

WEST COAST DOMESTIC WATER RESILIENCE OPTIONS PAPER



WEST COAST
EMERGENCY MANAGEMENT

GROUP

www.westcoastemergency.govt.nz

April 2022

Document Information

Document	Domestic Water Resilience Options Paper
Issue Date	08/04/2022
Prepared by	Michelle Gillman
Submitted to	Claire Brown, Director Natural Hazards and Emergency Management

Revision History

Revision	Date	Revision Details	Name
1	09/03/2022	Draft to West Coast CDEM Group for review	Michelle Gillman
2	08/04/2022	Final version submitted to WCCDEM	Michelle Gillman
3			

Contents

1.	Introduction	4
1.1.	Scope	4
1.2.	Background	4
2.	NEMA household recommendations (National)	5
2.1.	How much water to store?	5
2.2.	Water storage options	5
2.3.	Ministry of Health recommendations	6
3.	West Coast household recommendations (West Coast)	8
3.1.	Minimum water storage recommendation (households).....	8
3.2.	Water storage options (in detail)	8
3.3.	Domestic water tanks	10
3.4.	Health and safety risks	11
4.	West Coast community options (West Coast)	12
4.1.	Water storage options for community groups.....	12
4.2.	Health and safety risks	15
5.	West Coast organisation/business options (West Coast)	16
5.1.	Water storage options for organisations/businesses	16
5.2.	Operational or response risks	16
5.3.	Health and safety risks	16
6.	Public Education	17
6.1.	Engagement with communities	17
7.	Summary	18
8.	Appendices	19
8.1.	Appendix A – Food-grade, water-storage containers	19
8.2.	Appendix B – Commercially bottled water	21
8.3.	Appendix C – Water storage tanks (domestic).....	22
8.4.	Appendix D – Water storage tanks (community).....	23
8.5.	Appendix E - Water collection tanks and safe household water	24
9.	Bibliography	29

1. INTRODUCTION

1.1. Scope

This ‘options paper’ forms part of the West Coast Resilience Action Plan project undertaken by West Coast Civil Defence Emergency Management (WC CDEM) in 2021/22.

The paper has been developed to “identify options for households to establish emergency water supply (personal preparedness opportunity)”.

While the scope of this paper is focused on domestic water supply however some suggestions have been made for both West Coast community groups and organisations/businesses.

Purpose

The purpose of this report is to:

- Provide information for WC CDEM promotion and education to West Coast householders to promote and improve take-up of personal preparedness with regard to emergency water supply i.e., increase domestic water resilience on the West Coast.

Audience

The intended audience for this report includes:

- West Coast Civil Defence Emergency Management
- West Coast householders
- Local and Regional Councils
- Community groups including WCCDEM Community Response/Resilience Groups (CRGs)
- Other interested parties e.g. other CDEM Groups

1.2. Background

The National Disaster Resilience Strategy (NEMA, 2019) includes objectives designed to progress the priority of enabling, empowering, and supporting community resilience, at all levels. One of these objectives (Objective 13) is:

Enable and empower individuals, households, organisations, and businesses to build their resilience, paying particular attention to those people and groups who may be disproportionately affected by disaster.

The West Coast Resilience Action Plan project funded by the NEMA Resilience Fund includes a stream of work around domestic water resilience for the West Coast which may experience extended disruption to reticulated water supply following a significant event e.g. AF8¹. This options paper forms the deliverable for that stream of work.

To read more about the National Disaster Resilience Strategy go to:

<https://www.civildefence.govt.nz/assets/Uploads/publications/National-Disaster-Resilience-Strategy/National-Disaster-Resilience-Strategy-10-April-2019.pdf>

¹ AF8 refers to the Alpine Fault rupture scenario which is expected to be a Mw 8+ event when it occurs.

2. NEMA HOUSEHOLD RECOMMENDATIONS (NATIONAL)

“Water supplies could be affected in an emergency. Have a supply of stored water for three days or more” (NEMA, 2021).

2.1. How much water to store?

NEMA offers the following guideline below for emergency needs i.e. drinking and basic hygiene only, in an emergency situation:

Keep at least a three-day supply of water. You'll need at least three litres of drinking water per person per day (at least nine litres per person for the three days). This equates to four 2.25 litre soft-drink bottles. This will be enough for drinking and basic hygiene.

You should store more if you can. Hot environments and intense physical activity can double the amount required. Children, nursing mothers and ill people will also need more.

Be sure to include drinking and clean-up water for your pets. The amount needed will depend on their sizes and the conditions. Remember that pets often drink more water than usual when under stress.

You will need more water if you want to wash, cook or clean with water, or if the emergency is long.

Some parts of New Zealand could be without water for longer than three days during an emergency. Your Civil Defence Emergency Management Group can recommend how much you should store.

Source: <https://getready.govt.nz/prepared/household/supplies/storing-water/>.

Refer to Section 3 *West Coast CDEM household recommendations (West Coast)* on page 8 for West Coast specific recommendations.

