

Stand-off pads

Your essential guide to planning, design and management





Ministry for Primary Industries
Manatū Ahu Matua



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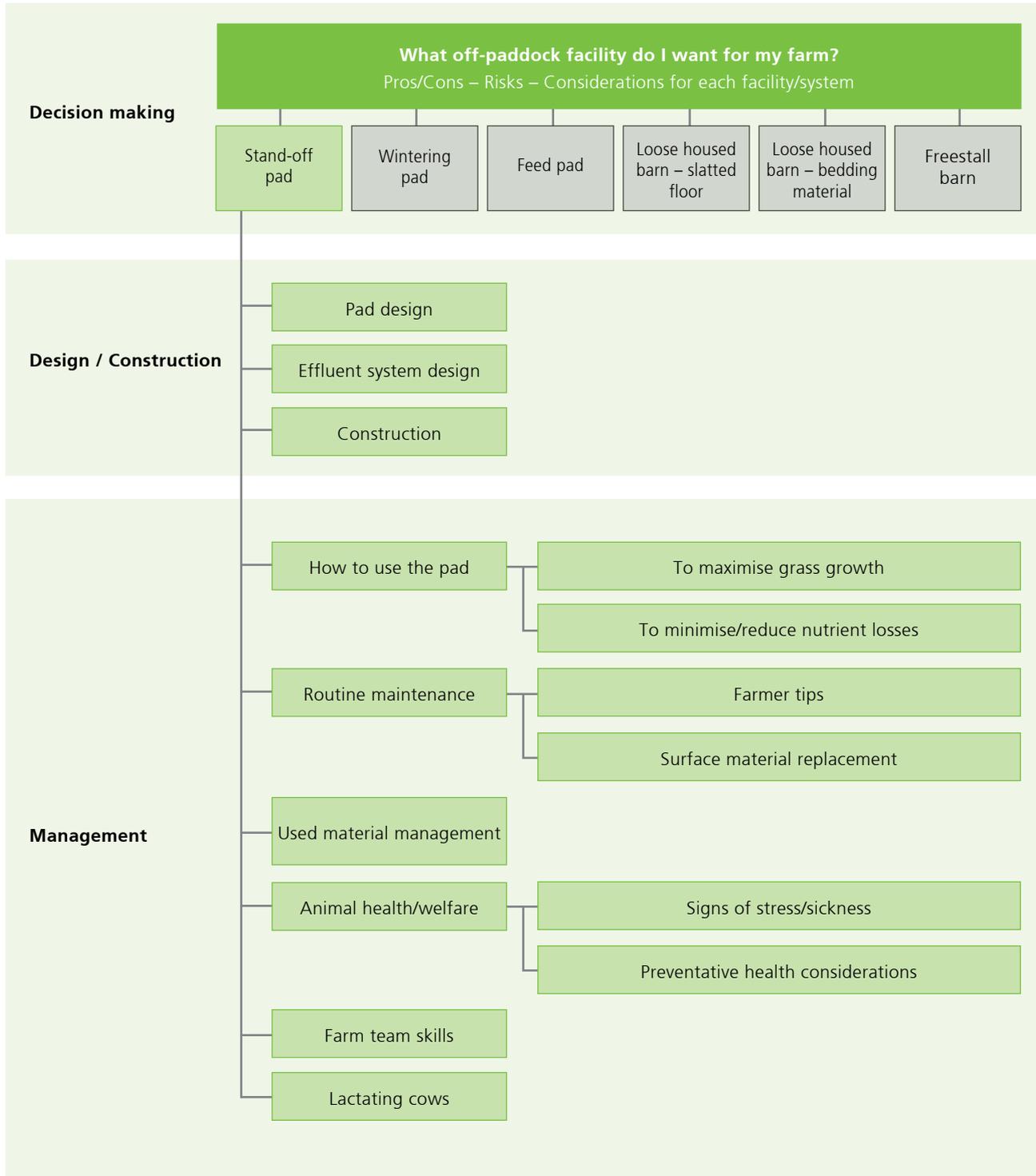
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Is this book for you?

If you are thinking about building or upgrading a stand-off pad or looking for information to manage your pad, then this booklet is for you! It gives you options and tips for adding a pad into your farming operation. It covers planning and decision making, design, construction, management and maintenance to help you get the most out of your stand-off facility.

Here's an overview of what this booklet covers:



Section 1:

Making a decision



Is a stand-off pad the right option?

If you're thinking about investing in a stand-off pad, you need to have thought about what the limiting factors are on your farm and how a pad will improve your operation. Refer to the DairyNZ resource *Investing in off-paddock facilities, making an informed decision*; which assesses each of the benefits of keeping cows off paddock. If you are considering a stand-off for wintering cows make sure you have thought through alternative wintering system options and assessed the pros and cons and risks associated with each system. Go through the DairyNZ "Reviewing your wintering system" booklet to help determine which system will suit you best. You can find both resources on www.dairynz.co.nz

What will be the result of putting a stand-off pad into your farm system? How will the change affect the risks your farm business is exposed to? What additional skills or knowledge do you and your team need to run this system effectively?

QUICK CHECK: Answer the following questions to see if a stand-off pad may benefit your farm.

