

EMSSR-001 – Community Drinking Water Protection Zone Risk Assessment

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1 Introduction

Community Drinking Water Protection Zones are the area of land surrounding a human drinking water supply at risk of influencing the quality of the water supply.

2 Purpose

The purpose of this document is to support the completion of a Community Drinking Water Protection Zone (CDWPZ) Risk Assessment and ensure compliance with Condition 21 of resource consent CRC185857, which states:

For any Property falling partly or wholly within a Community Drinking Water Protection Zone, the Consent holder shall ensure:

- a. Discharges from the Property are assessed and managed in discussion with the impacted shareholder(s) and the Community Drinking Water Supplier in accordance with Schedule CRC185857E, and in a manner that is consistent with the Resource Management (National Environmental Standard for Sources of Human Drinking Water) Regulations 2007, with the assessment completed:*
 - i. within three months of the Commencement Date for all properties managed by the Scheme and falling partly or wholly within a Community Drinking Water Protection Zone at that date;*
 - ii. at least once every three years for Properties with existing Community Drinking Water Protection Zone risk assessments;*
 - iii. within three months of a Property within a Community Drinking Water Protection Zone being added to Schedule CRC185857A (including a new Community Drinking Water Protection Zone being added to Schedule 1 of the Canterbury Land and Water Regional Plan that includes Properties) that have not been previously assessed in accordance with Schedule CRC185857E);*
 - iv. within three months of the Consent Holder becoming aware of information that may materially impact on any assessment previously undertaken; and*
 - v. within three months of any change to the area of an existing Community Drinking Water Supply Protection Zone taking formal effect for the purposes of Schedule 1 of the Canterbury Land and Water Regional Plan.*

- b. Where a Community Drinking Water Protection Zone Risk Assessment identifies the Property as:*
 - i. **Low Risk:** there shall be no further management actions required in relation to the farming activities able to occur on the CDWPZ Impacted Land (subject to compliance with this resource consent and permitted activity rules related to Community Drinking Water Protection Zones);*
 - ii. **Medium Risk:** the farming activities able to occur on the CDWPZ Impacted Land shall be managed to (in addition to compliance with this resource consent and permitted activity rules related to Community Drinking Water Protection Zones):*
 - A. avoid the discharge of solid or liquid effluent (including animal based manures) within 20 metres of the Community Drinking Water Protection Zone;*
 - B. ensure all irrigation on the CDWPZ Impacted Land in the Community Drinking Water Protection Zone is undertaken using good management practice to minimise drainage to groundwater; and*

- C. *implement any other site specific recommendations that are consistent with managing Medium Risk activities and that are identified in the Community Drinking Water Protection Zone Risk Assessment.*
- iii. **High Risk:** *the farming activities able to occur on the CDWPZ Impacted Land shall be managed to (in addition to compliance with this resource consent and permitted activity rules):*
 - A. *avoid the discharge of solid or liquid effluent (including animal-based manures) within 20 metres of the CDWPZ;*
 - B. *avoid any winter grazing (as defined in the Canterbury Land and Water Regional Plan at the Commencement Date) within the CDWPZ Impacted Land;*
 - C. *ensure all irrigation on the CDWPZ Impacted Land in the Community Drinking Water Protection Zone is undertaken using good management practice to minimise drainage to groundwater;*
 - D. *ensure there is no increase in stocking rate or fertiliser application on the CDWPZ Impacted Land in the Community Drinking Water Protection Zone; and*
 - E. *implement any other specific recommendations that are consistent with managing Medium and/or High Risk activities and that are identified in the Community Drinking Water Protection Zone Risk Assessment.*
- c. *All new Community Drinking Water Protection Zone Risk Assessments prepared after the commencement date are to be reviewed by a suitably qualified and experienced individual prior to implementation of the required actions set out in the risk assessment for the Property.*
- d. *Where a Community Drinking Water Protection Zone Risk Assessment review increases the risk status of a Property compared to previous assessments, the assessments are to be provided to the Regional Leader -Monitoring and Compliance, Canterbury Regional Council prior to the implementation of the required actions set out in the risk assessment for the Property.*
- e. *as a part of the Farm Environment Plan, Schedule 24a Plan or Certified Freshwater Farm Plan (as might apply) for any Property located within the CDWPZ, there shall be additional requirements:*
 - i. *to include an objective that seeks to ensure land located within the CDWPZ is managed to prevent deterioration of drinking water from activities occurring on that land; and*
 - ii. *for the Property Owner to maintain records to demonstrate all agreed minimum actions are being implemented,*
- f. *without limiting Condition 21(b), the Consent Holder shall, as soon as practicable, and in all cases within two working days, notify relevant Community Drinking Water Supplier, and the Regional Leader - Monitoring and Compliance, Canterbury Regional Council, if it becomes aware of an "Event" that may have an adverse effect on the quality of the water in the community supply bore, with an "Event" for the purposes of this consent meaning, but not limited to, an incident within the well protection zones of the relevant community supply bore that may contaminate the water supply from the community supply bore - such as accidental release of pollutants or excessive stock access, combined with the saturation of soil beyond the water retaining capacity (e.g. over-irrigation).*

Advisory note: The level of mitigation required should apply based on whichever contaminant has the highest risk rating.