2.2. Water storage options

There are lots of ways you can store emergency water.

- You can prepare your own containers of water in soft-drink bottles. Don't use plastic jugs or cardboard containers that have had milk or fruit juice in them. Milk protein and fruit sugars cannot be removed from these containers.
- You can also fill plastic ice cream containers with water. Label them and keep them in the freezer. These can help keep food cool if the power is off and can also be used for drinking.
- Your hot water cylinder and toilet cistern are valuable sources of water. Check that your hot water cylinder and header tank are well secured. Do not use water from the toilet cistern if you are using chemical toilet cleaners.
- Water storage tanks are also an option. Water storage tanks come in different shapes and sizes. Ask your local council if there are any planning requirements you need to consider before installing a large water tank.
- If you use collected rain water, make sure that you disinfect it with household bleach. If you are uncertain about the quality of water, do not drink it.

Source: <https://getready.govt.nz/prepared/household/supplies/storing-water/>.

2.3. Ministry of Health recommendations

Source: <https://getready.govt.nz/prepared/household/supplies/storing-water/>.

Water collection tanks and safe household water (health.govt.nz)



Find advice on how to keep tank water safe from contamination, including the use of water filters, on the HealthEd website at <https://www.healthed.govt.nz/resource/water-collection-tanks-and-safe-household-water>.

Prepare containers of water

If you are preparing your own containers of water, follow the directions below.

- If you choose to use your own storage containers, plastic soft-drink bottles are best.
- Do not use plastic jugs or cardboard containers that have had milk or fruit juice in them. Milk protein and fruit sugars cannot be removed from these containers. They provide an environment for bacterial growth when water is stored in them.
- Do not use glass containers because they can break and are heavy.
- Do not use cardboard containers, because they can leak. These containers are not designed for long-term storage of liquids.
- You can also buy food-grade, water-storage containers from hardware or camping supplies stores.
- Thoroughly clean the containers with hot water. Don't use boiling water as this will destroy the bottle.
- Fill them to the top with regular tap water until it overflows. Add five drops of non-scented liquid household chlorine bleach per litre to the water. Do not use bleaches that contain added scent or perfume, surfactants or other additives. These can make people sick. Do not drink for at least 30 minutes after disinfecting.
- Tightly close the containers using the original caps. Be careful not to contaminate the caps by touching the inside of them with your fingers.
- Place a date on the outside of the containers so that you know when you filled them. Store them in a cool, dark place.
- Check the bottles every 6 months. You can do this when the clocks change over at daylight savings.
- If the water is not clear, throw it out and refill clean bottles with clean water and bleach.

Commercially bottled water

- If you choose to buy commercially bottle water, store it in the original sealed container. Do not open it until you need to use it.
- Observe and replace according to the expiration or use by date.

Translated information about storing water

- [تخزين الماء — How to store water in \(Arabic\) عربي \(getthru.govt.nz\)](#)
- [Te rokiroki i te wai — How to store water in Te Reo Māori \(getthru.govt.nz\)](#)
- [पानी \(स्टोर\) संग्रह करना — How to store water in हिन्दी \(Hindi\) \(getthru.govt.nz\)](#)
- [물 저장 — How to store water in 한국어 \(Korean\) \(getthru.govt.nz\)](#)
- [Teuina malu o le suavai — How to store water in Gagana Samoa \(getthru.govt.nz\)](#)
- [水的储存 — How to store water in 简体中文 \(Simplified Chinese\) \(getthru.govt.nz\)](#)
- [Tauhi 'o e vai' — How to store water in Lea Faka-Tonga \(Tongan\) \(getthru.govt.nz\)](#)
- [水的儲存 — How to store water in 繁體中文 \(Traditional Chinese\) \(getthru.govt.nz\)](#)

Figure 1 - Examples of translated information



The figure shows two examples of translated information from the 'GET READY GET THRU' website. Both examples feature a central image of several plastic water bottles. The top example is in Te Reo Māori, with the title 'Te rokiroki i te wai'. The bottom example is in Simplified Chinese, with the title '水的储存'. Both pages include a navigation menu at the top, a sidebar with various categories, and a main content area with text and a list of links.

3. WEST COAST HOUSEHOLD RECOMMENDATIONS (WEST COAST)

3.1. Minimum water storage recommendation (households)



West Coast Civil Defence Emergency Management recommends that each household plans to have sufficient emergency water for a two-week period due to the nature of our location, possible isolation following a major emergency and potential damage to supply chain routes.

West Coast CDEM recommends that you allow for 20 litres per person per day after the first 3 days. While the minimum 3 litres per day/per person may be enough in the immediate days after an event drinking and basic hygiene only it is unlikely that this minimal volume is sufficient beyond that period i.e. larger volumes of water will be required for other necessary activities e.g. clothes washing, cooking etc.

