Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Maxwell George WOODING	
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Contact Person *(if applicable)*		
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	Redwood Village	
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Telephone Business		Home (03) 577 8738
Fax		Mobile
Address for Service *(if different from above)*		
		Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	M G Wooding	Date 20-12-2012

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 48

RECEIVED
20 DEC 2012
MARLBOROUGH DISTRICT COUNCIL

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: *(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)*

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: *(where amendments are sought, provide details of what changes you would like to see)*

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Oliver Joseph Reed
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Contact Person *(if applicable)*	
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	Witherlea
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Fax	*Mobile* 021 1460481
Address for Service	
(if different from above)	
	Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	Date 20/12/12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For office use
Submission No: 49.

RECEIVED
20 DEC 2012
DISTRICT COUNCIL

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	ROBIN WILLIAM FRANCIS YORK
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Contact Person *(if applicable)*	
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	BLENHEIM Post Code 7201
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Fax	*Mobile*
Address for Service	
(if different from above)	
	Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	Date 19/12/12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 50

RECEIVED
20 DEC 2012
MARLBOROUGH DISTRICT COUNCIL

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Wayne Francis Lucas		
Organisation *(if applicable)*			
Contact Person *(if applicable)*			
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Address for Service			
(if different from above)			
	Post Code		
Signature *(of submitter or person authorised to sign on behalf of submitter)*		Date	15 - 12 - 2012

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 51.

RECEIVED
DEC 2012
MARLBOROUGH DISTRICT COUNCIL

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission in respect of Proposed District Plan Change No. 61 Minor Amendments

Submitted by: Delegat's Wine Estate Ltd (Delegat's)

Contact for Service: R. Bala or Richard Bullock, Manager Capital Projects,
Delegat's Wine Estate Ltd.

Address For Service: PO Box 305, Blenheim 7240 or PO Box 91 681, Auckland Mail Centre, Auckland 1142,

Email: bala@delegats.co.nz or richard.bullock@delegats.co.nz

Tel: 03 572 6301 or 09 359 7300

Fax: 09 359 7359

General Submission

1. Delegat's Wine Estate Ltd (Delegat's) is one of New Zealand's larger wine producers and our strategy is to lead New Zealand's wine category growth and establish Oyster Bay as one of the world's great Super-Premium wine brands. . At present, the company accounts for approximately 10% of New Zealand's total wine production.

2. The Marlborough Region's climate and soils have unique qualities that make them ideal for producing world-class wines.

3. Delegat's already has extensive vineyard plantings in Marlborough and combined with our grower partners we would account for approximately 10% of the Region's total vineyard area.

4. Delegat's consider we are very well positioned to continue to be successful and to grow further using wine from this key producing region of New Zealand.

5. Delegat's is a founding member of Sustainable Winegrowing New Zealand, which provides a framework for wine companies to continually work towards improving all aspects of their performance in terms of the environment, social and economic sustainability in both the vineyard and the winery.

6. Delegat's acknowledges it is vital that all parties play their part to protect and ensure the sustainability of the resources in the Marlborough Region and our commitment to this is not made lightly. We have much at stake, both as a company and as an industry.

7. Delegat's submits that it is vital that the District Plan's policies and rules continue to acknowledge and provide for the existing and ongoing investment of the wine industry in the region by providing certainty and avoiding unnecessary restrictions.

8. It is on the basis of these key principles that Delegat's has made its submission on the proposed changes to the Plan.

9. We consider that we are an "interested party" for the plan changes proposed by Council and we are pleased to have the opportunity to make this submission on two items.

Item 1 – Policy on term of water permits to take and use water.

Refer Policy 6.3.1.1.3

Delegat's submits that the proposed policy change is not a minor amendment; rather we consider it is a substantial change to a long standing policy that was developed and endorsed by the Marlborough community.

In our view the proposed policy change seeks to unduly restrict the term for water permit. Additionally the proposed new policy does not adequately reflect:

i. the existing Plan provisions regarding water allocation; and

ii. the level of knowledge surrounding Marlborough water resources in particular the surface water resources of the Awatere, Waihopai and Wairau Rivers.

The Section 32 analysis states that "the term needs to provide sufficient certainty to water users while allowing the Council to effectively reconsider the consent to address full or over allocation issues". Delegat's agrees with this statement insofar as it applies to water resources where an allocation regime has yet to be determined.

In the case of the Awatere, Waihopai and Wairau Rivers a Sustainable Flow Regime (SFR) has been established that includes a water allocation limit. Delegat's consider that for surface water bodies with established and agreed to SFR's in place it is more appropriate that water permits be granted for a term of 30 years as per the current policy.

Delegat's submits that such a term is consistent with the Third Report of the Land and Water Forum which recommends that regional councils should grant water allocation consents for 20 to 35 years.

Delegat's OPPOSES the proposed changes to Policy 6.3.1.1.3 (i) and (ii).

Decision Sought: Retain the current intention and wording of this Policy – reject the proposed changes in entirety.

Item 10 – Wineries, distilleries, and breweries in rural environments

Rule 30.4.1 -Definition of 'Wineries'.

Currently, in Chapter 26 of the Plan, 'Wineries' are defined as:

"*premises for the retail sale of wine, associated wine promotional material and associated dining facilities*".

We are not sure why Council have referenced Rule 30.4.1 as it appears there are no proposed changes to this Rule, only the definition as per Chapter 26.

We agree with Council that this definition does not provide for all aspects of how most wineries function (commercially and operationally) and that it is appropriate to amend the definition of 'Winery' to reflect the wide range of commercial and operational functions associated with most wineries.

In reality, wineries may do any of the following things related to grapes, juice and wine.

- Receive and process grapes into juice –called de-juicing.
- Receive juice from another winery (i.e. purchase surplus juice or have another winery 'dejuice' from grapes owned by the receiving wine company but which needs to be de-juiced at the other winery).
- Process the juice into wine, blend and store the finished wine until it is ready to be despatched (it's referred to as "Bulk Wine" when it is being shipped).
- Receive Bulk Wine (purchased or transfer) from another winery.
- Associated Bottling, packaging and despatching of wine.

It is vital that any revised definition allows for all of the above possibilities as these are routine commercial and functional occurrences in the wine sector. Any definition that restricts any of these commercial and functional activities cannot be contemplated by the wine sector.

We suggest that the definition of "Wineries" in Chapter 26 be amended to the following;'

"a facility for the receival, processing, production, storage and despatch of grapes, grape juice and finished wine. The facility may or may not also include premises for the bottling and packaging and despatch of wine, public tasting, retail sale of wine, associated wine promotion material and associated dining facilities".

Delegat's SUPPORTS that a change to the definition in Chapter 26 of the Plan is required but **OPPOSES** the proposed wording by Council.

Decision Sought: Amend the proposed definition of Wineries in Chapter 26 of the Plan and replace with an alternative as noted above

CLOSING

We wish to speak at the hearing in support of this submission. We would also be willingly to be part of any 'pre-hearing' discussions with Council and other submitters.

If others make a similar case we would consider presenting a joint case with them at the hearing.

for and on behalf of Richard Bullock

Bala or Richard Bullock,
Manager, Capital Projects;
Delegat's Wine Estate Ltd

Date: 20 December 2012

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	BEVERLEY RUTH DOOLE
Organisation *(if applicable)*	RARANGI DISTRICT RESIDENTS ASSOCIATION
Contact Person *(if applicable)*	BEV DOOLE
Postal Address	49 MIRO ST
	RD3
	BLENHEIM Post Code 7273
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Telephone Business	03 570 5233 Home 03 570 5233
Fax	Mobile 021 0697836
Address for Service *(if different from above)*	
	Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	B. Doole Date 20/12/12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☒ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☐ Yes ☑ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☐ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax 520 7496

Email: pc61@marlborough.govt.nz

For Office Use Submission No: 54

5. **The specific parts of the proposed plan change the submission relates to are as follows:**

ZONING AMENDMENT FROM TOWNSHIP RESIDENTIAL TO DEFERRED TOWNSHIP RESIDENTIAL

Continue on a separate sheet if necessary

6. **My submission is:** *(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)*

THE RDRA SUPPORTS THE PROPOSED PLAN CHANGE AND ITS INTENTION TO ENSURE OUR WATER SUPPLIES ARE KEPT CLEAR OF SEPTIC TANK CONTAMINATION.

Continue on a separate sheet if necessary

7. **The decision I seek from Council is:** *(where amendments are sought, provide details of what changes you would like to see)*

THAT THE PLAN CHANGE IS APPROVED.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Neville Marr		
Organisation *(if applicable)*			
Contact Person *(if applicable)*			
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	Springlands		
	Blenheim	Post Code	7241
Email	office@marr.nz.com		
Telephone *Business*	03 929 3100	*Home*	
Fax		*Mobile*	027 276 7682
Address for Service			
(if different from above)			
		Post Code	
Signature *(of submitter or person authorised to sign on behalf of submitter)*		Date	21. Dec. 12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No:

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	John Webber		
Organisation *(if applicable)*			
Contact Person *(if applicable)*	John Webber		
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Telephone *Business*	95,795,684	*Home*	
Fax		*Mobile*	21,447,273
Address for Service			
(if different from above)			
		Post Code	
Signature *(of submitter or person authorised to sign on behalf of submitter)*	J Webber	Date	21.12.12.

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☐ Yes ☑ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☐ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use Submission No: 56

5. The specific parts of the proposed plan change the submission relates to are as follows:

Item 1 Policy on term of water permits to take and use water.

It is the Intent of Plan Change 61, Item 1, to remove the RMA provision for 30 year water permit terms and introduce 10 year water permits by changing the existing Policy 1.3 to read:
"To issue water permits to take and use water for a period of 10 years where water resources are either fully allocated or over-allocated relative to the allocation limits set in this Plan or where water is taken from a resource for which no SFR has been established in the Plan".

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

This submission opposes that the maximum period of a Resource Consent to take and use water is limited to 10 years.
We believe that the proposed change to shorten consent terms will put our vineyards under uncertainty of water supply.
The time and costs associated with obtaining Resource Consents is considerable, The costs of renewal are particularly daunting as generally requirements from Council have changed, and further Technical detail from professionals is required, from what should simply be a rolling over of the consent providing there have not been any problems during the period of the previous consent.
Water is vital in viticulture production in Marlborough, and without it there would be no vineyards. There is significant financial investment in the establishment of water infrastructure within the development costs of new vineyard developments, as well as ongoing costs of delivering water to the vines. Such developments are long term investments and as such require long term water certainty to underpin these investments.
It is noted that the third report of the Land and Water forum has signalled that Councils should grant consents for a minimum of 20 years and that longer durations should become the norm. There is no sound reason given in Councils proposed changes, to reduce the term of Consent to below that recommended by the Land and Water forum.
Shorter consent terms will increase the frequency of renewals (depending on consent number and cycles) and this is a costly and time consuming process.

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That the policy on term of water permits to take and use water remain unchanged.

That no further action on this item be contemplated until the completion of the Water Allocation Plan Review.

Further consultation with The Marlborough Water Forum is undertaken and users are kept informed of progress.

Continue on a separate sheet if necessary

MG

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21 DEC 2012
MARLBOROUGH
DISTRICT COUNCIL

MARLBOROUGH DISTRICT COUNCIL

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Geoffrey Edward VAN ASCH		
Organisation *(if applicable)*	van Asch Irrigation Limited		
Contact Person *(if applicable)*	Geoff van Asch		
Postal Address	PO Box 1003		
	Blenheim	Post Code	
Email	geoff@tva.co.nz		
Telephone *Business*	(03) 5783386	*Home*	
Fax		*Mobile*	
Address for Service			
(if different from above)			
		Post Code	
Signature *(of submitter or person authorised to sign on behalf of submitter)*		Date	18.12.12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 57

5. The specific parts of the proposed plan change the submission relates to are as follows:

Item 1 Policy on term of water permits to take and use water

It is the intent of Plan Change 61, Item 1, to remove the RMA provision for 30 year water permit terms and introduce 10 year water permits by changing the existing Policy 1.3 to read:
"To issue water permits to take and use water for a period of 10 years where water resources are either fully allocated or over-allocated relative to the allocation limits set in this Plan or where water is taken from a resource for which no SFR has been established in the Plan".

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

This submission opposes that the maximum period of a Resource Consent to take and use water is limited to 10 years.
* There is a substantial financial investment in establishing irrigation infrastructure and high development costs when moving into intensive land uses like viticulture. These developments are long-term investments and require certainty of access to water over a 20 to 30 year permit term to allow this commitment.
* The third report of the Land and Water Forum has signalled that Councils should grant consents for a minimum of 20 years and that longer durations should become the norm. Therefore reducing consent terms as proposed in Plan Change 61is out of step to National direction.
* Shortening Resource consent terms will increase the frequency of renewal which is a costly and time consuming process.
* The Water Allocation Plan is currently under review as part of the Wairau/Awatere -Regional Policy Statement Review. This proposed amendment through a Plan change would be premature and pre-emptive while the the Water Allocation Review is yet to be completed.

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

Delete entirely Item 1 "Term of Water Permits for the Taking of Water from the Proposed Plan Change -Schedule of Changes"

No further action on this item be contemplated until the completion of the Water Allocation Plan Review.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Beavon Investments Limited
Organisation *(if applicable)*	
Contact Person *(if applicable)*	
Postal Address	
	Post Code
Email	
Telephone *Business*	*Home*
Fax	*Mobile*
Address for Service	DJ Clark Wisheart Macnab & Partners
(if different from above)	Box 138 Benheim
	david@wmp.co.nz Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	Date 21/12/2012

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 58

5. The specific parts of the proposed plan change the submission relates to are as follows:

Minor Amendment Provisions relating to "family flat"

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

The proposal to make a "family flat" limited to 70m2 is arbitrary and too small, and does not account for the various possibilities that should be encompassed.
Also there is no distinction drawn between an existing building and a new building.
Utilisation of an existing building should be more flexible.

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

For a new building the limit should be 100m2.
Where the building is relocatable there should be no limit of size.
There should be no limit of size where the building exists (and has a building permit) prior to the coming into force of the minor amendment to the Plan.

Continue on a separate sheet if necessary

FEDERATED FARMERS OF NEW ZEALAND

To: Marlborough District Council

Submission on: Plan Change 61

From: Marlborough Province of Federated Farmers of New Zealand

Date: 21 December 2012

Contact: Michael Bennett
Policy Advisor
Federated Farmers of New Zealand

PO Box 1992
Christchurch

P: 03 357 9452
M: 027 551 1629
E: mbennett@fedfarm.org.nz

Federated Farmers would like to be heard in support of this submission

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KEY SUBMISSIONS

1. **Withdraw Item 1 and Item 12 of the Plan Change 61 to the Wairau/ Awatere Resource Management Plan.**

2. **If Item 1 of Plan Change 62 to the Wairau/ Awatere Resource Management Plan can not be withdrawn, extend the term of water permits to 20 years, with special provision of up to 30 years for abstraction via community water infrastructure, including storage.**

3. **If Item 12 of Plan Change 61 to the Wairau/ Awatere Resource Management Plan can not be withdrawn, include a definition of 'drainage channel' that excludes ephemeral channels, subsurface drains, drainage channels used to divert runoff water around and away from sensitive areas, and drainage channels that do not eventually 'discharge' to a water body.**

SUBMISSION TO MARLBOROUGH DISTRICT COUNCIL ON PLAN CHANGE 61 TO THE WAIRAU/ AWATERE RESOURCE MANAGEMENT PLAN

1. GENERAL SUBMISSIONS

1.1. Federated Farmers welcomes the opportunity to submit on Plan Change 61 to the Wairau/Awatere Resource Management Plan (the Plan Change). Federated Farmers support the proactive approach taken by Marlborough District Council to make minor changes to keep the Plan relevant and correct inaccuracies.

