

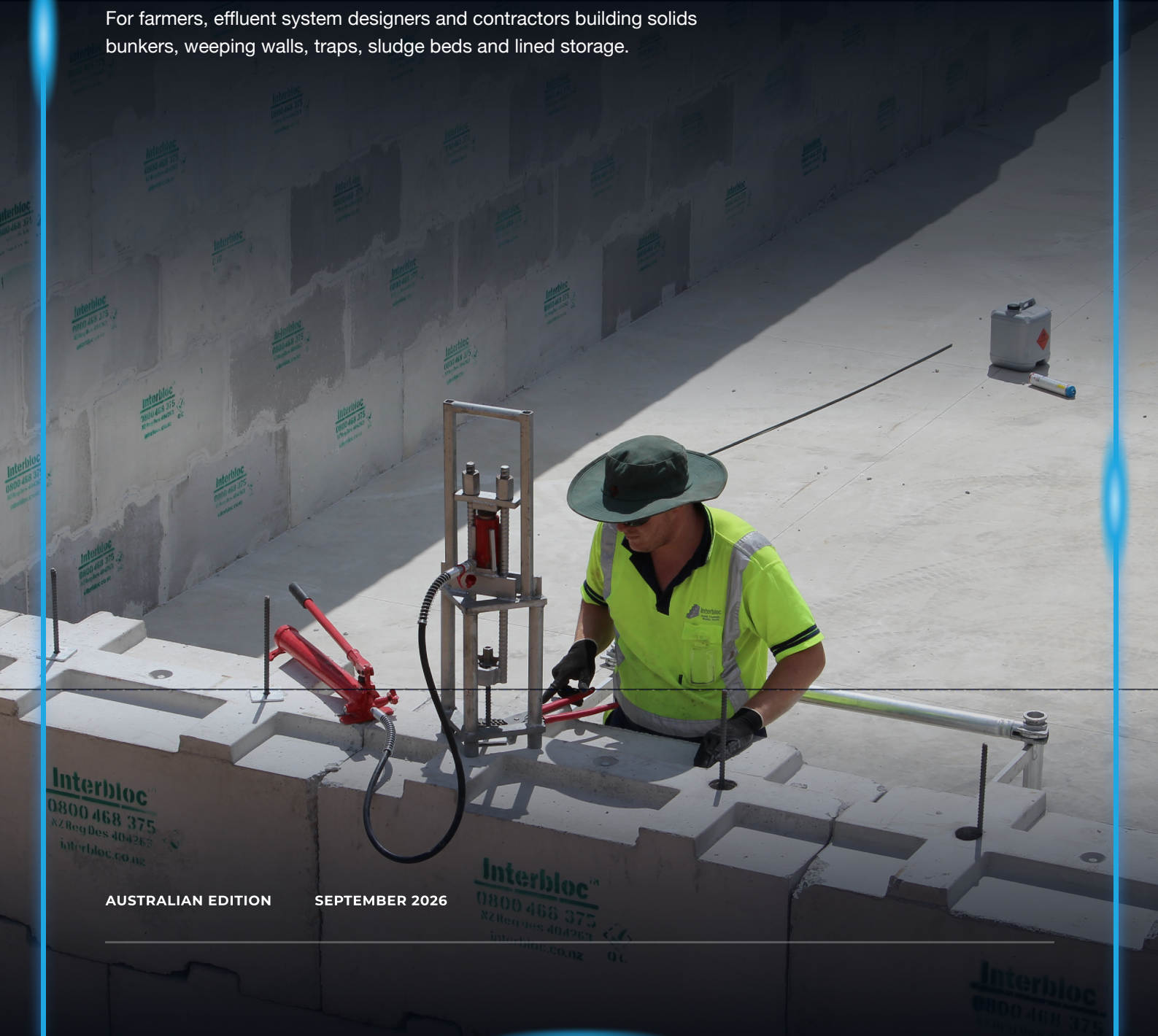
ENVIROCON® DAIRY EFFLUENT DESIGN

INTERBLOC®

DAIRY EFFLUENT GUIDE

A DESIGN AND APPLICATION GUIDE FOR DAIRY EFFLUENT MANAGEMENT

For farmers, effluent system designers and contractors building solids bunkers, weeping walls, traps, sludge beds and lined storage.



