Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

KĀPITI COAST RAINWATER AND GREYWATER CODE OF PRACTICE GUIDELINES

A guideline to help the residents, building industry and real estate industry understand the rainwater and greywater requirements when building (or selling) a new compliant home.

October 2017
(based on the Code written in 2012)

CONTENTS

1 Introduction

1.1 The Kāpiti Coast Rainwater and Greywater Code of Practice Guideline

Originally written in 2012, the *Kāpiti Coast Rainwater and Greywater Code of Practice* (the Code) provides solutions to meet the water demand management provisions of the *Kāpiti Coast District Plan*, the Greater Wellington's *Regional Plan for Discharges to Land* and the New Zealand Building Code.

This guideline was written to support the Code and make it easier for residents, building industry and real estate industry to understand the rainwater and greywater requirements when building (or selling) a new home, compliant with the above documents.

1.2 Purpose of this document

The aim of this guideline is to make sure:

- best-practice solutions are used to install a safe and reliable rainwater/greywater system
- residents with a rainwater and/or greywater system understand their responsibilities in the safe use of non-drinkable water and ongoing maintenance of the systems.

This document:

- provides guidance for residentially-zoned properties that receive a public water supply connection. It does **not** apply to residential dwellings in rural zones.
- only provides guidance for greywater diversion devices and does **not** provide guidance on greywater treatment systems.

1.3 Performance criteria for compliant systems

To help make sure all systems are installed safely and reliably, the Kāpiti Coast District Council (the Council) has developed *Performance Criteria* that the systems need to comply with (see Section 5). The *Performance Criteria* can be met by implementing the *Acceptable Solutions* provided in that section.

Unless otherwise provided by the Code, the requirements of New Zealand Building Code and any relevant Australian and New Zealand Standards are applicable. Where infrastructure is created to meet the *water demand management provisions of the District Plan,* the requirements of the *Building Act 1991* must be observed. Nothing in the Code shall detract from the requirements of the *Building Act 1991* or the *New Zealand Building Code.*

The Australian / New Zealand Standards referred to in the Code are taken to apply to all rainwater harvestings systems and greywater use facilities assessed under the *New Zealand Building Code*.

1.4 What do I need to read?

To help you navigate these guidelines, we have added symbols on the top right corners, to highlight which sections are important for various groups of readers (home owners, building industry and the real estate industry).

Table 1: What sections of the guidelines should you read?

	Pay attention to	Look for symbol
Home owners	• Benefits, risks, responsibilities, maintenance • (**all Sections**)	
Building industry	• Risks, responsibilities, compliance, performance criteria • (**Section 3, 4, & 5**)	
Real estate industry	• Risks, responsibilities, maintenance, when home changes hands • (**Sections 3, 4 & 6**)	

1.5 More information and free advice

The Council offers free building and garden advice for people constructing a compliant and sustainable home – you are not alone!

This free **Sustainable Home Advice** service provides independent impartial information on sustainable, intelligent and sensible residential building practices and is available to all Kāpiti residents including home owners, families renting, community groups, designers/architects and trades people. Someone from the team will visit you and review your home, proposed alterations or new home plans.

For more information, go to: http://www.kapiticoast.govt.nz/services/A---Z-Council-Services-and-Facilities/Sustainable-Home-Advice/

Our **Green Gardener** can help make your garden bloom with less impact. The service offers sustainable gardening advice for local residents, community groups and schools.

For more information, go to: http://www.kapiticoast.govt.nz/services/A---Z-Council-Services-and-Facilities/Green-Gardener/

2 Why use rainwater or greywater?

2.1 A change for a sustainable future in water supply and use

On the Kāpiti Coast, everybody recognises that water is a resource we need to use wisely. We need to make sure that we, and future generations, have a reliable, quality water supply and have healthy streams, rivers and lakes.

With a growing district and changes in weather patterns, our water supplies cannot sustain intense irrigation and water use, especially during the summer months. So in 2009, the Council made it compulsory for all new homes to have an alternative non-drinkable water supply (untreated rainwater and/or greywater system) for outdoor, washing machine and toilet flushing use.

2.2 Benefits of using rainwater and greywater systems

The benefits to the **community** from households using rainwater and greywater include:

- reducing high demand on water supplies during the spring and summer period
- reducing the amount of wastewater needing to be treated
- freeing up capacity in wastewater and water supply for future growth of the district
- extending the time period of needing costly upgrades to water supply infrastructure
- more resilience in the water supply to ease effects of dry periods
- less impact on the environment (eg, less water needed from local rivers).

The benefits to a **household** include

- saving on the water meter bill (up to 30-40% depending on house and occupants)
- having alternative water sources in case of emergency/disaster
- more certainty of having a green garden all year round
- irrigating gardens (from own water) during a sprinkler ban.

2.3 Risks of using rainwater/greywater

Rainwater or greywater can be contaminated and become a public health risk if not used properly. It is important to read this whole document about the risks and responsibilities (eg, maintenance and use) of owning a dwelling with rainwater and greywater systems.

2.4 How much can you save (on average) when using rainwater/greywater?

2.4.1 How much drinking water do we use?

In 2015, an average home on the Kāpiti Coast used **450 litres/day** of drinking water (based on a 2.2 people household). This is about **200 litres/day** per person, on average.

Based on a New Zealand study on water use[1], at least half of this amount per household (225 litres/day) is used for washing clothes (21%), toilet flushing (17%) and outdoor use (10-20% depending on the season). The rest is used in the bathroom and kitchen, so does need to be drinkable water.

[1] Based on data from *Water Use in Auckland Households Auckland Water Use Study*, Matthais Hienrich (2008), BRANZ

2.4.2 How much rainwater can a home produce?

We can estimate the amount of rainwater a house can collect with a simple calculation:

Roof area (m^2) x average daily rainfall (mm/day) x 0.8 (water loss) = water harvested for reuse (l/day)

On average, a Kāpiti home could harvest around **315 litres/day** (based on an average 158m^2 roof and Kāpiti's average daily rainfall of 2.66mm per day) which can be reused outdoors or to wash clothes and flush toilets.

2.4.3 How much greywater can a home produce?

Kāpiti residents likely produce about 100 litres of greywater per person per day, from bathrooms and washing machines.[2] This means an average Kāpiti home could use up to **220 litres/day** for outdoor subsurface irrigation, but it can't be stored (public health risk).

2.4.4 Possible benefits and savings on water bills and community infrastructure

The following diagrams show the possible effects of installing different water systems, and the benefits for home-owners as well as the community and environment.

Figure 1: Infographic of possible benefits and savings when using rainwater and greywater systems

[2] Based on data from *Water Use in Auckland Households Auckland Water Use Study*, Matthais Hienrich (2008), BRANZ

3 Rainwater and greywater characteristics

3.1 What is rainwater/greywater?

Rainwater and greywater are untreated water resources that are used where drinking water is not required.

For the purpose of these guidelines:

- **Rainwater** is water collected from the roof of the residential dwelling or garage and stored to reuse for flushing toilets, washing clothes and outdoor water use.
- **Greywater** is untreated wastewater (not containing serious contaminants) collected from specific laundry and bathroom sources where a greywater diversion device is used, to be reused for subsurface irrigation (where the soil type and slope allows).

Table 2: Collection and use of rainwater and greywater

	Water collected from	Reuse stored and untreated water for
Rainwater	☑ roofs of a residential dwelling or garage	☑ outdoor use (garden, washing car, etc) ☑ toilet flushing ☑ washing clothes
Greywater	☑ laundry: washing machines ☑ bathroom: showers / baths / hand basins Excludes greywater from: ☒ toilet / urinal / bidet ☒ laundry tub (due to household chemicals) ☒ kitchen (due to low water volumes and poor water quality including oils, fats, food particles, dishwasher chemicals)	☑ subsurface irrigation (where the soil type and slope allows) to avoid unnecessary human contact since water could contain contaminants Excludes using greywater for: ☒ toilet flushing, washing clothes or surface irrigation (this is only possible if greywater is treated)

Not every dwelling is suitable to have a greywater system – check Appendix 2 for more information.

If you want more information about installing a compliant greywater **treatment** system check out the New Zealand Building Code and AS/NZS 1547:2012 'On-site domestic wastewater management' for more guidance.

3.2 Why use greywater for subsurface irrigation only?

The quality and quantity of the greywater produced by a dwelling will depend on the number of people living in the home, their age, health, water use patterns and the products used in the bathroom and washing machine.

Table 3: Two acceptable greywater sources

	Greywater can be contaminated with	% of water used in average home[3]
Laundry greywater (washing machines)	Hair, lint, salts, nutrients, oils, detergents, chemicals, faecal material and pathogens (washing contaminated clothes). The water quality varies with each wash cycle. Washing machine water is of a lower quality than bathroom.	28%
Bathroom greywater (bath, basin and shower)	Hair, soap, shampoo, hair products, nutrients, body oils, fats and cleaning products. It also may contain faecal material (including pathogens) through body washing.	35%

While greywater does not contain toilet waste, it can contain a small amount of the same type of pathogenic micro-organisms (eg, bacteria, viruses and fungi that could make you sick) just from washing hands, bathing and washing dirty clothes. The safest way to reuse greywater without using expensive or complex treatment and technologies, is to use it underground to avoid unnecessary human contact. Also, its safest to avoid using greywater in the vegetable garden or garden areas where the soil is frequently disturbed.

3.3 Is it safe to use rainwater and greywater?

All forms of household wastewater and rainwater have the potential to be infectious to human health and pollute the environment. However, when managed properly and carefully using appropriate processes, rainwater and greywater can be reused as a valuable resource.

It is very important to follow official guidelines when installing greywater devices and systems to ensure the health and safety of your household and community is protected.