1.2. In spite of our support, we have some concerns about changes for some sectors of the community, and we do not agree with the comment at p14 of the section 32 report that:

> *The changes proposed are all minor, and will not alter the existing structure or intent of the rules in the District Plan.*

1.3. Aspects of the Plan Change that do not satisfy this proviso include:

- Include a policy to require a maximum term of ten years for new or renewed permits to take and use water where water resources are at or exceed allocation limits, or where allocation limits are not known (Item 1).
- Include 'drainage channels' in rules requiring discharge setbacks from water bodies (Item 12).

1.4. Federated Farmers also point out that that a revised Regional/District plan, which will supersede Plan Change 61 will be notified mid-2013. It would be preferable to invest the time of staff and submitters in principled and open discussion on aspects of the Regional and District Plan now in preparation.

Relief Sought:

1.5. Withdraw Item 1 and Item 12 of the Plan Change 61 to the Wairau/ Awatere Resource Management Plan.

2. TERM OF WATER PERMITS

2.1. Federated Farmers appreciates that there is an issue with over-allocation of water in some parts of Marlborough, and recognise the efforts by Marlborough District Council to address this. We do not however see that Item 1 of Plan Change 61 provides an appropriate mechanism to achieve this, and prefer that any changes be undertaken in an integrated and consultative manner as part of the combined District/Regional Plan.

2.2. Plan Change 61 includes an amendment to Policy 6.3.1.1.3 to reduce the maximum term for water permits from 30 to 10 years *where water resources are either fully allocated or over-allocated relative to the allocation limits set in this Plan or where water is to be taken from a resource for which no sustainable flow regime has been established....* Federated Farmers see this as a significant change that will make it

more difficult to raise capital for further development, and be unfair to those who have invested substantially in irrigation systems. It will also create significant uncertainty for schemes that rely on community owned water storage and infrastructure.

2.3. The section 32 analysis of Plan Change 61 lacks appropriate supporting information, and in particular lacks the depth of understanding that would have been achieved by wider involvement of industry and affected community members. The implications of lack *of long term security* for water permits, while only briefly discussed in the report, are profound, and require further understanding. Above all it is not appropriate to rely on the assumption that Item 1 is a minor change that does not affect the functionality of the Wairau/ Awatere Resource Management Plan.

2.4. Federated Farmers asks that any response to water allocation issues should first and foremost be built upon giving stakeholders a long term basis upon which to make decisions, protect the investment of existing water users, and avoid unduly hindering sustainable irrigation development.

2.5. The lack of security of tenure poses particular problems for community scale, or farm scale water storage or infrastructure projects due to the very high capital cost of such schemes. Water storage or augmentation is a possible management tool in 'over-allocated' catchments where these are over-allocated in terms of the 'driest week of the driest year', and where considerable allocable water remains on the shoulders of the season. Policies must enable and encourage this to happen in areas which are near or at full allocation. Users should be able to utilise times of high flow and high groundwater to harvest water to enable flow management and to increase irrigation reliability at times of the year when flows or groundwater levels are low.

2.6. Short terms for water permits also create unacceptable uncertainty for investors and lenders at the individual farm level. Modern irrigation systems that can achieve efficient water use such as centre pivot irrigators are expensive relative to less precise systems. Also, the use of water for irrigation (or other purposes) and/or dairy shed wash down and/or milk cooling already involves very considerable expense, such as the development of on-farm or off-farm infrastructure, energy use and labour. Normally terms of credit for farming enterprises require at least a 20 year horizon and a similar timeframe is suggested for water permits.

2.7. The section 32 report to Plan Change 61 also fails to recognise the lost opportunities of creating barriers to irrigation development or underutilisation of water resources that might result from implementation. The Opuha Dam study[1] showed that irrigation storage schemes are enormously beneficial, both in terms of the profitability of farms and off-farm effects such as employment. There are also substantial social benefits such as reduced average age of farmers, increased educational attainment of those employed in the rural economy, and better business confidence and utilisation of human capability.

[1] The Opuha Dam: An ex post study of its impacts on the provincial economy and community. Aoraki Development Trust 2006.

2.8. Plan Change 61 must recognise these benefits and any policy change that creates a disincentive to new development. In light of potential to obstruct irrigation development, particularly water storage development that achieves more efficient use of the water resource, Federated Farmers disputes the assumption that the effect of the Plan Change is of 'minor' regulatory effect and do not agree that it should have been developed with minimal consultation with the community.

Relief Sought

2.9. If Item 1 of Plan Change 62 to the Wairau/ Awatere Resource Management Plan can not be withdrawn, extend the term of water permits to 20 years, with special provision of up to 30 years for abstraction via community water infrastructure, including storage.

3. DRAINAGE CHANNELS

3.1 Item 12 of Plan Change 61 is to *Include drainage channels in in the rules requiring discharge setbacks from water bodies.* The discharge rules in question are:

- Rules 30.1.8.2.4 and 30.1.8.2.5 (on-site wastewater);
- Rule 30.1.8.4.1 (animal dips);
- Rules 30.1.8.9.4 and 30.1.8.10.7 (liquid waste from the processing of fruit, vegetable, shellfish, fish or animal products);
- Rule 30.1.8.11.3 (offal pits);
- Rule 30.2.5.1.2 (liquid waste or animal effluent);
- Rule 30.4.3.4.1(e) (solid waste landfill).

3.2 Federated Farmers submits that the implications of Item 12 have not been fully understood and are not 'minor'. Therefore it is not *appropriate to add 'drainage channel' to all of the existing setback rules.*

3.3 Item 12 is not a minor change because of potential conflicts created between different uses of land. In some cases required setbacks may result in reverse sensitivity effects as occupiers of nearby land are hindered in installing new drainage channels, or if an existing activity requires resource consent because a neighbour has constructed a 'drainage channel' within the setback distance. Drainage channels can be located virtually anywhere and are often necessary to achieve sustainable use of land. Users of land rely on drainage channels to remove accumulated precipitation, prevent erosion, divert water from where it can damage structures or cause environmental effects, and improve the production of land that is permanently or intermittently wet.

3.4 Item 12 as it stands is also inappropriate for several reasons:

- Some drainage channels discharge to an open paddock or constructed wetland rather than a waterway;

- Activities such as disposal fields for on-site waste water systems, offal pits or landfills often utilise drainage channels to divert stormwater runoff around the area;
- Many drainage channels are dry most of the time, and the only difference between them and a swale/surface flow path is often the presence of a formed channel to facilitate runoff and prevent inundation. Runoff will occur subsequent to precipitation whether or not a drainage channel is present;
- Subsurface drainage channels (tile drains) are not easily located and it will not be apparent whether or not compliance with a given setback is achieved.

Relief Sought

3.5 If Item 12 of Plan Change 61 to the Wairau/ Awatere Resource Management Plan can not be withdrawn, include a definition of 'drainage channel' that excludes ephemeral channels, subsurface drains, drainage channels used to divert runoff water around and away from sensitive areas, and drainage channels that do not eventually 'discharge' to a water body.

4 ABOUT FEDERATED FARMERS

4.1 Marlborough Federated Farmers welcomes the opportunity to submit on Plan Change 61 to the Wairau/Awatere Resource Management Plan.

4.2 Federated Farmers of New Zealand is a primary sector organisation that represents farming and other rural businesses. Federated Farmers has a long and proud history of representing the needs and interests of New Zealand farmers.

4.3 The Federation aims to add value to its members' farming business. Our key strategic outcomes include the need for New Zealand to provide an economic and social environment within which:

4.3.1 Our members may operate their business in a fair and flexible commercial environment;

4.3.2 Our members' families and their staff have access to services essential to the needs of the rural community; and

4.3.3 Our members adopt responsible management and environmental practices.

4.4 This submission was developed in consultation with the members of Federated Farmers. It is important that this submission is not viewed as a single submission, but as a collective one, that represents the opinions and views of our members.

4.5 Federated Farmers acknowledges submissions from individual members of Federated Farmers.

Gary Barnett
Provincial President
Marlborough Province
Federated Farmers of New Zealand

MCa

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

Submissions close 5.00 pm Friday, 21 December 2012

MARLBOROUGH DISTRICT COUNCIL

RECEIVED
21 DEC 2012
MARLBOROUGH DISTRICT COUNCIL

1. Submitter Details

Full Name	Tonino Caccimani Tony Caccimani
Organisation *(if applicable)*	
Contact Person *(if applicable)*	
Postal Address	73 MAIN RD HAVELOCK
	Post Code 7106
Email	
Telephone *Business*	574824 *Home* 574293
Fax	*Mobile*
Address for Service	
(if different from above)	
	Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	Date 4-12-2012

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 60

5. The specific parts of the proposed plan change the submission relates to are as follows:

Plan change number 61
Clarify that utility provisions apply to 'requiring authorities'.

Continue on a separate sheet if necessary

6. My submission is: *(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)*

I oppose the proposed submission that utility provisions apply to "requiring authorities"

Continue on a separate sheet if necessary

7. The decision I seek from Council is: *(where amendments are sought, provide details of what changes you would like to see)*

That the amateur radio service be included in the utility provisions, along with the requiring authorities, with regard to antenna and their supporting structures.

Antenna and their supporting structures for the purpose of Amateur Radio, be regarded under the utilities provisions.

I seek to include the Amateur Radio Service along with the 'requiring authority', so that the existing requirements can continue to apply to Amateur Radio antenna structures.

Amateur Radio Service operators take an active part in Search and Rescue events, as well as providing communications for numerous community and sports events. Operators played an important role in the recent Christchurch Civil Defence operations at the time of the recent earthquakes and subsequent activities. Not including the Amateur Radio antennas along with the supporting structures in the utility provisions, will limit the opportunities for the growth and expansion of the hobby. Additionally it may hamper the communications role that has been so valuable in emergency situations.

Continue on a separate sheet if necessary

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

RECEIVED
[illegible] 2012
MARLBOROUGH DISTRICT COUNCIL

1. Submitter Details

Full Name	Blind River Irrigation Limited
Organisation *(if applicable)*	
Contact Person *(if applicable)*	Vaughan Harris
Postal Address	c/- V Harris
	Winstanley Kerridge
	22 Scott Street, Blenheim Post Code
Email	
Telephone *Business*	*Home*
Fax	*Mobile*
Address for Service	Steve Wilkes
(if different from above)	WilkesRM Ltd, Temple Chambers, 76 High St
	Post Code
Signature *(of submitter or person authorised to sign on behalf of submitter)*	Date 20/12/12

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 61.

5. The specific parts of the proposed plan change the submission relates to are as follows:

see attached

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

see attached

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

That Item 8 be approved in full and Item 1 be amended as per the attached.

The submitter would welcome the opportunity for a pre-hearing meeting.

Continue on a separate sheet if necessary

Plan Change 61 – Submission Draft on behalf of Blind River Irrigation Ltd.

1. Introduction

Blind River Irrigation Limited (BRIL) is a community irrigation scheme that services land in the Blind River catchment.

BRIL have recently applied for the 're-consenting' of two resource consents U031371 and U031018.

BRIL make the following submission regarding Proposed Plan Change 61: Minor Amendments

5. The specific parts of the proposed plan change this submission relates to are as follows:

Item 1 – Policy on term of water permits to take and use water; and

Item 8 – Include rules for the damming of water.

6. The submission is:

Item 8

BRIL ***supports*** Item 8 and the proposed change to Rule 27.1.6 in entirety.

The proposed change to Rule 27.1.6 represents a pragmatic and sensible change that seeks to remove unnecessary resource consenting requirements as the existing Plan provision are confusing with respect to the damming of water associated with constructing storage dams.

Item 1

BRIL ***opposes*** Item 1 and the proposed change to Policy 6.3.1.1.3.

The proposed policy change is not a minor amendment, rather it is a substantial change to a long standing policy that was developed and endorsed by the Marlborough community.

The proposed policy change seeks to unduly restrict the term for water permit. Additionally the proposed policy wording is unclear and does not adequately reflect the existing Plan provisions regarding water allocation and the level of knowledge surrounding Marlborough water resources in particular the surface water resources of the Awatere, Waihopai and Wairau Rivers.

The Section 32 analysis states that "the term needs to provide sufficient certainty to water users while allowing the Council to effectively reconsider the consent to address full or over allocation issues". BRIL agrees with this statement insofar as it applies to water resources where an allocation regime has yet to be determined.

In the case of the Awatere, Waihopai and Wairau Rivers a Sustainable Flow Regime (SFR) has been established that includes a water allocation limit. BRIL consider that for surface water bodies with established and agreed SFR's in place it is more appropriate that water permits be granted for a minimum term of 20 years.

Such a term is consistent with the Third Report of the Land and Water Forum which recommends that regional councils should grant water allocation consents for 20 to 35 years.

BRIL submit that Item 1 and the proposed change to Policy 6.3.1.1.3 be rejected in entirety. If it is considered that a change to Policy 6.3.1.1.3 is necessary for that water bodies that do not have in place Sustainable Flow Regimes, then BRIL submits that:

i. Policy 6.3.1.1.3 be amended as follows:

~~To increase certainty for water users by issuing water permits for 30 year terms, subject to reviews of the resource every 5 or 10 years to ensure ongoing sustainable management of the water resource.~~ To issue discharge permits for a maximum period of 15 years for resources where the existing water quality is to be maintained and to issue discharge permits for a maximum period of 10 years in resources where the existing water quality requires enhancement.

To issue water permits to take and use water for a period of 10 years where water resources are ~~either fully allocated or~~ over-allocated relative to the allocation limits set in this Plan or where water is to be taken from a resource for which no SFR has been established in the Plan.

To issue water permits to take and use water for a period of 20 years for water resources where a Sustainable Flow Regime (SFR) has been established in the Plan and where the water resource is not over-allocated.

To issue discharge permits for a maximum period of 15 years for resources where the existing water quality is to be maintained and to issue discharge permits for a maximum period of 10 years in resources where the existing water quality requires enhancement.

FORM 5 OF THE RESOURCE MANAGEMENT ACT 1991

File Refs. W045-15-61 / M135-15-26

TO:

The Chief Executive
Marlborough District Council
PO Box 443
Blenheim 7240
PC61@marlborough.govt.nz

Resource Management Act 1991 (RMA)
Clauses (5) and (6) Part 1, First Schedule

SUBMISSION ON PROPOSED PLAN CHANGE 61 TO THE WAIRAU / AWATERE RESOURCE MANAGEMENT PLAN AND PLAN CHANGE 26 TO THE MARLBOROUGH SOUNDS RESOURCE MANAGEMENT PLAN

SUBMITTER :

Name : Clintondale Trust – Whyte Trustee Company Limited

Postal Address : Clintondale, 42 Rapaura Road, RD3, Blenheim 7273

Telephone Number : 64-3-5728193

E-mail Address : clintondale@xtra.co.nz

Address for Service : As above.

Background to the Submission

On 222nd November 2012 the Chief Executive, Marlborough District Council (MDC) notified proposed changes to the Wairau / Awatere Resource Management Plan and the Marlborough Sounds Resource Management Plan both entitled "Minor Amendments", specifically :-

(a) Proposed Plan Change Number (61) to the Wairau / Awatere Resource Management Plan, and

(b) Proposed Plan Change Number (26) to the Marlborough Sounds Resource Management Plan,

hereafter referred to as the Plan Changes. Reference has been made to the respective versions of the two Plans currently displayed on the Council website.

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2. The submitter opposes the proposed Plan Changes in the specific areas detailed in this submission except where otherwise explicitly stated.