Do you have problems with ...	Tick if YES ✓
Soil structure problems or pugging of paddocks	
Pasture damage due to wet conditions	
Slow pasture re-growth after winter and spring grazings	
Having to renew pastures more frequently than you would like to	
Damaging laneways from standing cows on them	
Problems with lameness and mastitis during/ following wet periods	
Concerns due to your current wet weather practices, such as standing cows off on the yard or laneways for long periods	
Managing nutrient loss from your property	

Have you ticked YES to any of the above boxes?

YES

NO

A stand-off pad may add value to your farm system.

A stand-off pad may not add value to your farm system. Reconsider why you want a stand-off pad. An alternative solution or off-paddock facility may suit you better.

Do you want to feed cows while off-paddock?

NO

YES

A stand-off pad may be a suitable option.

A stand-off pad does not have feeding facilities. You should consider an alternative off-paddock facility/system. To work out which facility/system is most suitable, read the DairyNZ *Reviewing your wintering system* booklet and Good Practice Guide to Housed Cows (dairynz.co.nz)

The five key benefits of a stand-off pad

1. Protecting pasture and soil

The primary purpose of most stand-off pads is to protect soils and pastures. Cows standing on wet paddocks causes damage. This can reduce pasture production for several months afterwards and as a result lower milk production.

RESEARCH SNAPSHOT

Impact of pugging on pasture production

Studies have shown that soil treading and compaction from just one pugging event over winter halved pasture production over a period of seven weeks (Figure 1). Similar results have been measured on many different soil types around NZ.

Approximately 40% of the ground was bare after moderate treading in winter and pasture growth took two months to recover during which time growth fell by 600 kg DM/ha. The same study showed that one month after a treading event, N fixation from clover was still reduced by 60% where treading was moderate and 80% where treading was severe (Figure 2).

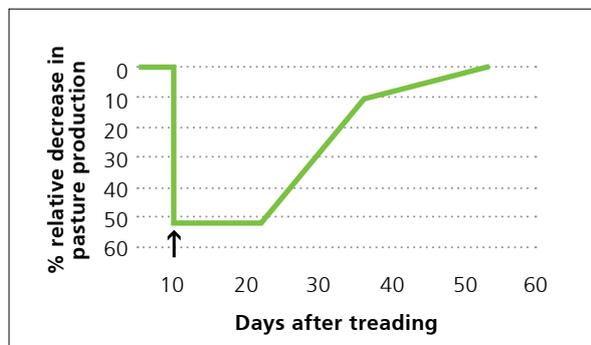


Figure 1: Impact of treading on pasture production

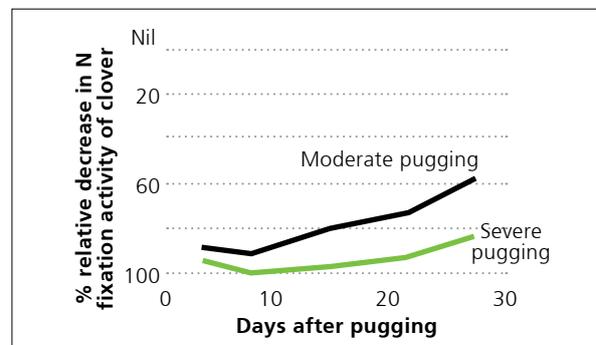


Figure 2: Impact of pugging on N fixation

2. Managing nutrients

Losing nitrogen from the farm system via leaching and run-off is a concern when wintering cows on pasture or crop. Stand-off pads offer an option to reduce nitrogen loss: by taking cows off the paddock you stop the deposition of urine patches, and therefore the risk of nitrogen moving downwards through the wet soil. Instead, the nutrients are captured in a specifically designed storage facility, and can be applied at a suitable time, depth, rate and location.

3. Holding cows off paddocks for long periods of time

Cows need to lie down for at least eight hours every day. To do this there must be enough space and the surface must be comfortable. If the surface is too wet or slippery and/or the area available to the cows too small they will not lie down. This will result in tired animals with sore legs and feet. When they return to the paddock, they will prefer to lie down and rest rather than eat.

4. Managing pasture proactively

Stand-off pads can be used as a proactive tool for pasture management, to maximise pasture production in the early months of lactation. For some farmers this means that for a set period of time every year regardless of the weather, cows are moved to the stand-off pad and an on-off grazing system is operated. For example dry cows between 15 May and 15 September, spend 20 hours on the pad and 4 hours grazing.

RESEARCH SNAPSHOT

Stand-off pad maintenance affects cow lying times

Research looked at cow lying times on stand-off pads and in the paddock. The graphs show when cows had about 18 hours on a pad and 6 hours grazing.