[3] *Water Use in Auckland Households Auckland Water Use Study*, Matthais Hienrich (2008), BRANZ

3.4 What harmful things can be found in rainwater?

3.4.1 Microbial quality of rainwater

Rainwater can be contaminated with heat-resistant bacteria that grow in the intestines of animals (faecal coliforms). In general, the number of faecal coliforms in rainwater is low but untreated rainwater in urban areas may contain these pathogens.

People in urban areas could be at risk of illness or infection if they come in contact with contaminated water, which is why rainwater should only be reused for non-drinkable uses like toilet flushing, washing clothes and outdoor use.

3.4.2 Chemical and physical quality of rainwater

The chemical and physical qualities of the rainwater depend on the roof materials, the debris collected by the rain passing over the roof and guttering, and the rainwater tank material. As rainwater will not be used for drinking purposes, the risks are quite low.

3.5 What harmful things can be found in greywater?

3.5.1 Microbial quality of greywater

Although greywater does not contain toilet waste, it could contain similar bacteria. The quality of greywater is variable and depends on the where it comes from (eg, where people live, how healthy they are). Faecal coliforms are generally low unless greywater contains water from washing nappies or clothes contaminated from faeces or vomit.

Microbiological risks of untreated greywater reuse are low when the home occupants:

- only use greywater from their own dwelling (they are already intimately exposed to the same greywater from bathing and washing, whereas exposure to greywater from other houses can potentially spread disease)
- properly manage greywater reuse (ie, use below ground to a suitable area).

For this reason, the District Plan only allows greywater reuse systems at a single dwelling.

3.5.2 Chemical and physical quality of greywater

The key elements to consider around greywater and outdoor irrigation are:

- the pH of greywater produced (acid-loving plants can be sensitive to greywater)
- the salt content (salts can alter soil quality and influence plant growth)
- the chemicals used in products (phosphorus, boron, nitrogen and high nutrients can influence water quality in the water table and influence plant growth).

Greywater is highly variable as influenced by factors such as:

- the type of appliances used
- individual habits in water use
- products selected for hygiene and washing clothes.

The salt, oils, grease, fats and nutrients in greywater can be managed by using your appliances well and selecting appropriate products (see *Good practice and things to avoid when using greywater for outdoor irrigation*).

4 Responsibilities for compliant, safe & reliable systems

4.1 District Plan water supply compliance when building a new home

4.1.1 Two solutions

In 2008, the Council made a change to the District Plan that all new residential dwellings connected to the town water supply system must reduce peak reticulated water used by households, by 30%[4], while;

- protecting reticulated water supply and households from cross contamination; and
- preventing unacceptable risk to the receiving environment (including human health).

The Council has two minimum acceptable solutions to comply, either installing a:

a) 10,000 litre **rainwater** storage solution, connecting to all toilets and outdoor taps; or
b) 4,000 litre **rainwater** storage, connecting to toilets and outdoor taps and a **greywater** diversion device.

On application, alternative measures that can demonstrate compliance with the above performance criteria will be considered by the Council.

4.1.2 Responsibilities for rainwater and greywater systems

Table 4: Responsibilities for rainwater and greywater systems

Action	Responsibility		
	Owner / Agent	Plumber	Council
Ensure overall compliance with the Code before making application	yes		
Ensure greywater water balance is calculated before making application	yes (see Appendix 2)		
Engage a qualified plumber with a greywater installer certificate to install device	yes		
Ensure the rainwater system is installed to code of practice requirements		yes (see 4.1.3)	yes (see 4.1.3)
Ensure the greywater diversion device is installed to the Code requirements and the building code		yes (see 4.1.3)	yes (see 4.1.3)
Install the subsurface irrigation system to distribute greywater	yes	yes (see 4.1.3)	yes (see 4.1.3)
Undertake regular maintenance of the rainwater and greywater systems in accordance with the manufactures instructions and the code of practice	yes (see 4.2.4 & 4.3.4)		
Ensure systems are maintained in optimal conditions			yes

[4] As per the Kāpiti Coast District Plan the target is to reduce water use from 1536 litres/house/day by 30%.

4.1.3 Resource and building consent requirements for rainwater/greywater systems

Table 5: Resource and building consent requirements for rainwater/greywater systems

Type of house/system / Paperwork needed	New build		Existing house	
	Rainwater only	Rain & greywater	Rainwater only	Rain & greywater
A completed *water supply connection / alteration application form (159)*	✓	✓	✓	✓
Compliance with the permitted activity standards in the District Plan (follow the checklists in the *Performance criteria for rainwater systems*).	✓ see Section 5	✓ see Section 5	✓ see Section 5	✓ see Section 5
A completed *water demand management declaration of compliance form (164)*	✓	✓	✓	✓
Regular building consent	✓	✓	--	--
A *building consent for minor drainage works (form 443)* You can use a *checksheet for minor works* to prepare (*form 336*).	--	--	✓ if the rainwater system is also intended to **supply water for indoor non-potable uses** such as toilet flushing and washing clothes	✓
Check if a resource consent is required under Greater Wellington's *Regional Plan for Discharges to Land* if the facility does not meet the permitted thresholds specified in the Regional Plan.	--	✓	--	✓

4.1.4 Offences and penalties

It's the residential property owner's responsibility to ensure the rainwater and greywater systems are maintained so they are no risk to public health, the public water supply or the environment.

The good practices outlined in these guidelines show how to properly maintain and operate rainwater and greywater systems.

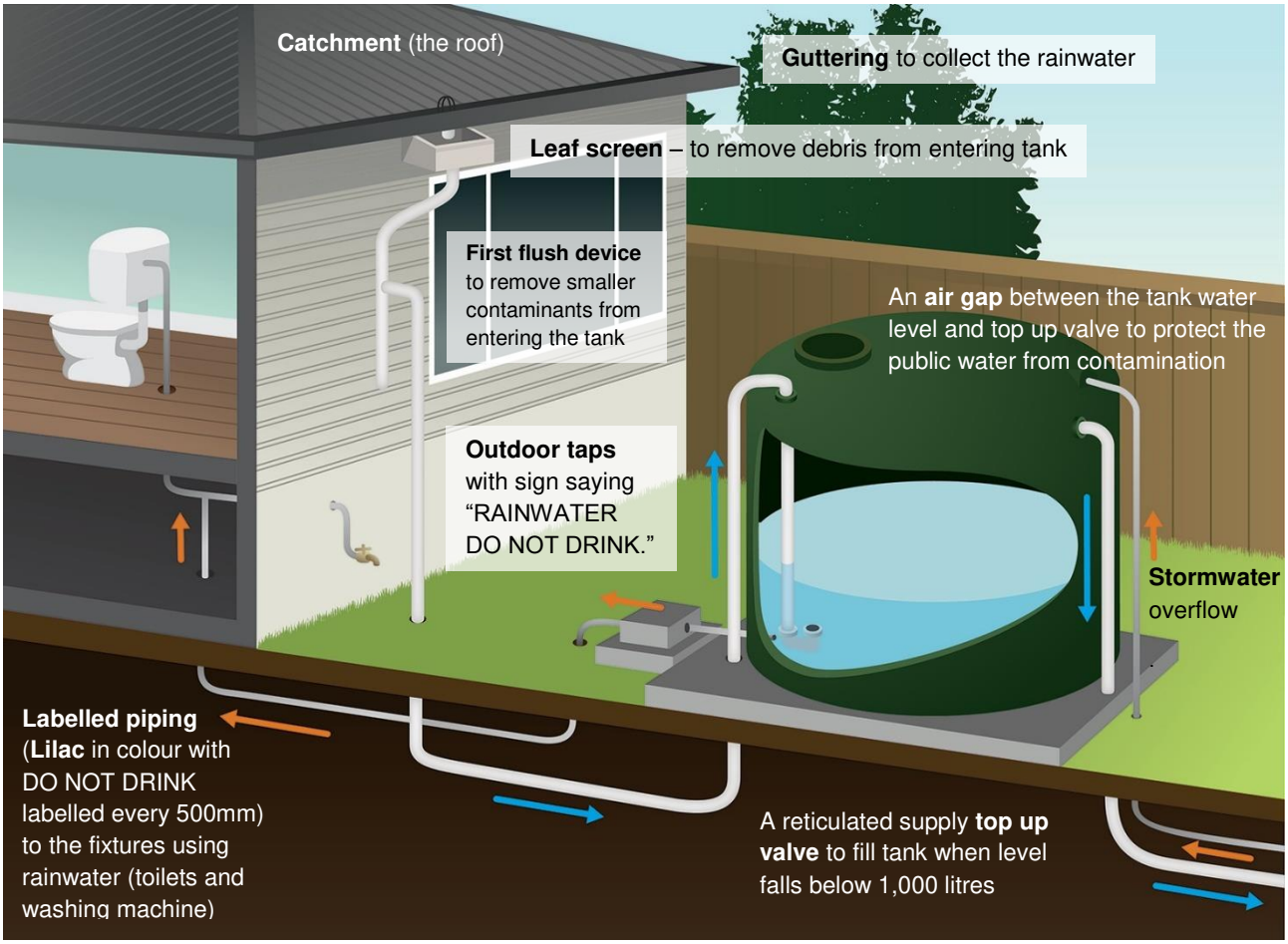
If the system isn't maintained properly and there is a public health or environmental issue identified, the Council will require you to resolve issue. If a neighbour or a member of public reports a nuisance crossing boundary lines, the Council has the ability to follow up the complaint and issue direction to resolve the issue.

4.2 Rainwater system details

4.2.1 Overview of a rainwater system

A rainwater system for a new home collects and stores rainwater for outdoor use, toilet flushing, and washing clothes (optional). The rainwater tank has a top-up valve to fill the tank with public water when the water level in the tank falls below 1,000 litres.