3. In the interests of efficiency any reference to a part of the Wairau / Awatere Resource Management Plan shall be a commensurate reference to the corresponding part of the Marlborough Sounds Resource Management Plan where applicable unless specifically stated otherwise.

Relevance of the Submission

4. The submitter has established a substantial and dispersed vineyard estate in the Marlborough region and relies significantly upon this as a source of income. Considerable financial resources have been committed to this enterprise in expectation of a long term return upon investment. Confidence in securing this outcome is reliant upon an effective, consistent, unambiguous and transparent statutory and regulatory regime.

5. It is the submitter's determination that the proposed Plan Changes encompass aspects and proposed amendments that are far from minor. They will not enhance the effectiveness or enforceability of the existing Plans, and will potentially fail to protect and preserve this investment, impacting not only on the long term benefit of the submitter and the many other viticulture and wine production entities with investments in the industry in Marlborough, but also on the economic and social stability and advancement of the Region as a whole.

THE SUBMISSION

Item (1) policy on term of water permits to take and use water.

6. The successful production of grapes, and by extension wine, in Marlborough requires two vital and limited resources – water and money. The availability of these two inputs are inextricably connected. Inconsistency of either will impact upon the viability of the venture.

7. Over and above the cost of the land tens of thousands of dollars per hectare are required to develop, manage and operate a vineyard. Even a relatively small vineyard typical of those developed in Marlborough requires multi-million dollar investment. Frequently this involves the servicing of debt, commonly on both the land purchase and the development. A return on investment is realistically a long term prospect, calculated in decades similar to the life of the vines on which the investment is predicated. Vine viability is reliant upon a reliable and consistent water supply. Any impact upon the water supply jeopardises the likelihood of a return on investment.

8. The importance of this consistency and continuity would appear to be recognised by the Resource Management Act 1991 (RMA) in making provision for water permits to be issued for periods of 30 years.

9. It is further apparent that this intent to furnish confidence is reinforced by the Wairau / Awatere Resource Management Plan (the Plan) where at 6.3.1.1.3 it is stated as Policy 1.3 :-

To increase certainty for water users by issuing water permits for 30 year terms, subject to reviews of the resource every 5 or 10 years to ensure ongoing sustainable management of the water resource.

10. Any reduction in the duration of a water supply to a point where achieving a return on investment is no longer feasible would significantly impact upon confidence in committing significant financial resources into the local industry, and the Region as a whole.

11. Apart from the direct impact on the industry and the part it plays in the Region's economic position, this lack of confidence for financial commitment would be reflected in a reduction in land values and hence the rates income upon which the Council's ability to meet social obligations is directly dependent.

12. It is the intent of Plan Change 61, Item 1, to remove the RMA provision for 30 year water permit terms and introduce 10 year water permits by changing the existing Policy 1.3 to read :-

To issue water permits to take and use water for a period of 10 years where water resources are either fully allocated or over-allocated relative to the allocation limits set in this Plan or where water is to be taken from a resource for which no SFR has been established in the Plan.

13. To reduce the term of water permits to take and use water from 30 years to 10 years is significant and cannot be considered a "Minor Amendment."

14. There is no unequivocal indication from the proposed amendment or the Section 32 Report that the 30 year water permit term will not be retained for those areas where water resources have not been fully allocated or over allocated, or where a Sustainable Flow Regime (SFR) has been established. It would appear therefore that the provision of 30 year water permit terms would be retained in the Plan.

15. The Section 32 Report evaluation (Option 1 cost / disadvantage) details the Council's position that "*a 30 year term gives rise to the risk of unanticipated adverse effects arising, and the inability to address them in a timely fashion due to the long life of the permit.*" There is concern therefore that upon the introduction 10 year terms such would become the de facto policy across the board.

16. The Section 32 Report concedes that there is uncertainty over the nature and severity of adverse effects on water resources due to limited hydrological information and/ or knowledge. It is reasonable therefore to expect difficulties in determining when a water resource is fully or over allocated. Equally there is no time frame indicated on when SFRs would be established that would conceivably allow a reversion to 30 year water permit terms.

17. The proposed amendment to Policy 6.3.1.1.3 in removing the provision for the issue of 30 year water permits, replacing it with a 10 year term, also removes the requirement to "review the resource every 5-10 years to ensure ongoing sustainable management of the water resource."

18. The proposed amendment to the explanation to the policies under Section 6.3.1 however states that :-

Resource reviews will be undertaken every 5 or 10 years depending on location, to ensure ongoing sustainable and equitable management of the resource. The interval of resource review is related to the level of understanding for the particular resource. The longer the interval between reviews for example 10 years, the greater the understanding of the resource and less potential there is for adverse effects.

19. The imposition of resource reviews, be they at 5 or 10 yearly intervals, would need to be explicitly expressed in the Policy 6.3.1.1.3, not merely stated as an aside in any explanation to the policy, especially where they have apparently been removed from the existing policy statement.

20. Furthermore the paragraph of the explanation immediately following that proposed to be amended states :-

Users will not be required to apply for renewal of consent at either the 5 or 10 year interval as terms will be granted for 30 year periods. Instead, the Council will use monitoring information gathered over the 5 or 10 year period to determine the appropriateness of the existing quota volumes.

21. There is no reference in the Section 32 Report to any intent or proposal to amend this paragraph of explanation. Accordingly the provision for water permits of 30 year term remains as a stated policy in the Plan.

22. The proposed amendment to the explanation to the policies under Section 6.3.1 also states :-

Domestic water extraction up to 10 m^3 per day is exempt from requirements for metering or water permits. For non-domestic extraction the term of water permits will be 10 years where the cumulative volume of water allocated through individual water permits has reached the Class A and (where there is a Class B limit set) Class B allocation limits. This will allow the adverse effects of abstraction in a situation of full or over-allocation to be addressed in a timely fashion. A 10 year term is also appropriate where water is to be taken from a water resource for which no SFR has been established due to the uncertainty over the cumulative effects of water extraction in these circumstances.

23. Neither Domestic nor Non-Domestic Water Extraction is defined in the Chapter 26 Definitions. The RMA at section 14 (3)(b) permits a person to take and use fresh water for an individual's reasonable domestic needs, or the reasonable needs of an individual's animals for drinking water, provided the taking or use does not, or is not likely to, have adverse effect on the environment.

24. The Plan under 27.1.2 Fresh Water Abstraction, specifically General Rule 27.1.2.1. reflects the RMA provision by stating :-

Unless expressly limited elsewhere, the following activities shall be permitted without a resource consent where together with any relevant definition they conform to the conditions set out below:

- *Any abstraction for domestic needs, from any source except the Wairau Aquifer, up to 10 m3/day/site, except where water rationing has been imposed within the water management zone, in which case domestic use is permitted up to 1 m3/day/certificate of title.*
- *Any abstraction for road, stopbank or other engineering construction works of up to 50 m3/day/site.*
- *Any abstraction for the reasonable needs of an individual's animals for drinking water, from any source except the Wairau Aquifer, up to 10 m3/day/site, for sites up to 20 hectares in area, plus an additional 100 litres/ha/day for the balance of area for any site over 20 hectares.*
- *Any abstraction from the Wairau Aquifer up to 15 m3/day/site.*
- *Any use of water for fire-fighting purposes.*
- *Any use of water from storage dams.*
- *Any abstraction for the purposes of completing bore tests required to determine the yield of a bore and interference effects on other users, provided that the following condition is met: not more than 100 l/s is extracted.*

25. The rule requires conformation with a relevant definition. The proposed amendment to introduce a 10 year term for water permits for "Non-Domestic Extraction" would require Domestic and Non-Domestic Water Extraction to be adequately defined to ensure consistent interpretation and application.

26. The proposed amendment to the explanation to the policies under Section 6.3.1. limits water extraction without a water permit to domestic water up to 10m^3/day. However the existing Rule 27.1.2.1 allows for an additional 10 m^3/day at least for stock drinking water for any site up to 20 hectares, and additional water for larger sites. This would be a non-domestic extraction and under the

proposed amendment would require a water permit with a term of 10 years where the water resource was fully or over allocated, or no SFR was established.

27. Equally Rule 27.1.2.1 allows for any abstraction from the Wairau Aquifer up to 15 m^3/day, for any extraction. The proposed amendment would limit domestic extraction to 10 m^3/day without a permit, and would require a water permit with a 10 year term for non-domestic extraction despite the apparent existing provision for 15 m^3/day without a permit.

28. The limiting extent of the proposed amendment on existing domestic and non-domestic water rights provide by Section 14 of the RMA and Rule 27.1.2.1 are ramifications beyond the stated intent and cannot be seen as a minor amendment.

29. The proposed reduction in the term of water permits from 30 to 10 years is based on the rationale that "the term needs to provide sufficient certainty to water users while allowing the Council to effectively reconsider the consent to address full or over allocation issues."

30. The proposed reduction in the term of water permits from 30 to 10 years will not provide water users with the certainty essential to commit to significant investment. The prospect that a water permit may be revoked or not renewed after 10 years, one third of the life of a grape vine, does not provide confidence in securing a return on that investment.

31. This viewpoint is reinforced by the national Land and Water Forum which in its third report in October 2012 concluded that *: "To safeguard and enable this investment water consents need to have clear security of tenure. The duration and certainty of consents, and the way they are treated on expiry have an influence on investment confidence and, ultimately, the efficiency of water management outcomes."*

32. The Forum believed that councils should not be able to grant consents for less than 20 years unless an applicant is seeking temporary access to water, and that longer consent durations could become the norm.

33. The proposed reduced term would impose additional cost in attending to repeated water permits for both the consent holder and Council.

34. The Section 32 Report evaluation (Option 2 benefit / advantages) states that by reducing the term granted to water permits the Council will be given the opportunity to reassess the water allocation limits of the area at more regular intervals, therefore, any issues associated with over allocation can be dealt with in a timely manner. The explanation however details that irrespective of the current provision of 30 year terms for water permits, the majority of water permits issued since the Plan was notified are for terms of 10 to 20 years.

35. It is indicated therefore that the current Plan has adequate provisions encompassing maximum total abstraction rates for ground water resources (Rule 27.1.1.3), SFRs, water permit conditions and review processes to address the stated intent of the amendment in a timely manner without resort to reduction of the 30 year term.

36. It is noted that the proposed amendment does not appear in Plan Change 26 in respect of the Marlborough Sounds Resource Management Plan despite the fact that it would conceivably be equally applicable to the major users of water resources in that area, for example the dairy industry in the Havelock, Pelorus and Rai Valley areas.

37. It is understood that a Water Allocation Plan Review is currently being conducted. The viticulture and wine industry participates through the Marlborough District Council Water Allocation Working Group and workshops are in progress.

38. The proposed amendment through a Plan Change to a fundamental aspect of water allocation and management i.e. the term of a resource consent water permit would be premature and pre-emptive whilst the Water Allocation Plan Review is yet to be completed.

Item 10 Wineries, Distilleries, and Breweries in rural environments.

39. Rule 30.4.1 of the Plan provides for 'wineries, distilleries and breweries' as discretionary activities. Currently, 'Wineries' are defined at Chapter 26 (Definitions) as:- "*premises for the retail sale of wine, associated wine promotional material and associated dining facilities*". This definition does not provide for wine making/production. There is no commensurate definition for distillery or brewery, or for that matter cellar door.

40. It is proposed to delete the existing definition of 'Wineries' from Chapter 26 (Definitions) and replace it with the following definition:-

WINERY - a facility for the processing of grapes or other fruit for the production of wine, or juice from the subsequent production of wine, premises for the retail sale of wine, associated wine promotional material and associated dining facilities.

41. It is uncertain what is meant by the phrase "or juice from the subsequent production of wine." It is presumed that what was intended was "or juice for the subsequent production of wine."

42. It is considered that any definition of winery should simply reflect its core function – the production of wine. Other ancillary activities that may be associated with the winery are adequately covered by other provisions. To include these in the definition of a winery provides the opportunity for unintended regulation. For example whilst licensed premises (bars, cellar doors, internet wine sales premises) are engage in the retail sale of wine the majority are not wineries involved in the production of the wine and likely to be subject to winery regulations e.g. winery waste disposal.

43. The definition of winery may well more appropriately be state as :-

"A facility for the processing of grapes or other fruit, or their juice, for the subsequent production of wine."

Item 14 Garden maintenance.

44. The Section 32 Report is of the opinion that the maintenance of vegetation (such as trimming or pruning) or the removal of trees is not provided for as a permitted activity in the rules in the Plan at present and would require resource consent.

45. A new general rule (27.6.1) Permitted Activities is proposed to provide for the maintenance or removal of trees and other vegetation as a permitted activity. It is specifically stated however that this rule would not apply to the Rural Zones.

46. This would appear to conflict with Chapter 30 Rural 3 and 4 Zones, specifically Rule 30.1.7.1 Vegetation Clearance, which provides for the removal of vegetation in the rural zones as a Permitted Activity.

47. Over the years the viticultural industry has made considerable effort to address the reverse sensitivity arising from the removal of shelter belts and standing trees to allow for vineyard development. This has resulted in the installation of a considerable areas of native planting to enhance biodiversity and amenity value. This has been supported by the Council with the Tui to Town program and plant subsidies.

48. To exclude the Rural Zones from the permitted status of this new rule would discourage further installation of such amenity, or maintenance of the existing areas.

Conclusion

49. In respect of the proposed amendments the Section 32 Report states that they :-

(a) intended to provide greater clarity,
(b) intended to remove inconsistencies,
(c) are generally minor,
(d) have not required in depth research.

50. On the contrary the aspects identified in this submission, especially the significant reduction in the term of water permits, has the potential for serious ramifications for the Region as a whole and cannot be considered to be minor in nature.

51. Furthermore the amendments fail to provide greater clarity and indeed introduce more inconsistencies and anomalies than they resolve. It is evident that this is the result of the absence of in depth research into the implications of the proposed amendments.

52. Accordingly the submitter opposes the Plan Change in respect of the items specified below and seeks relief from the Council in the terms detailed,

53. In respect of **Item 1 Policy on the term of water permits to take and use water** the following conclusions are reached.

(a) It is unclear if it is intended by the amendments that the 30 year term of water permits will be retained for those water resources that are not yet fully allocated or where a SFR has been established.
(b) It is unclear whether it is the Council's intent to impose as policy a 10 year term on all water permits irrespective of the water resource, despite provision for 30 year terms being apparently retained for specified resources,
(c) It is unclear whether it is the Council's intent to retain water permit reviews, be they at 5 or 10 year intervals,
(d) The Council concedes uncertainty over the nature and severity of adverse effects on water resources and a lack of hydrological information / knowledge on which to base regime changes.
(e) Since the Plan became operative the Council has been issuing water permits with reduced terms, down to 10 years.
(f) Accordingly there is adequate provision in the existing Plan to address the intent of the amendment i.e. reduced term for water permits in certain locations, without resort to a plan change.
(g) The proposed amendments apparently impact upon existing permitted rights for non-domestic water extraction for stock purposes, and any extraction less than 15 m^3/day from the Wairau aquifer.
(h) The proposed reduced water permit term would impose additional cost on both the applicant and Council at a time of economic constraints.

54. Most important however is the impact that the proposed amendment would have on the confidence to commit significant financial resources in expectation of a return on investment which cannot conceivably be secured within the reduced period.

55. In the absence of a demonstrable assurance that the proposed amendment will the "provide sufficient certainty to water users" sought by Council the resulting degradation of investment confidence would impact upon land values and the industry upon which the Council relies significantly for economic and social stability.