01 INTRODUCTION

WHY THIS GUIDE, AND WHERE INTERBLOC® FITS

1.1 WHY THIS GUIDE

A dairy cow produces between 50 and 70 litres of effluent a day at the shed.¹ For a 400 cow herd that is around 24,000 litres every day, or a 25 metre swimming pool every two and a half weeks. All of it has to be captured, held, separated and returned to land without reaching a waterway or the water table.

The rules are tightening. Regulators and dairy processors now expect sealed storage, separated solids on an impermeable surface, and enough capacity to hold effluent through the wet season. In Western Australia the Code of Practice sets those expectations out plainly, and local governments use it to assess new and upgraded dairies.^{11, 12}

Most of the structures involved are walls. Walls around a solids bunker. Walls either side of a weeping wall. Walls that form a stone trap, a sump, a sludge bed or a storage pond. Those walls are usually poured in place, which means formwork, curing time, and a structure that can never be moved or extended.

Interbloc® gives you an engineered wall that goes up in a day and can be changed later.

This guide sets out where Interbloc® fits in a dairy effluent system, how to design it properly, how it lines up with the standards and rules that apply, and what we have built before. It is written for farmers, effluent system designers and contractors. Where the detail is technical, it is exact.

1.2 WHERE INTERBLOC® FITS IN AN EFFLUENT SYSTEM

Interbloc® is a precast concrete block system. Each standard block is 1200mm long, 600mm wide and 600mm high and weighs about one tonne. Blocks interlock through a cast shear key and stack into gravity walls. Vertical ducts take reinforcing bar when the wall needs it. Flat top, flat bottom, 1800mm and 600mm units finish corners and top courses.

The block is the wall. The floor, liner, pipework, pumps and screens belong to the system designer and your contractors. That split matters, because it lets the wall go in fast without changing how the rest of the system is engineered.

01 INTRODUCTION

INTERBLOC® FOR DAIRY EFFLUENT MANAGEMENT

1.3 APPLICATIONS

APPLICATION	WHAT IT DOES	HOW INTERBLOC® IS USED	TYPICAL WALL
Solids bunker or dry effluent storage	Holds separated solids or scraped manure until it can be spread. Keeps it dry and off the ground.	Three sided bunker on a falling slab. Blocks sealed with expansion foam. Optional sliding roof on flat top blocks.	1.8m, three courses
Weeping wall bunker	Passive solids separation. Effluent enters a bunker, liquid drains through a slotted screen to a sump, solids stay behind and dry.	Blocks form the three solid walls and the dividing wall between paired bunkers. The slotted weeping wall screen is fixed across the open end.	1.8m to 2.4m, three to four courses
Stone trap, sand trap and sump surround	Drops stones, sand and grit out of the effluent stream before pumps and irrigators.	Short block walls form the trap and protect the sump. Base course sealed to the slab with polyurethane sealant.	0.6m to 1.2m
Sludge bed and drying pad	Dewaters pond sludge or separated solids on a drained pad.	Low block walls contain the bed. Drainage runs back to the effluent system.	0.6m to 1.2m
Lined storage or settling pond	Holds liquid effluent through wet periods, or settles solids from a high volume stream.	Vertical block walls on an engineered slab with a geomembrane liner or shotcrete finish inside. Walls reinforced through the ducts.	1.2m to 2.4m
Feed pad, stand off pad and silage bund	Keeps feed leachate and pad run off inside the effluent catchment.	Block bund walls around the pad edge, sealed and drained to the effluent system.	0.6m to 1.8m

PAIRED BUNKERS

Two bunkers side by side is the usual weeping wall layout.⁵ One fills while the other dries and is emptied. A shared centre wall in Interbloc® is tied with fixing kits so both sides can be worked independently.