Based on the minimum 3-day supply for drinking and basic hygiene (only) this would mean:

- 3 litres per day/per person x 3 days (initial days after an event) = 9 litres **per person**
- A **household of 4 people** would require: 4 x 9 litres = 36 litres for a 3 day period.

Note: **These amounts provide the minimum recommended for drinking and basic hygiene** (i.e. basic hygiene using a bucket, and drinking water). They do not allow for 'normal' water consumption and consider basic needs in an emergency only. Any other activities would require greater stores of water to be maintained.

For a two week supply West Coast CDEM recommends:

- **20 litres per day/per person** for 14 days – see table on page 10 for minimum recommended volumes.

You should store more water if you can. Refer to NEMA's notes (in section 2.1) about situations that will require storage of greater quantities of water for minimum emergency supply.

3.2. Water storage options (in detail)

In the previous section (*Water storage options* on page 5) NEMA provides a number of ways households can easily store emergency water. These include:

- Preparing your own containers of water in soft-drink bottles.
- Plastic ice cream containers filled with water and kept in the freezer.
- Water in your hot water cylinder and toilet cistern (if free of toilet chemicals).
- Collecting rain water.
- Filling food-grade, water-storage containers from hardware or camping supplies stores.
- Commercially bottled water.
- Water storage tanks.

Costs per option (estimates only)

Option	Examples	Cost
Fill own household containers with tap water	Soft-drink bottles, ice-cream containers	Free
Water already in household vessels	Hot-water cistern/toilet cistern	Free
Rainwater collected in suitable containers	Clean plastic containers etc. Note: Rainwater must be treated, refer to Ministry of Health guidelines	Free
Tap water stored in food-grade, water-storage containers	Water containers from hardware or camping supplies stores	From around \$20 each (see Appendix A – Food-grade, water-storage containers on page 19)
Commercially bottled water	Available from all supermarkets and many other retailers/wholesalers.	Minimal \$ (see Appendix B – Commercially bottled water on page 21)
Water storage tanks (domestic)	Available from water service providers or specialist hardware/rural supply stores.	Starting from \$1,250 ² for 1000L (includes pump) (see Appendix C – Water storage tanks (domestic) on page 22)
Water storage tanks (community)	Available from water service providers or specialist hardware/rural supply stores.	Starting from \$3,550 ² for 10,000L (see Appendix D – Water storage tanks (community) on page 23)

Important note:

The prices provided above are estimates only. Each householder/organisation should contact the retailer or service provider directly for current pricing and purchase direct based on own needs. There is no ‘one-size fits all’.

² Pricing includes multiple components. This figure is based on the smallest capacity tank listed in the appendices. Costs increase as volume increases. Optional items not included and some exclusions apply (there may be additional costs).

3.3. Domestic water tanks

There are a number of options available for domestic emergency water tanks. Note: These are not intended for households which are already on tank water supply (non-reticulated) i.e. these options are for those households that are on reticulated supply or piped ‘town supply’ water.

As these options are for a supply of emergency water only they may be considerably smaller than those that are in place on properties with non-reticulated water supply tank.

How much water should a household have available for emergency use?

NEMA recommends **3 litres per day per person as the minimum amount per person for drinking and basic hygiene (only)**. NEMA recommends households to store sufficient for 3 days which would be 9 litres per person.

On the West Coast we recommend holding enough water for 14 days due to our potential isolation and disruption to supply chain routes. **West Coast CDEM recommends that you allow for 20 litres per person per day after the first 3 days.** While the minimum 3 litres per day/per person may be enough in the immediate days after an event drinking and basic hygiene only it is unlikely that this minimal volume is sufficient beyond that period i.e. larger volumes of water will be required for other necessary activities e.g. clothes washing, cooking etc. Based on this we suggest the following:

Table 1 - Household water storage volumes for emergencies (suggested only)

	Drinking & Basic Hygiene only - First 3 days (Minimum)	Recommended storage for 7 days (Better goal)	Recommended storage for 14 days (Best goal)
Number of people in household	Minimum <u>3 litres per person per day</u>	Minimum <u>20 litres per person per day</u>	Minimum <u>20 litres per person per day</u>
1	9	140	240
2	18	280	560
3	27	420	840
4	32	540	1080
5	45	660	1320
6	54	780	1560
7	63	900	1800
8	72	1020	2040
9	81	1140	2280
10	90	1260	2530

The figures above do not allow for wastage, individuals using amounts over their allocation or additional people that require emergency water. The figures above should at all times be considered the bare minimum. Additional storage should be held if possible.

Households may want to consider how much is held by the community if they want to reduce the household storage maintained.

This paper supports the 'Kit Me' recommendations

These water storage recommendations support the household readiness steps detailed in 'Kit Me'. Kit Me is another West Coast CDEM project currently underway to provide easy to use information to householders via an online tool to improve household readiness for an emergency through small but important planning and actions. Having emergency supply of water will increase each household's resilience in an emergency where regular water supply is interrupted.

More information about Kit Me will be available later in 2022.

How much do tanks cost?