Figure 3: Key elements of a compliant rainwater system:



4.2.2 Additional cost commitments

The additional costs to install a rainwater system include:

- replacing the existing manifold if a dual manifold is not in place (see Section 5.2.1 – How the manifold works)
- running pipe between the manifold and the rainwater top-up valve
- ensuring there is a compliant top-up valve that performs with a restricted water supply
- ensuring the tank and pump are compliant
- fees for various consents and council applications.

4.2.3 What to include in the building consent?

See Section 4.1.3 Resource and building consent requirements for rainwater/greywater systems for what paperwork is needed to comply, and which supporting checklists/checksheets are available.

4.2.4 Maintenance of a rainwater system – an owner's responsibility

Once a rainwater system is installed, it is the owner's responsibility to ensure it is maintained for the life of the installation.

Rainwater systems will require ongoing maintenance, such as cleaning the first flush device, the sediment build-up in the tank and pump maintenance. Without regular maintenance, many problems can arise, including:

- blockages in gutters, pipes, inlets, and even the pump
- low water quality, often caused by the growth of bacteria, algae and other micro-organisms
- harmful to human health and/or a build-up of sediment and particulates
- mosquitoes can enter the tank and breed
- poor water pressure
- pump failure.

Table 6: Recommended maintenance of a rainwater system

Action	Frequency
Inspect/clean roof, gutters and downpipes (check for blockages, debris or leaks)	Every 3 months
Inspect and clean first flush devices	Every 3 months
Check the water quality and odour	Every 3 months
Inspect the tank for any leaks	Annual inspection
Ensure the pump is operating well	Annual inspection
Inspect/repair the top-up valve for any leaks	Every 2 years
Clean the tank by removing sediment and debris from the rainwater tank floor	Every 2 years
Inspect/repair the plumbing from the tank to the dwelling unit	Every 2 years

4.2.5 Links to more information

Advice on rainwater from the Building Research Association of New Zealand (BRANZ)
(http://www.level.org.nz/water/water-supply/mains-or-rainwater/)

BRANZ provides independent and impartial research, testing and consulting for the building and construction industry. They produced the *Level website* to help people design and build homes which have less impact on the environment and are healthier, more comfortable and have lower running costs. Their rainwater section covers Building Code requirements, designing the rainwater system and safety recommendations.

4.2.6 Trouble shooting

Rainwater systems aren't always trouble free, and sometimes you can encounter a problem to various parts of the system (eg, the tank, switching device, pump or suction system).

Part	Problem	Possible solution
Tank	**Cleaning** Even with pre-filters there will eventually be a build-up of dirt and cloudy water at the bottom of the tank.	Contact a professional tank cleaning company to provide the safest and most efficient way of cleaning a tank (they filter the water from the sludge so minimise water lost from your tank). You can do it yourself too, but work from outside the tank (do not climb in the tank). When the water level in the tank is low, use a water blaster to wash the sides and move the sludge in the bottom, then flush it out of the drain.
Tank	**Chlorination** You shouldn't have to chlorinate your rainwater regularly, since you will develop an immunity to the tiny amounts of bacteria in the water. However, you can chlorinate the water if: • people are getting ill • you suspect the water in your tank is contaminated • you have elderly people or small children visiting regularly, who are used to drinking town water.	**What** To chlorinate add: • swimming pool chlorine (calcium hypochlorite 60-70%) **or** • sodium hypochlorite (bleach) 12.5% by volume. **Dose** To treat contamination use 7 grams of calcium hypochlorite or 40mL of sodium hypochlorite per 1000 litres of water in the tank at the time of treatment. **Method** Do not add water to chlorine. Instead, fill a plastic bucket with water to 2/3 full and add the chlorine, in the open air. Empty the bucket into the tank, being careful not to spill it, and then mix the contents of the tank. If you have a pressure pump, put a hose into the tank and leave it running for 15-20 minutes. Once the water is mixed leave it to stand for at least 24 hours to allow the chlorine taste and smell to dissipate.
Pump	**Pump is turning on and off repeatedly** The pump will turn on when the pressure in the discharge piping is low. It will turn off when it has pumped the pressure high. The pressure in the household piping can only go down if there is a tap open or a leak in the system	• Check all taps for leaks. • Check all toilets that there is no slow leak into the bowl. • Check washing machine by turning off water isolation tap. Repair leaks if necessary, or contact a plumber to investigate leaks that may not be visible.
Pump	**Pump continually operates** The pump will operate continually if there is a tap open or a severe leak. If this is not the case, then the pump controller may be faulty.	Check for open tap and leaks in system from toilet and pipework. Contact a plumber if there is a leak. If no leak is detected, contact the pump manufacturer, repairer, or retailer.
Pump	**Pump doesn't operate when rainwater in tank**	Turn the pump off and then on at the power point. a) If the pump does not start, test power point by

Part	Problem	Possible solution
	The pump should operate when a tap is opened or a toilet is flushed. There could be electrical supply problems to the pump or even pump failure.	using another appliance. If other appliance doesn't operate, check circuit breaker at switchboard. Reset circuit breaker and test appliance again. If circuit breaker trips again contact electrician. If pump is causing circuit breaker to trip, contact pump manufacturer or retailer. b) If the pump starts but doesn't continue the problem maybe with the switching device. Contact the pump manufacturer, repairer, or retailer.
Pump	**No water to tap or toilets or washing machine** Tank top-up systems rely fully on the pump to deliver water to toilets and/or washing machine. Systems that have electronic or hydraulic switching to mains water should deliver water at all times even when there is no rainwater in tank.	Check pump operation and power supply by following procedure in section above. Clean all filters and strainers to ensure there are no blockages. Contact the pump manufacturer, repairer or retailer.
Pump	**Low flow to tap or toilet or washing machine** There could be blockages in the system that is restricting flow. It is possible that the pumping system or mains switching system supply is designed for low flow.	Clean all filters and strainers to ensure there are no blockages. If the flow is still not acceptable contact the pump manufacturer, repairer, or retailer.
Suction pipes / lines	**Air leaks**	Check if all threads are sealed with thread tape correctly (put up to 10 wraps of tape around each thread). Tanks, pumps and homes can move over time due to seasonal changes, so using flexible pipework between all components, especially on the suction can ease the stress on them. For information and diagrams on suction pipe troubleshooting check: http://www.rainwaterharvesting.org.au/rainwater-harvesting-maintenance-advice/pumps-and-switching-devices

Greywater system details (greywater diversion devices)

4.3.1 Overview of a greywater system

A compliant greywater diversion device collects water from bath, shower, hand basins and washing machine and uses it for subsurface irrigation of appropriate gardens.

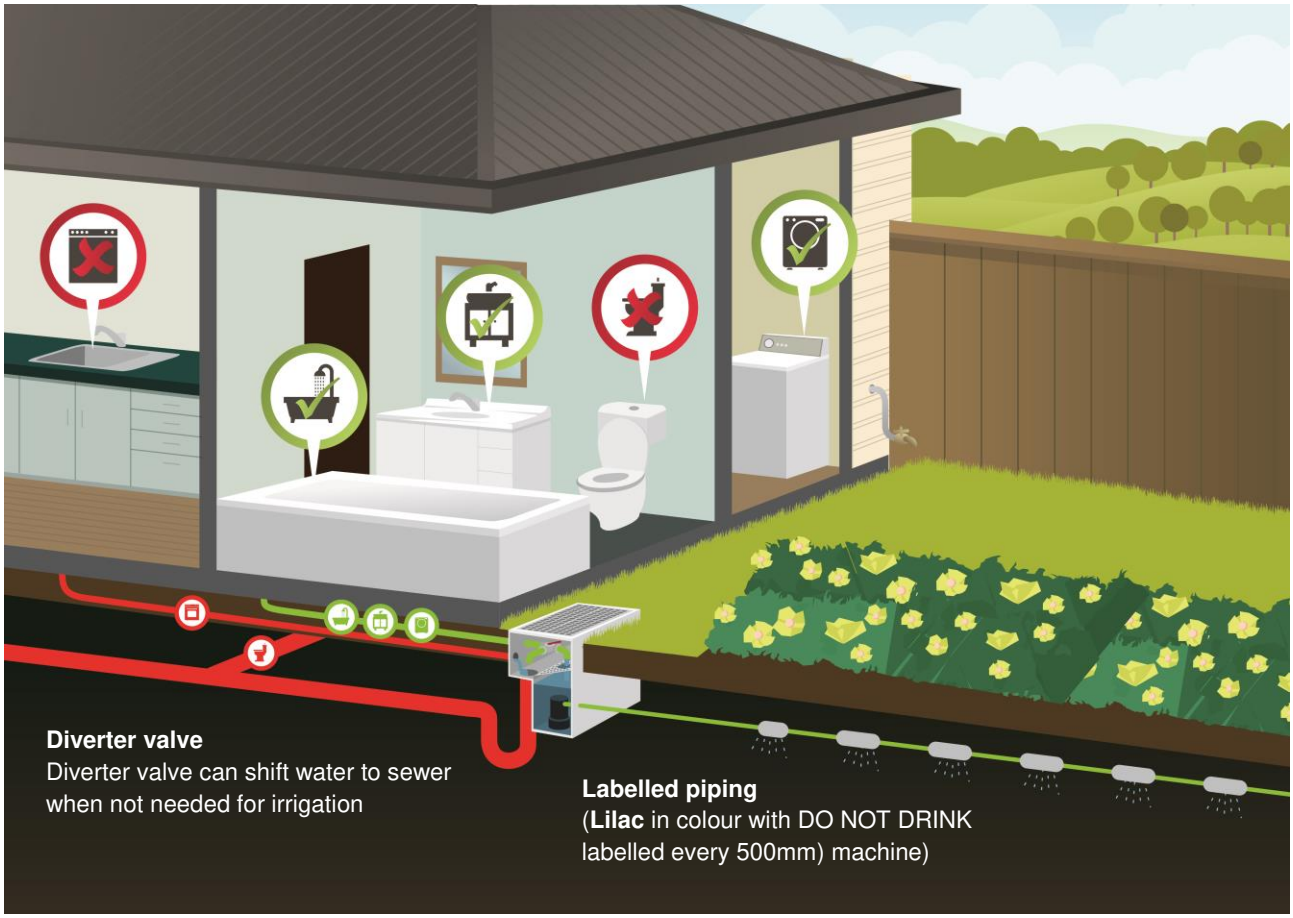


Figure 4: Compliant greywater system

Greywater from a diversion device is untreated and can only be used in a subsurface irrigation system. It should only be used when the garden needs irrigating and the device should be diverted to the wastewater network when the garden doesn't need irrigation. This will reduce the risk of greywater ponding on the surface and occupants coming into contact with greywater.