56. In respect of this item the submitter seeks the Council's determination to :-

(a) Delete entirely Item 1 Term of Water Permits for the Taking of Water from the Proposed Plan Change – Schedule of Changes.
(b) No further action on this item be contemplated until the completion of the Water Allocation Plan Review.
(c) Consideration be accorded addressing this aspect in the next full review of the Plan which would enable sufficient time for all ongoing reviews to be concluded, consultation to be undertaken and in depth research to be conducted to secure better hydrological information and knowledge on which to base more definitively the extent of the water resources and the severity of adverse effects upon them.

57. In respect of **Item 10 Wineries, Distilleries, and Breweries in rural environments** it is concluded that the definition of winery as proposed fails to provide the clarity and consistency on which the amendment is predicated.

58. In respect of this item the submitter seeks the Council's determination to delete the existing definition of 'Wineries' from Chapter 26 (Definitions) and replace it with the following definition:-

WINERY - a facility for the processing of grapes or other fruit, or their juices, for the production of wine,

59. In respect of **Item 14 Garden maintenance** it is concluded that the proposed amendment is inconsistent, overly restrictive and does not encourage initiatives to address reverse sensitivity issues or enhance amenity values.

60. In respect of this item the submitter seeks the Council's determination to delete the reference to exclusion of Rural Zones from the proposed new Rule 27.6.1.

61. These conclusions and requested decisions pertain equally to both Plan Change 26 and 61 where applicable.

62. Trade Competition :I would not gain an advantage in trade competition in making this submission.

63. Hearing. : I reserve the right to be heard at any Council hearing in support of this submission, either as an individual of as a joint presentation with others who have made similar submissions.

David A. Whyte

Clintondale Trust 21 December 2012

Submission on Plan Change 61 - Minor Amendments to the Wairau/Awatere Resource Management Plan

MARLBOROUGH DISTRICT COUNCIL

Submissions close 5.00 pm Friday, 21 December 2012

1. Submitter Details

Full Name	Kevin and Lynda Morgan			
Organisation *(if applicable)*				
Contact Person *(if applicable)*	Murray Hunt			
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		Post Code		
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	Fax (03) 578 0323	*Mobile*	027 434 2782	
Address for Service	C/- Hardy-Jones Clark			
(if different from above)	PO Box 646			
	Blenheim 7201	Post Code		
Signature *(of submitter or person authorised to sign on behalf of submitter)*	[signature] and authorised agent	Date	21.12.2012	

2. Trade Competition

Could you gain an advantage in trade competition in making this submission? ☐ Yes ☑ No

If you answered yes, pelase note that there are restrictions on your ability to make a submission. Refer to Clause 6(4) of the First schedule of the RMA for further information.

3. Council Hearing

Do you wish to be heard in support of your submission? ☑ Yes ☐ No

If you answered 'Yes to being heard, would you be prepared to consider presenting a joint joint case with others who have made a similar submission? ☑ Yes ☐ No

4. Return Submission to:

Attention Planning Technician
Marlborough District Council
PO Box 443
Blenheim 7240

Fax: 520 7496

Email: pc61@marlborough.govt.nz

For Office Use
Submission No: 63

5. The specific parts of the proposed plan change the submission relates to are as follows:

Item 2 - Definition of 'Family Flat'

Continue on a separate sheet if necessary

6. My submission is: ***(state the nature of your submission whether you support or oppose (in full or in part) specific provisions)***

I support the inclusion of a restrictive definition of a family flat and in particular the limit on the size. It is my submission that tighter controls are required to ensure that family flats do not proliferate and create pressure and adverse effects in the rural environment and Rural zone by way of reverse sensitivity, loss of productive soils and pressure for subdivision.

Continue on a separate sheet if necessary

7. The decision I seek from Council is: ***(where amendments are sought, provide details of what changes you would like to see)***

To approve the change and include additional restrictions/ definitions addressing the following.

(i) Defining the term family - the addition of the word "immediate" before family would assist.
(ii) Requiring the family flat building to be located adjacent and/or proximate to the principal residence.
(iii) Requiring the building to be secondary and ancillary in size and scale to the principal dwelling.
(iv) Prescribing a time limit for the status of a permitted use, i.e. they are to be permitted for a fixed term only.
(v) Require payment of a bond to secure removal of the family flat at the end of the term of the permitted use either by reference to time or end of family occupation.
(vi) Such other decisions as are necessary to make clear that family flats are in fact a very limited and restricted exception to the provisions that permit only one dwelling house per title as of right and ensure that "family flats" are properly controlled and restricted to their primary purpose which is to provide accommodation often for dependent family and often for a limited time frame.

Continue on a separate sheet if necessary

Form 5

Submission on publicly notified proposal for policy statement or plan

Clause 6 of Schedule 1, Resource Management Act 1991

To :	Marlborough District Council
Name of submitter:	New Zealand Association of Radio Transmitters (Incorporated)
This is a submission on:	Plan Change 26 to the Marlborough Sounds Resource Management Plan and on Plan Change 61 to the Wairau Awatere Resource Management Plan
Our submission is:	We oppose the application of the proposed clarification in its entirety to the Amateur Radio Service

We could not gain an advantage in trade competition through this submission.

Our submission is: The proposed plan change fails to recognise the needs of the amateur radio service in respect of antennas, aerials and their supporting structures, poles and masts. The change will relegate amateur radio configurations to consideration under inappropriate rules relating to buildings.

The specific provisions of the proposal that my submission relates to are:

1. The removal from the plan of provisions which allow for the installation as permitted uses, of effective aerials, antennas and supporting structures in the configurations used by the amateur radio service and required for effective communications. The proposed change as worded will inappropriately relegate amateur radio configurations to consideration under rules relating to buildings.
2. Under the proposed change, effective antennas will become discretionary uses, with no certainty of consent, and will involve amateur radio operators in substantial costs in consent and planning fees with no guarantee of consents being granted.
3. The proposed change ignores planning law precedents established in the matter of an appeal against the Tauranga City Council city plan relating to amateur radio antenna configurations

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The reasons for my submission are:

1. It is unclear from examination of the Proposed Plan Change how whether amateur radio antennas, aerials and their supporting structures are to be regulated. Recent plans elsewhere have regulated amateur radio configurations (ie, the antennas, aerials, and their supporting structures) through the Utilities sections of their plans, but this is not always the case. The control through the utilities section is because of the commonality of the radio frequency communication by the commercial and telco users and amateur radio operators, all of whom use radiocommunication.

2. The absence in the Plan of specific rules to regulate amateur radio configurations, would leave a void in on these uses. Council might seek to apply the Zone Rules controlling buildings to amateur radio aerials and antennas, and their supporting structures. Such application is strongly opposed as the building rules are totally inappropriate for application to amateur antenna installations, and in particular rules relating to boundary clearances, yards, heights, and recession planes.

3. Clarification is required as to how amateur radio antennas will be treated under the Proposed Plan Change

4. For further clarification, a definition of amateur radio antenna configurations is required.

5. The proposed plan change fails to accommodate as permitted uses the reasonable requirements of amateur radio operators and the amateur radio service, The Zone Rules for buildings are totally inappropriate fo amateur radio antenna configurations, because of egregious excessive limitations on the height, and location of amateur radio aerials and antennas and their supporting structures, and the lack of a clear and appropriate definition of an amateur radio configuration comprising antennas, aerials and their supporting structures.

6. Please note that In this submission, the words "antenna" and "aerial" are used synonymously, as they are in radio engineering. The arrangements of wire, rods, and tubes are described as "antennas" in United States and the United Kingdom (where"aerial" is also used but is becoming less so, in favour of "antenna").

7. The proposed Plan Change would appear then to relegate amateur configurations to consideration under the Zone Rules, which for a Permitted Use would appear to limit the heights of antennas and their supporting structures to the relevant in zone Building Height

These rules are;

(a) are inappropriate for amateur radio antenna arrays of the type commonly used in New Zealand for effective international and long distance communications on the amateur transmitting bands

(b) seriously inhibit the activities of licensed Amateur Radio operators in their communication and experimentation activities and in particular the ability of the licensed Amateur Radio operators to engage in international communication, and to provide service in times of emergency.

(c) will render neighbourhood electronic and radio devices more susceptible to possible interference.

(d) will impose unreasonable costs on amateur station owners, by requiring discretionary consents for effective antennas and aerials in the residential zones, with costs that are disproportionate to the cost of station equipment, and are likely to dissuade potential new licencees and recruits to the amateur radio service.

(e) are an excessive use of the Council's statutory powers by imposing the onerous requirements of a discretionary consent for an activity which is accepted by the community, presents no risks to the community and has no reported history of community resentment.

What is the amateur radio service?

8. The community at large, some community leaders, and administrators do not generally understand amateur radio. Therefore it is necessary to explain the background of amateur radio and provide some essential information about this service, and the reasons why part of the Proposed Plan Change is unacceptable in respect of antennas and their supporting structures.

9. "Amateur radio" (often known as "ham radio") is a recreational and self-training activity and a communication service that is established as the amateur radio service by international treaty. It fosters cutting edge experimentation in radio-technology and related topics and provides a pool of scientific research worldwide.

10. Amateur radio uses an international natural resource, the radio spectrum, thus the amateur radio service is regulated by international convention to which all signatory countries to the International Telecommunications Union (ITU) are bound. The Radio Spectrum Management division of the Ministry of Business, Innovation and Employment administers amateur radio in New Zealand. At the international level, national societies throughout the world work together for the international good of amateur radio under the auspices of the International Amateur Radio Union (IARU).

11. The following extracts from the ITU regulations define the amateur service and the amateur-satellite service;

1.56 amateur service: A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

1.57 amateur-satellite service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur radio service.

12. The New Zealand Association of Radio Transmitters (Incorporated) [NZART]is a member organisation of the International Amateur Radio Union (IARU). Because it uses an international natural resource – the radio spectrum – amateur radio has organized nationally and internationally for better mutual use of the radio spectrum among radio amateurs throughout the world, to develop amateur radio worldwide, and to successfully interact with the agencies responsible for regulating and allocating radio frequencies.

13. An example of the IARU organisation at a national level, NZART has the responsibility to successfully interact with the agencies responsible for regulating and allocating radio frequencies and for the establishment and operation of amateur radio stations within New Zealand. The Society's membership stands at 1800 of the 4800 NZ amateur license holders. (Many licensees are no longer active but remain on the license database as licenses are held for lifetimes – active licensees probably number around 3000).

14. In order for you to understand the role of amateur radio in the community some explanation of the reasons for the existence of amateur radio is necessary. The amateur service uses a wide range of spectrum allocations allowing it to, among other things;

(1) engage in experimentation that has advanced the radio state-of-the-art,

(2) provide emergency communications in times of natural or man-made disasters,

(3) provide trained radio operators in times of local and national emergencies,

(4) encourage international cooperation and goodwill by allowing direct communications between and among people on an international basis and,

(5) provide an important educational outlet for people interested in the more technical aspects of radio communications.

15. To gain an appreciation of its standing within the ITU, consider that amateur radio has been allocated

(a) 14.0% of the available bandwidth in the 1.8 MegaHertz (MHz) to 30MHz part of the radio spectrum (3.95 MHz in 10 bands comprising the upper medium frequency and entire high frequency sections of the radio spectrum); in comparison international shortwave broadcasting stations are allocated 16.4% (4.645 MHz in 14 bands).

(b) 2.4% of the available bandwidth in the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands from 30 MHz to 1 GigaHertz (GHz)

(c) 10.3% of the available bandwidth in the UHF and SHF bands from 1 GHz to 10 GHz,

(d) 7.3% of the available bandwidth from 10 GHz to 250 GHz.

16 The allocation of this not inconsiderable amount of spectrum to the amateur radio service

through international convention can be considered to be analogous to the establishment of national and world heritage parks, where land is set aside for the enjoyment of people.

17. In further explanation of Paragraph 14 above;

(1) Experimentation is an activity in which amateurs engage in pursuit of technical knowledge and equipment, a privilege not available to any other spectrum users, who are required to have their equipment pass rigorous approval processes.

In the mid-1920's, exploration of the "short waves" was just beginning. Through experimentation, radio amateurs were well ahead of their commercial counterparts in exploiting the long-distance capabilities of this unique part of the radio spectrum. The technical contributions of the amateurs were very important to subsequent telecommunication development, and remain so today.

Experimentation with antennas is possibly the most frequent form of experimentation radio amateurs engage in. Antennas are frequently built, modified and replaced with alternative designs. The range of designs is very extensive.

18. (2) & (3) Emergency communications is an infrequent activity but one in which radio amateurs willingly engage in times of emergency.

Infrastructure-free amateur radio communications, often overlooked in favour of high-technology commercial means of communication, can maintain communications in disasters that bring more vulnerable technology to its knees. Major cellular phone system failures occurred during Hurricane Katrina in New Orleans in August 2005 and Cyclone Larry throughout Far North Queensland around Cairns in March 2006.

19. Many emergency situations utilise amateur radio, more particularly in Search and Rescue (SAR) activities, such as for the frequent lost or injured person in the ranges, and a large number of urban searches for elderly people. In New Zealand amateur radio operators are members of an organisation, Amateur Radio Emergency Communications, which is dedicated to providing emergency communications assistance. Fortunately, massive disasters, such as Cyclone Tracy, which in December 1974 hit Darwin, the enormous Sumatra-Andaman earthquake and tsunami of December 2004 in the Indian Ocean and Hurricane Katrina, which hit Louisiana in August 2005, have not occurred in New Zealand. In each of these emergencies amateur radio provided vital links saving lives and property when normal communications, even those of military and normal emergency services, were disrupted. Nationally in March 1987 members of the Tauranga branch of NZART provided

for 7days, 24 hours a day, the only outside link to the rest of New Zealand during the Te Teko earthquake; again in May 2005 when the torrential downpour fell in Tauranga members of that branch manned the Civil. No doubt local amateurs will provide details of rescue and public service activities in Marlborough.

20. Amateur radio operators have participated in providing communications in many hundreds of events which have occurred throughout New Zealand. It was indeed very fortunate that the cellular phone network largely survived the Christchurch earthquakes, nevertheless amateurs from all over New Zealand provided operators for the various relief teams. Amateur radio operators have participated in providing communications in many similar event which have occurred throughout New Zealand. Marlborough District may not be so fortunate with communications after a disaster – in overseas situations amateur radio has often provided the main communications for some days following a disaster.

21. The simplicity and portability of amateur radio communications is enormously advantageous in times of emergency, when compared with the mainstream communications

22. Radio amateurs often provide communications to public events, such as car rallies and scouting events, off-road events such as mountain biking, and to other sporting events. These events, sometimes in remote and bush locations provide training in portable and mobile communications, and in message handling; these are skills needed in emergencies.

23. (4) Internationally - Many radio amateurs participate in world-wide communications from their homes as a recreational activity. International cooperation and goodwill is fostered through personal friendships, despite political tensions that arise across borders, which develop from sharing a common interest in amateur radio operation and radio technology. Strong personal relationships develop between amateurs across geographical, political, cultural and other barriers.

24. Amateurs frequently engage in operating contests, many of which are worldwide events, and some participate in expeditions to remote parts of the world, all of which develop and extend their communication skills, particularly in the area of weak-signal communications, which is often a feature of emergency communications. New Zealand amateurs have been involved in rescues following yachting mishaps such as when acting as a relay to a US Coastguard vessel for a sinking yacht 300km off the Californian coast when the two vessels could not communicate due the radio waves skipping over them, but both could be heard here.

25. Today there are nearly three million amateur service licensees located in nearly every country of the world. Radio amateurs continue to build and maintain personal ties in a world that

is in ever-greater need of mutual understanding. Kings presidents, leading politicians, Nobel laureates, eminent engineers and scientists, and many astronauts all can be counted in the ranks of amateur radio operators.