2.1 Review

This procedure may be reviewed for the following reasons:

- Change in the extent of CDWPZ
- NES-DW requirements

2.2 Sensitive Receptors Requirements

A Community Drinking Water Supply and Protection Zone are defined as a “Sensitive Receptor” in resource consent CRC185857. As a sensitive receptor, MHV Water are required to ensure effects are “*avoided, remedied or mitigated*” and are unable to approve significant changes in farms systems if the change has a negative impact on the supply.

MHV Water manage these effects through other EMS supporting documents, EMS-001 FEP Process, EMS-002 Audit Process and EMSNM-FAVA Process and is therefore not covered in this document.

2.3 Frequency of Assessment

Any new property located within a CDWPZ joining the scheme ASM programme will complete an assessment within **3 months** of joining the programme.

All CDWPZ assessments are reviewed and updated **at least once every three years** for existing shareholders as part of the nutrient discharge resource consent application.

All updates will review water supply and farm activities, including consultation with the water supply manager.

Assessments may be reviewed earlier if the following occurs and materially impacts on previous risk assessments:

- Property is sold and/or changes management
- A change in land use or Farm Activity Variation Application is approved
- An event has occurred which may change the risk profile of the site
- A change to the area of a Community Drinking Water Protection Zone as defined by Schedule 1 of the Canterbury Land and Water Regional Plan

In these circumstances, an updated CDWPZ will be completed within **3 months**.

2.4 CDWPZ Assessors

All CDWPZ Risk Assessments are to be completed and/or reviewed by an individual with sufficient qualifications and experience to effectively assess contaminant mobility and understand impacts on drinking water supplies.

3 Community Drinking Water Protection Zone Risk Assessments

Community Drinking Water Protection Zone Risk assessments are to be completed in accordance with Schedule CRC185857E of resource consent CRC185857. The excel spreadsheet titled *CDWPZ Assessment Template v4¹* is the basis of the schedule and to be used to complete the risk assessments. The following steps detail how the risk assessment spreadsheet is to be completed.

3.1 Philosophy

A risk management philosophy is applied as the basis of this methodology.

¹ Risk assessment template located here: C:\Dropbox (BCI Water)\EMS\Consents\CRC162882 Consent renewal\CDWPZ\Shareholder Assessments

Risk management is defined as:

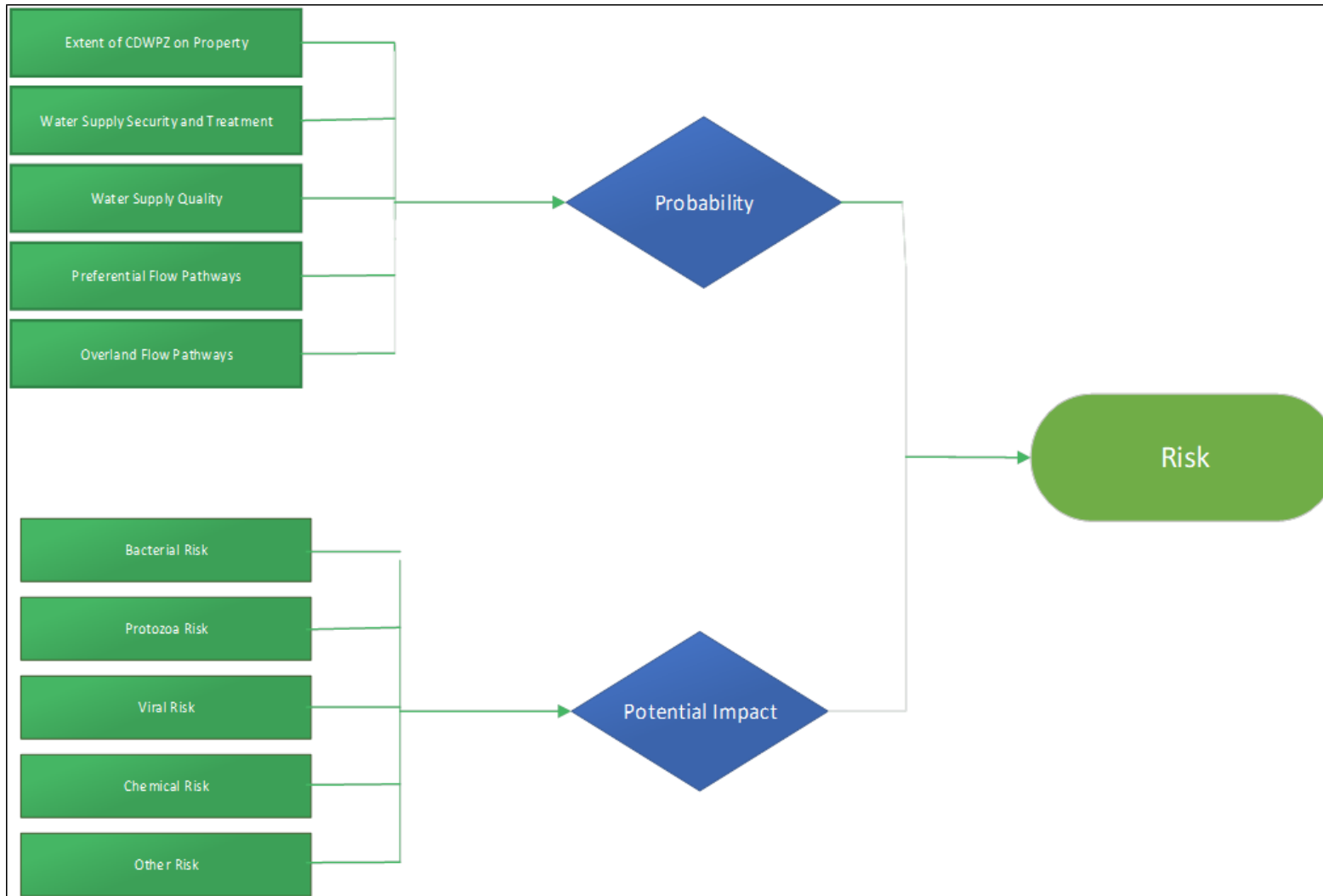
The culture, process, and structures that are directed towards effective management of potential opportunities and adverse effects