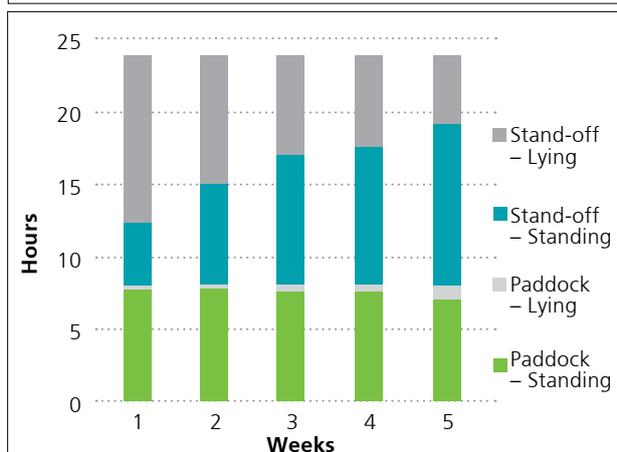
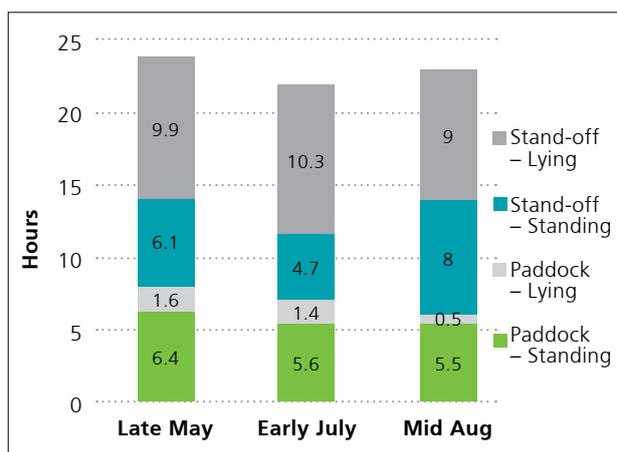
When a pad is well maintained, cows have high lying times throughout winter.

In a Northland study the surface materials were regularly topped up. Cows spent most of their time on the stand-off pad lying down (9-10 hours per day), and spent their time in the paddock eating and not lying down. This situation is the ideal pattern, resulting in high lying times on the pad throughout the winter period.

When a pad is not well maintained, cows lying times and welfare will be compromised.

In a Waikato study where there was no bedding maintenance, lying times were initially good while the bedding was in good condition (11.5 h/day). However, after 5 weeks this declined to 5.6 h/day and more cows lay down, and for longer, when on the paddock. After only five weeks cow daily lying times were so low that welfare was compromised at both a herd and individual cow level.

Note: Where bars do not equal 24 hours, the remaining time was spent moving on races or in the shed.



5. Reducing stress for farmers

Knowing that cows are safe and securely held on a suitable pad provides peace of mind and can greatly reduce stress levels for the people working on farm during times of bad weather and calving.

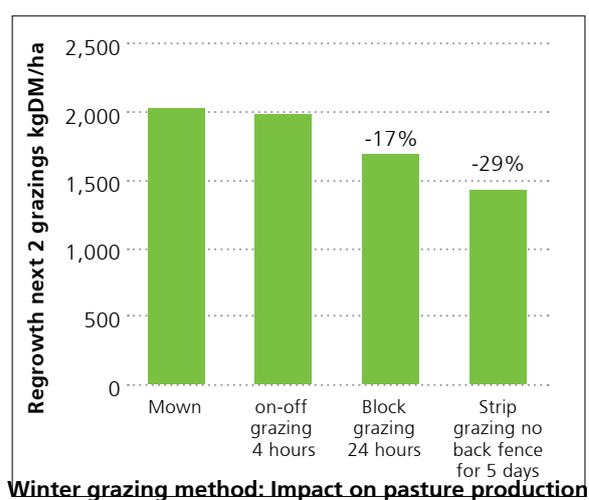
RESEARCH SNAPSHOT

Winter grazing method: impact on pasture production

Research in Taranaki compared winter grazing systems, illustrating the advantage of on-off grazing compared with 24 hour block grazing. Block grazing reduced pasture production by 15% over the next two grazings compared with on-off grazing.

This equates to about 305 kg DM/ha and has a value of \$91 if it has to be replaced at \$0.30/kgDM.

Reference: Thomson N A, Judd T G, Johnson R J. 1993. Winter grazing – Is There a Better Way? Dairy Farming Annual 45:78-82. Location: Taranaki Agricultural research Station, Normanby.



Winter grazing method: Impact on pasture production

Pros and cons of stand-off pads

While there are definite benefits to using a stand-off pad, like any change to a farm system, new issues and problems can come up. It is important that you consider the downsides and other changes that will need to happen as a result of building a stand-off pad.

Pros	Cons
<ul style="list-style-type: none"> • Less pugging of pasture 	<ul style="list-style-type: none"> • High initial capital cost
<ul style="list-style-type: none"> • More grass in spring compared to wintering on paddock 	<ul style="list-style-type: none"> • More time involved moving the herd between pasture and facility
<ul style="list-style-type: none"> • Less stressful for farmer during wet periods 	<ul style="list-style-type: none"> • Needs time and budget to regularly clean & maintain
<ul style="list-style-type: none"> • Ability to maintain rotation length 	<ul style="list-style-type: none"> • Reduced fertility levels on paddock, (as a percentage of effluent is captured on pad)
<ul style="list-style-type: none"> • Will help protect farm drainage work (i.e. integrity of subsoiling and moling) 	<ul style="list-style-type: none"> • Another effluent source to manage
<ul style="list-style-type: none"> • Reduce need for grazing off-farm 	<ul style="list-style-type: none"> • Availability and cost of surface material (e.g. sawdust, wood chip bedding)
<ul style="list-style-type: none"> • Provide a suitable clean area for calving; possible reduction in calf losses when calving on the pad (depending on stock density and the condition of the pad compared with the paddock; supervision is easier) 	<ul style="list-style-type: none"> • Increased risk of mastitis (increased cost for dry cow therapy / teat sealant)
<ul style="list-style-type: none"> • Transfer of herd urine to the pad from pasture. This is important when attempting to meet nutrient loss targets in sensitive catchments 	<ul style="list-style-type: none"> • Increased risk of lameness

Think about the following:

- How will you adjust your pasture management to maximise efficiency?
- How will a pad impact on your farm's profitability?
- How will building a pad impact on you and your staff's time?
- What will you use the pad for?
- How will you manage animal health on the pad?
- How will you manage cow comfort on the pad?
- Can you maintain the proposed system long term, e.g. material replacement etc.?
- Will a change in system align with your personal and family goals?
- How will the effluent system handle the increased effluent and storm water created from the pad?
- What new skills will you/your staff require to manage the pad?