Refer to Appendix C – Water storage tanks (domestic) on page 22 for some indicative costs from a local provider, however many local plumbers will be able to supply a tank (from a manufacturer).

On top of tank costs are:

- Installation
- Site preparation
- Transport
- Non-standard fittings

Ensure your quote includes these costs because you commit to purchasing a tank for your household.

3.4. Health and safety risks

All stored water requires steps to ensure and maintain the water is safe to drink and consume.

Health advice for rainwater and stored household water is available at

<https://www.healthed.govt.nz/resource/water-collection-tanks-and-safe-household-water>.

The information on this site is also provided in *Water collection tanks and safe household water* on page 19 (information current as at 14 December).

4. WEST COAST COMMUNITY OPTIONS (WEST COAST)

4.1. Water storage options for community groups

Each community should consider its water needs in the event that the usual water supply is interrupted.

Every effort should be made to promote personal preparedness within the community to reduce the need for external water supplies in an emergency particularly during the first few days when there may be multiple priority activities due to the emergency.

Personal and community preparedness can take the pressure off emergency services and local authorities in the immediate period following an event. This may allow focus on preservation of life and response faster restoration of key services including water supply, respectively.

Options for organisation/businesses may include those listed in section 3.2 or be specific to the community.

There is no 'one size fits all' option and decisions should be evidence-based following consideration of the community's access to water supplies including from commercial outlets, household storage and natural sources and the risks to those sources in an emergency event e.g. earthquake.

Natural water sources should not be relied on for emergency preparedness.

Community water resilience tanks

Some communities have installed or plan to install 30,000 litre 'water resilience tanks'. These have sometimes been funded by Lotteries Grants or community fundraising.

The tanks are available in a number of other sizes and profiles. Some examples are shown on the next page however individual service providers should be contacted to discuss the products that their suppliers offer.

Some local plumbers/rural supply outlets may have different suppliers that offer alternate products.

How much water should a community have available for emergency use?

NEMA recommends **3 litres per day per person as the minimum amount per person for drinking and basic hygiene (only)**. NEMA recommends households to store sufficient for 3 days which would be 9 litres per person.

On the West Coast we recommend holding enough water for 14 days due to our potential isolation and disruption to supply chain routes. **West Coast CDEM recommends that you allow for 20 litres per person per day after the first 3 days.** While the minimum 3 litres per day/per person may be enough in the immediate days after an event drinking and basic hygiene only it is unlikely that this minimal volume is sufficient beyond that period i.e. larger volumes of water will be required for other necessary activities e.g. clothes washing, cooking etc.

If communities want to consider **community (shared) emergency water supplies** some figures have been suggested below for emergency supply of water for **drinking and basic hygiene (only)**. Note: that this would require careful management at the community level to manage the supply.

Additional figures based on a 20 litres per day for 7 and 14 day periods are also provided. It may be unrealistic to hold these volumes of water considering the tank investment, land required and ongoing management of the water supply contained within the tanks (emptying, refilling, testing etc.).

Feasible stocks should be considered based on the risks to the community, household stores within that community, and available funding. Achieving the minimum volumes required for drinking and basic hygiene for the initial 3 days is a great place to start and volumes can be increased over time.

Table 2 - Community water storage volumes for emergencies (suggested only)

	Drinking & Basic Hygiene only - First 3 days (Minimum)	7 days	14 days
Number of people in community sharing the supply	Minimum 3 litres per person per day	20 litres per person per day	20 litres per person per day
50	450	7,000	14,000
100	900	14,000	28,000
150	1,350	21,000	42,000
200	1,800	28,000	56,000
250	2,250	35,000	70,000
500	4,500	70,000	140,000
1000	9,000	140,000	280,000
5000	45,000	700,000	1,400,000
10000	90,000	1,400,000	2,800,000

The figures above do not allow for wastage, individuals using amounts over their allocation or additional people that require emergency water. This would require careful management of the resource.

Communities may want to consider how much is held by households (and work to increase that) if they want to reduce the shared storage maintained.

Figure 2 - Examples of tank sizes

Source: <https://www.rxp.co.nz/wp-content/uploads/2021/06/RXP-Tank-Brochure-2021-web.pdf>

Note: There are many tank manufacturers – this example is provided for reference only.



How much do community tanks cost?

Refer to Appendix D – Water storage tanks (community) on page 23 for some indicative costs from a local provider, however many local tradesmen or rural supply outlets will be able to source a tank (from a manufacturer).

The costings provided are for 'standard' durability there will be more expensive tanks available that may offer/promise greater levels of durability. Costs will increase accordingly.

Additional costs

- Pumps and other fittings
- There is also a labour cost for installation by a registered plumber (depending on your requirements).
- Transportation costs may be separate to tank supply and installation costs (i.e. costs should be confirmed as included or additional at time of enquiry)
- The location where the tank is to be placed must have a suitably engineered foundation for the tank (significant weight once filled). Costs associated with site preparation will not be included in tank pricing.
- Council may have some consent/permit requirements for installation (with associated fees and timelines)

Ensure your quote includes these costs because you commit to purchasing tank/s for your community.

