Appendix C

Data Extract from the Water Information for New Zealand Database

Drinking Water for New Zealand

Managed by ESR for the Ministry of Health. Data extracted from the National WINZ Database.

Register of Community Drinking-Water Supplies in New Zealand

Darfield – Supply Structure and Grading

District Health Board: Community & Public Health (Chch)

Component	Code	Name	Population	Grading
Community:	DAR001	Darfield	2,700	
		Local Authority: Selwyn District Council		
Zone:	DAR001DA	Darfield	2,700	Ee
Plant:	TP00220	Darfield		E
Source:	S00130	Darfield Galleries		

Source: Water Information New Zealand, as extracted from the National WINZ database on 4 May 2009.

Drinking Water for New Zealand

Managed by ESR for the Ministry of Health. Data extracted from the National WINZ Database.

Public Health Grading of Supplies

The current Grading specification was released by the Ministry of Health in 2003, replacing the previous one of 1993.

What is the Public Health Grading?

In order to compare water supplies and identify those which may not be delivering quality water, the Ministry of Health grades each supply. So far, only those with populations over 500 are graded, but those with as few as 25 users will be graded in the future.

How are supplies graded? First they are examined to find out how they function, where the water comes from, what is done to it, how often its quality is checked and what the results indicate. In all, 33 aspects of the source and treatment are examined, along with 22 factors for the distribution system and final water quality. There is a strong concern, not only about the quality of the end product, but also about whether adequate barriers to potential contamination are in place in the system. This is important, because even frequent monitoring can miss some pollution events.

For each zone (ie area of similar water received), a two-letter grading is designated, such as Aa, Cb, Ed, etc. The capital letter (A1, A, B, C, D or E) represents the grade of the water coming into the zone (ie source quality and treatment) while the lower-case letter (a1, a, b, c, d or e) indicates the quality of the water received at your gate. Typically, if one tends to be high (A or B), so will be the other (a or b), but any combination is possible.

As a very rough rule of thumb, for a grade of Bc, the B represents the best potential quality (regarding risks of contamination, etc), as it leaves the treatment plant, while the c is the actual quality received by the consumer. This is a gross simplification, but is useful to gain an initial grasp of how the letters relate.

In the *Register*, each graded zone has its two-letter grade listed on the same line. Each contributing plant has its "source and treatment" upper case grade alongside it. Where only one plant serves a zone, this grade is the same as the upper case letter in the zone line, so it hardly needs repeating. However, if two or more plants serve a zone, the "worst case" plant grade is the one taken up by the zone. Having it all here lets you see if any plant is associated with more risk than the others.

The Source and Plant grading (A1 to E)

This grading relates to the water as it is when leaving the treatment plant, before it enters the reticulation system. It is concerned with the barriers guarding against contaminated water. Possible grades are:

Grade	Description
A1	Completely satisfactory, negligible level of risk, demonstrably high quality
A	Completely satisfactory, extremely low level of risk
B	Satisfactory, very low level of risk when the water leaves the treatment plant.
C	Marginally satisfactory, low level of microbiological risk when the water leaves the treatment plant, but may not be satisfactory chemically.
D	Unsatisfactory level of risk
E	Unacceptable level of risk
u	Ungraded

Gradings are calculated using a complex algorithm involving multiple tables. Factors include the water's origin, characteristics, and compliance with standards and the degree of treatment and process supervision. Each grade can be attained by a variety of factor combinations.

However, some generalisations can be made:

- An 'A1' grade requires not only a high quality water and procedures, but also an internationally recognised audited quality assurance scheme.
  - An 'A1' or 'A' grade will always have residual disinfection in place to safeguard against microbiological contamination.
  - An 'A1' grade will always meet the Guideline Values for aesthetic determinands.
- A plant using a secure groundwater that is not chlorinated can at best receive a 'B' grade, because of the possibility of contamination in the reticulation system. However an a grade for the distribution system can be achieved if monitoring is increased by 50 percent from DWSNZ 2000.
  - A treatment plant that does not comply with the major requirements of DWSNZ 2000 cannot attain an 'A' or a 'B' grade.
  - A 'C' grade for a plant means that the microbiological quality of the water delivered is satisfactory when the water leaves the plant, but the plant does not have an appropriate level of supervision and/or has one or more chemical determinands that exceed their MAV.
  - A 'D' grade for a plant means that the supply is from a source with a low risk of contamination, but treatment is not adequate.
  - An 'E' grade for a plant is likely to mean the water comes from a surface water source without adequate protection from animal or human contamination, and subsequent treatment, if any, is not adequate.