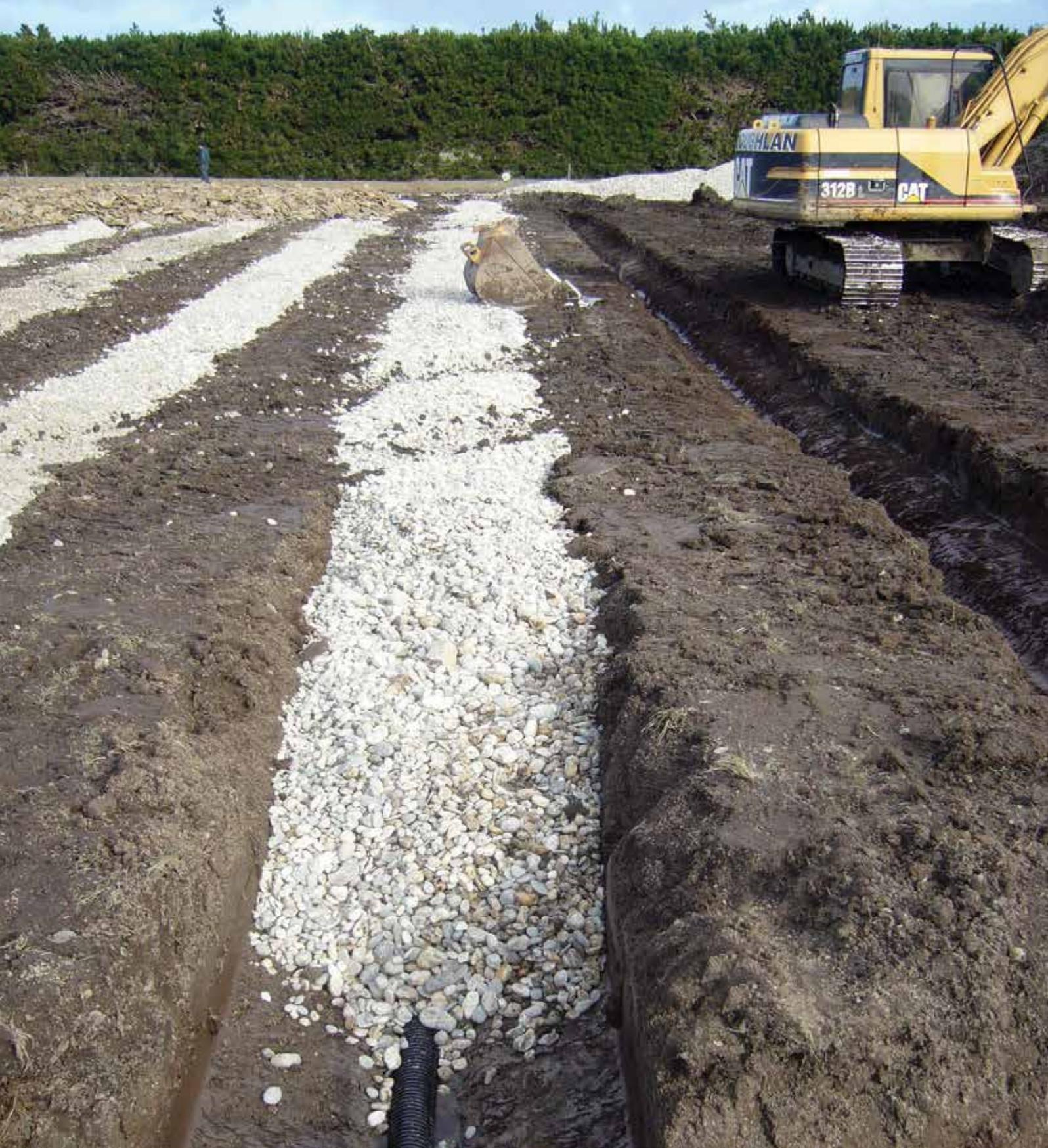
Risks for stand-off pad systems

All off-paddock systems and infrastructure have risks. It is important to identify these risks early and consider the best options to reduce the likelihood of them happening and the impact if they do.

