Version 1.2 September 2017

Vegetable Washwater Discharge Code of Practice

1) The requirements for achieving Good Practice

The following checklist, decision tree, and reference values is a self-audit to assist you in determining if your discharge of vegetable washwater meets Good Practice.

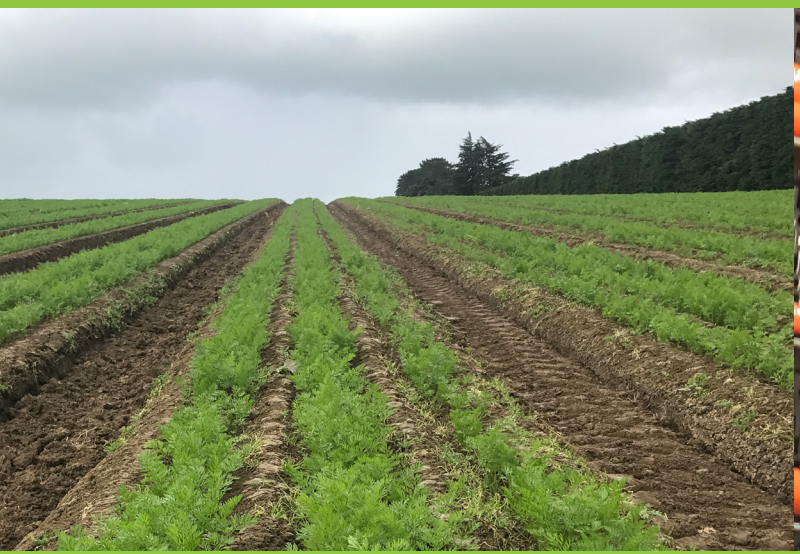
The primary contaminants in vegetable washwater is sediment, phosphorus and nitrogen. Disposal of washwater through the soil profile using an infiltration bed is a very effective way of removing suspended sediment and phosphorus. As nitrogen is not well filtered by the soil, levels need to be reduced to less than the receiving environment prior to application though a soil-aquifer treatment system (SAT). If nitrogen levels cannot be lowered enough, then land application to unsaturated soil through an irrigation system may be more appropriate. When applying washwater to land through an irrigation system the required application area is generally determined by the volume of water, not the nitrogen level as is the case for most other agricultural discharges.

Good Practice is to discharge the washwater through an infiltration bed where nutrient levels are low enough or apply the washwater to land through an efficient irrigation system where nutrients can be taken up by the plants. With an irrigated system, winter storage is one of the major considerations.

To meet Good Practice, you need to achieve the conditions in the following checklist.

Further information on vegetable washwater systems can be found in Vegetable Washwater – Literature and Council Policy Review (Barber, Wharfe and Hodgson, 2017), available from HortNZ.

Always aim to improve the environment through Good Practice, rather than just achieving council compliance.



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2) Good practice standards and methods

Good Practice – All systems		
Standard	**How achieved**	✓ ✗
Reduce discharge volumes		
Use best practicable methods to reduce the volume of water being discharged.	This includes minimising soil on the harvested produce, monitoring and tracking water use, leak detection, and nozzles attached to end of hoses rather than the tap end. Where possible reuse in a continuous recycling system using filtered and disinfected water.	
Use of sanitisers		
Any sanitisers used in the washing process must have HSNO approval.	Follow the label recommendations, and meet NZS 8409:2004 Management of Agrichemicals.	
Application to land (infiltration or irrigation)		
Remove organic matter from the discharge water.	Reject crop disposal practices, filter.	
Pre-treat discharge water with a sediment trap.	Ensure sediment trap is operating to minimise sediment load and clogging.	
No discharges into surface water from runoff can occur.	The land application system must be setup to ensure that discharged washwater is applied in a way that does not result in runoff to waterways or artificial water courses.	
There is no application within 20m of the landholding boundary, lake, river, modified watercourse, artificial watercourse, ephemeral waterway, the coastal marine area, or natural wetland.	Ensure adequate buffer areas are established.	
There is no application within 20m of residential dwellings.	Ensure adequate buffer areas are established.	
There is no application within 250m of a drinking water supply site.	Ensure adequate buffer areas are established.	
There is adequate storage volume (m^3) for improving water quality or delayed irrigation.	See the storage calculations at the end of this COP.	

Good Practice – Soil-Aquifer Treatment system (SAT) - infiltration bed		
Standard	**How achieved**	✓ ✗
Soil-Aquifer Treatment system (SAT) - Infiltration bed		
Levels of nitrogen concentrations in the final discharge water are less than the receiving environment[1].	Undertake methods to reduce the nitrogen concentrations. See the following Discharge Decision Tree. Test to ensure that the nitrogen levels at the outlet are less than the receiving environment.	
Recordkeeping for evidence of Good Practice		
Record and monitor the discharge system including volumes and concentrations; retain records.	Put in place a monitoring and recording system to track that there are no negative impacts on the receiving environment.	