The Council only permits use of untreated greywater irrigation for single residential dwellings in residential zoned areas, and not for groups of townhouses, apartments or retirement villages. This is to prevent other people who have not been exposed to any microbes of the household, who may pick up an illness and spread it throughout the community. This is particularly true for retirement villages where residents are more vulnerable to illness.

4.3.2 Additional cost commitments

The additional costs to install a greywater system include:

- purchase and installation of a greywater diversion device
- purchase and installation of an irrigation system
- ensuring the system is compliant
- fees for various consents and council applications.

4.3.3 What to include in the building consent?

See Section 4.1.3 Resource and building consent requirements for rainwater/greywater systems for what paperwork is needed to comply, and which supporting checklists/checksheets are available.

4.3.4 Maintenance of a greywater system – an owner's responsibility

Once the greywater diversion device is installed it is the owner's responsibility to ensure it is maintained for the life of the installation.

The greywater diversion device and associated subsurface irrigation distribution systems require regular maintenance, such as cleaning (and replacing if needed) of filters, periodic desludging of the surge tank, inspection of the subsurface irrigation network and soil condition evaluation.

Table 7: Recommended maintenance of a greywater diversion device

Components	Maintenance Required	Frequency
Sensor probe	• Clean level sensor to ensure correct readings and subsequently pump operation	Weekly
Filter	• Clean filter as per manufacturer instructions	Weekly
	• Replace filter (if needed)	As per manufacturer's instructions
Subsurface irrigation	• Check water is dispersing • Monitor soil health to ensure all areas are wet after irrigation	Weekly
	• Flush irrigation lines	As per manufacturer's instructions
Soil condition	• Check the soil is healthy. Signs of unhealthy soil include: ○ damp and boggy ground, hours after irrigation ○ surface ponding and run-off of irrigated water ○ evidence of pests and diseases on plants ○ poor vegetation growth ○ unusual odours ○ clumping of soil ○ fine sheet of clay covering surface.	Monthly
Surge tank	• Clean out sludge from surge tank	Every 6 months

This maintenance work itself has inherent risk, just like managing a compost bin or spreading mulch.

Wear rubber gloves and a mask and thoroughly wash hands and clothes immediately afterwards.

4.3.5 Using greywater safely

It is important to manage greywater sensibly to ensure public health and the environment are protected. Table 8 outlines good practice and things to avoid when using greywater for outdoor irrigation, to guide occupants on best ways to manage their greywater reuse.

Table 8: Good practice and things to avoid when using greywater for outdoor irrigation

Good practice for greywater	
☑ Before selecting greywater make sure your property is suitable for greywater irrigation.	A map has been compiled to select areas that greywater can be effectively used, while complying with the Code (look for the green areas on the *Greywater Suitability Map* on the Council website).
☑ Install a greywater device that has a *Watermark* licence, has been BRANZ approved or similar accreditation.	This will ensure the device is fit for the purpose of greywater reuse.
☑ Calculate the amount of greywater you will generate to ensure you have enough garden space to use the greywater generated.	The calculations will ensure you have enough space to use greywater while preventing outdoor areas being over-watered or greywater ponding on the surface.
☑ Only use subsurface irrigation that is 100mm below the true soil surface.	This will ensure greywater targets the plants without ponding on the surface and coming into contact with people.
☑ Ensure all irrigation pipes are lilac in colour and labelled with “Recycled water do not drink”.	This will ensure there are no accidental connections to the greywater system.
☑ Only use the device when the plants need irrigation.	This will ensure plants are irrigated and ensure that water will not pond on the surface or you over-water plants.
☑ Choose detergents that are garden friendly: **Liquids**: • pH less than 10 • sodium/salt less than 10g per wash • phosphorus less than 1 gram per wash • electrical conductivity less than 1.0 dS/m **Powders**: • pH less than 10.8 • sodium/salt less than 20g per wash • phosphorus less than 1 gram per wash • electrical conductivity less than 2.2 dS/m	Salt and pH will influence soil quality and plant health. Check out Lanfax Labs for more information on suitable detergents for greywater irrigation.
☑ Monitor plant health and soil conditions and irrigate with drinking water if there are long periods of low rainfall.	Rainfall will wash salts from soil and during low rainfall periods, the drinking water will help wash salts through the soil. If the soil is becoming impermeable (ie, water isn’t soaking in) consider adding a wetting agent or compost to free up soil.
☑ Undertake regular maintenance to maintain performance of device and irrigation network.	Regular maintenance will ensure system works optimally while protecting environment and public health.

Things to avoid with greywater irrigation	
☒ Don't leave your greywater system on all the time.	This will increase the chance of greywater ponding on the surface (especially during wet periods) and chances of coming into contact with greywater.
☒ Don't irrigate vegetables, areas where food collected off the ground, flower beds and close to children's play equipment/areas.	These areas are disturbed often and greywater reuse increases risk of being exposed to a pathogen.
☒ Don't use greywater from kitchen, laundry tub or toilet.	This greywater is of low quality, low volume and is unsuitable for irrigation
☒ When it's wet, do not use.	If the soil is wet, there is an increased chance of greywater ponding on the surface.
☒ Don't use the greywater system if washing nappies or contaminated clothing (with chemicals or bodily excretions).	This will degrade the quality of the greywater and increase the chance of passing pathogens to the gardens and chances of contact with occupants or others.
☒ Don't use if someone is sick.	This will significantly increase chances of passing pathogens to your gardens.
☒ Don't store greywater for longer than 24 hours.	Storing greywater longer than 24 hours will increase risk of bacteria growing in the greywater and generating a smell nuisance.
☒ Don't install irrigation system within 500mm of boundaries.	You must ensure that no greywater enters neighbour's property or the street.
☒ Greywater cannot be used on the surface.	Greywater must be used by subsurface irrigation.

4.3.6 Greywater reuse estimation

To estimate the amount of greywater you will generate, use the calculation in the *Water Demand Management Schedule of Compliance form* (available from the Council office or website).

4.3.7 Links to more information

At the time of these guidelines, there are some useful websites for further information.

Guidance on choosing greywater-friendly detergents
(http://lanfaxlabs.com.au/greywater.htm)

Lanfax Laboratories provides independent advice on the chemical characteristics of detergents. The site provides benchmarks of suitable greywater quality to manage salt build-up in the soil, nutrient overloading for groundwater and keeping soil pH in optimal condition.

Advice on greywater from the Building Research Association of New Zealand (BRANZ)
(http://www.level.org.nz/water/wastewater/on-site-wastewater-treatment/greywater-recycling/)

BRANZ provides independent and impartial research, testing and consulting for the building and construction industry. They produced the *Level website* to help people design and build homes which have less impact on the environment and are healthier, more comfortable, and have lower running costs. Their greywater section covers Building Code requirements and safety recommendations.

4.3.8 Trouble shooting

The level of greywater reuse in the garden needs to be balanced with the amount of water and nutrients that the plants and soil in your garden can absorb. Regular checks will ensure that the use of greywater is not damaging the health of your garden. Some signs of unhealthy soil, lawn or plants include:

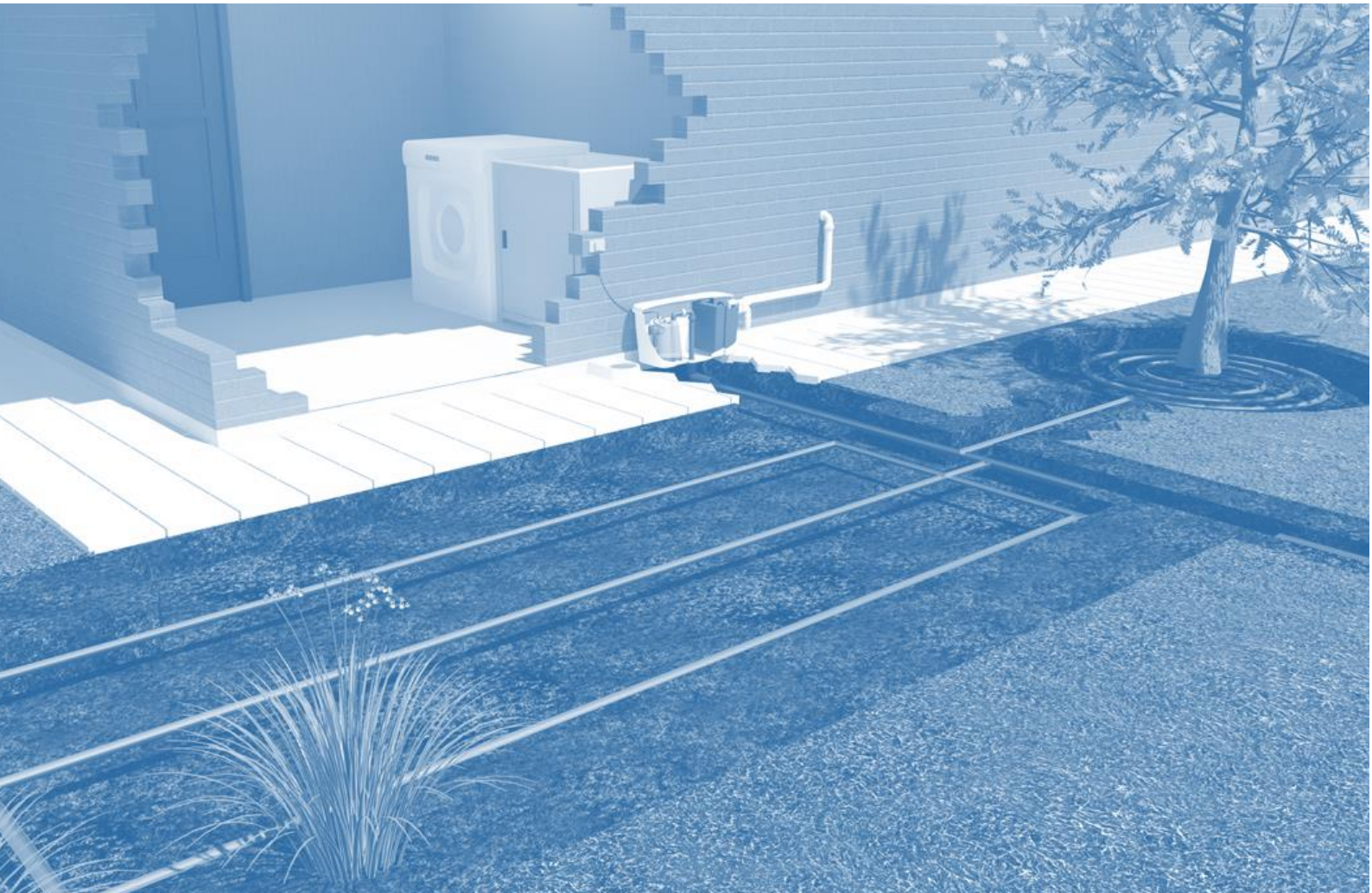
- damp and boggy ground, hours after irrigation
- surface ponding and run-off of irrigated water
- evidence of pests and diseases on plants
- poor vegetation growth
- unusual odours
- clumping of soil
- fine sheet of clay covering surface.

If any of the above signs are identifies you should reassess the amount or quality of greywater you are using and check that your system is working correctly.

Greywater that has not been disinfected will contain bacteria. Greywater may also contain chemicals from cleaning products, detergents and bleaches that can contaminate the soil and kill plants. If using greywater for irrigation, avoid:

- harsh detergents, softeners and whiteners
- bleach or cleaners with chlorine
- cleaners containing boron.

Opt for garden-friendly detergents that are biodegradable and low in salts. Consider applying a soil rewetting agent every six months. Avoid reusing greywater regenerated from chemical cleaning, nappy washing, hair dyes or car/machinery maintenance.



5 Performance criteria & technical information (for building industry)

5.1 What building control inspects for rainwater/greywater systems

5.1.1 Performance criteria for water demand management (new dwellings) in reticulated areas

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS		CHECKLIST
New Households				
P1	New residential dwellings supplied directly with water from the reticulated town water supply system, by the Kāpiti Coast District Council, must achieve targets listed in P1(a). To achieve the targets in P1(a), new homes must use other sources of water in conjunction with reticulated water supply system.	A1	The Council has two *minimum* acceptable solutions comply with P1. The two acceptable solutions are: a) 10,000 litres of rainwater storage connecting to all toilets and outdoor taps; or b) 4000 litre of rainwater storage connecting to toilets and outdoor taps and a greywater diversion device.	One of these solutions has been installed. ☐
P1(a)	Residential dwellings connected to a reticulated town water supply system must: • Reduce peak reticulated water used by household by 30%1, while; • Protecting reticulated water supply and household from cross contamination; and • Preventing unacceptable risk to the receiving environment (including human health).		On application, alternative measures that can demonstrate compliance with the P1(a) performance criteria will be considered by Kāpiti Coast District Council.	

[1] As per the Kāpiti Coast District Plan the target is to reduce water use from 1536 litres/house/day by 30%.

5.1.2 Performance criteria for rainwater systems

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS		CHECKLIST
Rainwater tank installation, capacity & water quality protection measures				
P2	A rainwater tank must have sufficient storage capacity to provide an acceptable contribution to meet water savings targets listed in P1(a) allowing for: a) local rainfall pattern; b) roof catchment area; and c) area available to site the rainwater tank. Figure 1 details the rainwater system. For performance requirements and acceptable solutions for greywater diversion devices please refer to the next section.	A2	A rainwater tank(s): a) has a minimum storage capacity of: i. of at least 10,000 litres for new residential dwellings; or ii. of at least 4,000 litres for new residential dwellings in conjunction with an approved greywater diversion device. b) is installed to receive rainfall from a minimum roof catchment area of one half of the total roof area or 100m^2, whichever is the lesser; and c) is connected to: i. toilet cisterns; and ii. taps for outdoor use.	Storage capacity can cope with rainfall and water use for toilets and outdoor taps. ☐
P3	A rainwater tank must have suitable measures to prevent contaminants from entering the rainwater tank appropriate to the end use of the water.	A3	A rainwater tank has – a) a screened downpipe rain head, having screen mesh 4–6mm and designed to prevent leaves from entering each downpipe supplying water to the tank; and b) if washing machines, toilet or hot water services are to be supplied by rainwater, there must be a first flush diverter installed to remove a minimum of 20 litres of the first flush of roof catchment before entering the rainwater tank.	Rainwater tank has suitable measures to prevent contaminants from entering the rainwater tank. ☐
P4	The rainwater tank must have a continuous supply of water for the toilets supplied with water from a rainwater tank. [1, 2, 3]	A4	A rainwater tank has a top-up valve, providing supplementary water from the reticulated town water supply with: • flow rate of 25 litres per hour; and • an approved top-up valve installed in an accessible location; and • a maximum storage volume of reticulated town water supply top up not exceeding 1,000 litres • air-gap.	Rainwater tank has a continuous supply of water for the connected toilets ☐
P5	Water from a rainwater tank must not contaminate the drinking water within a	A5	Backflow prevention must be installed to protect the drinking water within the reticulated town water	Water from a rainwater tank will not contaminate the reticulated town

	reticulated town water supply system.		supply system in accordance with G12/AS1.	drinking water. 
P6	Any outdoor taps connected to rainwater must have signage stating it is not fit for drinking.	A6	The outdoor signage must comply with the G12/AS1 or AS/NZS 3500.1:2003 Water supplies.	Any outdoor taps connected to rainwater have suitable signage. 
P7	All piping from a rainwater tank must be clearly labelled as rainwater pipe to prevent cross connecting drinking water appliances with untreated rainwater.	A7	The pipe must comply with AS/NZS 3500.1.2003 where all pipe supplying rainwater to toilet and outdoor taps needs to be lilac in colour and clearly labelled with “DO NOT DRINK” every 500mm in contrasting colour.	All piping from a rainwater tank are clearly labelled as rainwater pipe. 
System materials				
P8	Materials used in a rainwater tank must be suitable for its intended use.	A8	a) Polyethylene tanks complying with AS/NZS4766:2006 polyethylene storage tanks for water and chemicals. b) Galvanised steel sheet complying with AS1397:2011 galvanised steel sheet and strip – hot-dipped zinc-coated or aluminium/zinc-coated, and have minimum coating of 550 g/m^2. c) Concrete tanks complying with NZS 3106:2009 Design of concrete structures for the storage of liquids. d) Collection well/underground water cell (non-potable), or bladder tank complying with Vertical Axis Type Section 10 of *AS/NZS 1546.1:2008* – Septic Tanks.	Materials used in the rainwater tank are suitable for its intended use. 
Rainwater tank stands				
P9	Where a rainwater tank is supported on a stand or other structure, the supporting structure must be capable of withstanding any loads likely to be imposed on it.	A9	A rainwater tank stand or other supporting structure complies with the New Zealand Building Code Clause B2 Structure.	A supporting structure is capable of withstanding any reasonable loads  The water tank is (classed as detached structure): • less than 2.4 metres in height • less than 8m2 in

				floor area • located at least 1 metre from any adjoining property boundary. 
Rainwater tank openings				
P10	Rainwater tank openings are constructed to prevent ingress of surface stormwater and groundwater.	A10	a) All rainwater tanks are sealed to prevent surface stormwater and groundwater entering the rainwater tank. b) Non water-tight access lids terminate a minimum 150 mm above finished ground level with the ground sloped away from the tank and access lid. c) Water tight access lids are permitted to finish flush with the finished surface level.	Rainwater tank openings are constructed to prevent access of surface stormwater and groundwater  Rainwater tank openings comply with the District Plan and have a lockable lid to prevent access of children, animals, insects, and rubbish. 
Rainwater tank overflow – point of discharge				
P11	Rainwater tank placement and tank overflow is to be designed to ensure stormwater does not pond under building floors or flood around foundations of buildings.	A11	a) The rainwater tank overflow is connected to a Council approved stormwater system in accordance with the Council's Subdivision and Development Principles and Requirements, Part 4 Minimum Engineering Requirements, Schedule 4 Altered Requirements to Part 4 NZS4404:2010, b) A physical air break or non-return valve on the outlet from the rainwater tank overflow is provided before connecting to the stormwater drainage system. c) All plumbing and stormwater connections comply with New Zealand Building Code requirements.	Rainwater tank placement and tank overflow is designed to ensure stormwater does not pond under building floors or flood around foundations of buildings. 

[1] Appendix 1 details the new manifold Council will use for providing water to new dwellings with rainwater reuse.

[2] Any tobies or manifolds needing upgrading to comply with the district plan will be at the homeowner's expense.

[3] The Council's responsibility for maintaining the reticulated water supply stops at the manifold. The home owner is responsible for maintaining the water supply on their property.