	Risk	Factors to consider
Infrastructure	Public image	Keep pad well maintained, manage effluent well and address animal health issues promptly. Consider security and health and safety requirements such as a locked gate to the area around the pad.
	Cows breaking out	Good power on fences, monitor feeding levels
	Tree fall from shelter belts	Have a tree replacement / maintenance policy. Keep trees trimmed
	Effluent system /pump breakdown	Ensure all annual repairs and maintenance are complete. Have a backup system in place
	Inadequate or no access to yard/race/crush for handling animals that need individual treatment	Ensure adequate treatment and drafting facilities
	Effluent and moisture making pad too wet and dirty	Replace top layer with clean material from time to time. Ensure good drainage. Check drains in summer
	Drains block / not enough drainage	Correct size and depth of material over drains. Correct distance between drains. Care when cleaning off. Pads set up with ends of drains accessible to allow flushing if required. Check drain flow regularly
	Surface material not available	Forward purchase, relationship management. Shelter belt /tree stands on farm for renewable material
Animal health and welfare	Fail to identify and treat lameness and mastitis	Delayed identification and treatment will increase severity of the problems. Put in place routine checks for animal health. Check cows as they walk to and from the paddock for grazing
	Increased lameness and mastitis	Replace top layer with clean material regularly. Ensure good drainage. Check drains in summer. Teat seal dry cows
	Not enough space per cow to move freely and rest	Check area per cow table on page 11. Ensure correct stocking rates. Keep cows in similar groups for size and age. Remove cows that are not coping
	Lack of overall management plan and procedures	Have clear and agreed plan before pad use begins. Ensure staff know what outcomes are required from using the pad
	Infectious disease outbreak e.g. Salmonella	Lying surfaces that can remain dry, through good drainage and good management and are exposed to sunlight will reduce risk of bacteria borne outbreaks.
	Poor cow condition	Monitor condition and adjust daily allowance as required. Reallocate cows to mobs and feed appropriately
People	Insufficient skill level to manage / operate the system	Ensure sufficient training of staff prior to pad use. Good orientation plans for new staff
	Handling / driving machinery in wet weather, wet paddocks / surfaces	Train all staff who will be using machinery
Environment	Effluent not captured and contained	Ensure all drains are linked to effluent system, bund edges of pad
	Not enough liquid storage	Increase storage capacity to provide more flexibility so effluent can be applied when soil conditions are appropriate
	Not enough solids storage	Have a large enough contained sealed area to store solids until they can be applied when conditions allow
	Effluent application to wet soils	Increase storage. Applying to wet soils at low temperatures will mean less nutrient uptake by the plant and more nutrient loss by leaching and runoff
	Odour	Locate stand-off pad well away from property boundaries and residential dwellings. Keep up routine maintenance
Financial	Fines for regulatory non-compliance, e.g. if effluent enters waterways through drains or runoff	Ensure all people understand and put in place best practice for managing effluent. Ensure that any required resource consents or other requirements are in place. Check requirements with your regional council.
	Bedding surface material costs too high	Long term plan required, work out what costs are feasible

Section 2:

Design and construction



Design and construction

The size and complexity of your pad depends on you and your operation. A pad needs to be effective, appropriate for your herd and your management goals, well managed and maintained. Designing a stand-off pad may seem relatively simple; there are a number of things that are critical to the long term effectiveness of the pad and the wellbeing of your cows. These areas will each be discussed in this section.

How to select the best site

Factors to consider in site selection are:

Proximity to water	<ul style="list-style-type: none"> • At least 50 m away from drinking water supply, waterbody, drain, spring, wetland, well or borehole • Not over laying permeable soil in a sensitive groundwater zone • Check with your local regional council for specific regulations
Land features	<ul style="list-style-type: none"> • A gently sloping site with 2-4% slope is ideal • Avoid sites where water from higher areas may drain to the site • Ideally locate pad so effluent can gravity feed to pond rather than require pumping
Drainage	<ul style="list-style-type: none"> • No flood risk • Avoid high water table areas or peaty soils • Avoid previously artificially drained (mole and tile drain) areas
Aspect	<ul style="list-style-type: none"> • Use existing shelter or vegetation to provide shelter from the prevailing wind if possible. However ensure it is not too shaded as this can make drying the surface difficult
Infrastructure	<ul style="list-style-type: none"> • Proximity to dairy (no closer than 40m) • Access to existing site services (water, power, effluent systems) • Easy access for stock and vehicles, and for vehicles to turn easily • Ease of cow flow and cow management (especially if calving on pad) • Proximity to feed stores • Room for future expansion • Well away from residential housing, neighbours or property boundaries <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>FARMER TIP: "Having the pad central to the farm and near the shed and other facilities is a huge benefit."</p> </div>
Effluent	<ul style="list-style-type: none"> • Try to locate your stand-off pad so that collected effluent can easily be added to the existing system • Consider if you build your pad higher than the effluent system you can gravity feed effluent, otherwise you will need a sump and pump • Is your current effluent storage large enough to cope with the addition of the the extra effluent from the stand off pad. Are there any resource consenting requirements relating to the additional input to the effluent system?

How will you use the pad?

It is important to have a clear idea of how many cows will be stood off, how often and for how long. These factors help determine the most appropriate surface type and the size of the pad. If the surface type and area per cow are not suitable for the frequency of use and time on surface, cows are likely to suffer discomfort. By following some simple guidelines for pad size and surface type you can ensure that your cows are kept healthy and content.

Pad size

The main factor overriding all others is the cows' ability to lie down. Cows need to lie down for at least eight hours a day.

- The area provided per cow during standing-off will affect the animals' comfort levels and their ability to lie down.
- The area per cow depends on the size of the cows and the length of time cows will spend in the facility.
- Good practice guidance in this area is shown in the table below. Use the stand-off pad tipping point online calculator to look at what size pad you need for your herd size in your region.