4.2. Health and safety risks

If loss of water supply presents a risk to the health and safety of the community or responders (in an emergency) this should be risk assessed and controls put in place to minimise risks.

Possible scenarios, their associated risks and the controls should be documented in Emergency Response Plan/s.

5. WEST COAST ORGANISATION/BUSINESS OPTIONS (WEST COAST)

All organisations and businesses on the West Coast should consider water resilience as part of their emergency response plans (ERP) and business continuity plans (BCP).

5.1. Water storage options for organisations/businesses

Each organisation/business should consider its water needs in the event that the usual water supply is interrupted. A risk assessment (detailed above) will identify potential scenarios that the business may encounter if this occurs, and options (controls) selected accordingly.

Options for organisation/businesses may include those listed in 3.2 or be specific to the organisation/business.

There is no 'one size fits all' option and decisions should be evidence-based following risk assessment exercises.

5.2. Operational or response risks

If loss of water supply presents a risk to business operations or the ability for the organisation to respond to an emergency this should be risk assessed and controls put in place to minimise risks to operations (BAU and emergency response).

Possible scenarios, their associated risks and the controls should be documented in the Business Continuity Plan.

5.3. Health and safety risks

If loss of water supply presents a risk to the health and safety of workers this should be risk assessed and controls put in place to minimise risks to the health and safety of workers.

Possible scenarios, their associated risks and the controls should be documented in Emergency Response Plan/s.

6. PUBLIC EDUCATION

6.1. Engagement with communities

Water resilience should be raised in all opportunities to engage with communities. EMO's should discuss options within their community groups and encourage them to take steps to improve resilience within their community either by shared community resilience tanks or by encouraging local residents to improve household water resilience.

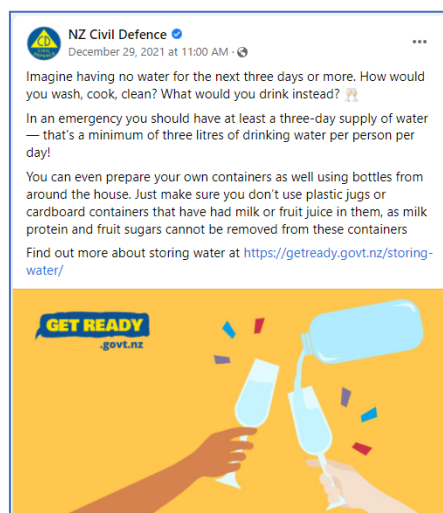
Community Response Planning

Include water resilience as part of Community Response Plans. This will require communities to evaluate current water resilience and set some actions for improvement. EMOs can support this process.

Social media messaging

Water resilience messaging has featured on the West Coast Facebook page. This should be continued as part of an ongoing, scheduled water resilience messaging programme. An example from NEMA is shown below.

Figure 3 - NEMA Facebook post



Reaching all communities (about drinking water safety)

Messaging should reach all communities. Information about safe water storage has been translated in a number of languages.

Refer to *Translated information about storing water* on page 7.

7. SUMMARY

This paper presents a number of options for householders, communities and businesses to consider for increasing emergency water supply to improve resilience in an emergency.

It is anticipated that the resources set out in this options paper will support water resilience discussions and public messaging.

In summary of the key points:

- There is no 'one size fits all' approach and each household, group or business must evaluate their needs and plan accordingly.
- Water resilience needs to be a recurring agenda item for community groups and businesses.
- There are a number of West Coast providers who can source and supply water tanks including plumbers, hardware stores and rural supply outlets. Prices will vary depending on requirements.
- West Coast organisations should consider water resilience in their business continuity planning processes.
- Public education via ongoing communications programmes should continue to educate the general public and householders.
- Any stored water must be kept safe for consumption and this paper highlights resources where key information can be found.
- Planning should allow for more capacity than the minimum 'emergency needs' recommendation wherever possible.

For further information on household, community or business tanks it is recommended that you approach a local plumber or water specialist to discuss your specific requirements in detail and requesting a detailed quote.

8. APPENDICES

8.1. Appendix A – Food-grade, water-storage containers

Food grade water storage containers are readily available from camping/outdoors, marine or hardware stores.

Local suppliers

Local businesses that may be able to order/supply food-grade water storage containers include:

- Mitre 10 MEGA Greymouth or Mitre 10 Westport
- The Warehouse (Greymouth)
- Coll Sportsworld (Greymouth)
- Wild Outdoorsman - Fishing and Firearms (Greymouth) or Wild Outdoorsman (Hokitika)
- Hokitika Cycles & Sports
- Reefton Sports

Note: This may not be a complete list and is provided as examples only.


These retailers have not been approached individually to confirm stock and enquiries should be made directly to the retailer. Containers may need to be ordered in as stock may not be held locally or may fluctuate in demand over the seasons.