Hence this approach seeks to assess potentially significant adverse and beneficial effects on community drinking water supplies, including

- i. the magnitude of the impact of adverse effects;
- ii. the likelihood of occurrence; and
- iii. options for managing risks

By comparing **Impact** and **Probability** of a **Hazard** (refer to 5 for definitions), a semi quantitative measure can be determined for the **Risk**. From this position, mitigation strategies can be developed to reduce the risk and corresponding consequence and likelihood of an event.

3.2 Risk Assessment Process Summary



3.3 Property Information

3.3.1 Spatial Data Compilation

The CDWPZ Risk Assessment is conducted in a standardised QGIS project template [MHV GeoFEP base.ggs](#)

The CDWPZ spatial data set is to be compared to

- i. the shareholder title data set;
- ii. the Farm Environment Plan (FEP)
- iii. Land Use and Activity Status; and,
- iv. The Canterbury Bores data set

Any FEP boundary which overlaps with a CDWPZ polygon is subject to complete a CDWPZ Risk assessment in accordance with resource consent conditions.

3.3.2 GIS Analyses

3.3.2.1 Map Generation

As part of the CDWPZ Risk Assessment, spatial data will need to be presented.

ALL maps should (as shown in **Figure 1**):

- Be plotted at a suitable scale and rounded to the nearest 1:10,000
- Be plotted in NZTM with north facing upwards
- Have a 1 km graticule and co-ordinates printed
- Possess a locality diagram
- Have a clear legend of the information on the map

3.3.2.2 CDWPZ Extent on Property

GIS Tools are used to calculate the size of the CDWPZ and the number of hectares located within the property. GIS tools can also be used to calculate the distance from the property to the point of take of the water supply.