The following table indicates the minimum area required per cow:

	Short term Up to 12 hrs / day (up to 2 days in a row)	Medium – Long term + 12hrs / day, (3 or more days in a row)	Wintering Pad No on-off grazing (24/7 on pad)
Dry cows	3.5m ²	6-8m ²	9-11m ²

*These figures are based on a standard cross-bred size cow. Add an extra 1m² per cow if you have a larger cow.

Remember to allow for any likely herd size increases in the future. To help visualise the space, when cows stand in a yard before milking, they have about 1.0 – 1.5 m² each.

National regulations and regional council requirements

During the planning stage of your pad, it is important you understand the rules and regulations set nationally and by your regional council on stand-off pads. As well as national requirements under the National Environmental Standard for Freshwater Management all regional councils have different rules and regulations relating to stand-off pads. You may require resource consent.

Building a new stand-off pad using current best practice and appropriate effluent capture and management systems will help ensure you comply with requirements.

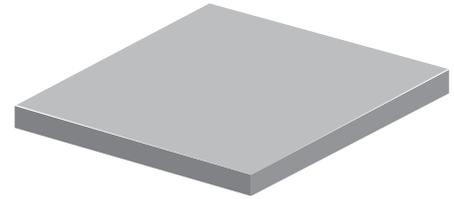
Consult your regional authority directly to get the most up-to-date requirements for your stand-off pad and to check whether resource consent is required.

Questions	Notes
What are the requirements for proximity to other features (e.g. waterways, drains, wetlands, bores)?	
What are the requirements for pad sealing and effluent capture/storage?	
Are there any other features for pad design and construction that I need to be aware of?	

Regional council contact information

North Island		South Island	
Northland Regional Council	0800 002 004	Environment Canterbury Regional Council	(03) 353 9007
Auckland Council	(09) 301 0101	Tasman District Council	(03) 543 8400
Environment Waikato	0800 800 401	Marlborough District Council	(03) 520 7400
Bay of Plenty Regional Council	0800 884 880	West Coast Regional Council	(03) 768 0466
Taranaki Regional Council	(06) 765 7127	Otago Regional Council	(03) 474 0827
Hawkes Bay Regional Council	(06) 835 9200	Environment Southland	0800 768 845

Horizons Regional Council	(06) 952 2800
Wellington Regional Council	0800 496 734
Gisborne District Council	06-867 2049
Nelson City Council	03-546 0200



Subsurface design and construction

Prepared base

It may be necessary to strip off all topsoil and soft materials before beginning work. This depends on the site. Some backfilling of suitable fill material may be necessary to lift the base of the structure above ground, especially if it is on a poorly drained site.

Water table	Build your pad above the highest annual water table.
Slope	Ensure a slope of at least 2% to allow adequate fall.

Subsurface hump and hollow drainage	Subsurface hump and hollow drainage works well combined with subsurface drains particularly on sites with little fall. Humps and hollow drainage should be 2.5 m apart and have 150 mm depth between top of hump to bottom of the hollow.
Liner protection	If using a synthetic liner, materials above and below the liner need to be properly selected and prepared otherwise there is a risk of puncturing. Check with the liner company if you need a geotextile to protect the liner.

Liners

It is recommended to lay a liner between the prepared base and the drainage coil to contain any effluent not collected in the drainage system. To meet the National Environmental Standard for Freshwater Management and good management practice (GMP) liners can be formed from geosynthetic membranes or concrete. Compacted clay is likely to require engineering assessment and reporting. Check with your regional council prior to considering compacted clay.

Options	Pros	Cons
Compacted clay	<ul style="list-style-type: none"> • May have suitable clay on site • Moderate cost 	<ul style="list-style-type: none"> • No longer considered best practice as does not clearly meet national requirements • Soils need to be laboratory tested and meet specific criteria • Needs technical expertise to compact clay correctly to achieve sealing requirement • Warranties may be more difficult to get • Can be costly if importing clay from off-site • Not favoured by all councils – you need to check • Not suitable for peat soils
Synthetic liners	<ul style="list-style-type: none"> • Good range of liners available • Good warranties available • Should meet national requirements for permeability 	<ul style="list-style-type: none"> • Moderate to high cost • Some variation in quality of synthetics on market • May be more expensive than compacted clay
Concrete	<ul style="list-style-type: none"> • Readily available • Should meet national requirements for permeability 	<ul style="list-style-type: none"> • High cost • May be more expensive than synthetic liner

Synthetic Liner product considerations

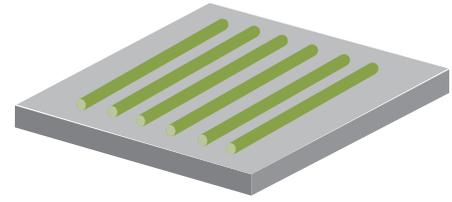
There are some very good lining options in the market, but there are also a number of cheap products advertised as liners that are not suitable for this purpose. It is recommended that a geomembrane polymer liner at least 1mm thick is used. A synthetic liner will be installed by the liner supplier. We suggest you ask liner suppliers these few key questions before finalising your decision:

Warranties	<ul style="list-style-type: none"> • What kind of warranty do they provide? (20 year period is recommended) • Are all joins leak tested? • Is the company likely to be around in future if a defect does occur?
Quality assurance	<ul style="list-style-type: none"> • What written quality assurance information will be provided for the installation of your effluent liner? • Are they prepared to give references for previous installations?
Independent testing of the liner	<ul style="list-style-type: none"> • Has the synthetic lining product been tested? • What are the attributes of the liner? Ask about: <ul style="list-style-type: none"> – Thickness (min of 1mm recommended) – Thermal stability – Flexibility – Elasticity – Tear strength – Environmental stress cracking – Resistance to puncture – Surface friction – Chemical resistance

If you want further information on synthetic liner product options refer to the Institute of Professional Engineers of New Zealand (IPENZ) Practice Note Part 3: Geomembranes (Synthetic Liners) Selection at www.dairynz.co.nz/effluent.