26. (5) Technical training – the opportunity for technical self-training often leads to careers in technology. Amongst New Zealand amateurs who have achieved professional eminence from their beginnings in amateur radio are; William Pickering, (http://www.nzedge.com/heroes/pickering.html) who led the United States (US) space exploration programme. He developed his scientific interest through participation in amateur radio operation while at secondary school in Wellington, and Sir Angus Tait, founder of Tait Industries, manufacturer of high-technology radio communications systems marketed worldwide, was another prominent New Zealander whose technical interests began in amateur radio. http://www.taitradio.com/news-and-media/biographies/sir-angustait

Amateur Radio in the Community

27. Amateur radio operation takes place mainly at the operator's residence. Mostoperators reside in urban or semi-urban areas. Amateurs are normal members of the community. Many communities pride themselves on providing facilities for community and individual recreational activities, through the provision of halls, libraries, playgrounds, reserves and sports grounds, swimming pools, walking tracks, boat ramps and other such facilities which enable the populace to participate in their chosen recreational activities. Councils, at a cost borne by the ratepayers, provide most of these facilities. The amateur radio operators who participate in their avocation of amateur radio, mainly at the place where they reside, are not seeking such community-funding of their facilities, just the opportunity to install effective antennas appropriate to their technological pursuit. The community as a whole benefits through and thrives on diversity; radio amateurs create another thread to that diversity, they are responsible community members, and they offer essential communication services in times of emergency.

28. A radio aerial, antenna or supporting structure, mast or pole, erected for the purpose of pursuing a hobby as an amateur radio operator is ancillary to the enjoyment of the dwelling on the property, it being part and parcel of the enjoyment of normal residence. The aerial or antenna and its supporting structure form part of the normal and ancillary appurtenances of a dwelling, no different in that regard to a swimming pool, a gazebo, a television antenna or a clothes line. The essential aerials and antennas and their supports should not be disallowed by the imposition of dimensions, which are inhibiting to the hobby and to the enjoyment of normal residence.

29. High frequency antennas can generally be reasonably accommodated on an urban lot, although in some instances these would be compromised in performance through lack of height, or length.

30. The types of communication systems used by network utility operators such as Telecom NZ and Kordia are radically different to those of the amateur service. Telecom NZ and the other utility operators operate of necessity at an extremely high level of service, necessary to the reliability of the essential services they supply. The lengths of the propagation paths they use are limited and much less than amateur operators use. Telecom NZ and the other utility operators frequently have their major installations in the industrial zones where by virtue of higher building heights, the antennas are much more efficient.

31 Amateur radio operators operate mainly in the residential zones, where the building heights are less than in other zones and so are considerably disadvantaged by comparison with utility operators such as Telecom NZ, Kordia and others. Amateur radio operations bear no resemblance to the operations of the telecommunications service and network providers, with the exception of the land mobile services. The recently adopted National Environmental Standard for Telecommunications Facilities relates to the radiofrequency fields of all telecommunication facilities and the dimensions and noise levels of telecommunication facilities in road reserves and has no application to the amateur radio service where the antenna technology is very different.

Antenna Height and Radio Wave Propagation

33. Amateurs have for many years erected their antennas as high as possible, within the constraints of available land area, cost and planning rules, knowing how important height is in achieving effective performance.

33. Radio waves emanating from an antenna travel in straight lines into space. The ionosphere absorbs and refracts radio waves; those that travel upwards above around 45 degrees of elevation mainly penetrate the ionosphere and continue out into space although a small amount is reflected back to earth. Waves that are emitted at lower angles are partially absorbed by the ionosphere, the unabsorbed waves are refracted by the ionosphere and are returned to earth at a distance from the transmitter. This refraction by the ionosphere is the basic mechanism of short-wave radio propagation.

34. The propagation around the world of radio waves is strongly affected by the height of the transmitting antenna, and the reception performance of an antenna is similarly affected. These effects are due to the angle of the outgoing or incoming wave and are reciprocal between transmitting and receiving. The wave-angle is largely determined by the height of the antenna.

35. A low horizontal antenna radiates mainly upwards, and the energy is lost, through ionospheric absorption, and into space. Only a small amount of the radiated energy is directed at a desirable low angle. The low angled waves reach the ionosphere at a shallower angle than the higher upward angled waves, and can be refracted by the ionosphere to return to earth, where

the radio signal can be detected. Often the wave will be reflected by the earth back to the ionosphere in a second hop, and up to four or more hops (multi-hops) may be required for a wave to reach its destination. At each reflection, both in the ionosphere and at the earth's surface much of the wave energy is absorbed. So for long distance communication the minimum number of hops is required to maintain an adequate signal level (the more hops, the more absorption), and the wave take-off angle should be as low as possible, directing the radiated energy towards the horizon. This gives the minimum number of hops between two points, and hence the least loss of signal energy.

36. The radiation take-off angle is the key factor in determining effective long distance communications. The angle of radiation (the take-off angle) is primarily determined by the height of the antenna, hence the need for high antennas for effective communication.

37. Placing an amateur radio antenna system higher in the air enhances communication capabilities, while reducing the chances of electromagnetic interference with neighbours, and also reducing the level of spurious radio noise (interference) from neighbourhood computers and electronic appliances.

38. Studies in USA have shown that for effective long-distance terrestrial communication 21 metres is the minimum necessary height for an antenna. Earlier studies on communication between Europe and South America showed that 20 metres height was required for the same reasons.

39. Attached to this submission as Appendix 1 is a report, prepared by the AmericanRadio Relay League (ARRL), on amateur antenna performance in relation to height entitled "Antenna Height and Communications Effectiveness a Guide for City Planners and Amateur Radio Operators" 2nd Edition 1999

40. Quoting from that report, "*...In terms of safety and aesthetic considerations it might seem intuitively reasonable for a planning board to want to restrict antenna installations to low heights. However, such height restrictions often prove to be very counter-productive and frustrating to all parties involved. If an antenna is restricted to low antenna heights, say 35 feet, he will suffer from poor transmission of distant signals. In an attempt to compensate on the transmitting side (he can't do anything about the poor reception problem, he might boost his transmitted power from say 150 watts to 1,500 watts, the maximum legal limit. This ten-fold increase in power will very significantly increase the potential for interference to telephones, televisions, VCRs and audio equipment in his neighbourhood.*

41. *Instead, if the antenna can be moved further away from neighbouring electronic devices -- putting it higher in other words -- this will greatly reduce the likelihood of interference, which*

decreases at the inverse square of the distance. For example, doubling the distance reduces the potential for interference by 75%. As a further benefit, a large antenna doesn't look anywhere near as large at 120 feet as it does close-up at 35 f eet.

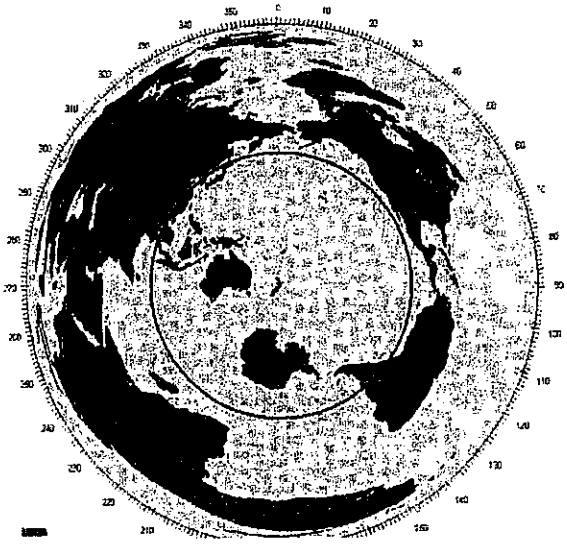
42. *As a not-so-inconsequential side benefit, moving an antenna higher will also greatly reduce the potential for exposure to radio-frequency fields for neighbouring human and animals...."*

43. The same considerations apply in New Zealand, although the maximum power limit is less, at 1,000 watts. Amateur antenna installations on towers exceeding 120 feet in height are not uncommon in the US, mainly being in rural areas and communities.

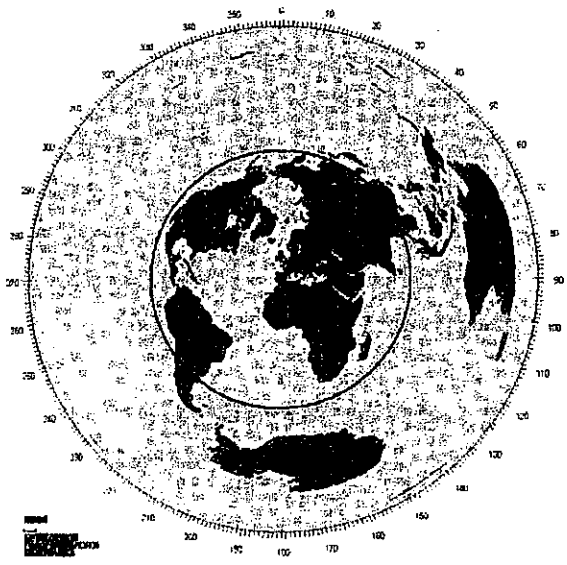
44. The ARRL report uses as examples communication paths from continental United States to Australia, Europe and to Japan. The same considerations apply to worldwide communications from New Zealand. The geographic isolation of New Zealand places most countries of the world at far greater distance than for Europe or the US. Refer to the following great circle maps.

45. Map 1
Great circle map centered on Marlborough shows that there are very few countries in the hemisphere centered on Marlborough.

Most of the world's countries and by far the bulk of the earth's population lie more than 10,000 km away.



46. Map 2
Great Circle map centered on the antipode to Marlborough, in Spain.
Most of the world's countries and by far the bulk of the earth's population are within 10,000 km from the antipode.



47. It is obvious from these two maps that worldwide communications from New Zealand is much more difficult than it is from the US, Europe, most of Asia, and most of Africa.

48. Attached to this submission as Appendix 2 is a paper by Dr K Siwiak, PhD, MSEE, PE, SMIEEE. The paper, published in QEX journal by the ARRL, reinforces the conclusions of the ARRL report in Appendix 1.

49. On the 4th page of Appendix 2, under the heading "Multiband Considerations", the 4th paragraph begins

> "If operation anywhere in the 10 metre to 40 metre bands is of equal interest, the "best" height works out to about 19.9 metres",

and from the 7th line, the 4th paragraph states;

> "...If the 20 metre band is to be optimised, then the best height is about 32 m. If 6 m band is operation is important, then the optimum height is about 15.3 metres. The heights between about 15 metres and 32m (50 to 105ft) emerge as a good range of compromise choices for multiband HF and 6m band operations."

50. Almost all HF Yagi beams are, in urban situations, multi-band antennas, since there is not space available for multiple monoband (single band) antennas each on its separate mast. Stacking of several monoband HF beams on a common mast is achievable, but separation to avoid undesirable interactions could not normally be accomplished within the heights normally permitted.

51. Heights of less than 20 metres (a soft conversion from the 70 feet referred to in the ARRL report) for horizontal antennas on the HF bands will compromise performance, as evidenced in the ARRL report, and the Siwiak paper.

52. Antenna height is the most significant factor in obtaining effective antenna performance

United States - PRB-1 Federal Pre-emption

53. The matter of antenna heights has been of much concern to the amateur radioservice in the USA, where, due to undue restrictions imposed by planning authorities, the US government overrode local planning laws by issuing a federal pre-emption. This federal pre-emption, issued by the US Federal Communications Commission and called PRB-1, and subsequent State and case law, generally prevents planning authorities limiting antenna heights to below 70 feet (21 metres), but does not apply to restrictions arising from land use covenants or private contracts.

PRB-1 is the result of the strong concerns of the US government in response to overly restrictive planning. Regrettably no such pre-emption exists in this country.

54. Within the PRB-1 document are the following statements
..."There is. a strong federal interest in promoting amateur communications....

...Because amateur station communications are only as effective as the antennas employed, antenna height restrictions directly affect the effectiveness of amateur communications. Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator with the communications that he/she desires to engage in. For example, an antenna array for international amateur communications will differ from an antenna used to contact other amateur operators at shorter distances. ...

...Local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose.

55. Many US States have carried over the federal pre-emption into State Law. An example is the Oregon State Statute 221.295 which reads as follows;
221.295. Ordinances regulating placement or height of radio antennas. Notwithstanding ORS chapters 215 and 227, a city or county ordinance based on health, safety or aesthetic consideration that regulates the placement, screening or height of the antennas or antenna support structures of amateur radio operators must reasonably accommodate amateur radio communications and must represent the minimum practicable regulation necessary to accomplish the purpose of the city or county. However, a city or county may not restrict antennas or antenna support structures of amateur radio operators to heights of 70 feet or lower unless the restriction is necessary to achieve a clearly defined health, safety or aesthetic objective of the city or county. [1999c.507 Â§1]

56. NZART believes the same considerations as expressed in PRB-1 above should apply in New Zealand, but realises that legislation changes are required to achieve such result.

57. One further reason for requiring reasonable antenna requirements is the increasing pollution of the electromagnetic spectrum. This pollution, and its consequences, which are the subject of intense scientific investigation, can be likened to electronic smog. It has dramatically increased over recent years with the proliferation of electronic devices, which

taken singly are of no great consequence, but which now number many millions. The cumulative effect of these devices is to raise the noise floor (the background noise) of the electromagnetic spectrum. Efficient antennas are required to discern the wanted signals over prolific background noise, and efficient antennas demand height and appropriate dimensions. They cannot be miniaturised. Amateur radio communications are only as effective as the antennas they employ.

58. Note – the way urban city lighting has effected the ability of astronomical telescopes to see distant celestial bodies is analogous to the way the proliferation of electronic background noise from the host of electronic devices utilised by our populace has reduced the ability of radio users to detect weak signals. Commonly used antennas and their supporting structures

59. A typical urban amateur antenna installation would provide antennas for operation on any or all of the HF, VHF and UHF bands, depending on the interests of the operator.

60. Wire antennas for LF and HF are usually supported on simple slender poles, usually guyed, or on trees, and the antenna wires are raised with halyards through pulleys, as a flagpole is raised on a mast. The Marlborough Plan Changes remove provision for such simple poles in the District Plan at heights which will allow the antenna wires to radiate clear of obstruction by adjacent dwellings conforming to the permitted building envelope.

61. Antenna elements are often combined into a multiple element array to improve antenna performance, by providing directional performance and gain. Physical size generally limits such arrays. The boom (i.e., the support carrying the elements) length of any beam array would seldom will in a modest installation often be shorter than 8 metres for reasons of wind loading and durability, but may be longer to produce antennas of high gain.

62. The multi-element antenna acts as a beam array, the most common configuration is the Yagi array, (named after one of its developers), and Is often called just a "Yagi". The Yagi is a planar structure comprised of multiple elements and mounted on a single connecting support (the boom) – the commonly used terrestrial television antenna is an example. The HF Yagi is used with the elements occupying a horizontal plane (producing horizontally polarised emissions, while the VHF and UHF yagis are used in both vertical and horizontal polarisations.

63. The Yagi arrays are commonly used by amateur radio operators on the higher (20m to 10m) HF bands, and in all of the VHF and UHF bands. The HF antennas are generally constructed as multi-band antennas operating over three (a tri-band antenna) or more bands, so as to minimise the amount of hardware (masts and antennas) that need to be erected to provide the multi-band capability required to accommodate ionospheric variations. Three separate beams for say 20, 15 and 10 metres would either require three separate masts, or alternatively a single high mast with the antennas stacked on a single mast and suitably spaced to minimise

detrimental inter-actions.