5.1.3 Performance criteria for greywater diversion devices

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS		CHECKLIST
P12	A greywater facility must be designed, constructed, installed and maintained in such a manner as to— a) protect public health by ensuring that risks associated with the use and/or dispersal of greywater to the greywater land application area are minimised; and b) protect the environment by ensuring— i. surface and ground water are not polluted; and ii. soil productivity is maintained or enhanced; and c) minimise the impacts on the amenity by ensuring it has no adverse impact on— i. the built environment; and ii. people on and nearby the premises; and d) for the design life of the facility.	A1	a) Where greywater is disposed of to a greywater land application area, it complies with Part 4 of the Code; and b) The greywater facility otherwise complies with G13 of the New Zealand Building Code); and c) The greywater facility complies Greater Wellington's Regional Plan for Discharges to Land; and d) The greywater facility must be operated and maintained in accordance with the designer's or manufacturer's instructions (As outlined in Appendix 2).	The greywater facility is designed, constructed, installed and maintained according to best-practice standards to protect public health, environment and other amenities. ☐
P13	A greywater facility must be designed, constructed and installed— a) with adequate treatment for the volume of waste and frequency of disposal; b) with adequate size, strength and rigidity for the nature, flow rates, volume of wastes and/or waste products which must be processed; c) to avoid the possibility of contamination of any drinking water supplies; d) to avoid the possibility of contamination of soils, ground water and waterways; e) from materials which are impervious both to the waste for which disposal is required and to water; f) to avoid the possibility of foul air and gases accumulating within or entering into buildings; g) to avoid the possibility of	A2	All greywater diversion devices must be Watermarked or BRANZ appraised. Greywater can be diverted by connecting the washing machine and bathroom waste pipe to a diversion device. Figure 4 outlines key elements of greywater facility and a greywater land application system. The device must: • not be connected to the mains water supply; • have a filtering system that uses a coarse filter to remove solids from greywater; • not be connected to the laundry tub; • be able to direct and divert greywater to sanitary drainage or a greywater land application area;	The greywater facility is designed, constructed and installed according to best-practice standards in this criterion. ☐

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	CHECKLIST
unauthorised access by people; h) to permit cleaning, maintenance, measurement and performance sampling; i) to avoid the possibility of surface water and stormwater entering the system; j) to avoid the possibility of uncontrolled discharge; k) to permit the manufacturer, model, serial number and design capacity to be reasonably easily identifiable after installation; l) must meet noise provisions of District Plan and minimise nuisance to the occupants of neighbouring properties; and m) so that the installation throughout its design life will continue to satisfy the requirements of items (a) to (l).	• the surge tank does not operate as a storage tank; • automatically divert greywater from the facility to sanitary drainage if the facility does not work properly or at all; • allow the manual diversion of greywater from the facility to sanitary drainage; • be fitted with a switch to divert greywater from the sewer to a subsurface irrigation system; • automatically divert to the sewer if there is a blockage, or heavy rainfall and ponding; and • be connected to a soil moisture probe and be able to automatically divert to sewer when the soil is saturated. A pump diversion device incorporates a surge tank to cope with influxes of greywater for distribution by a pump. The surge tank must not operate as a storage tank. Greywater must be screened as it enters the tank, the coarse screens cleaned regularly and the tank flushed periodically. Surge tanks must be: • not operate as a storage tank • vented • fitted with an overflow line connected to the sewer • fitted with a scour line that is connected to the sewer • have all access openings sealed and vermin proof • fitted with a hopper floor sloped to the scour line • designed based on household fixture ratings of AS/NZS 3500.2, section 6.1, which specifies the maximum discharge from	

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS		CHECKLIST
			any fixture to be 500 litres. Greywater diversion devices must be designed and installed according to the following criteria: • only for *single* residential dwellings that generate up to 2,000 litres per day • minimum maintenance requirements must be specified • must meet relevant health and plumbing requirements and minimise risks to public health • overflow connection to the sewer must be maintained.	

5.1.4 Performance criteria for greywater land application systems

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS		CHECKLIST
P14	A greywater land application system must be designed constructed, installed and maintained in such a manner as to— a) complete the treatment, uptake and absorption of the greywater within the boundaries of the approved application area; b) avoid the possibility of the creation of unpleasant odours or the accumulation of offensive matter; c) avoid the possibility of the ingress of effluent, foul air or gases entering buildings; d) avoid the possibility of stormwater run-off entering the system; e) avoid the possibility of root penetration or ingress of ground water entering the system; f) protect against internal contamination; g) provide adequate access for maintenance; h) incorporate adequate provisions for effective cleaning; i) avoid the possibility of unintended or uncontrolled discharge; j) avoid the possibility of blockage and leakage; k) avoid the possibility of damage from superimposed loads or ground movement; l) provide ventilation to avoid the possibility of foul air and gases from accumulating in the system; m) minimise noise nuisance to the occupants of neighbouring properties; and n) prevent greywater discharging into neighbouring properties; and o) ensure that the installation throughout its design life will continue to satisfy the requirements of items (a) to (n).	A1	1. The land application system complies with each of clauses (a), (b), (c) and (d) in determining the size and position of the land application system while taking into account any additional information (and any photographic material) produced as a result of an on-site inspection carried out in accordance with Clause 4.1.3.4(b) of AS/NZS 1547— a) the setback distances specified for a greywater diversion device in T1 Appendix 4; b) design loading rate is to be appropriate to the characteristics of the terrain and soil in and near the land application area (Table 2-6 Appendix 4); c) the environmental constraints and the anticipated daily volume of greywater in sewered areas. (Table 2-6 Appendix 4); d) greywater must be discharged at a minimum of 100mm below the true ground surface; e) the irrigation system cannot be connected to the mains supply and the greywater diversion device; and f) all irrigation lines and irrigation outlets must be lilac and labelled with “NON POTABLE – DO NOT DRINK” every 500mm. 2. Any pump or motor complies with the District Plan permitted noise levels. 3. The greywater land application system can be installed by property owner, provided they follow the manufacturers’ specifications	The greywater land application system is designed constructed, installed and maintained according to best-practice standards in this criterion. ☐

5.2 Technical details

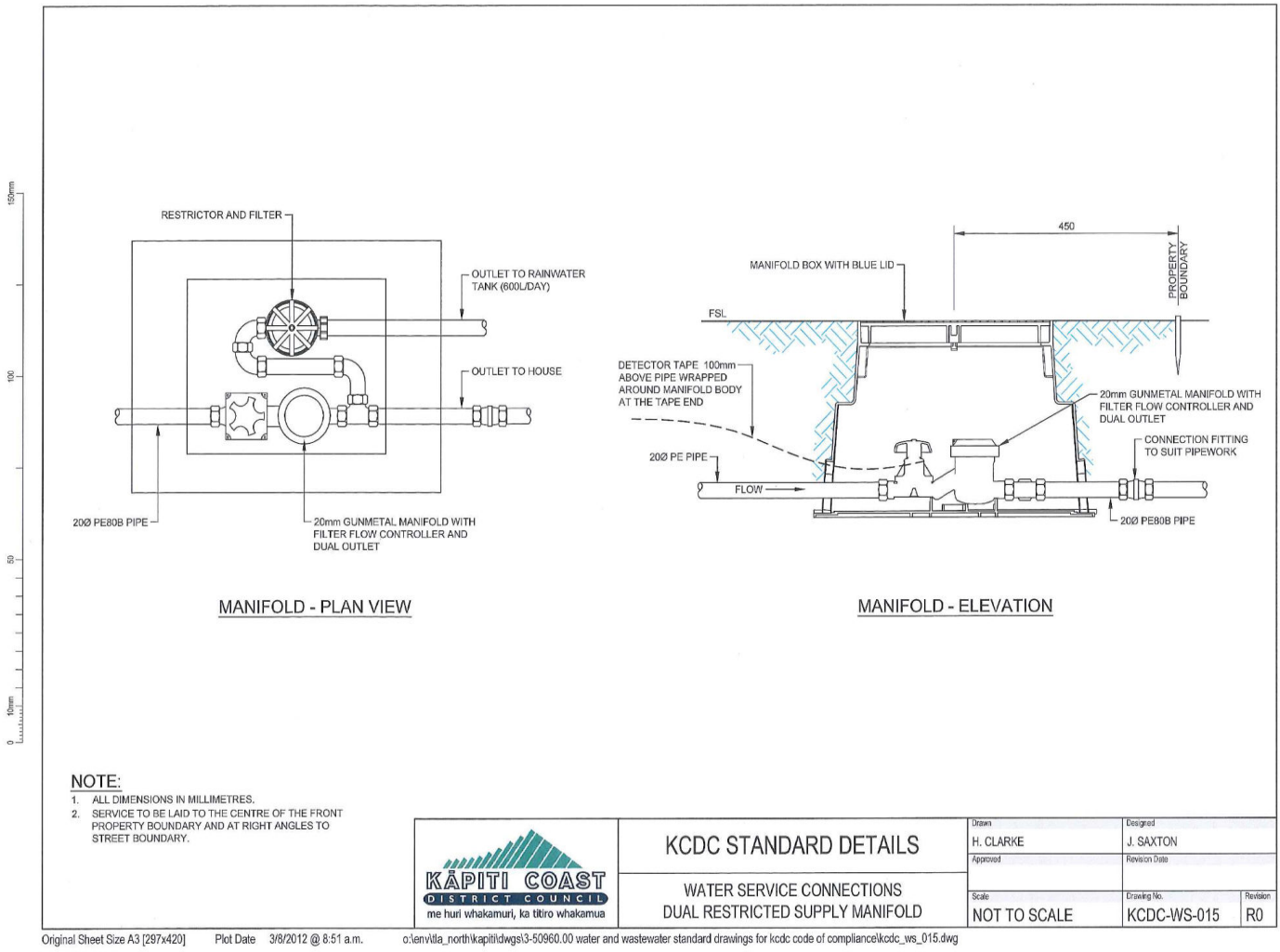
5.2.1 How the manifold works

The manifold is the point of supply between the Council water supply and the property. The manifold contains two check valves to protect the home and water supply from backflow. The manifold houses the water meter to record all water moving through to the property.