02 BEST PRACTICE DESIGN

GET THE SLAB RIGHT, SEAL FOR THE DUTY, SIZE WITH YOUR DESIGNER

A block wall is only as good as what it sits on and how it is sealed. Every job we have built since 2011 has taught us the same three lessons: get the slab right, choose the seal for the duty, and keep the effluent system design with the person qualified to do it.

2.1 THE SLAB

The customer or their concreter pours the slab to our specification. Our standard for effluent and feed structures:

- Minimum 150mm thick, 30 MPa concrete. Effluent and silage leachate are acidic and wear softer concrete.¹⁰
- Thickened to 300mm under the block walls, with 2 x N16 bars and SL72 mesh through the thickening. Without this the slab cracks along the line of the wall within a season.^{8, 10}
- A fall of 1:50 towards a drainage point so liquid runs back into the effluent system, never off the pad.
- Sub base of compacted hardfill over stripped ground. Soft spots dug out and replaced.
- Allow 5mm between blocks when setting out the slab dimensions.

2.2 SEALING FOR THE DUTY

The seal you choose depends on what the structure holds.

DUTY	SEAL	NOTES
Solids storage, weather tight	Expansion foam in every joint inside and out, trimmed flush	Standard for solids bunkers, dry effluent storage and feed bins. Stops rain and air getting to stored material. Not a liquid seal.
Splash and low head liquid	Polyurethane sealant bead under the base course and over joints	Used on stone traps, sumps and bund walls. Applied to a dry, clean slab, one block at a time.
Liquid retention	Geomembrane liner (HDPE or VLDPE) or shotcrete over the inside face	Required for storage and settling ponds. Concrete liners need a geotextile or synthetic liner beneath them. ¹ The liner is specified by the system designer.

NOTE

02 BEST PRACTICE DESIGN

INTERBLOC® FOR DAIRY EFFLUENT MANAGEMENT

2.3 SIZING

Storage volume should be sized by your effluent system designer using a water balance for your herd, rainfall and soil. As a guide, solids traps sized for a 30 day cleaning cycle run from about 8 cubic metres for 100 cows to 36 cubic metres for 500 cows.⁴ Allow freeboard of at least 0.5 metres on any liquid storage.¹

Blocks make sizing simple. A wall is built in 600mm steps of height and 1200mm steps of length, so the designer's volume converts straight into a block count and a laying plan. If the herd grows, the bunker grows with it.



2.4 WALLS, REINFORCING AND ACCESS

- Walls to 1.8 metres are gravity walls. Above that, or where a wall is loaded from one side only, we reinforce through the vertical ducts or specify earth backfill.
- Weeping wall screens are typically slats with a 6mm to 25mm gap, fixed to a frame across the open end of the bunker. Ramps into trafficable bunkers should be graded around 1 in 10.^{4, 5}
- Every structure comes with an engineered wall design and a block by block laying plan.

2.5 WHO DESIGNS WHAT

The effluent system is designed by a nationally accredited effluent system designer, who sets the storage volume, the liner, the falls, the setbacks and the pipework. Envirocon® designs the wall to carry the loads that system puts on it, supplies the blocks, and installs or supervises installation. We work directly with your designer so nothing falls between the two.

03 MEETING AUSTRALIAN REQUIREMENTS

REGULATED STATE BY STATE, UNDER ENVIRONMENTAL PROTECTION LEGISLATION

Dairy effluent in Australia is regulated state by state, under environmental protection legislation, with industry codes of practice setting the standard regulators and processors expect. Every state carries the same core obligations: contain all effluent, keep it out of surface water and groundwater, reuse it on land without overloading nutrients, and keep odour inside the boundary.¹⁴