These containers may also be able to be purchased online (however there may be delivery fees to consider). Other businesses such as Burnsco, Briscoes, Supercheap Auto and Repco may also sell these types of water containers.

Please consider supporting local businesses wherever possible.

Approximate cost

Some examples found during an online search (4/01/2022) included:

Supplier/Specification	Image	Which means...
Mitre 10 Kiwi Camping Water Carrier with Tap (23 litre) \$28.99each SKU: 362204 MODEL: KC017-020		If a one-person supply of 3 litres per day for the initial 3 days = 9 litres (drinking and basic hygiene only) then: <ul style="list-style-type: none"> • A 4-person household would need 2 x containers (23L) to have a minimum of 28L (4 x 9L) for the first three days = \$57.98

<p>The Warehouse Navigator South Jerry Can with Tap (20 litre) \$27.00 Item No: 9401056132393</p>		<p>If a one-person supply of 3 litres per day for the initial 3 days = 9 litres (drinking and basic hygiene only) then:</p> <ul style="list-style-type: none"> • A 4-person household would need 2 x containers (20L) to have a minimum of 28L (4 x 9L) for the first three days = \$54.00
--	---	---

Note:

Prices may have changed since this paper was written. Prices are indicative only. Some prices may reflect quality which should be a consideration, as should stackability/storage considerations, ease of use etc.

Important note:

Stored tap water should be stored and used as per NEMA recommendations

<https://getready.govt.nz/prepared/household/supplies/storing-water>

Careful water conservation and management would be required to stay under/at the 3L per person per day limit.

8.2. Appendix B – Commercially bottled water

Commercially bottled water is readily available from food retailer/wholesalers including supermarkets, service stations and dairies and commercial wholesalers e.g. Trents.

Local suppliers

Local businesses that can supply food-grade water storage containers include the following businesses:

- Countdown
- Four Square
- Fresh Choice
- New World
- Trents (wholesale only)
- Other food/beverage suppliers

Approximate cost

One food retailer’s prices as at 4 January 2022 were:

Advertised price	Which means...
24-pack x 600ml bottles (14.4 litres) for \$10.00	If a one-person supply of 3 litres per day for the initial 3 days x 9 litres (drinking and basic hygiene only) then: <ul style="list-style-type: none"> • A 4-person household would need 2 x 24 packs (28.8L) to have at least the minimum of 28L (4 x 9L) for the first three days = \$20.00
6-pack x 1.5l bottles (9 litres) for \$5.30	If a one-person supply of 3 litres per day for the initial 3 days x 9 litres (drinking and basic hygiene only) then: <ul style="list-style-type: none"> • A 4-person household would need 4 x 6 packs (36L) to have at least the minimum of 28L (4 x 9L) for the first three days = \$21.20

Note: This is not a complete list of products or suppliers. This information is provided as example only. Prices may have changed since this paper was written. Prices are indicative only.

Commercially bottled water is also able to be purchased online (however there may be delivery fees to consider).

Please consider supporting local businesses wherever possible.

Important note:

Commercially bottled water should be stored as per manufacturer instructions and swapped out before expiry dates.

Careful water conservation and management would be required to stay under/at the 3L per person per day limit.

8.3. Appendix C – Water storage tanks (domestic)

Small Household Systems

Model	Capacity (Litres) / Notes	Price ex-GST (Approx.)
TT01S DEVAN 1000L	1000	\$700.00
TT02S DEVAN 2000L	2000	\$900.00
TT05S DEVAN 5000L	5000	\$1,500.00
Plus:		
BBP25 P25 - 1"/ 25mm water pump 100cc engine (Petrol)	For the tanks listed above	\$350.00
Miscellaneous fittings	For the tanks listed above	\$200.00

Exclusions: There is no labour, plumbing, site preparation, mileage or transport costs included in these costs.

All prices are subject to change and may increase due to supply chain issues/demand.

Indicative prices kindly provided by **Thinkwater West Coast**.

8.4. Appendix D – Water storage tanks (community)

Community Emergency water system

Tanks

Model	Capacity (Litres) / Notes	Price ex-GST (Approx.)
TT10S DEVAN 10000L (standard duty)	10,000	\$2,200.00
TT25S DEVAN 25000L (standard duty)	25,000	\$3,300.00
TT30S DEVAN 30000L (standard duty)	30,000	\$3,900.00

Pump options

Model	Notes	Price ex-GST (Approx.)
BBP25 P25 - 1"/ 25mm water pump 100cc engine (Petrol)	For the tanks listed above	\$350
BBP50 P50 - 2"/ 50mm water pump 200cc engine (Petrol)	For the tanks listed above	\$400
99463898 Grundfos Pump JP 3-42 PM1 1x230V 50Hz 1,5m AUS		\$500
Pump cover - EPCOVER-S-M Davey Pump Cover - Mist Green (required)		\$200
Pipe & Fittings (required)	To connect tank to pump and bottle filling stations	\$1,000

Optional

Model	Notes	Price ex-GST (Approx.)
G3500I Inverter Generator AVR,3kVA	To run pump when no mains power.	\$1,300
TWFIREKIT 100mm Fire Fighting Kit	To allow fire hose connection.	\$1,000

Exclusions: There is no labour, plumbing, site preparation, mileage or transport costs included in these costs.