Unlike older properties, the manifold contains two outlets:

1. One outlet supplies standard flow to the house, excluding toilets and outside taps.
2. The other outlet supplies water to the rainwater tank, as a top up when the tank level falls below 1000 litres. The rainwater tank outlet is restricted to 600 litres/day.

Figure 5: How the dual manifold works



5.2.2 Information to include in the building consent

The Council's website has various checklists to assist with completing building consent application forms. In particular, you should complete the *Water Supply Connection / Alteration Application Form 159* and the *Water Demand Management Declaration of Compliance Form 164* (if your property does not have the dual manifold installed at your point of supply).

Also check Section 4.1.3 Resource and building consent requirements for rainwater/greywater systems.

5.2.3 Legitimate use of water during construction phase

At time of submitting building consent

All homes being built in residential zoned areas must contain a dual restricted manifold. If the property contains an older manifold, it will need to be replaced before construction starts.

To avoid unnecessary delays, complete and include the *Water Supply Connection / Alteration Application Form 159* at the time of submitting the building consent.

During construction

Water is critical at the time of construction for activities such as:

- ablution block for workers
- concrete work
- managing dust and sand (either keeping areas damp or establishing vegetation to prevent sand movement).

While water is important, please be aware that *Kapiti Coast Water Supply Bylaw* clearly states that only Council staff or authorised agents shall have access to any Council-owned part of the water supply system.

No person can tamper, modify or damage the water supply (including the manifold and water meter) either directly or indirectly.

If Council identifies any damage or tampering to part of the water supply, Council may recover the costs from the customer or person who caused the damage.

To legitimately use water during construction phase, you need to:

- complete the *Water Supply Connection / Alteration Application Form 159* to ensure the appropriate point of supply is installed on site
- protect the manifold/water meter and water meter box from heavy traffic (the meter box cannot sustain the weight of heavy vehicles and manifold and meters will get broken/damaged)
- blank off the restricted feed to rainwater tank, since you are permitted to use the full supply for construction activities
- alert the property owner that they will be invoiced for all water used.

When home completed

Council inspectors will be checking to confirm all outside taps and toilets are connected to the rainwater tank at the time of code of compliance (ie, no unrestricted supply can be available for outside taps).

5.2.4 Setting restricted top up

When the rainwater tank falls below 1,000 litres, it activates a top-up valve placed on the top of the tank. The top-up valve works by having a float on a string set to the height of 1,000 litres in the tank. When the level falls below 1,000 litres level, the weight of the float pulls on the top-up valve and opens the device, allowing restricted reticulated water to top up the tank. When the level rises and the float sits in the water, the valve shuts off.

Setting the top-up valve involves setting the float so the valve switches on when the rainwater tank volume falls below 1,000 litres. The top-up supply will provide water at a rate of 600 litres/day. Please ensure the top-up valve can operate with a restricted water flows.

6 When a home changes hands (for real estate industry)

6.1.1 Introduction

Real estate agents play a vital role in passing on information to new house owners. Having a sustainable water supply is a great sales feature, but the potential buyers need to be fully informed of the compliance and maintenance requirements before a home changes hands.

6.1.2 Explain what they have

Check if the home has been built to comply with the water saving requirements in the Kapiti Coast District Council District Plan requirements.

The home will have one of the following options:

1. **Rainwater system only**
   - A minimum 10,000 litre **rainwater** tank, collecting water for supplying toilets and outside taps. When the rainwater volume falls below 1,000, reticulated water from Council supply will top up the rainwater tank to the 1,000 litre level.
2. **Rainwater and greywater systems**
   - A minimum 4,000 litre **rainwater** tank, collecting water for supplying toilets and outside taps. When the rainwater volume falls below 1,000, reticulated water from Council supply will top up the rainwater tank to the 1,000 litre level
   - A **greywater** system collecting water from bathrooms and laundries for subsurface irrigation.
3. **Alternative solution**
   - The household has proposed an alternative solution to the two options above (eg, bore).

6.1.3 Key forms in building consent file

To make sure the systems are compliant, look for the following key forms in the building consent file at the Council:

- The ***Water Demand Management Declaration of Compliance form 164*** will inform future homeowners on the option chosen by original owners.
- The ***drainage plan*** will show:
  - the location of the greywater and or rainwater system
  - what downpipes (and roof area) provide water to the rainwater tank
  - what bathrooms and laundries provide water for the greywater system
  - what areas will be irrigated with greywater at time of house being built.
- ***Rainwater tank producer statement*** demonstrates the rainwater tank meets the volume requirement.

It is also helpful to ask the original owners to leave the system manufacturer's user and installation manuals for the new owners, and any other documentation that might be useful.

6.1.4 How the system works

Residential homes relying solely on town water supply have a single feed manifold / toby that supplies water to the house, along with piping all containing drinkable water. A District Plan compliant home has a dual manifold, and different piping systems for potable and non-potable water.

Rainwater

A dual feed manifold means there are two water supplies running from the water supply/manifold:

1. a full supply to the house (except toilets), and
2. a restricted supply to top up the rainwater tank when it falls below 1,000 litres.

The rainwater tank will supply water to the toilets and outside taps. No outside taps are permitted to be connected to the full town water supply.

When the rainwater tank falls below 1,000 litres, it activates a top-up valve placed on the top of the tank. The top-up valve works by having a float on a string set to the height of 1,000 litres in the tank. When the level falls below 1,000 litres level, the weight of the float pulls on the top-up valve and opens the device, allowing restricted reticulated water to top up the tank. When the level rises and the float sits in the water, the valve shuts off.

The pipe connecting the toilets and outside taps to the rainwater tank is separate to the rest of the plumbing to prevent cross connection.

To prevent accidental connection to the rain-fed pipe work (eg, connecting a tap for drinking) the pipe is lilac in colour and stamped with “non-potable do not drink”.

For more information, read Section 4.2 - Rainwater system details.

Greywater

If the home has a greywater system, water from the washing machine and bathrooms supplies water to the greywater diversion device.

The greywater passes through a coarse filter into a chamber, where it is pumped out for subsurface irrigation use.

As the greywater is untreated, the pipe is purple in colour and labelled “non-potable do not drink”. Further, irrigation must be 100mm below the soil surface to prevent people having any direct contact with the greywater.

One of the most important components of the greywater system is the diverter valve. The valve allows a homeowner to choose whether to use the water for irrigation, or if it is wet or the garden doesn’t need irrigation the homeowner can divert the greywater into the sewer.

Greywater may be used to irrigate parts of the outdoor area.

For more information, read Section 4.3 - Greywater system details (greywater diversion devices).

6.1.5 Maintenance of a rainwater system – an owner’s responsibility

Once a rainwater/greywater system is installed, it is the owner’s responsibility to ensure it is maintained for the life of the installation.

Rainwater systems will require ongoing maintenance, such as cleaning the first flush device, the sediment build-up in the tank and pump maintenance.

Table 9: Recommended maintenance of rainwater system.

Action	Frequency
Inspect/ clean roof gutters and downpipes (check for blockages, debris or leaks)	Every 3 months
Inspect and clean first flush devices	Every 3 months
Check the water quality and odour	Every 3 months
Inspect the tank for any leaks	Annual inspection
Ensure the pump is operating well	Annual inspection
Inspect/repair the top-up valve for any leaks	Every 2 years
Clean the tank by removing sediment and debris from the rainwater tank floor	Every 2 years
Inspect/repair the plumbing from the tank to the dwelling unit	Every 2 years

Greywater diversion devices and their associated subsurface irrigation distribution systems require regular maintenance, such as cleaning and (replacing if needed) filters, periodic desludging of the surge tank, inspection of the subsurface irrigation network and soil condition evaluation.

Table 10: Keeping a greywater diversion device well maintained

Components	Maintenance Required	Frequency
Sensor probe	• Clean level sensor to ensure correct readings and subsequently pump operation	Weekly
Filter	• Clean filter as per manufacturer instructions	Weekly
	• Replace filter (if needed)	As per manufacturer's instructions
Subsurface irrigation	• Check water is dispersing • Monitor soil health to ensure all areas are wet after irrigation	Weekly
	• Flush irrigation lines	As per manufacturer's instructions
Soil condition	• Check the soil is healthy. Signs of unhealthy soil include: ○ damp and boggy ground, hours after irrigation ○ surface ponding and run-off of irrigated water ○ poor vegetation growth ○ unusual odours ○ clumping of soil ○ fine sheet of clay covering surface	Monthly
Surge tank	• Clean out sludge from surge tank	Every 6 months

This maintenance work itself has inherent risk, just like managing a compost bin or spreading mulch.

Wear rubber gloves and a mask and thoroughly wash hands and clothes immediately afterwards.

7 Definitions

Unless noted otherwise, all terms have the same meaning as defined in the Building Act 2004, or a relevant Australian/New Zealand Standard.

If a definition given in a relevant standard is inconsistent with the New Zealand Building Code, Regulation or the KCRGW code, the legislation (ie, the Act or Regulation) prevails as to the extent of the inconsistency.