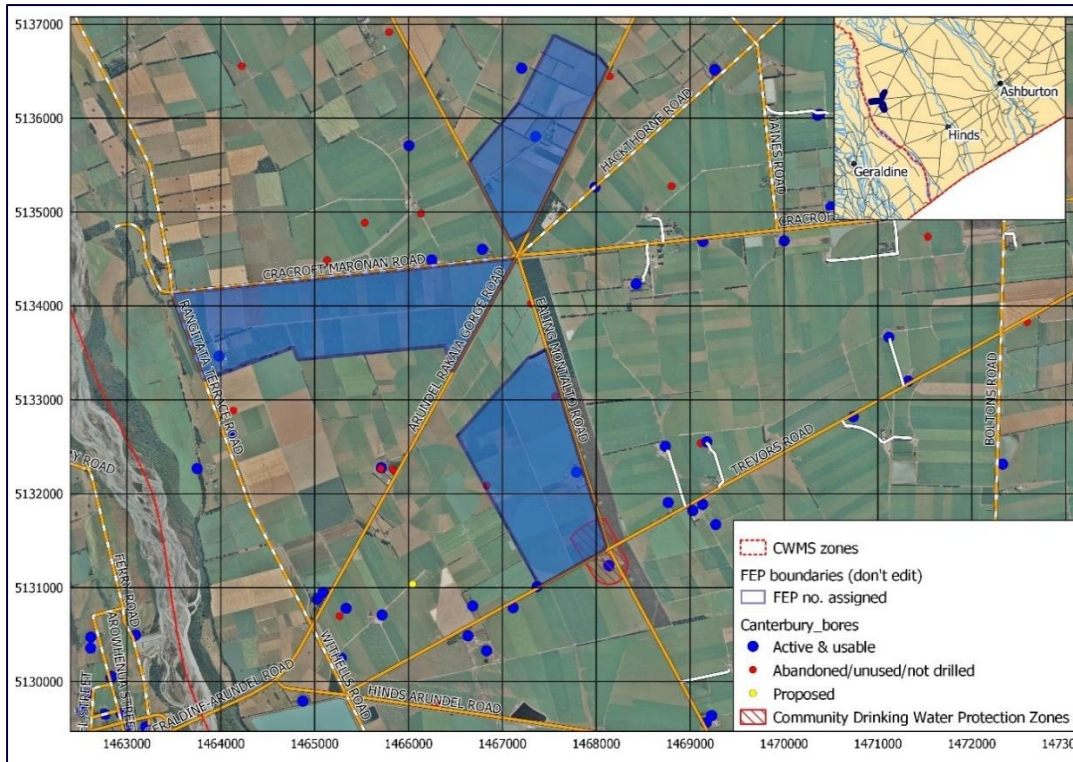


Figure 1 Example of a CDWPZ Risk Assessment map

3.4 Water Supply Details

3.4.1 Water Supply Information

Borehole and well information such as screen and well depth can be located from the [Environment Canterbury Well Card](#).

Water supply information such MOH Code, population served etc. is obtained from the [Drinking Water for New Zealand Register](#).

3.4.2 Water Supplier Notification

The landowner is to notify the supplier of the drinking water:

- Property contact name and phone number
- Risks identified and actions taken to address risks

Details of the notification are to be recorded and included in the assessment form. Property owners are to advise the water supplier when there are changes in contact details.

3.4.3 Other Water Supply Information

Include any other relevant details relating to the water supplier, for instance contact details if private supply or version of water safety plans used to inform the assessment, or if it serves a particularly vulnerable population (e.g., pre-school or rest home).

3.5 Drinking Water Standards Compliance

3.5.1 Water Supply Security Status

Bore water is considered secure when it can be demonstrated that contamination by pathogenic organisms is unlikely as because the bore water is not directly affected by surface or climate influences. Water suppliers provide evidence to the Canterbury District Health Board (CDHB) to demonstrate compliance with bore water security criteria (s4.4.2-s4.4.4 Drinking Water Standards for New Zealand 2005 (revised 2018)).

Where a water supply has been assessed as meeting the criteria by CDHB, it is deemed “secure”. Where the water take is affected by surface or climate influences or there has not been an assessment, the supply is deemed “insecure”.

3.5.2 Water Supply Treatment.

Where a water supply is treated, record and describe the treatment received. The Ashburton District Council (ADC) record these details, with photos, in the water safety plans for the supply. Small, private supplies may not have these details immediately available. Where no information is available, the water supply is assumed to be untreated.

3.5.3 Water Supply Monitoring

Monitoring details required for water supplies are detailed in the Drinking Water Standards for New Zealand 2005 (revised 2018)). Where insufficient samples are taken or they detect Priority 1 contaminants (E. coli, Protozoa, Chemicals), then they are deemed “non-compliant” or “unknown”. The Ministry of Health reports the results of reported water supply results on the New Zealand Drinking Water Registry² and in the publicly available annual report for drinking water supplies.

Water supplies are then graded as follows according to the monitoring results provided.

3.5.4 Grade Description

In 2003, Ministry of Health provided the following grading specification metric (Table 1).

This grading relates to the water as it is when leaving a water source (or treatment plant) before it enters the reticulation system. It is concerned with the barriers guarding against contaminated water.

Table 1 Ministry of Health metric for water source grading

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

Where insufficient information is available to demonstrate compliance with the standards, they are deemed “unknown” for the purpose of the risk assessment, which is equivalent to “non-compliant” status.

3.6 Water Supply National Environmental Standard Status

The Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007 (NES) specify the resource consenting requirements for discharges which may impact human drinking water. The NES has different consenting criteria if the water supply meets drinking water standards (s7) compared to if they do not meet existing drinking water standards (s8). For the scheme discharge consent applications, the NES status is identified for all water supplies currently located within the scheme ASM area.

² <https://www.drinkingwater.esr.cri.nz/general/supplyregistration.asp>

3.7 Risk Assessment – Impact

3.7.1 Sources of Contamination

The property specific risk assessment seeks to understand the potential sources of contaminants on a property and how they may enter the drinking water supply. **Figure 2** identifies key potential contaminant sources and mobilisation pathways which should be considered for all property specific risk assessments.