All prices are subject to change and may increase due to supply chain issues/demand.

Indicative prices kindly provided by **Thinkwater West Coast**.

8.5. Appendix E - Water collection tanks and safe household water

The following information is excerpted from <https://www.healthed.govt.nz/resource/water-collection-tanks-and-safe-household-water>.

A downloadable PDF brochure is available with this information from the link above. This link should be accessed for the most up to date information. The information below was current as 14 December 2021.

“Safe drinking water is vital for the good health of you and your family and the people who visit your home.

Water used for drinking, teeth cleaning, hand washing, bathing, showering, food preparation, and cooking needs to be free from harmful germs and chemicals.

If your water comes from a water collection tank, it is up to you to keep your water safe and reduce the risk of water-borne illness from contaminated tank water.

If your water comes from a mains supply, your water safety is monitored by your local authority.”

(HealthEd.org, 2021)



Water collection tanks

Tank water may be collected from:

- **Rain off the roof.**
- **Natural water** (from streams or lakes).
- **A bore** (a deep hole in the ground).
- **A spring.**

Water supplies from all these sources can very easily become unsafe. For example:

- Roof water may be corrosive or may become contaminated with ash, dust, agricultural spray, bird or possum droppings.
- Water from rivers, streams, shallow bore and spring may contain harmful germs, chemicals or be discoloured and unpleasant to taste.
- Bore water can contain harmful chemicals and may be hard or corrosive.

If you are unsure about the quality of your water, have it tested in a recognised laboratory (scroll down for details).

Water contamination

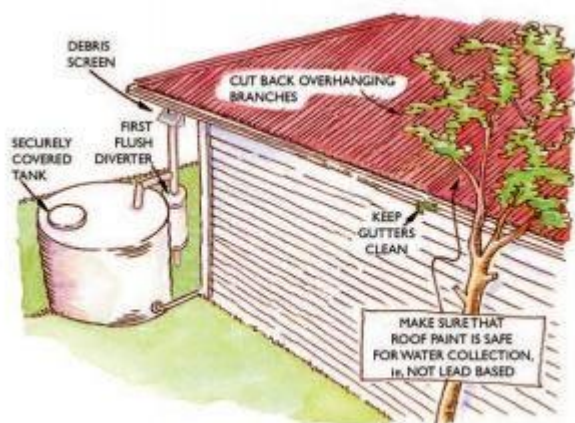
Water contamination can cause serious illness (for example, diarrhoea and vomiting), which can be particularly dangerous for infants, the elderly, and people with compromised immune systems.

Contamination of a tank water supply can be caused by:

- Viruses and germs (such as *Cryptosporidium*, *Giardia*, *Campylobacter*, *Salmonella*, *E. Coli* 0157) from animal or bird faeces entering the source of the supply.
- Bird or animal droppings on the roof, dead animals or insects in the gutters or in the tank itself.
- Leaves, soil, or other debris entering the tank.
- Lead flashing on the roof causing high lead levels in the collected water.
- Volcanic and wood ash, agricultural spray drift, and chemical residues from road vehicle emissions.
- Cracks or holes in partially-buried tanks.

Ways to improve the quality of roof-collected rainwater

- Install the entire system correctly.
- Ensure the roof surface is suitable for collecting quality rainwater.
- Use safe roof paint:
 - check old paint for lead through your local public health unit
 - choose paint that the manufacturer advises is suitable for roof water.
- Use plastic pipes and gutters approved for rainwater collection.
- Install a gutter mesh to prevent leaves and debris from blocking gutters.
- Include a fine mesh (such as a debris screen) and a first flush diverter (a device that reduces contamination of the tank water by diverting the first flush of contaminated water when it rains).
- Install the inlet pipe to the tank so that the roof water enters near the bottom of the tank through a 'U' bend in the pipe. This will avoid disturbing sediment in the bottom of the tank. Fit a floating outlet pipe to extract water from near the top of the tank. This is a flexible outlet hose that is attached below a float and it is always just below the surface of the water in the tank.
- Attach insect-proof screens at the ends of the tank overflow outlets to keep mosquitoes and pests out. Ensure that the tank is vented properly to reduce pressure build-up, allowing the water to breathe.
- Operate two tanks in series. This provides higher quality water than water that is stored in just one large tank.
- Cover the tank to prevent animals, birds, and other matter from entering.



- Roof areas should be kept clear of overhanging vegetation to prevent leaves and other debris from falling onto the catchment. Overhanging branches also give rodents, cats, and possums access to the roof and allow birds to roost above it.