Drainage

IMPORTANT: Regardless of the liner you choose or surface material you plan to use it is absolutely critical to have good drainage in the pad. Poor drainage is the main reason farmers have bad experiences with stand-off pads. Poor drainage will lead to wet, uncomfortable conditions for cows, shorter lying times, higher maintenance and material replacement costs and more animal health problems.

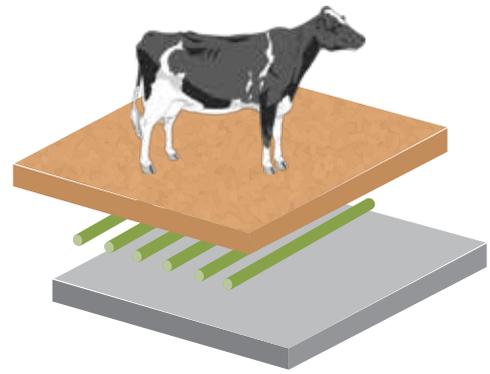


Drainage design considerations

Water table	Build your pad above the highest annual water table.
Drainage slope	Drainage pipes should be laid at a slope of at least 2% to allow adequate fall.
Subsurface hump and hollow drainage	Subsurface hump and hollow drainage works well combined with subsurface drains particularly on sites with little fall. Humps and hollow drainage should be 2.5m apart and have 150 mm depth between top of hump to bottom of the hollow.
Drainage coil	150mm drainage coil should be laid in the bottom of each hollow. Use smoothbore subsoil pipe, not corrugated & perforated drain coil which will crush under the heavy loads. The pipes also need to be encased in filter fabric to avoid a build-up of sediment in the pipes so they don't become blocked. Leave access to the top end of the drainage to allow flushing.
Drainage metal	Drainage coil should be covered by at least 100 – 350 mm of drainage metal.
Perimeter drainage channel	You should have a perimeter ring open drainage channel around the outside of the pad to stop rain water or subsurface water flowing into or under the stand-off pad area.
Drain coil connection	Drain coil is connected to a 150mm PVC pipe which carries the collected effluent to the farms' effluent system. To make sure effluent does not leak, pipes should be connected through sealed boot penetrations through the upturned liner. Talk to your liner supplier about what this means.
Drain outlets	Rats can make their way up drainage systems and block them. Cover subsurface drainage outlets with wire netting and use rodent traps for control. Pipe drain outlets need to be directed into an effluent storage system, as drainage water will be contaminated by animal dung and urine.

Surface material

When you decide on a surface type for your pad, consider the following factors:



<p>Ability of the cow to lie down</p>	<p>The main factor overriding all others is the cow's ability to lie down comfortably on the surface. Cows need to lie down for at least eight hours a day.</p> <p>There are three key features that make a cow want to lie down: is the surface soft, not slippery and dry?</p> <ul style="list-style-type: none"> • Cows will lie down sooner on softer surfaces compared to harder surfaces • If the surface is overly slippery the cows will be less likely to lie down • Cows are very reluctant to lie down on wet surfaces. <p>Woodchip surfaces are the best stand off surface types for cows to lie on.</p>
<p>Time on surface</p>	<p>Consider the length of time you will be holding the cows. Harder surfaces must only be used for short periods of time. If hard surfaces are used for long periods they can cause lameness, stiffness and agitated behaviour.</p>
<p>Frequency of use</p>	<p>The frequency of use is the number of days per year that cows are stood off. For example, standing cows off for 20 days a year compared to 70 days a year will influence the facilities you need and the surface type. You must also take into account the number of days in a row it is used.</p>
<p>Maintenance and availability of materials</p>	<p>You need to consider the availability of the surface material. While woodchip and sawdust are excellent for animals you need to think how available it is in your area, how much it costs, and any additional purchases, such as a ripper for the back of a tractor, you will need to make.</p>
<p>Cost</p>	<p>Cost is always important to think of and there are a wide range of cost options. Do not choose a surface type only on this factor; you are better off to spend a little more and build an effective and animal-friendly pad rather than suffer the longer-term cost of animal health issues and production loss due to uncomfortable cows.</p>