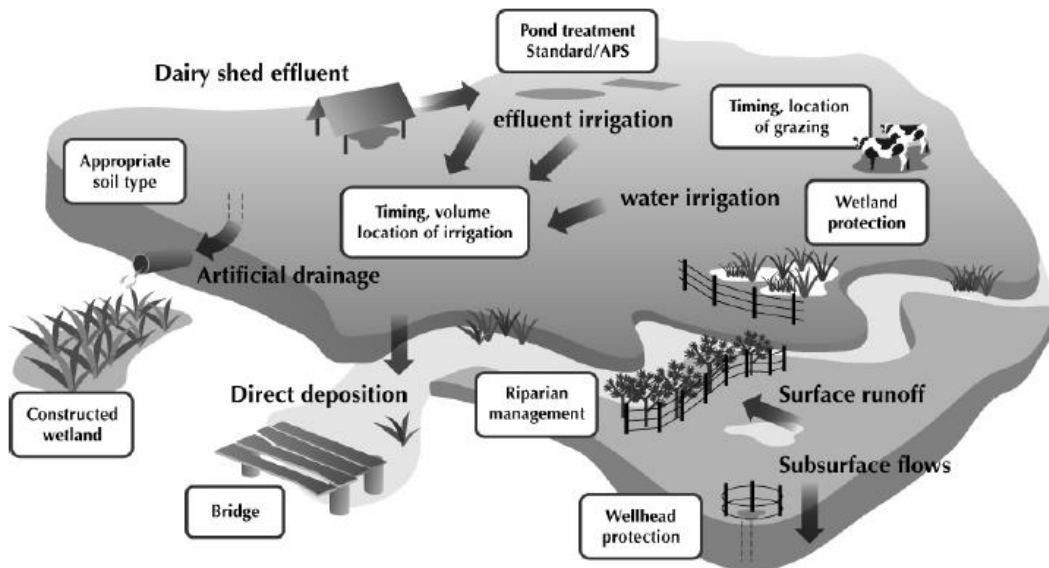


Figure 2 Key potential contaminant sources and mobilisation pathways³

Land use activities which occur on farm, which may occur within the CDWPZ are assessed for their potential contribution of the following contaminants:

1. Bacteria and Virus'
2. Protozoa
3. Chemical
4. Other contaminants of potential harm to human health

3.7.2 On-Farm Bacterial and Viral Sources of Contamination

Key bacterial and viral contaminants of concern include *E. coli* O157, *Salmonella*, *Campylobacter*, and norovirus. Drinking water contaminated with these pathogens can cause serious illness, permanent harm or even death, particularly for children, elderly or those who are immunocompromised. Higher contaminant loads are associated with a higher risk of infection.

Microbial and viral pathogens are commonly found in the guts of mammals and humans and faecal matter could become a source of contamination. Key sources on farm could include:

- Grazing of livestock, particularly intensive winter grazing
- Leaking effluent ponds
- Effluent discharges
- Offal holes

³ [Guidelines for Drinking Water Quality Management for New Zealand \(2017\)](#)

- Septic tanks and discharge fields
- Feed pads, animal holding areas
- Dairy sheds
- Heavily used stock races
- Soak holes draining any of the above areas
- Manure based soil conditioners

3.7.3 Protozoa Sources

Other zoonotic contaminants include protozoa, of which *Giardia* and *Cryptosporidium* are of particular concern. As for bacterial and viral contaminants, sources of protozoa are primarily from the gut of mammals and can cause significant harm when ingested.

Land use activities which may result in additional contaminant loads of protozoa include:

- Grazing of pre-weaned lambs and calves
- Possums (e.g., access to surface water in bush)

3.7.4 Chemical Sources

Chemical contamination on-farm can occur from several land use activities and biological processes. The potential impact on human health is variable, depending on the type of chemical and amount discharged.

Direct chemical discharges on farm could be acute (e.g., pesticide sprays) or historic (e.g., sheep dips, historic rubbish dumps or orchards).

Indirect chemical discharges may occur following a biological process, such as the production of nitrate after application of urea-based fertiliser.

Common on-farm activities which can contribute to chemical contamination of a water source include:

- Pesticide sprays and other agricultural sprays
- Leachate from rubbish holes
- Animal drench sites
- Fertiliser and chemical storage sites
- Diesel storage tanks
- Nitrate or cadmium from fertiliser applications
- Naturally occurring arsenic or other heavy metals
- Other source of high nitrate concentrations
- Other identified contaminated sites

3.7.5 Other Potential Sources

There are a number of other potential sources of contamination which may occur on a property which will need to be considered on a case-by-case basis.

3.7.6 Potential Impact Assessment

For each potential source of contaminant, the impact will need to be graded according to a semi quantitative scale of:

1. Minor
2. Moderate
3. Significant
4. Major
5. Catastrophic

Consideration should be given to the intensity and frequency of the activity (i.e., potential contaminant load). For instance, a dairy farm occasionally grazing the calves at a low intensity in the CDWPZ paddock will have a different impact compared to a calf rearer, where the un-lined calf rearing sheds were in the same area.