64. The higher HF bands, which mainly use the larger Yagi arrays, are the mainstay of long-distance communications. For effectiveness the antennas need to be supported at an adequate height, as evidenced in the contents of Appendices 1 and 2.

65. HF beam antennas are generally mounted on lattice masts. Such masts may be either guyed or self-supporting. Guyed poles and masts are more slender than self-supporting structures, but need sufficient surrounding space for guy wires and anchors to be installed. Some masts are made to telescope or to tilt over, to enable access to the antennas for experimentation, adjustment and maintenance. Unless they are of tilt-over or telescopic construction they often need to be safely climbable, for access to antennas. Such a pole or mast must have either climbing steps, or if a lattice structure is used, a horizontal dimension between the legs of at least 250 millimetres (mm). This is considerably less than the rung width for a domestic ladder.

66. Beam antennas are rotated to align with the direction along which communication is made. A small low-speed motor is mounted either above or within the mast to provide the rotation. For the larger HF beams (as compared with VHF and UHF beams) the rotator motor needs to be accommodated within the mast, some distance below the top, in order to keep the stresses on the rotator to an acceptable level. A common rotator, the Yaesu GX1000 as a diameter of 7.5 inches, and to accommodate this within the mast, requires a mast, which is close to 420 mms in horizontal dimension (for a triangular mast).

67. Self-supporting masts and telescopic or tilt-over lattice masts need to be up to 800 mm in horizontal dimension between legs across each face up to a height of 8 metres, but can reduce to 650 mm for the next 6 metres of height, and further reduce to 420 mm up to the desired height of 20 metres.

68 Any District Plan rules must allow for supporting structures of the types described briefly above.

Planning Rules for antenna supports in Marlborough District and elsewhere.

69. The normal supporting structure for a high frequency Yagi beam array is a lattice mast. Simple pole supports (steel pipe or tube) are not normally used for such antennas, due to the difficulty of installation and limited options for positioning on an urban lot if the mast exceeds about 10 metres in height. The maximum height of a simple pole of 100 mm diameter in a tilt-over or telescopic configuration and supporting such an HF Yagi would be of the order of 13 metres. The pole could be more slender if guyed, but would be very difficult to raise when surmounted by a beam array, which could be say, 8 metres square in plan dimension, for a 5 element 20 metre

Yagi. The Proposed Plan has restricted antenna supporting structures to a height not exceeding the maximum building height, commonly for a dwelling.

70. The HF Yagi is the most common array used for long-distance communication. It is ubiquitous in amateur radio, and it is puzzling as to why the support height to operate effectively will not be allowed as a permitted use under the Marlborough District Plan change, particularly when it is widely allowed elsewhere in New Zealand.

71. Normal established practice for the support of amateur radio HF and VHF/UHF antenna arrays is to use lattice masts, but the mast plan dimensions must be suitable to make them fit for the purpose of supporting antennas at their permitted heights. Support of an HF Yagi beam array at the height sought, on a slender pole, is in most cases impracticable as it requires extensive guying, such as could not be accommodated on most urban lots, the mast could not be safely climbed for antenna adjustments. The mast needs to be either safely climbable, to permit antenna maintenance or adjustment, or the antenna must be capable of being lowered, which can be accomplished by using a trolley sliding up and down the mast, or either tilting or telescoping to bring the antenna towards ground level. Additionally the mast should be sufficiently sized to enable the antenna rotator motor to be accommodated within it.

72. Lattice structures come in various types, either guyed, which are the more slender, or self-supporting. Self supporting masts are often either tilt-over or telescopic, which types have the distinct advantage that the supported antenna array can be lowered in height for experimental adjustment or for maintenance. In earlier years, lattice masts were generally slender, thus requiring guys for stability, but many masts are being superseded today, by self-supporting tilt-over and telescopic designs. Guy wires and their anchor blocks are a considerable nuisance and a potential hazard, particularly to children, on a residential property.

73. The rules in the residential and rural zones, if applied to amateur radio antenna installations limit the height of all antennas and their supporting structures to the maximum building envelope height. The effects on long-distance amateur radio communications will be egregious.

74. Limited height substantially reduces antenna performance; to perform adequately for long-distance communication an antenna needs to be well above the general level of buildings. Further, antennas, and particularly beam antennas, at such low heights as 8 metres will subject the adjacent buildings to radio frequency levels which can be expected to interfere with many domestic electronic devices, even at the emission levels permitted by the New Zealand Standard NZS 2772: Radiofrequency Fields Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz

75. There are a number territorial authorities in New Zealand which allow lattice masts as permitted uses, to greater heights than the 7.5 metres permitted in the residential zones by the

proposed Marlborough District Plans

76. Examples are

North Shore City	15 metres (primary support structures) 9 metres (secondary support structure)
Waikato District	15 metres in living zone and 20 metres in country living zone (maximum of 3 such supporting structures in both zones)
Wanganui District	no limits to height or number of supporting structures
Christchurch City	17 metres
Grey District	20 metres
Far North District	20 metres (except for Russell township which is historically significant, where that height requires a discretionary consent
Tauranga City	20 metres in all residential zones (first support structure) 11 metres (second support structure) 9 metres (6 support structures)

77. When finalising their district plans, these Councils (other than Tauranga City), on becoming made aware of the impediment to efficient amateur antenna installations their proposed rules created, provided relief to amateur stations by adopting less restrictive height and mast dimensions rather than simply applying the maximum building heights of building rules which have not considered the amateur antenna needs. The pragmatic approach of these Councils is applauded. A similar pragmatic should be taken by Marlborough District Council to allow antennas and wires to be supported at heights exceeding dwelling height limits.

78. For Tauranga City Council the 20 metres height resulted from a successful appeal by NZART and Tauranga Emergency Comunications Group (TECG) against a maximum height of 11 metres in the proposed plan.

79. Planning rules must be crafted to accommodate reasonably practicable regulation to accomplish the Council's legitimate purpose, without frustrating the legitimate purpose of the amateur radio service.

80. An example of such reasonable rules is in the excerpts below from the

from the Wanganui District Council District Plan

...Rule R5

d. Exceptions from height recession plane standard

The following structures* are exempt from the above height recession plane standard:

(i) Network utility masts, poles and antennas.

(ii) Flagpoles.

(iii) Wires.

(iv) Television and radio antennas and support structures.

(v) Chimneys.....

and ...

f. Height

Building height* shall not exceed 10 metres. Except that the standard shall not apply to supporting structures* such as masts and poles providing that, above 10 metres in height, they have a maximum horizontal dimension of 0.7 metres (excluding aerials and antennas).

Effects of the Marlborough Council's Proposed Plan Changes.

81 The proposed clarification will remove from amateur radio operators the right to install appropriate effective antennas. Our members are very concerned about the erosion of property rights, in particular the imposition of severe antenna restrictions and the consequences to the amateur services of inappropriate and excessive restrictions. Such restrictions will have significant effects on entry to the amateur service, and will reduce the pool of stations and operators available for emergency communications assistance in times of emergency.

82. Given that almost all amateur radio antenna installations seeking long-distance communications will be subject to the provisions of the Discretionary Use, it is particularly pertinent to note that the costs of such resource consent application, are considerably higher than entry-level costs of amateur radio station equipment and the antenna installation. Not all new amateurs wishing to enter the HF bands and communicate over long distances such as to Europe, Asia and the Americas will want to or will be able to construct their own equipment. The cost of an entry-level reputable 100 watt HF transmitter is around $2000, and the cost of a new antenna could be of the order of a further $1000. A new 15-metre high lattice mast with guys and anchors will cost around $3000 – 4000. This cost will be reduced if the station is built using used equipment, as new amateurs usually do; there is a thriving market in New Zealand for second-hand equipment in good working condition.

83. The resource consent costs for a non-notified limited discretionary or discretionary consent application are high and rise even higher for a publicly notified consent, plus additional costs of pre-lodgement meetings/site visits, consultants/expert advice at cost, cost of hearings, disbursements and administration charges, all expended with no guarantee of a consent being

granted. To these costs must be added the building consent fees, plan and specification and site inspection costs and the total application and consent costs to an applicant seeking a resource consent for an antenna support exceeding the zone maximum building height could well exceed $10,000, which should be weighed against the cost for a modest new amateur radio station with elevated mast and HF Yagi antenna of the order of $5000 to $7000. For a modest station capable of long-distance communication, one can be fairly certain that the planning consent even for a Limited notification application plus building consent costs will substantial outweigh the station equipment cost for a station using used equipment. The ratio of approval costs to equipment costs will be much higher if the resource consent was Fully Notified. Not all amateurs will initially want or need to have a 15 to 20 metre high mast but it doesn't take very long for an operator to realise that height is needed to communicate over the distances to Europe, the Americas, Asia and Africa.

84. If HF (this does not include the 6 metre band) Yagi arrays cannot be installed at heights well in excess of 9 metres and up to 20 metres their will be less incentive for amateur operators to operate long-distance communications, and Marlborough District will gradually disappear from the map of those places in New Zealand where effective long-distance amateur radio communications can be enjoyed.

85. Section 32 of the RMA requires that the council objectives must be evaluated as to the most appropriate way to achieve the purpose of the Act, and whether the policies, rules and other methods are the most appropriate for achieving the objectives. Clause 4 of Section 32 also adds its Section (b) where the risk of not acting also has to be evaluated. I raise this because we have no evidence to establish any risk from the history of amateur radio operations in urban areas. While there is ample evidence of community resentment to cellular radio towers. There is no record of such community resentment to amateur radio antennas, masts and poles, in fact surrounding neighbours are mainly found to be supportive of, or at least, unconcerned about amateur radio antenna installations.

86. The effect of the observations in the preceding three paragraphs is that the Council is being too heavy handed in the absence of risk and in requiring significant expenditure on substantial resource consent costs, and is being neither efficient or effective for an activity that has not troubled the community.

Environment Court Decisions ENV-2011-AKL-000074

87. The Council's attention is drawn to the interim and final decisions of the Environment Court in the matter of an appeal against The Tauranga City Council's Proposed City Plan, by NZART and Tauranga Emergency Communications Group on identical issues to those arising from the Proposed Plan Change.

88. The interim decision is attached as Appendix 3.

89. The final decision is attached as Appendix 4.

90. The Council should note that the erection of amateur radio configurations was directed by the Court to be a permitted use at heights well in excess of the zone permitted building heights and without restrictions created by recession planes and with small clearances to boundaries.

In Summary

91. NZART acknowledges that local authorities can remake rules to regulate amateur antenna installations to insure the safety and health of persons in the community, but believes that those rules cannot be so restrictive that they preclude effective amateur communications.

92. On the other hand, local municipalities or governing bodies frequently enact regulations limiting antennas and their support structures in height and locations, e.g. to side or rear yards, for health, safety or aesthetic considerations. These limiting regulations can result in conflict because the effectiveness of the communications that emanate from an amateur radio station is directly dependent upon the location and the height of the antenna. Amateur operators maintain that they are precluded from effectively operating in certain bands allocated for their use if the height of their antennas is limited by the proposed rules.

93. Amateurs do not find safety precautions objectionable. What they do object to are the sometime prohibitive, non-refundable application filing fees to obtain a permit to erect an antenna installation and those provisions in ordinances, which regulate antennas for purely aesthetic reasons. The amateurs contend, almost universally, "beauty is in the eye of the beholder." They assert that an antenna installation is not more aesthetically displeasing than other objects that people keep on their property, e.g. motor homes, trailers, pick-up trucks, solar collectors and gardening equipment.

94. Amateur radio antennas and aerial wire need to be erected at heights greater than the proposed Marlborough District permitted residential zone building envelope maximum height of 7.5 metres for effective long distance amateur radio communications.

95. The Proposed District Plan Change should be amended to include the relief which is inherent in the Rules set out in the decisions of the Environment Court, so as to achieve the submitter's objective of a reasonable accommodation of amateur radio antennas and their supporting structures.

I seek the following decision from the Marlborough District Council:

That the Council amends the proposed Marlborough District Plans to remove the unduly severe restrictions on the amateur radio service which would be a consequence of the proposed Plan Changes, and that the Council include rules which are more accommodating to the amateur radio service, so providing for more effective long distance communications than the proposed plan allows.

Such Rules must:-

provide Permitted Use supporting structure heights to at least 20 metres in the residential zones, and to at least 25 metres in the Rural zone,

allow surmounted whip and discone antennas above the mast heights

allow minimal setback on internal site boundaries, and no greater than 3 metres on road boundaries

allow penetrations of the daylight control recession planes

New rules must be devised in consultation with the amateur radio service, and in particular with the New Zealand Association of Radio Transmitters (Inc) and the Marlborough Amateur Radio Society (Inc)

Attachments

95. The following documents are appended.

Appendix 1	"Antenna Height and Communications Effectiveness a Guide for City Planners and Amateur Radio Operators" 2nd Edition 1999 American Radio Relay League (ARRL),
Appendix 2	"An Optimum Height for an Elevated HF Antenna" QEX May/June 2011 Pg 32-38, a paper by Dr K Siwiak, PhD, MSEE, PE, SMIEEE, published in QEX journal by the ARRL,
Appendix 3	Environment Court ENV-2011-AKL-000074 Interim Decision
Appendix 4	Environment Court ENV-2011-AKL-000074 Final Decision

Person Authorised to make submission:

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21 December 2012

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Antenna Height and Communications Effectiveness

Second Edition

A Guide for City Planners and Amateur Radio Operators

By R. Dean Straw, N6BV, and Gerald L. Hall, K1TD
Senior Assistant Technical Editor and Retired Associate Technical Editor

The American Radio Relay League, Inc.
225 Main Street
Newington, CT 06111

Executive Summary

Amateur radio operators, or "hams" as they are called, communicate with stations located all over the world. Some contacts may be local in nature, while others may be literally halfway around the world. Hams use a variety of internationally allocated frequencies to accomplish their communications.

Except for local contacts, which are primarily made on Very High and Ultra High Frequencies (VHF and UHF), communicating between any two points on the earth rely primarily on high-frequency (HF) signals propagating through the ionosphere. The earth's ionosphere acts much like a mirror at heights of about 150 miles. The vertical angle of radiation of a signal launched from an antenna is one of the key factors determining effective communication distances. The ability to communicate over long distances generally requires a low radiation angle, meaning that an antenna must be placed high above the ground in terms of the wavelength of the radio wave being transmitted.

A beam type of antenna at a height of 70 feet or more will provide greatly superior performance over the same antenna at 35 feet, all other factors being equal. A height of 120 feet or even higher will provide even more advantages for long-distance communications. To a distant receiving station, a transmitting antenna at 120 feet will provide the effect of approximately 8 to 10 times more transmitting power than the same antenna at 35 feet. Depending on the level of noise and interference, this performance disparity is often enough to mean the difference between making distant radio contact with fairly reliable signals, and being unable to make distant contact at all.

Radio Amateurs have a well-deserved reputation for providing vital communications in emergency situations, such as in the aftermath of a severe icestorm, a hurricane or an earthquake. Short-range communications at VHF or UHF frequencies also require sufficient antenna heights above the local terrain to ensure that the antenna has a clear horizon.

In terms of safety and aesthetic considerations, it might seem intuitively reasonable for a planning board to want to restrict antenna installations to low heights. However, such height restrictions often prove very counterproductive and frustrating to all parties involved. If an amateur is restricted to low antenna heights, say 35 feet, he will suffer from poor transmission of his own signals as well as poor reception of distant signals. In an attempt to compensate on the transmitting side (he can't do anything about the poor reception problem), he might boost his transmitted power, say from 150 watts to 1,500 watts, the maximum legal limit. This ten-fold increase in power will very significantly increase the *potential* for interference to telephones, televisions, VCRs and audio equipment in his neighborhood.