WARNING: Take care when cleaning roofs and gutters. Ensure that the ladder is secure and away from power lines and make sure another person is present while you are cleaning.

If there is any evidence of faecal contamination on your roof:

- Disconnect the pipes that feed water to the tank.
- Clean the droppings from the roof by adding half a teaspoon of plain, unperfumed household bleach to 10 litres of water and use this to scrub and flush away the faecal material (do not use scented or coloured brands of bleach).
- Use sufficient quantities of clean water to flush away the remaining material.
- Reconnect the pipes that feed water to the tank.

If your gutters need cleaning:

- Disconnect the pipes that feed water to the tank.
- Remove any debris that have collected in the gutters.
- Use clean water to flush the gutters of all dirt, animal droppings, or paint flakes.
- Reconnect the pipes to the tank.

Tank cleaning

Tanks should be inspected annually and cleaned if necessary. Ideally tank cleaning should be carried out by tank cleaning contractors

WARNING: If you enter the tank to clean it, ensure there is adequate ventilation and another person present.

- Cleaning should generally be limited to removing accumulated sediment, leaf litter, or other objects such as insects and animals that may have gained access to the tank.
- Sediment may be removed by:
 - installing a tank vacuum system that automatically siphons off sediment from the bottom of the tank whenever the tank water overflows

- putting an inverted funnel on the end of a hose and moving it carefully across the bottom of the tank
 - using a swimming pool vacuum cleaner.
- Further details on tank cleaning and disinfection can be found in the *Household Water Supplies* booklet available at <https://www.healthed.govt.nz/resource/household-water-supplies> (HealthEd.org, 2019).

Other ways to keep household water safe

Water that is untreated or from mixed sources is often corrosive and plastic pipes could be used to carry cold water. If you are installing a new system, see *Household Water Supplies* for more information.

A water filter or point-of-use device

Water filters help remove impurities from your household water. To treat all household water, place the filter at the point where the water enters your house. To treat some of the water, put the filter on the appropriate tap. Always install filters in places where it can be easily inspected and cleaned.

Water filters may remove:

- tastes and smells
- harmful bugs
- chemicals.

Note: Most filters will only remove one or two types of impurities therefore, it is important that you choose the right type of filter for your needs. Buy from reputable suppliers and always ask the supplier what the device can and can't do before buying.

Disinfect unsafe water

If you are unsure about the quality and safety of your drinking-water, you can disinfect the supply by:

- Using an approved filter or purifier.
- Boiling the water for one minute. Boiling is the simplest and most effective method to reliably kill *Cryptosporidium* parasites and other germs. It is ok to use jugs with an automatic cut-off switch, as long as the jug is full. Never hold down the switch to increase the boiling time. The jug should be allowed to turn off automatically.
- Adding half a teaspoon of plain, unperfumed household bleach to 10 litres of water. This will kill most germs (but note that some parasites are resistant to chlorine). Bleach used to disinfect water should not contain perfume, colour, or detergents (surfactants), so always check the label before using.

A backflow prevention device

Backflow prevention devices stop contaminated water from flowing back into the household water supply. Devices are required on:

- Home-made toilet flush systems.
- Animal dosing, washing, and watering systems.

- Connections for hoses that are used for mixing sprays, or for washing down animal or bird droppings. A registered water carrier If you need to fill your water tanks from an external source, such as in times of low rainfall, use a registered water carrier. To find a registered water carrier in your area, see the **Register of Water Carriers for New Zealand** on the Ministry of Health website or check with your local District Health Board public health unit. Ask the carrier for a delivery docket that includes information about the source of the water and any instructions for use (such as whether it needs boiling).

For more information on water safety and tank installation, read Household Water Supplies. This is available online at: <https://www.healthed.govt.nz/resource/household-water-supplies>

If you are concerned about the quality of your drinking-water supply, contact a Health Protection Officer at your local public health unit or an Environmental Health Officer at your local council. They can also advise you on the location of water-testing laboratories and assist you with the interpretation of laboratory results.

9. BIBLIOGRAPHY

The following external sources and documents were referred to in this report:

HealthEd.org. (2019). *Household Water Supplies*. Health Promotion Agency and the Ministry of Health Retrieved 14 December from <https://www.healthed.govt.nz/resource/household-water-supplies>

HealthEd.org. (2021). *Water collection tanks and safe household water*. Te Hiringa Hauora/Ministry of Health. Retrieved 12 December from <https://www.healthed.govt.nz/resource/water-collection-tanks-and-safe-household-water>

NEMA. (2019). *National Disaster Resilience Strategy*. Rautaki ā-Motu Manawaroa Aituā <https://www.civildefence.govt.nz/assets/Uploads/publications/National-Disaster-Resilience-Strategy/National-Disaster-Resilience-Strategy-10-April-2019.pdf>

NEMA. (2021). *Storing water. Te rokiroki i te wai*. NEMA. Retrieved 11 December from <https://getready.govt.nz/prepared/household/supplies/storing-water/>