Table 2 Risk matrix used as part of the CDWPZ Risk Assessment

Regime		OHSE	Environment	Financial	Reputational	Production
Consequences	Catastrophic (5)	1 or more fatalities Irreversible health problems for employees and community	Offsite release un-contained. Long term impacts on environment Ground and surface water affected	Severe financial loss – possible liquidation. \$>1 Million	International loss of reputation with international media coverage. Loss of social licence Criminal charges likely	Cessation of farming operations. Projected loss against budget >75%
	Major (4)	Medium to long term health problems for employees and community. Long term to permanent disabilities Multiple MTI's	Offsite release contained & restored in medium term (<1 month). Medium to long term (< 6 month) impacts on environment. Surface water affected with potential risk to groundwater	Major financial disruptions to long term profitability expected \$<1 Million	National loss of reputation with national media coverage. Loss of social licence Litigation likely	Major production disruption (<6 months) Projected loss against budget <75%
	Significant (3)	Short - medium term health problems for employees and community Lost time injuries (LTI).	On site release contained & restored in short term (< 7 days). Moderate term (< 1 month) impacts on environment Slight short-lived surface water impact	Moderate financial impact likely to effect annual profit line. \$<100,000	Regional loss of reputation with local media coverage. Potential loss of social licence Fines expected	Moderate term production disruption (1-month) Projected loss against budget <50%
	Moderate (2)	Very short-term health concerns Recorded medical treated injuries (MTI)	On site release immediately contained & restored. Short term (< 1 week) impacts on environment Potential impact on surface water only	Minor (tolerable) financial loss or asset loss impact < \$10,000	Loss of local reputation by word of mouth	Short term production disruption (1 week) Projected loss against budget <25%
	Minor (1)	Inherently safe- Unlikely to cause health problems First Aid Injuries	Minor Localised Spill with insignificant effects on farm or environment No impact on surface water only	Low financial loss < \$1,000	Unsubstantiated rumours Slight impact on reputation	Slight loss of production (< 2 days) Projected loss against budget <10%

3.8 Risk Assessment – Probability

The potential likelihood of an event is a qualitative description of its probability or frequency.

The site probability assessment identifies the potential pathways available for a contaminant to enter the drinking water supply. The risk assessment allocates a score based on:

- i. Preferential Flow Pathways Assessment
- ii. Irrigation
- iii. Other Preferential Flow Pathways
- iv. Overland Flow Pathway Assessment

Details of these the potential pathways is presented below with a summary presented in **Table 3**.

3.8.1 Irrigation

A key risk factor on irrigated properties is related to additional water provided to the land through irrigation. Excessive water can mobilise contaminants through the soil profile and increase the risk of contaminants entering the drinking water supply.

Irrigation system risk takes into consideration the system potential for applying excessive water in relation to irrigation design specifications, climate, and soil type.

Irrigation systems which are highly reliant on labour to effectively implement of Good Management Practice⁴ to ensure excessive applications of water are minimised are higher risk compared to automated systems, such as VRI or low application rate systems.

3.8.2 Preferential Flow Pathways Assessment

Preferential flow pathways refer to the movement of water through the soil. Surface water can enter groundwater directly by channelizing between stones, or cracks which can develop during wet/dry cycling of some soil types.

3.8.3 Other Preferential Flow Pathways

Water supplies screened to a depth greater than 80m are low risk of contaminant mobilisation from preferential flow pathways, irrespective of other factors.

Where screen depth is less than 80m, the following factors need to be considered:

- Screen depth
- Length and depth of gallery
- Soil(s) tendency for creating preferential flow pathways
- Sources of preferential flow pathways (e.g., tree roots)
- On farm management practices (e.g., cultivation)
- Rainfall intensity
- Other sources of water movement (e.g., leaky stock water races, ponds etc)

Stony soils and clays are more prone to developing preferential flow pathways than deeper silty or loam-based soils and should be given a higher risk, particularly if the water supply is shallow and/or insecure.

⁴ As defined in the [Industry-Agreed Good Management Practices Relating to Water Quality \(September 2018\)](#)

Regular cultivation tends to reduce the risk of preferential flow pathways developing, whereas clays in low rainfall areas in permanent pasture may be prone to developing cracks in summer.

Higher rainfall areas can also increase the risk of preferential flow pathways developing due to higher soil moisture status, particularly in stony soils.

Stockwater races and other natural or artificial waterways may seep and be a continuous source of water to mobilise contaminants.

3.8.4 Overland Flow Pathway Assessment

Overland flow pathways relate to the water supply take site's potential to flood, potentially increasing the risk of a high contaminant loading in an event entering the supply.

Key matters to consider include:

- Topography and slope of land from property to water supply
- Physical features of the property which may impact on overland flow pathways.
- Proximity of natural or artificial waterways to the water supply
- Flood risk potential of the natural or artificial waterway
- Soil type run-off potential

In many instances, even if a site could flood, the influence from the property on contaminant loads is minimal. For instance, if the property is located downhill of a water supply or a physical barrier exists. A physical barrier could be a bund, land contour, railway tracks, buildings, or any other physical impediment to overland flow pathways.

Waterways include drains, stock water races, rivers, lakes, streams, and springs. In most situations drains and natural waterways will be higher risk than stock water or irrigation races, as they are intended to drain water from the land and the influence of rainfall on water levels are high.

Environment Canterbury and District Councils are required to identify flood prone land. Where a waterway is identified, the site should be compared against the flood risk potential identified by the relevant council records.

Heavy soil types have lower infiltration rates and can cause run-off during high-intensity rainfall events. The run-off potential of a soil is recorded in S-maps.