Instead, if the antenna can be moved farther away from neighboring electronic devices—putting it higher, in other words—this will greatly reduce the likelihood of interference, which decreases at the inverse square of the distance. For example, doubling the distance reduces the potential for interference by 75%. As a further benefit, a large antenna doesn't look anywhere near as large at 120 feet as it does close-up at 35 feet.

As a not-so-inconsequential side benefit, moving an antenna higher will also greatly reduce the potential of exposure to electromagnetic fields for neighboring human and animals. Interference and RF exposure standards have been thoroughly covered in recently enacted Federal Regulations.

Antenna Height and Communications Effectiveness

By R. Dean Straw, N6BV, and Gerald L. Hall, K1TD
Senior Assistant Technical Editor and Retired Associate Technical Editor

The purpose of this paper is to provide general information about communications effectiveness as related to the physical height of antennas. The intended audience is amateur radio operators and the city and town Planning Boards before which a radio amateur must sometimes appear to obtain building permits for radio towers and antennas.

The performance of horizontally polarized antennas at heights of 35, 70 and 120 feet is examined in detail. Vertically polarized arrays are not considered here because at short-wave frequencies, over average terrain and at low radiation angles, they are usually less effective than horizontal antennas.

Ionospheric Propagation

Frequencies between 3 and 30 megahertz (abbreviated MHz) are often called the "short-wave" bands. In engineering terms this range of frequencies is defined as the *high-frequency* or *HF* portion of the radio spectrum. HF radio communications between two points that are separated by more than about 15 to 25 miles depend almost solely on propagation of radio signals through the *ionosphere*. The ionosphere is a region of the Earth's upper atmosphere that is ionized primarily by ultraviolet rays from the Sun.

The Earth's ionosphere has the property that it will refract or bend radio waves passing through it. The ionosphere is not a single "blanket" of ionization. Instead, for a number of complex reasons, a few discrete layers are formed at different heights above the earth. From the standpoint of radio propagation, each ionized layer has distinctive characteristics, related primarily to different amounts of ionization in the various layers. The ionized layer that is most useful for HF radio communication is called the *F layer*.

The F layer exists at heights varying from approximately 130 to 260 miles above the earth's surface. Both the layer height and the amount of ionization depend on the latitude from the equator, the time of day, the season of the year, and on the level of sunspot activity. Sunspot activity varies generally in cycles that are approximately 11 years in duration, although short-term bursts of activity may create changes in propagation conditions that last anywhere from a few minutes to several days. The ionosphere is not homogeneous, and is undergoing continual change. In fact, the exact state of the ionosphere at any one time is so variable that is best described in statistical terms.

The F layer disappears at night in periods of low and medium solar activity, as the ultraviolet energy required to sustain ionization is no longer received from the Sun. The amount that a passing radio wave will bend in an ionospheric layer is directly related to the intensity of ionization in that layer, and to the frequency of the radio wave.

A triangle may be used to portray the cross-sectional path of ionospheric radio-wave travel, as shown in **Fig 1**, a highly simplified picture of what happens in propagation of radio waves. The base of the triangle is the surface of the Earth between two distant points, and the apex of the triangle is the point representing refraction in the ionosphere. If all the necessary conditions are

met, the radio wave will travel from the first point on the Earth's surface to the ionosphere, where it will be bent (*refracted*) sufficiently to travel to the second point on the earth, many hundreds of miles away.

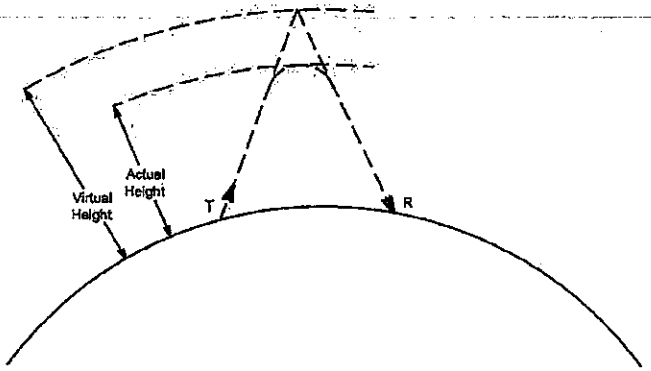

Fig 1—A simplified cross-sectional representation of ionospheric propagation. The simple triangle goes from the Transmitter T up to the virtual height and then back down to the Receiver R. Typically the F layer exists at a height of 150 miles above the Earth at mid-latitudes. The distance between T and R may range from a few miles to 2500 miles under normal propagation conditions.

Of course the Earth's surface is not a flat plane, but instead is curved. High-frequency radio waves behave in essentially the same manner as light waves—they tend to travel in straight lines, but with a slight amount of downward bending caused by refraction in the air. For this reason it is not possible to communicate by a direct path over distances greater than about 15 to 25 miles in this frequency range, slightly farther than the optical horizon. The curvature of the earth causes the surface to "fall away" from the path of the radio wave with greater distances. Therefore, it is the ionosphere that permits HF radio communications to be made between points separated by hundreds or even thousands of miles. The range of frequencies from 3 to 30 MHz is unique in this respect, as ionospheric propagation is not consistently supported for any frequencies outside this range.

One of the necessary conditions for ionospheric communications is that the radio wave must encounter the ionosphere at the correct angle. This is illustrated in **Fig 2**, another very simplified drawing of the geometry involved. Radio waves leaving the earth at high elevation angles above the horizon may receive only very slight bending due to refraction, and are then lost to outer space. For the same fixed frequency of operation, as the elevation angle is lowered toward the horizon, a point is reached where the bending of the wave is sufficient to return the wave to the Earth. At successively lower angles, the wave returns to the Earth at increasing distances.

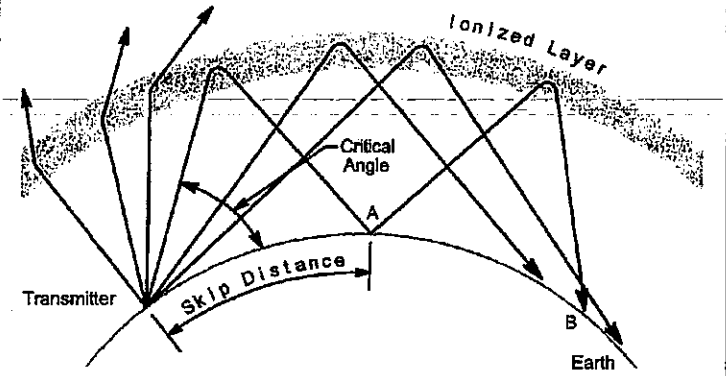

Fig 2—Behavior of radio waves encountering the ionosphere. Rays entering the ionized region at angles above the critical angle are not bent enough to return to Earth and are lost to space. Waves entering at angles below the critical angle reach the Earth at increasingly greater distances as the angle approaches the horizontal. The maximum distance that may normally be covered in a single hop is 2500 miles. Greater distances may be covered with multiple hops.

If the radio wave leaves the earth at an *elevation angle* of zero degrees, just toward the horizon (or just tangent to the earth's surface), the maximum distance that may be reached under usual ionospheric conditions is approximately 2,500 miles (4,000 kilometers). However, the Earth itself also acts as a reflector of radio waves coming down from the ionosphere. Quite often a radio signal will be reflected from the reception point on the Earth back into the ionosphere again, reaching the Earth a second time at a still more distant point.

As in the case of light waves, the angle of reflection is the same as the angle of incidence, so a wave striking the surface of the Earth at an angle of, say, 15° is reflected upward from the surface at the same angle. Thus, the distance to the second point of reception will be approximately twice the distance of the first. This effect is also illustrated in Fig 2, where the signal travels from the transmitter at the left of the drawing via the ionosphere to Point A, in the center of the drawing. From Point A the signal travels via the ionosphere again to Point B, at the right. A signal traveling from the Earth through the ionosphere and back to the Earth is called a *hop*. Under some conditions it is possible for as many as four or five signal hops to occur over a radio path, but no more than two or three hops is the norm. In this way, HF communications can be conducted over thousands of miles.

With regard to signal hopping, two important points should be recognized. First, a significant loss of signal occurs with each hop. Lower layers of the ionosphere absorb energy from the signals as they pass through, and the ionosphere tends to scatter the radio energy in various directions, rather than confining it to a tight bundle. The earth also scatters the energy at a reflection point. Thus, only a small fraction of the transmitted energy actually reaches a distant receiving point.

Again refer to Fig 2. Two radio paths are shown from the transmitter to Point B, a one-hop path and a two-hop path. Measurements indicate that although there can be great variation in the ratio of the two signal strengths in a situation such as this, the signal power received at Point B will generally be from five to ten times greater for the one-hop wave than for the two-hop wave. (The terrain at the mid-path reflection point for the two-hop wave, the angle at which the wave is reflected from the earth, and the condition of the ionosphere in the vicinity of all the refraction points are the primary factors in determining the signal-strength ratio.) Signal levels are generally compared in decibels, abbreviated dB. The decibel is a logarithmic unit. Three decibels difference in signal strengths is equivalent to a power ratio of 2:1; a difference of 10 dB equates to a power ratio of 10:1. Thus the signal loss for an additional hop is about 7 to 10 dB.

The additional loss per hop becomes significant at greater distances. For a simplified example, a distance of 4,000 miles can be covered in two hops of 2,000 miles each or in four hops of 1,000 miles each. For illustration, assume the loss for additional hops is 10 dB, or a 1/10 power ratio. Under such conditions, the four-hop signal will be received with only 1/100 the power or 20 dB below that received in two hops. The reason for this is that only 1/10 of the two-hop signal is received for the first additional (3^{rd}) hop, and only 1/10 of that 1/10 for the second additional (4^{th}) hop. It is for this reason that no more than four or five propagation hops are useful; the received signal eventually becomes too weak to be heard.

The second important point to be recognized in multihop propagation is that the geometry of the first hop establishes the geometry for all succeeding hops. And it is the elevation angle at the transmitter that sets up the geometry for the first hop.

It should be obvious from the preceding discussion that one needs a detailed knowledge of the range of elevation angles for effective communication in order to do a scientific evaluation of a possible communications circuit. The range of angles should be statistically valid over the full 11-year solar sunspot cycle, since the behavior of the Sun determines the changes in the nature of the Earth's ionosphere. ARRL did a very detailed computer study in the early 1990s to determine the angles needed for propagation throughout the world. The results of this study will be examined later, after we introduce the relationship between antenna height and the elevation pattern for an antenna.

Horizontal Antennas Over Flat Ground

A simple antenna that is commonly used for HF communications is the horizontal half-wave *dipole*. The dipole is a straight length of wire (or tubing) into which radio-frequency energy is fed at the center. Because of its simplicity, the dipole may be easily subjected to theoretical performance analyses. Further, the results of proper analyses are well borne out in practice. For these reasons, the half-wave dipole is a convenient performance standard against which other antenna systems can be compared.

Because the earth acts as a reflector for HF radio waves, the directive properties of any antenna are modified considerably by the ground underneath it. If a dipole antenna is placed horizontally above the ground, most of the energy radiated downward from the dipole is

reflected upward. The reflected waves combine with the direct waves (those radiated at angles above the horizontal) in various ways, depending on the height of the antenna, the frequency, and the electrical characteristics of the ground under and around the antenna.

At some vertical angles above the horizon, the direct and reflected waves may be exactly in phase—that is, the maximum signal or field strengths of both waves are reached at the same instant at some distant point. In this case the resultant field strength is equal to the sum of the two components. At other vertical angles the two waves may be completely out of phase at some distant point—that is, the fields are maximum at the same instant but the phase directions are opposite. The resultant field strength in this case is the difference between the two. At still other angles the resultant field will have intermediate values. Thus, the effect of the ground is to increase the intensity of radiation at some vertical angles and to decrease it at others. The elevation angles at which the maxima and minima occur depend primarily on the antenna height above ground. (The electrical characteristics of the ground have some slight effect too.)

For simplicity here, we consider the ground to be a perfectly conducting, perfectly flat reflector, so that straightforward trigonometric calculations can be made to determine the relative amount of radiation intensity at any vertical angle for any dipole height. Graphs from such calculations are often plotted on rectangular axes to show best resolution over particularly useful ranges of elevation angles, although they are also shown on polar plots so that both the front and back of the response can be examined easily. **Fig 3** shows an overlay of the polar elevation-pattern responses of two dipoles at different heights over perfectly conducting flat ground. The lower dipole is located a half wavelength above ground, while the higher dipole is located one wavelength above ground. The pattern of the lower antenna peaks at an elevation angle of about 30°, while the higher antenna has two main lobes, one peaking at 15° and the other at about 50° elevation angle.

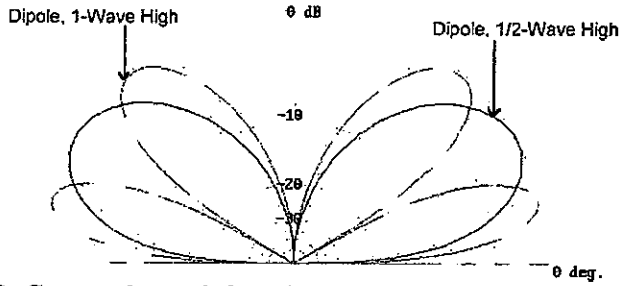

Fig 3–Comparison of elevation responses for two dipoles: one ½-wavelength high, and the other 1-wavelength high.

In the plots shown in Fig 3, the elevation angle above the horizon is represented in the same fashion that angles are measured on a protractor. The concentric circles are calibrated to represent ratios of field strengths, referenced to the strength represented by the outer circle. The circles are calibrated in decibels. Diminishing strengths are plotted toward the center.

You may have noted that antenna heights are often discussed in terms of *wavelengths*. The reason for this is that the length of a radio wave is inversely proportional to its frequency. Therefore a fixed physical height will represent different electrical heights at different radio frequencies. For example, a height of 70 feet represents one wavelength at a frequency of 14 MHz. But the same 70-foot height represents a half wavelength for a frequency of 7 MHz and only a quarter wavelength at 3.5 MHz. On the other hand, 70 feet is 2 wavelengths high at 28 MHz.

The lobes and nulls of the patterns shown in Fig 3 illustrate what was described earlier, that the effect of the ground beneath an antenna is to increase the intensity of radiation at some vertical elevation angles and to decrease it at others. At a height of a half wavelength, the radiated energy is strongest at a rather high elevation angle of 30°. This would represent the situation for a 14-MHz dipole 35 feet off the ground.

As the horizontal antenna is raised to greater heights, additional lobes are formed, and the lower ones move closer to the horizon. The maximum amplitude of each of the lobes is roughly equal. As may be seen in Fig 3, for an antenna height of one wavelength, the energy in the lowest lobe is strongest at 15°. This would represent the situation for a 14-MHz dipole 70 feet high.

The elevation angle of the lowest lobe for a horizontal antenna above perfectly conducting ground may be determined mathematically:

$$\theta = \sin^{-1}\left(\frac{0.25}{h}\right)$$

Where

θ = the wave or elevation angle
h = the antenna height above ground in wavelengths

In short, the higher the horizontal antenna, the lower is the lowest lobe of the pattern. As a very general rule of thumb, the higher an HF antenna can be placed above ground, the farther it will provide effective communications because of the resulting lower radiation angle. This is true for any horizontal antenna over real as well as theoretically perfect ground.

You should note that the *nulls* in the elevation pattern can play an important role in communications—or lack of communication. If a signal arrives at an angle where the antenna system exhibits a deep null, communication effectiveness will be greatly reduced. It is thus quite possible that an antenna can be *too high* for good communications efficiency on a particular frequency. Although this rarely arises as a significant problem on the amateur bands below 14 MHz, we'll discuss the subject of optimal height in more detail later.