In conclusion, water of grade C is considered marginal. It may be acceptable to consumers in very small supplies if the alternatives are too expensive or otherwise impracticable.

Water of grade A or B is considered as safe, while a grading of D or E indicates either the water is unsafe, or inadequate data or procedures are in place to demonstrate otherwise. This is an important proviso, since both the grading and standards emphasise that you have to show it is safe. Finding nothing wrong because you hardly looked is not acceptable.

The Distribution Grading (a1 to e)

Emphasis in this part of the grading is on the quality of the water and the systems in place (procedures and reticulation quality) to minimise the risk of unsafe water to the consumer. The grading is calculated using a questionnaire, with demerit marks awarded for unsatisfactory aspects.

Grade Description, with Sum of Marks

Grade	Range of marks	Meaning
a1	0 - 10	Completely satisfactory, negligible level of risk, demonstrably high quality; meets Aesthetic Guidelines and has ISO 9001:2000 accreditation
a	0 - 10	Completely satisfactory, extremely low level of risk
b	11 - 20	Satisfactory, very low level of risk
c	21 - 30	Marginally satisfactory, moderately low level of risk
d	31 - 45	Unsatisfactory level of risk
e	46 or more	Unacceptable level of risk
u	-	Ungraded

Demerits are given for a variety of reasons, including (most significant ones first):

- 23 marks: Non-compliance for faecal coliform bacteria
- 12 marks: Any combination of: No residual disinfection, median turbidity greater than 1 NTU, no regular testing programme
- 10 marks: Non-compliance for chemical monitoring and/or results

- 7 to 10 marks: No professional engineering supervision
- 9 marks: Backflow legislative requirements not met in a supply without residual disinfection
- 9 marks: Uncovered or unsecured service reservoirs
- 2 marks Each of: inadequate inspection and maintenance, low pressure, poor records of pressure, no service reservoirs.

While the combinations are obviously many, three important conclusions are:

- A zone without microbiological compliance cannot gain an 'a' or 'b' grade.
- A zone without chemical compliance cannot gain an 'a' grade, unless no demerit points are scored in all other questions.
- Inadequate management alone can have a significant effect on the grading attained.

As emphasised in the earlier discussion, while chemical risks are important, the primary risk is microbiological.

To conclude, an "a" or "b" grade is satisfactory, a "c" is marginal and "d" or "e" are unsatisfactory.

If you are concerned by your grading . . .

The *Register* shows the gradings for supplies, but it does not go further. For a low grading, it does not say exactly why it is low, or what would make it higher.

A grading below Cc is unsatisfactory. The grading may arise for a number of reasons, including:

- The quality of the water is poor.
- The quality is unknown because monitoring is inadequate.
- Quality may be adequate most of the time, but the risk of quality deteriorating without users knowing is significant. In other words, there are inadequate "barriers" against contamination.

Note that in each case the "solution" will probably require money, although in some situations improved management of the resource may significantly affect the grading allocated.

The emphasis in the grading, and in the *Drinking-Water Standards for New Zealand 2000*, is on "demonstrable quality of water", ie not just "it seems OK", but "it is safe and we have taken measures so that any risks to its quality are minimal".

If you are concerned about your supply's grading or water quality, contact those responsible for your supply, who are usually your city or district council (check your *Register* entry).

More about the Grading

You can download the official Public Health Grading of Community Drinking-Water Supplies 2003 document from the Ministry of Health website, in Word or PDF format.

Note that there is also an amendments document on the same Ministry web page that you need to download. These amendments were made in September 2004, a year after the Grading specification, and describe changes in the points allocation for grading a zone. You should manually change your downloaded copy of the main document accordingly.