Table 3 Summary of site pathways

Risk level	Irrigation Potential	Preferential Pathways	Overland Flow Pathway
High	<ul style="list-style-type: none"> • Higher application rate system on insufficiently heavy soils OR • Low application rate system on very light soils in high rainfall area OR • CDWPZ located at start or end of a travelling irrigator run 	<ul style="list-style-type: none"> • One or more flow pathways are present OR • Potential frequency and/or volume of water is medium or higher OR • Well screen depth is less than 30 m 	<ul style="list-style-type: none"> • Water supply located in flood prone area AND • Property land use can contribute to contaminant load
Medium	<ul style="list-style-type: none"> • Low application rate system, actively poor management required to apply water more than field capacity OR • Higher application depth system on sufficiently heavy soils to minimise risk of excessive application of water AND • No other system factors which could 	<ul style="list-style-type: none"> • One or more flow pathways are present AND • Potential frequency and/or volume of water is low AND • Well screen depth is greater than 30 m 	<ul style="list-style-type: none"> • One or more overland flow risk factors are feasible AND • Property land use can contribute to contaminant load
Low	<ul style="list-style-type: none"> • No irrigation OR • System incapable of applying water to exceed field capacity OR • Irrigated area within the CDWPZ is insignificant 	<ul style="list-style-type: none"> • All potential preferential flow pathways are low risk 	<ul style="list-style-type: none"> • Water supply is up-gradient from property; OR • Physical barrier prevents overland run-off from property entering water supply take point; OR • No overland flow risk factors are present

3.9 Probability Score

The probability score calculates the likelihood of an event occurring on the property, based on the inputs provided.

The probability score allocates up to 10 points for each risk factor and is calculated as shown in **Table 4**.

Table 4 Calculated probability score from CDWPZ Risk Assessment Spreadsheet

Probability Factor	Low Risk Criteria	Medium Risk Criteria	High Risk Criteria
Irrigation			
Other Preferential Flow	See above	See above	See above
Overland Flow			
Population Size Served	Less than 250	Between 250-500	More than 500
Water Supply Security Status	Secure		Insecure
Water Supply Treatment	Treated		Untreated
Water Quality History	Compliant		Non-Compliant Unknown
Score Allocated (per factor)	0	5	10
Proportion land in CDWPZ	Score out of 10 proportional to the % of CDWPZ located on the property.		

The score out of 10 for each probability factor is summed and a risk likelihood is allocated as follows:

Table 5 Risk Likelihood Allocation Based on Calculated Probability

Probability Descriptor	Score	Description
LIKELY	Greater than 54	<ul style="list-style-type: none"> High probability the event will occur Similar event has occurred recently on the property
POSSIBLE	Between 27-54	<ul style="list-style-type: none"> Risk factors present which indicate an event could occur High chance of cumulative effects Similar event has occurred in the past on or near the property
UNLIKELY	Less than 27	<ul style="list-style-type: none"> Plausible the event could occur at some time Event has not occurred on or near the property in the past Some chance of cumulative effect

The CDWPZ Risk Assessment form automatically calculates the probability score, based on the inputs provided.

3.10 Overall Risk Assessment

Once the contaminant Impact and Probability assessments are completed, the Overall Risk grading is calculated by scoring the Impact and Probability and multiplying them as detailed in Table 6.

Table 6 Overall Risk Grading based on assessed Impact and Probability

	Probability	Unlikely	Possible	Likely
Impact	Score	1	2	3
Minor	1	1	2	3
Moderate	2	2	4	6
Significant	3	3	6	9
Major	4	4	8	12
Catastrophic	5	5	10	15

Green = Low Risk, Orange = Moderate Risk, Red = High Risk

The risk is calculated for each potential contaminant, with the highest risk rating setting the risk level for the property.

3.10.1 Mitigation Strategies

Depending on the highest risk rating the property received, condition 21(b) prescribes the minimum actions to be implemented through the Farm Environment Plan, which are assessed during their audits (Table 7).

Table 7 Mitigation Strategies Matrix

Assessed Risk Rating	Minimum Actions
<p>Low</p> <p><i>Low risk of land use activities contaminating drinking water</i></p>	Complies with regional council resource consent conditions and permitted activity rules
<p>Medium</p> <p><i>Potential risk for land use activities to contaminate drinking water</i></p>	<p>Low risk actions and, where applicable, the following:</p> <ul style="list-style-type: none"> No discharge of solid or liquid animal effluent (including animal-based manures) within 20 m of the CDWPZ Irrigation is managed to Good Management Practice within the CDWPZ Impacted Land to minimise drainage to groundwater. Actions necessary to mitigate other medium risk activities specific to the property, not otherwise managed by the above.
<p>High</p> <p><i>Likely risk of land use activities to contaminate drinking water</i></p>	<p>Low and Medium risk actions and, where applicable, the following:</p> <ul style="list-style-type: none"> Avoid any winter grazing (as defined in the Canterbury Land and Water Regional Plan at the Commencement date) within the CDWPZ Impacted Land. Ensure no increase in stocking rate or fertiliser application on the CDWPZ Impacted Land Actions necessary to mitigate other High risk activities specific to the property, not otherwise managed by the above.

