
+91 80 67333100

### UK Office

Unit B2, Linhay Business Park,  
Eastern Road, Ashburton, United Kingdom, TQ13 7UP  
441 1364 655500

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# PTP 820/850

LICENSED ETHERNET MICROWAVE FOR MULTI-SERVICE NETWORKS

## Cambium PTP 820/850



PTP 820S



PTP 820C



PTP 820E



PTP 850E



PTP 820G

Split-Mount / All-Indoor, Multi-Carrier



PTP 820F

Split-Mount / All-Indoor, Multi-Carrier

A single platform serving all radio transport requirements.

PTP 820/850 is a point-to-point licensed microwave backhaul platform that integrates leading networking functionality with the industry's most advanced microwave technologies, creating a superior microwave transport solution.

Supporting licensed frequency bands ranging from 6 to 86 GHz, the PTP 820/850 series delivers a wide range of configurations to offer a tailored solution for any deployment scenario.

Composed of high-density multi-technology nodes and integrated radio units, the PTP 820/850 series offers flexibility in choosing all-indoor, split-mount, and all-outdoor configuration options. Exploiting unique Line of Sight (LOS) Multiple Input Multiple Output (MIMO) technology, modulation up to 4096 QAM and wider channel bandwidths ensures industry-leading throughput and spectral efficiency.

The PTP 820E/850E operate in E-Band radio providing throughput up to 20Gbps, this eliminates the need for future forklift upgrades, or major system overhaul by the network operator to deliver multi-gigabit-plus capacity.

PTP 820/850 also offers both Synchronous Ethernet (SyncE) and IEEE1588 synchronization protocols required for large ISP and MPLS networks.

Operations, Administration and Maintenance (O&M) tools coupled with a full suite of network and element management systems (NMS and EMS) simplify network provisioning and monitoring, reducing operators' total cost of ownership and enabling them to meet the most stringent service level agreements.

Combining technologies, equipment and services, PTP 820/850 enables network operators to meet accelerating demand for capacity cost-effectively under rapidly evolving conditions.

### PTP 820/850 Product Series Highlights

- Licensed frequency bands 6-86 GHz
- Up to 4096 QAM, with T2-step hitless and errorless Adaptive Coding & Modulation (ACM) for high reliability
- Up to 20 Gbps bandwidth supported
- Multi-gigabit radio capacity with high spectral efficiency
- TDM and/or packet supporting legacy services and evolution to all-packet
- Integrated Ethernet Switch, MEF Carrier Ethernet 2.0 compliant, MPLS-TP-ready
- Header de-duplication for additional capacity boost
- Intelligent service-centric management utilizing QoS and advanced O&M capabilities
- Carrier-grade service resiliency (G.8032, M5TP)
- ITU-T Y.1731 Performance Management – MEF 35
- Integrated synchronization solution: Native/SyncE/IEEE 1588v2
- Lowest power consumption with adaptive green mode
- Low latency with unique frame cut through for latency sensitive services
- Industry-leading system gain

NOTES: The highlight feature may not apply to all PTP 820/850 platform.



PUBLIC SAFETY



ENTERPRISE



WIRELESS CARRIER



WIRELESS INTERNET SERVICE PROVIDER

### LINKPlanner

LINKPlanner is a free, easy-to-use link design tool that allows network operators to easily and quickly design networks. Microsoft® Windows® and Intel®-based Mac® versions of LINKPlanner can be downloaded from Cambium Networks' support pages.

#### Key LINKPlanner features:

- Design a five-nines-reliable wireless link
- Plan and optimize a single link or multiple links simultaneously
- Perform calculations for both licensed and unlicensed products
- Automatically load path terrain profiles and environmental factors such as rain fade
- Display a comprehensive overview of your entire point-to-point wireless network via Google™ Earth
- Generate reports that validate projected performance and serve as time-saving deployment guidelines
- Create bills of material for point-to-multipoint and point-to-point networks including accessories

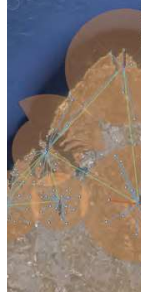
### About Cambium Networks

Cambium Networks is a leading global provider of wireless connectivity solutions that strengthen connections between people, places and things. Specializing in providing an end-to-end wireless fabric of reliable, scalable, secure, cloud-managed platforms that perform under demanding conditions, Cambium Networks empowers service providers and enterprise, industrial and government network operators to build intelligent edge connectivity. Cambium Networks' commitment to continuous innovation in wireless access is demonstrated in the millions of radios deployed in thousands of networks that benefit communities around the world. Team members also contribute to social responsibility activities to serve the communities in which they live. Headquartered outside Chicago and with R&D centers in the U.S., U.K. and India, Cambium Networks sells through a range of trusted global distributors.

[www.cambiumnetworks.com](http://www.cambiumnetworks.com)



PATH PROFILE WITH OBSTRUCTIONS



GOOGLE EARTH NETWORK VIEW



MAP OF THE SITES AND LINKS IN THE PROJECT

## Contact List

### CEO

Leigh Ballard

E: [ballard@crispwireless.com.au](mailto:ballard@crispwireless.com.au)

M: 0428 832 095

### Project Manager

Jeremy Devenish

E: [jdevenish@crispwireless.com.au](mailto:jdevenish@crispwireless.com.au)

M: 040480289