3.1 WESTERN AUSTRALIA

REFERENCE	WHAT IT REQUIRES	HOW AN INTERBLOC® STRUCTURE ALIGNS
Code of Practice for Dairy Farm Effluent Management WA (Western Dairy and DWER, 2021)	All storage sealed or lined. Solids separated and stockpiled on an impermeable surface draining back to the system. Storage sized to hold effluent through the wet period. 1m separation to the water table. Setbacks of 100m from waterways and wetlands, 300m from neighbouring residences, 500m from residential areas and 50m from boundaries. No discharge to surface or groundwater. ¹¹	Sealed block bunkers on a drained slab for solids. Lined block walls for liquid storage. Setbacks and sizing set by the accredited designer.
Environmental Protection Act 1986 and Regulations	The Code is voluntary, but the Act applies wherever effluent causes environmental harm. ¹¹	A documented, engineered structure reduces the risk of a discharge event.
Local government development assessment (Western Dairy checklist)	Effluent system designs prepared by a nationally accredited effluent system designer, with an effluent management plan, for new and upgraded dairies. ¹²	Envirocon® wall design and laying plans form part of the designer's submission.
Healthy Estuaries WA (DWER)	State program supporting dairy effluent upgrades in estuary catchments. 31 farms upgraded systems between 2017 and 2021. ¹³	Fast installation suits funded upgrade programs with fixed delivery windows.

3.2 OTHER STATES

Victoria (Agriculture Victoria effluent guidelines and EPA Victoria general environmental duty), New South Wales (Department of Primary Industries Dairy Development and Environmental Guidelines), South Australia (EPA SA codes of practice), Tasmania (Tasmanian Dairy Industry Authority standards) and Queensland (Subtropical Dairy

natural resource management guidance). Dairy Australia's effluent compliance material links each of these.¹⁴ Our wall design is the same in every state. The system designer applies the local rules.

3.3 PLANNING AND PERMITS

Planning approval and building permits depend on height, location and use. We confirm what applies at design stage and provide structural documentation where it is needed.

04 WHY INTERBLOC® IS A CREDIBLE OPTION

WILL IT HOLD UP, WILL IT SEAL, AND WHAT IF THE FARM CHANGES

Concrete effluent structures have been poured in place for fifty years, and they work. The question a farmer or designer asks about a block system is fair: will it hold up, will it seal, and what happens if the farm changes? Here is the answer.

4.1 BUILT FOR IT SINCE 2011

Interbloc® effluent structures have been in service on New Zealand dairy farms since 2011, from a four course effluent bunker in the Manawatu to a dry effluent storage bunker on a Fonterra farm at Reporoa. The same block system built the settling ponds for the Waterview Connection, the largest roading project in New Zealand's history.^{6, 7, 8}

4.2 ENGINEERED AND CERTIFIED

Every block is cast from high quality, certified concrete batched by established ready mix suppliers, in steel moulds to a dimensional tolerance that lets walls stack true, with a certified lifting anchor in every unit. Walls are designed by engineers to the loads of your structure.

4.3 FAST

A three course farm bunker of around 70 blocks is installed in a day once the slab has cured. There is no formwork, no propping and no curing time for the walls. The structure is ready to load as soon as the seal has set.

4.4 BUILT TO CHANGE

Herds grow. Rules change. Effluent systems get upgraded. An Interbloc® wall is extended by adding blocks, raised by adding a course with reinforcing, or lifted out and rebuilt somewhere else. Nothing is demolished. The Waterview settling ponds were dismantled after the project and the blocks were reinstalled at another site within two weeks.⁶

4.5 LOWER CARBON, LESS WASTE

Interbloc® is made from excess ready mix concrete, high quality certified concrete that would otherwise set and be dumped. That gives the block very low embodied carbon compared with a poured wall, and at the end of its life it is reused, not broken up. Envirocon®'s CarbonSmart system covers accredited product stewardship, an environmental product declaration and the Interbloc® buyback guarantee.

4.6 BUYBACK GUARANTEE

If you no longer need the structure, Envirocon® buys the blocks back under the Interbloc® buyback guarantee. No other effluent wall carries a residual value.