A summary of the rules applicable to activities located within a CDWPZ are available from the Environmental Team. Where an activity within a CDWPZ is identified as needing a resource consent, a minimum action will require the landowner to obtain resource consent for the activity.

Often risks arise from very site-specific activities or management practices. Where these practices or activities result in a medium or high risk of contamination to the water supply, specific actions should be developed to mitigate the potential effects from these activities.

To identify if other additional mitigations are necessary for a property, the Guidelines for Drinking Water Quality Management for New Zealand (2017) list several potential mitigations which may be useful to consider, where applicable, such as:

- Allowing only approved animals
- Specifying stocking rates and grass/fodder length
- Standards for fencing
- Installing riparian strips – specifying size, planting
- Adopting approved fertiliser application rates
- Using approved fertiliser applicators
- Using approved pesticides and applications rates
- Using approved pesticides applicators
- Requiring bunded chemical and fertiliser storage areas
- Instituting waste controls and treatment, including dairy shed, offal pits, sheep dips etc
- Introducing holding paddock/yard/pen waste controls (pens include buildings for pigs, chickens, sale yards etc).
- Retire land from farming activities

All mitigations need to be discussed and agreed upon by the landowner before inclusion as an action.

3.11 Finalising

Once a CDWPZ risk assessment is completed, the assessment is peer reviewed by a suitably qualified individual and finalised once feedback is incorporated.

A copy of the full report generated in PDF format and provided to the landowner and manager(s), including notification of requirements to contact the water supplier and MHV Water if an event occurs in the CDWPZ.

The full assessment and final PDF report are added to the scheme shareholder folder. Actions arising from the assessment are to be incorporated into the FEP and made available to the auditor to be assessed during the FEP Audit.

4 Relevant Documents

Document
Resource Consent CRC185857
MHV Water Environmental Management Strategy
EMSSR – 002 Sensitive Receptors
EMSFEP – 002 FEP Audit Process
EMSNM – 002 FAVA Process
Community Drinking Water Protection Zone Risk Assessment Template
Industry-Agreed Good Management Practices Relating to Water Quality (September 2018)

[Guidelines for Drinking Water Quality Management for New Zealand \(2017\)](#)

[Environment Canterbury Well Card](#)

[Drinking Water for New Zealand Register](#)

4.1 Additional References

Lough, H., Clemens, H., Love, N., 2018. Technical Guidelines for Drinking Water Source Protection Zones (No. C01671502_R001). PDP Ltd on behalf of Ministry for the Environment - Manatū Mō Te Taiao. Christchurch.

Ministry for the Environment, 2008. National Environmental Standard for Sources of Human Drinking Water. Wellington

Ministry for the Environment. 2018. Review of National Environmental Standard for Sources of Human Drinking Water. Wellington

Ministry of Health. 2018. Drinking-water Standards for New Zealand 2005 (revised 2018). Ministry of Health. Wellington.

Kerr, T., Cranney, O., Dark, A., 2018. Drinking Water Source Protection Zones: Delineation Methodology and Potential Impacts of National Implementation. Aqualinc Research Ltd on behalf of the Ministry for the Environment. Christchurch.

5 Document Management Control

Version	Date Reviewed	Purpose / Amendments	Section Reviewed	Reviewer	Status
1.0	May 2022	Development of EMSSR - 001	All	Eva Harris and Justin Legg	FINAL DRAFT
1.0	May 2022		All	Mel Brooks	Approved

6 Definitions

Term	Definition
Community Drinking Water Protection Zone (CDWPZ)	Schedule 1 of the Land and Water Regional Plan (operative 8 December 2016) defines some 530 Community Drinking Water Protection Zones in Canterbury representing an area of 320 km ² . These designated areas act as spatial buffers around community water sources to mitigate the risk of contamination to community water supplies.
Community Drinking Water Protection Zone (CDWPZ) Impacted Land	Land that is included in a Community Drinking Water Protection Zone, plus any other land within the same paddock where it is not possible to treat such further land on a different management basis for the purposes of condition 21 of resource consent CRC185857.

Term	Definition
	<p><i>Advisory note: For example:</i></p> <ul style="list-style-type: none"> • <i>it will typically not be possible to provide differential stock grazing within the same paddock; and</i> • <i>it may be possible to provide differential management for a cropping or horticultural operation in the same paddock.</i>
Impact	The outcome of an event or situation expressed qualitatively or quantitatively in terms of loss, injury disadvantage – or if resolved, gain, improvement
Farm Environment Plan (FEP)	A planning document that outlines on-farm environmental risks and sets out a programme to manage those risks. It incorporates local climate and soils, the type of farming operation, and the goals and aspirations of the land user.
Hazard	A potential source of harm, or a situation, that could detrimentally impact on to a community drinking water supply from a social, environmental, economic, or cultural perspective.
Likelihood	A qualitative description of probability or frequency.
Risk Assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking.
Risk	The chance of an event that will lead to undesirable outcomes and/ or impacts on community drinking water supplies.
Shareholder Water Agreement	A contractual agreement between a shareholder and the water provider that specifies how much irrigation water (m ³) is to be provided to a specified area (ha).