Industry specific words within the body of the text, are defined below.

acceptable solution	a solution that must be accepted as complying with the building code.
amenity	an attribute of a *building* which contributes to the health, physical independence, and wellbeing of the *building's* users but which is not associated with disease or a specific illness.
building	has the meaning given to it by sections 8 and 9 in New Zealand Building Act 2004.
complying valve	a device incorporated as part of the manifold which a Water Service Provider can use to securely restrict the flow of water, either partially or fully, to be installed upstream of a water manifold.
Council	Kāpiti Coast District Council
design life	the period during which the item is designed to meet the performance criteria. It is to be a minimum of 15 years. Building Code clause B2 Durability specifies the durability of building work. Specifying a time may cause a conflict with the building code in some cases.
first-flush device	a container that collects and disposes of the initial rain that falls on a catchment surface, removing both debris and soluble pollutants.
greywater	wastewater from the washing machine, showers, hand basins and baths where a greywater diversion device is used. It does not include waste water from the toilet, kitchen or laundry tub.
greywater land application area	an area in which greywater is disposed of by subsurface or surface irrigation.
greywater land application system	a greywater application area associated with a greywater facility.
greywater diversion device	a device that consists of: • a diversion device with the characteristics mentioned below; and • a filtering system that uses a coarse filter to remove solids from greywater. The characteristics are that the device: • directs and diverts greywater to sanitary drainage or a greywater application area; and • automatically diverts greywater from the facility to sanitary drainage if the facility does not work properly or at all; and • allows the manual diversion of greywater from the facility to sanitary drainage.

greywater facility	a facility that consists of a greywater diversion device and a greywater land application area.
G12/AS1	acceptable solutions that comply with the performance criteria of section G12 of the Building Code.
manual bucketing	collecting greywater from the washing machine or bathroom and transferring it manually out to the garden.
residential dwelling	a single, detached residential household that: a) used, or intended to be used, only or mainly for residential purposes; and b) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but c) (iii) does not include any dwellings in a retirement village or rest home; a hostel, boarding house, or other specialised accommodation.
reticulated water supply	pipes, fittings and tanks used or intended to be used for the storage and reticulation of water from a *water main* or other water source, to *sanitary fixtures*, *sanitary appliances* and fittings within a *building*.
sanitary appliances	an appliance which is intended to be used for sanitation but which is not a sanitary fixture. Included are machines for washing dishes and clothes.
sanitary fixture	any fixture which is intended to be used for sanitation.
sewer	any pipeline or culvert, above or below ground level, used or intended to be used to convey sewage.
top-up valve	means the valve that provides *reticulated water* to the rainwater tank.
water supplier	the Kāpiti Coast District Council or nominee, who is responsible for operating, the local reticulated water supplies.
Watermark	a certification trademark used in relation to water supply, sewerage, plumbing and drainage goods.
waterways	any receiving water body including – ponds, rivers, streams, raceways, coastal marine area.

Appendix 1: Documentation for greywater systems

Owner's manual and label

Each greywater diversion device installed must be accompanied by:

- a label (securely affixed, designed to last for the system's life) showing items (a), (b) and (c) below.
- an owner's manual prepared by the manufacturer, written so it can be easily understood by the intended reader and must include at a minimum:

(a) The diversion device's model designation.

(b) The name and telephone number of an appropriate service representative to be contacted in the event that a problem with the plant occurs.

(c) The website from which the documentation can be downloaded during the design life.

(d) A statement confirming that the diversion device meets the requirements of this Code.

(e) A clear statement of examples of the types of waste that can be effectively treated by the device.

(f) A list of household substances that, if discharged to the diversion device, may adversely affect the garden or the environment.

(g) Comprehensive instructions in how to install the irrigation system to irrigate the target landscape areas, while protecting public health and the environment.

(h) Comprehensive operating instructions that clearly delineate proper function of the diversion device and the greywater land application system, operating and maintenance responsibilities of the owner and authorised service personnel, and service-related obligations of the manufacturer or facility builder.

(i) Requirements for any required periodic removal of sludge from the diversion device.

(j) A course of action to be taken if the plant is to be used intermittently or if extended periods of non-use are anticipated.

(k) Detailed methods and criteria to be used to identify plant malfunction or problems.

Installation manual for greywater diversion devices

Manufacturers must provide comprehensive and detailed installation instructions to authorised representatives. The manual must be written so that it can be easily understood by the intended reader and must include as a minimum:

(a) A numbered list of plant components and an accompanying illustration, photograph, or print in which the components are respectively identified.

(b) Design, construction, and material specifications for the plant's components.

(c) Wiring schematics for the plant's electrical components.

(d) Off-loading and unpacking instructions including safety considerations, identification of fragile components and measures to be taken to avoid damage to the plant.

(e) A process overview of the function of each component and the expected function of the entire plant when all components are properly assembled and connected.

(f) A clear definition of plant installation requirements including plumbing and electrical power requirements, ventilation, air intake protection, bedding, hydrostatic displacement protection, water tightness, slope and miscellaneous fittings and appurtenances.

(g) Repair or replacement instructions in the event that a plant possesses flaws that would inhibit proper functioning and a list of sources where replacement components can be obtained.

(h) A detailed start-up procedure.

Appendix 2: Assessing site suitability for greywater land application

Table T1: Setback distances from a greywater diversion device *irrigation outputs*

Feature	Setback distance (metres)
Property boundaries, pedestrian paths, and driveways	0.5
Footings of buildings	1.5
Retaining wall footing	1.0
In ground swimming pool surrounds	1.0
In ground potable water tank	6.0
Bores intended for human consumption	50

Table T2: Calculating greywater produced each week

Calculate how much water your home could generate. As the number of people will vary over the life of the house, use the following calculation to estimate greywater volume.

40 litres		60 litres		100 litres			x	7 days	=	litres
Laundry usage	+	Bathroom usage	=	Total daily usage	x	Occupancy * (depends on number of bedrooms, see table below)	x	Days per week	=	The amount of greywater produced each week

Table T3: Determining occupancy

Bedroom numbers in home	Occupancy for design purposes and calculation
1	2
2	4
3	6
4	8
5	10
6	12

Table T4: Calculating area needed for greywater irrigation

Litres produced each week	÷ Soil irrigation rate(T5)	= area needed for irrigation
litres/week	mm/week	m2

Table T5: Soil irrigation rate for soil classes

Soil category	Soil texture	Soil irrigation rate for greywater	Indicative drainage class
1	Gravel and sands – structure-less	35 mm/week	Rapid draining
2	Coarse to medium sand	35 mm/week	Free draining
3	Medium-fine and loamy sand (dune sands)	35 mm/week	Good drainage
4	Sandy loam, loam and silt loam	28 mm/week	Moderately well drained
5	Sandy clay loam, clay loams, silt clay loam, peaty loam	20 mm/week	Moderate to slow drainage
6	Sandy clay, non-swelling clay and silty clay, peat	15 mm/week	Slowly draining
7	Swelling clay, grey clay, hardpan	15 mm/week	Poorly or non-drained

The Council has developed a blanket assessment of the Kāpiti Coast to identify areas suitable for greywater irrigation (look for Greywater Suitability Maps on the Council website). The blanket assessment used the criteria in Tables T6 and T7. While the blanket assessment provides guidance on areas suitable for greywater irrigation, site specific information may still be required from Council.

- Areas shaded **green** (minor limitation) will only need to submit the **Water Demand Management Declaration of Compliance form** (Tables T1 – T5) with the building consent application.

- Areas shaded **yellow** (moderate limitation) will need to provide further information in how the proposed greywater facility will comply with the Kāpiti Coast Rainwater and Greywater Code in conjunction with **Water Demand Management Declaration of Compliance form**

- Areas shaded **red** (major limitation) are unlikely to be suitable for greywater irrigation and will need a report from a suitably qualified and experienced professional to demonstrate that the greywater system will comply with the greywater requirements in the Code and the Regional Discharge to Land Plan.

Table T6: Site assessment for soil suitability for greywater irrigation

Soil Feature	Minor limitation	Moderate limitation	Major limitation[1]	Restrictive feature
Depth to bedrock or hardpan (m)	>1.0	0.5 – 1.0	<0.5	Indicates potential for excessive runoff and/or water logging
Depth to high episodic/ or seasonal water table	>1.0	0.5 – 1.0	<0.5	Groundwater pollution hazard, resurfacing hazard
Soil permeability Category[2]	2, 3 and 4	5 and 6	1 and 7	Excessive runoff, water
Bulk density (g/cm3) Sandy loam Loam & clay loam Clay	 <1.8 <1.6 <1.4		 >1.8 >1.6 >1.4	Indicates permeability
Electrical conductivity (dS/m)[3]	< 4	4– 8	>8	Excessive salinity undesirable

1. Sites with these properties are generally not suitable.
2. See Table T4
3. Because of the elevated levels of sodium in domestic greywater, gypsum should be put on the application areas each year. Greywater land application systems should also be dosed on a regular basis.

Table T7: Site assessment criteria for greywater irrigation

Site feature	Minor limitation	Moderate limitation	Major limitation	Problem
Flood potential	Below 1:100 year	Below 1:50 year		High runoff and contamination risk
Exposure	High sun and wind exposure		Low sun and wind exposure	Poor evapotranspiration
Slope percentage	0–10	10–20	>20	Run-off, erosion
Landform	Hill crest, convex side slows and plains	Concave side slopes & foot slopes	Drainage plains and incised channels	Groundwater pollution hazard, resurfacing hazard
Run-on and upslope seepage	None–low	Moderate	High–diversion not practicable	High runoff and contamination risk
Erosion potential	No signs of erosion potential present		Signs of erosion, e.g. rills, mass movement and slope failure, present	Soil degradation and transport, system failure
Site drainage	No visible of signs surface dampness		Visible signs of surface dampness, such as moisture–tolerant vegetation (sedges and ferns), and seepages, soaks and springs	Groundwater pollution hazard, resurfacing hazard
Fill	No fill	Fill present		Subsidence, variable Permeability
Buffer distance	See Table T1			Health and pollution risks
Land area	Area is available		Area is not available	Health and pollution risks
Rocks and rock outcrops (percentage of land surface containing rocks >200mm diameter)	<10%	10–20%	>20%	Limits system performance
Geology/ regolith			Major geological discontinuities, fractured or highly porous regolith	Groundwater pollution hazard