Actual earth does not reflect all the radio-frequency energy striking it; some absorption takes place. Over real earth, therefore, the patterns will be slightly different than those shown in Fig 3, however the differences between theoretical and perfect earth ground are not significant for the range of elevation angles necessary for good HF communication. Modern computer programs can do accurate evaluations, taking all the significant ground-related factors into account.

Beam Antennas

For point-to-point communications, it is beneficial to concentrate the radiated energy into a beam that can be aimed toward a distant point. An analogy can be made by comparing the light

from a bare electric bulb to that from an automobile headlight, which incorporates a built-in focusing lens. For illuminating a distant point, the headlight is far more effective.

Antennas designed to concentrate the radiated energy into a beam are called, naturally enough, *beam antennas*. For a fixed amount of transmitter power fed to the transmitting antenna, beam antennas provide increased signal strength at a distant receiver. In radio communications, the use of a beam antenna is also beneficial during reception, because the antenna pattern for transmission is the same for reception. A beam antenna helps to reject signals from unwanted directions, and in effect boosts the strength of signals received from the desired direction.

The increase in signal or field strength a beam antenna offers is frequently referenced to a dipole antenna in free space (or to another theoretical antenna in free space called an *isotropic antenna*) by a term called *gain*. Gain is commonly expressed in decibels. The isotropic antenna is defined as being one that radiates equally well in all directions, much like the way a bare lightbulb radiates essentially equally in all directions.

One particularly well known type of beam antenna is called a *Yagi*, named after one of its Japanese inventors. Different varieties of Yagi antennas exist, each having somewhat different characteristics. Many television antennas are forms of multi-element Yagi beam antennas. In the next section of this paper, we will refer to a four-element Yagi, with a gain of 8.5 dBi in free space, exclusive of any influence due to ground.

This antenna has 8.5 dB more gain than an isotropic antenna in free space and it achieves that gain by squeezing the pattern in certain desired directions. Think of a normally round balloon and imagine squeezing that balloon to elongate it in one direction. The increased length in one direction comes at the expense of length in other directions. This is analogous to how an antenna achieves more signal strength in one direction, at the expense of signal strength in other directions.

The elevation pattern for a Yagi over flat ground will vary with the electrical height over ground in exactly the same manner as for a simpler dipole antenna. The Yagi is one of the most common antennas employed by radio amateurs, second in popularity only to the dipole.

Putting the Pieces Together

In **Fig 4**, the elevation angles necessary for communication from a particular transmitting site, in Boston, Massachusetts, to the continent of Europe using the 14-MHz amateur band are shown in the form of a bargraph. For each elevation angle from 1° to 30°, Fig 4 shows the percentage of time when the 14-MHz band is open at each elevation angle. For example, 5° is the elevation angle that occurs just over 12% of the time when the band is available for communication, while 11° occurs about 10% of the time when the band is open. The useful range of elevation angles that must accommodated by an amateur station wishing to talk to Europe from Boston is from 1° to 28°.

In addition to the bar-graph elevation-angle statistics shown in Fig 4, the elevation pattern responses for three Yagi antennas, located at three different heights above flat ground, are overlaid on the same graph. You can easily see that the 120-foot antenna is the best antenna to cover the most likely angles for this particular frequency, although it suffers at the higher elevation angles on this particular propagation path, beyond about 12°. If, however, you can accept somewhat lower gain at the lowest angles, the 70-foot antenna would arguably be the best overall choice to cover all the elevation angles.

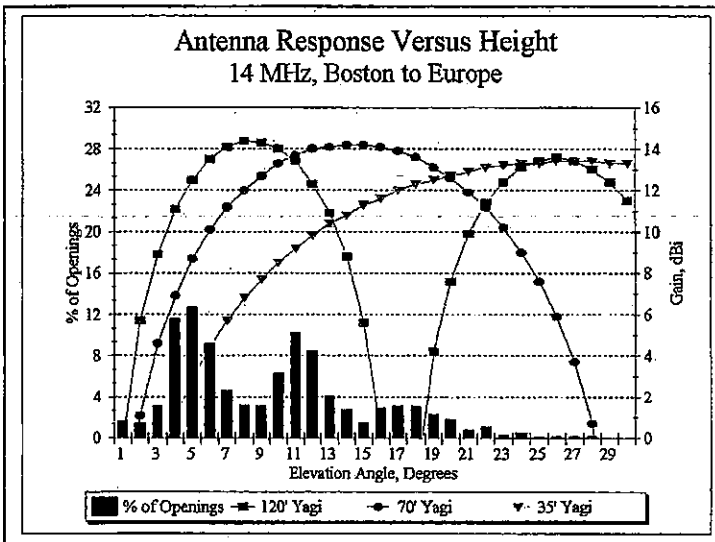

Fig 4—Elevation response patterns of three Yagis at 120, 70 and 35 feet, at 14 MHz over flat ground. The patterns are overlaid with the statistical elevation-angles for the path from Boston to continental Europe over the entire 11-year solar sunspot cycle. Clearly, the 120-foot antenna is the best choice to cover the low angles needed, but it suffers some at higher angles.

Other graphs are needed to show other target receiving areas around the world. For comparison, **Fig 5** is also for the 14-MHz band, but this time from Boston to Sydney, Australia. The peak angle for this very long path is about 2°, occurring 19% of the time when the band is actually open for communication. Here, even the 120-foot high antenna is not ideal. Nonetheless, at a moderate 5° elevation angle, the 120-foot antenna is still 10 dB better than the one at 35 feet.

Fig 4 and Fig 5 have portrayed the situation for the 14-MHz amateur band, the most popular and heavily utilized HF band used by radio amateurs. During medium to high levels of solar sunspot activity, the 21 and 28-MHz amateur bands are open during the daytime for long-distance communication. **Fig 6** illustrates the 28-MHz elevation-angle statistics, compared to the elevation patterns for the same three antenna heights shown in Fig 5. Clearly, the elevation response for the 120-foot antenna has a severe (and undesirable) null at 8°. The 120-foot antenna is almost 3.4 wavelengths high on 28 MHz (whereas it is 1.7 wavelengths high on 14 MHz.) For many launch angles, the 120-foot high Yagi on 28 MHz would simply be too high.

The radio amateur who must operate on a variety of frequencies might require two or more towers at different heights to maintain essential elevation coverage on all the authorized bands. Antennas can sometimes be mounted at different heights on a single supporting tower, although it is more difficult to rotate antennas that are "vertically stacked" around the tower to point in all the needed directions. Further, closely spaced antennas tuned to different frequencies usually interact electrically with each other, often causing severe performance degradation.

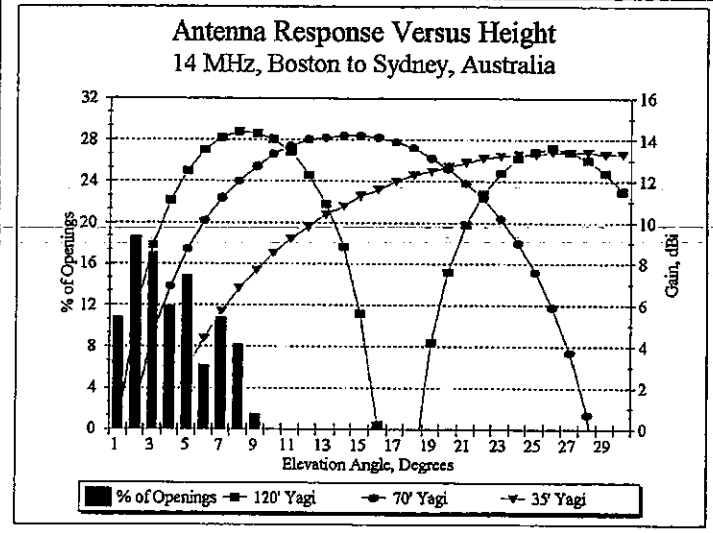

Fig 5—Elevation responses for same antennas as Fig 4, but for a longer-range path from Boston to Sydney, Australia. Note that the prevailing elevation angles are very low.

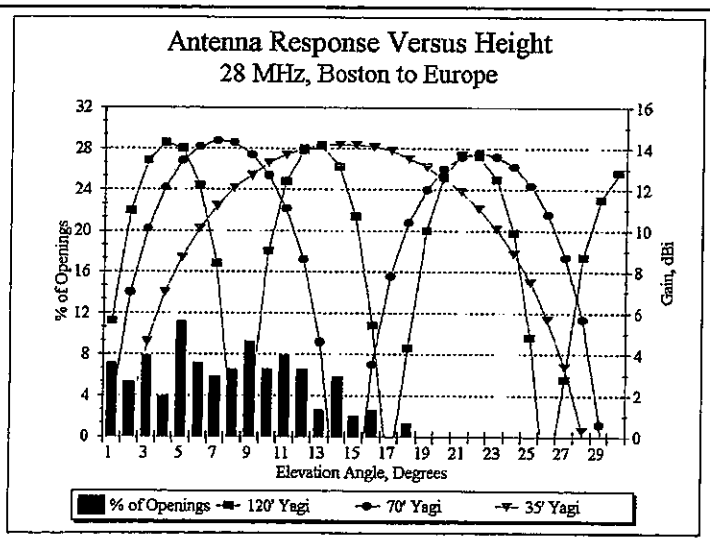

Fig 6—Elevation angles compared to antenna responses for 28-MHz path from Boston to Europe. The 70-foot antenna is probably the best overall choice on this path.

During periods of low to moderate sunspot activity (about 50% of the 11-year solar cycle), the 14-MHz band closes down for propagation in the early evening. A radio amateur wishing to continue communication must shift to a lower frequency band. The next most highly used band below the 14-MHz band is the 7-MHz amateur band. **Fig 7** portrays a 7-MHz case for another transmitting site, this time from San Francisco, California, to the European continent. Now, the range of necessary elevation angles is from about 1° to 16°, with a peak statistical likelihood of about 16% occurring at an elevation of 3°. At this low elevation angle, a 7-MHz antenna must be *very* high in the air to be effective. Even the 120-foot antenna is hardly optimal for the peak angle of 3°. The 200-foot antenna shown would be far better than a 120-foot antenna. Further, the 35-foot high antenna is *greatly* inferior to the other antennas on this path and would provide far less capabilities, on both receiving and transmitting.

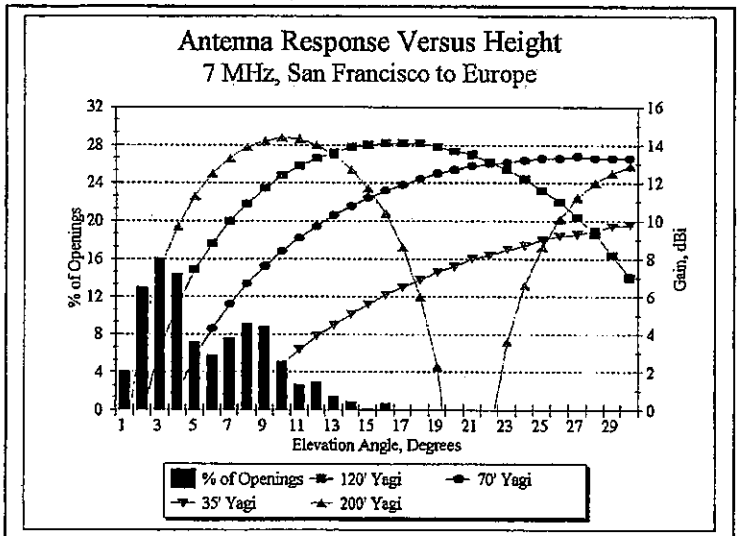

Fig 7—Comparison of antenna responses for another propagation path: from San Francisco to Europe on 7 MHz. Here, even a 120-foot high antenna is hardly optimal for the very low elevation angles required on this very long path. In fact, the 200-foot high antenna is far better suited for this path.

What If the Ground Isn't Flat?

In the preceding discussion, antenna radiation patterns were computed for antennas located over *flat ground.* Things get much more complicated when the exact local terrain surrounding a tower and antenna are taken into account. In the last few years, sophisticated ray-tracing computer models have become available that can calculate the effect that local terrain has on the elevation patterns for real-world HF installations—and *each* real-world situation is indeed different.

For simplicity, first consider an antenna on the top of a hill with a constant slope downward. The general effect is to lower the effective elevation angle by an amount equal to the downslope of the hill. For example, if the downslope is –3° for a long distance away from the tower and the flat-ground peak elevation angle is 10° (due to the height of the antenna), then the net result will be 10° – 3° = 7° peak angle. However, if the local terrain is rough, with many bumps and valleys in the desired direction, the response can be modified considerably. **Fig 8** shows the fairly complicated terrain profile for Jan Carman, K5MA, in the direction of Japan. Jan is located on one of the tallest hills in West Falmouth, Massachusetts. Within 500 feet of his tower is a small hill with a water tower on the top, and then the ground quickly falls away, so that at a distance of about 3000 feet from the tower base, the elevation has fallen to sea level, at 0 feet.

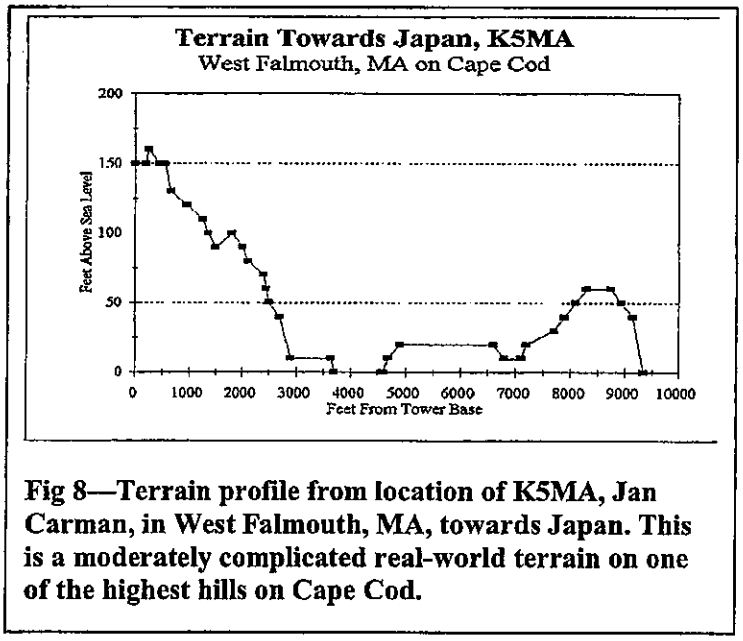

Fig 8—Terrain profile from location of K5MA, Jan Carman, in West Falmouth, MA, towards Japan. This is a moderately complicated real-world terrain on one of the highest hills on Cape Cod.

The computed responses toward Japan from this location, using a 120- and a 70-foot high Yagi, are shown in **Fig 9**, overlaid for comparison with the response for a 120-foot Yagi over flat ground. Over this particular terrain, the elevation pattern for the 70-foot antenna is actually better than that of the 120-foot antenna for angles below about 3°, but not for medium angles! The responses for each height oscillate around the pattern for flat ground — all due to the complex reflections and diffractions occurring off the terrain.

At an elevation angle of 5°, the situation reverses itself and the gain is now higher for the 120-foot-high antenna than for the 70-foot antenna. A pair of antennas on one tower would be required to cover all the angles properly. To avoid any electrical interactions between similar antennas on one tower, two towers would be much better. Compared to the flat-ground situation, the responses of real-world antenna can be very complicated due to the interactions with the local terrain.