05 CASE STUDIES

EFFLUENT AND WATER STRUCTURES BUILT SINCE 2011

5.1 FONTERRA FARM, REPOROA. DRY EFFLUENT STORAGE BUNKER, 2013

CLIENT Fonterra Ltd **STRUCTURE** 6m × 11.4m × 1.8m bunker, 123 m³ **BLOCKS** 73 **SOURCE** 7

Fonterra needed weather tight storage for dry effluent solids on a farm at Reporoa, on a fixed budget and a short programme. The site was ready for a slab and nothing else.

Interbloc® designed a three course bunker of 46 standard and 25 flat top Ag grade blocks with two 1800mm corner units, on a 7.2m by 15.3m slab with a 3m front apron falling to the front. Every joint was sealed with expansion foam inside and out. A custom Interbloc® sliding roof was fitted on the flat top course so the bunker could be covered and uncovered from the tractor seat.

Installation took a day. The bunker holds 123 cubic metres of solids, stays dry in Reporoa rain, and can be extended by adding blocks to the open end.

5.2 MANAWATU DAIRY FARM. EFFLUENT BUNKER, 2011

STRUCTURE 10.8m × 5.2m × 2.4m bunker, four courses **BLOCKS** 44 **SOURCE** 8

A Tangimoana farmer was building out feed and effluent infrastructure at the same time: two silage bunkers, a PKE bin and an effluent bunker. He wanted them all from one system so his loader could work all four and the walls could be reconfigured later.

The effluent bunker went up as a four course wall of 44 standard blocks to a full laying plan, on a slab poured by a local concreter to our thickened edge specification. The same job taught us the slab lesson that is now written into every specification we issue: thicken the edge under the wall, or the slab cracks along it.

5.3 FRANKLIN DAIRY FARM. EFFLUENT SOLIDS BIN DESIGN, 2013

STRUCTURE 68 block effluent bin replacing open drying beds **SOURCE** 9

A Franklin farmer was drying effluent solids on open sawdust beds between post and rail fences, in the weather, with no containment. He asked for a solids bin that his existing gear could load and empty.

Interbloc® designed a 66 block three course bin with two 1800mm corner units, with the slab, freight and installation in one quote. The design shows what the block system does for a small farm: a contained, drained solids store designed and priced in a week, on a footprint the farmer chose.

05 CASE STUDIES

INTERBLOC® FOR DAIRY EFFLUENT MANAGEMENT

5.4 WATERVIEW CONNECTION, AUCKLAND. SETTLING PONDS, 2014

CLIENT Well-Connected Alliance (McConnell Dowell)

STRUCTURE Two bay settling pond, 130 lineal metres of wall, 1.8m high

BLOCKS 378

SOURCE 6

Tunnelling for the Waterview Connection, New Zealand's largest roading project, produced large volumes of water that had to be held and treated on site. The alliance needed a settling pond in weeks, and needed it gone again at the end of the job.

Interbloc® supplied and installed 369 standard and 9 1800mm blocks as vertically reinforced walls, with a shotcrete finish inside for water retention. McConnell Dowell chose the system because the blocks could be removed at the end of the project, and used the Interbloc® buyback guarantee to do it. Within two weeks of decommissioning the blocks were transported and reinstalled as storage at another site.

WHY IT MATTERS FOR DAIRY

The Waterview ponds are not a dairy job, but they are proof at scale that a lined Interbloc® wall holds water, and that the structure can be taken away without demolition when it has done its work.

06 HOW WE WORK WITH YOU

FROM FIRST SKETCH TO HANDOVER

01 TELL US ABOUT THE FARM

Herd size, what the structure is for, where it will sit and who your effluent system designer is. A sketch or a designer's drawing is enough to start.

02 WE WORK WITH YOUR DESIGNER

We take the volumes, falls and liner requirements from the system design and turn them into a wall design.