1. Sediment and phosphorus concentrations are not normally a constraint as there is > 98% removal in the top 1m of soil.

Good Practice – Irrigated land application		
Standard	**How achieved**	✓ ✗
Irrigated land application - Infrastructure and maintenance		
All vegetable washwater discharge is fully contained within the system (pipe work, sumps, and ponds) prior to land application.	Ensure that there are no leaks in the system.	
There are no leaks or discharges to water or land from the storage structure.	This means all storage ponds must be adequately lined.	
The storage system for discharged washwater must have sufficient capacity to store water when soil conditions are unsuitable for application (saturated).	The volume of storage required will vary depending on the volumes discharged in winter, and the soil type. See the storage calculations at the end of this COP.	
Application - Getting the right amount of discharged washwater on the soil at the right time and in the right place		
Application does not occur when soils are saturated and do not have the capacity to fully absorb the discharged washwater.	The guidance is that soils must have greater than a 10mm soil moisture deficit in the top 300mm of soil.	
The application area is large enough to prevent the soils from becoming saturated or exceeding a nitrogen application rate of 150 kgN/ha/year (note water not nitrogen is normally the area determining factor).	See the following Discharge Decision Tree for an example of the required application area.	

Good Practice – Irrigated land application		
Standard	**How achieved**	✓ ✗
Recordkeeping for evidence of Good Practice		
Have a property map.	A property map with the size and unique code of each paddock used for applying washwater.	
Record the soil moisture level.	Soil moisture probes (see possible examples below), physical soil checks and rainfall records can be used to show that irrigation occurred when the soil had adequate capacity for the volume of washwater applied.	
Record irrigation practices.	The date, soil moisture level, field code, area irrigated, and total volume of washwater applied is recorded.	

Topography, rainfall, soil moisture, soil type and drainage all influence the risk of runoff and ponding. Therefore, the soil moisture at the time of irrigation must be checked to ensure there is adequate capacity in the soil to accept the discharged washwater. Good practice is to walk over the irrigation area prior to each application event to check soil moisture conditions. Soil moisture can be checked using soil moisture probes or records of evapotranspiration, rainfall and irrigation events. As a general guide between May and August do not apply irrigation unless there has been 10 days without rain (<2mm).

Five key elements of successful land application systems	✓ ✗
Have sufficient winter storage.	
Know the soil moisture to determine when and how much to irrigate.	
Know and track water volumes and nitrogen application rates.	
Ensure even irrigation.	
Keep a record of your activities and prevailing conditions.	

Possible soil moisture probes:	
	
Quick Draw Tensiometers Approximately $975	**Hand-held time-domain reflectometer (TDR)** Approximately $1,300 - $1,900

3) Vegetable Washwater Discharge Decision Tree

Calculate the volume and key characteristics of the pre-treated discharge.

NEXT

Investigate influent cleaning options:

- Filter organic matter
- Storage (detention time, volatilisation)
- Denitrification / filter beds (carbon source)
- Wetland

Reference values	Influent	After more than 1-month storage
Discharged water (m^3/t)	1.0 – 2.5	-
Sediment (g/m^3)	2,000	70
Nitrogen (g/m^3, ppm)	25	8
E. coli (cfu/100ml)	0.6	-

Can nitrogen concentrations be reduced to less than the receiving environment?

YES → Consider a soil-aquifer treatment system (SAT) using an infiltration bed or application to land without ponding and runoff.

NO

Is irrigating to unsaturated land an option?

NO → Other options include:

- More intensive water treatment (e.g. membrane reactor) followed by SAT
- Collect and supply to a neighbouring landowner with land for irrigation
- Truck it away
- Connect to a sewer – consent may be required
- Obtain a consent to discharge to water

YES

Calculate the irrigation area needed.

NEXT

Calculate the storage volume needed.

NEXT

Processing 2,500 tonnes per year (5,000 m^3)	Disposal area (ha)
Water limit @ 200mm/year	2.5
Nitrogen limit @ 150kgN/ha/year	0.3

NEXT

How will you manage the land application?

Sufficient storage is crucial. You may need 3 months or more storage, at winter discharge rates. Irrigation triggered at 5mm soil moisture deficit.
See the Permitted Activity Rules and Storage document for your regional requirements.

Processing over winter – 600 tonnes (20 m^3/day = 1,200 m^3)	Winter storage 3 months (m^3)
Covered storage	< 1,200
Uncovered storage	2,000

NEXT

Do you meet the permitted activity conditions in the Regional Plan?

NO → Apply for a resource consent.

YES

Apply discharged washwater to land using good management practices, including keeping records to show how conditions are being met.

Refer to Irrigation NZ guidelines

See the document:
Vegetable Washwater COP – Regional Requirements