03 YOU RECEIVE A WALL DESIGN AND LAYING PLAN

Block schedule, reinforcing, sealing method and a slab specification your concreter can pour to.

04 SLAB IS POURED AND CURED

We inspect it before the blocks arrive.

05 BLOCKS ARE DELIVERED AND INSTALLED

Most farm structures are installed and sealed in a day.

06 HANDOVER

As built laying plan, installation record and the Interbloc® buyback guarantee, ready for your designer's documentation and your local government and state regulator.

SEND US YOUR HERD SIZE AND A ROUGH SITE PLAN

Or put us in touch with your effluent system designer. We will come back with a wall design and a block count, and tell you plainly where Interbloc® fits your system and where it does not.

WEB

envirocon.net.au

PHONE

1800 834 486

Manufactured in Melbourne and Perth through Envirocon® licensed producers from excess ready mix concrete.

APPENDIX: REFERENCES

Numbered references in the text point to the sources below. Envirocon® project records are held on file and can be provided to your designer on request. Standards, codes and council rules change. Confirm the current version with your local government and state regulator and your effluent system designer before relying on any figure in this guide.

- 1** Institution of Professional Engineers New Zealand (IPENZ), with DairyNZ. Practice Note 21: Farm Dairy Effluent Ponds, Version 3, August 2017.
<https://www.dairynz.co.nz/media/sr2aifz3/ipenz-practice-note-21-farm-dairy-effluent-ponds.pdf>
- 2** DairyNZ. A farmer's guide to building a new effluent storage pond.
https://www.dairynz.co.nz/media/nexhmql/a_farmers_guide_to_building_a_new_effluent_storage_pond_web_dnz40_119.pdf
- 3** DairyNZ and IPENZ. Farm Dairy Effluent Design Standards and Design Code of Practice. Designing or upgrading effluent systems.
<https://www.dairynz.co.nz/environment/effluent/effluent-system-design-or-upgrade/>
- 4** Agriculture Victoria. Designing a trafficable solids trap.
<https://agriculture.vic.gov.au/livestock-and-animals/dairy/managing-effluent/designing-a-trafficable-solids-trap>
- 5** Dairy News (Rural News Group). Weeping wall effective, light on energy.
<https://www.ruralnewsgroup.co.nz/dairy-news/dairy-management/weeping-wall-effective-light-on-energy>
- 6** Envirocon®. Well Connected Alliance, Waterview Connection settling ponds. Case study.
<https://www.envirocon.net.au/well-connected/>
- 7** Interbloc Ltd. Contract of Works, Custom Effluent Bin, Fonterra Ltd, 3083 State Highway 5, Reporoa. Quote 1082, drawing Dry Effluent Bunker Rev 2, July 2013. Envirocon® project records.
- 8** Interbloc Ltd. Drawing 523R1, Effluent Bunker, Rosina Road, Tangimoana, and installation laying plan, April 2012. Envirocon® project records.
- 9** Interbloc Ltd. Quotation 0940 and Effluent Bin v1.2 design drawings, May 2013. Envirocon® project records.
- 10** Interbloc Ltd. Interbloc Rural Partners Operations Manual, Part Five: Installation Guidelines, January 2015.
- 11** Western Dairy and Department of Water and Environmental Regulation. Code of Practice for Dairy Farm Effluent Management WA, 2021.
<https://www.wa.gov.au/government/publications/code-of-practice-dairy-farm-effluent-management-wa>
- 12** Western Dairy. Dairy Effluent Management Systems: Guidelines and Checklist for Local Government Assessment.
<https://westerndairy.com.au/wp-content/uploads/2025/09/LGA-Checklist-Guidelines-for-Dairy-Effluent-Managment.pdf>
- 13** Department of Water and Environmental Regulation, Healthy Estuaries WA. Clear standards for dairy effluent, July 2021.

- 14** Dairy Australia. Effluent compliance: state guidelines and obligations.
<https://www.dairyaustralia.com.au/en/soils-and-water/effluent-management/effluent-compliance>
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