Surface material options

Surface type	Benefits	Factors to consider	Recommendation for lying provision
Concrete, gravel and stone 	<ul style="list-style-type: none"> Not advised for stand-off pads 		✘
Sand 	<ul style="list-style-type: none"> Easy to source 	<ul style="list-style-type: none"> Cold, and does not encourage lying when wet Longer periods on sand can cause wear on hooves Problems when drainage is insufficient (becomes soupy) 	✓
Soft Rock 	<ul style="list-style-type: none"> Easy to source in some areas 	<ul style="list-style-type: none"> Many types with differing qualities Can become compacted easily 	✓
Rubber matting over concrete 	<ul style="list-style-type: none"> Easy to clean Low maintenance required Reduced exposure to bacteria Softer on hooves Cows more likely to lie down than bare concrete 	<ul style="list-style-type: none"> Expensive to purchase Needs higher level of effluent management – increased frequency and quantity Animal comfort levels good, but cows take time to adjust. Rubber quality and thickness influences results i.e. thick rubber, around 24mm, is more comfortable for cows 	✓✓
Sawdust 	<ul style="list-style-type: none"> Warm Free-draining Reduced stress and lameness Cows lie down sooner Low chance of animals slipping Soiled product is high in nutrients and can be put back into paddocks and crops 	<ul style="list-style-type: none"> Some issues with blocking drainage Material needs to be replaced throughout season Will breakdown on the pad faster than other wood products Moderately expensive to source Requires careful planning of supply Some sawdust (hard wood) produces splinters which can damage teats and skin 	✓✓✓
Post-peelings 	<ul style="list-style-type: none"> Warm Free-draining Reduced lameness Cows lie down sooner Low chance of animals slipping Longer life span than sawdust Soiled product is nutrient rich and can be put back into paddocks and crops 	<ul style="list-style-type: none"> Post peelings break down quicker than wood chip, bark or chipped pallets Need to be replaced throughout season Moderately expensive to source Requires careful planning of supply 	✓✓✓✓
Woodchip / Bark 	<ul style="list-style-type: none"> Warm Free-draining Reduced lameness Cows lie down sooner Low chance of animals slipping Longest life span of wooden products High levels of nutrient absorbency Soiled product is high in nutrients and can put back into paddocks and crops 	<ul style="list-style-type: none"> Need to be replaced throughout season Most expensive wood product option Requires careful planning of supply 	✓✓✓✓

Wood product considerations

Type of wood	<ul style="list-style-type: none"> • Most types of wood chip product are suitable to be used as a stand-off base. Remember that some hardwood sawdust produces splinters, which can damage teats and skin. • Avoid using treated timber if possible as the treatment can be toxic. • Most materials originally come from forestry companies and are 90 -95% pine trees and about 5-10% eucalyptus trees.
Wood product size	<ul style="list-style-type: none"> • The amount of nutrient absorbed depends on the type of wood product. Woodchip and bark absorb more nutrients than post peelings and sawdust. • As long as wood products are applied at appropriate rates all product sizes can be applied directly back to paddocks and crops or incorporating into soils prior to crop drilling. Some farmers using larger size chip prefer to further compost the soiled product before putting it onto a paddock.
Sourcing / ordering wood material	<p>Poor service provided by material suppliers, increasing prices, irregular material quality, shortages of material in winter and slow delivery times are often heard when discussing sourcing wood product. There is a good supply across the country but transportation costs will vary.</p> <p>To help avoid some of these issues, keep the following in mind when ordering:</p> <ul style="list-style-type: none"> • Order early – order materials for the next season in advance or as soon as winter finishes rather than in May – July when demand is highest and trucking companies are busiest, to avoid delays in getting product delivered on farm. • Delivering the material at this time also improves access for trucks - avoiding wet soils. If possible get the truck to dump the material to the side of the pad rather than drive onto the pad as heavy trucks may damage drainage. • Get loads delivered throughout the year and stockpile until ready for annual replacement. Trucking firms like the flexibility of being able to deliver when it suits them rather than on demand. • Work together with other farmers - working as a group means a larger volume and may help secure supply.

FARMER TIP: “Have a standing order for materials and get in early or you will miss out.”

Quantity /depth of wood material	<p>We recommend to apply a 400-500mm layer of chip over top of the subsurface drainage and metal. A number of farms with stand-off pads indicated that when they scrimped and put less surface material on, there were more problems and the pad did not work as well.</p> <p>Example: For a pad for 300 cows with 5m²/cow = 1500m² area x 500mm depth of wood product = 750m³ of wood material.</p>
On site production of own chip	<p>Growing trees on farm to be later milled for chip is an option and may help resolve some of the issues around accessing materials and quality control of product; this is obviously a long term plan.</p> <p>Growing trees for harvesting as chip or coppicing trees is likely to provide only a small amount of the volume required, unless significant plantings are in place.</p>
Cost of wood product	<p>The cost of sourcing and maintaining wood product can be a concern for farmers in some locations (such as the West Coast of the South Island and Central Otago). The price of materials can vary across the regions and by season.</p> <ul style="list-style-type: none"> • Wood chip suppliers need more certainty about demand and the ability to deliver it on farm outside of peak demand. Work with your chosen supplier to forecast your woodchip needs, and secure supply. • While the cost of materials is an issue, stand-off pads will not function properly if they are not well maintained and material is regularly replaced. It is important to factor maintenance costs into your long term plan.



Design and construction

Other design considerations

Water

Cows must have access to enough fresh water at all times.

Water troughs work best on a hard standing area such as concrete. This will avoid pugging in the trough access area and subsequent breakdown of the drainage system.

Peak drinking water – Daily requirements

Lactating cow	70 Litres / cow
Dry cow	45 Litres / cow
Calves	25 Litres / cow

Peak drinking water – Flows required

Lactating Cow	12 - 14 Litres / cow / hr
Dry Cow	8-10 Litres / cow / hr

Water supply

Herd Size	Trough Flow (1 per sec)	Trough Size (litres)
100	0.33	600
200	0.67	1200
300	1.00	1800
400	1.33	2 @ 1200
500	1.67	2 @ 1500

Feeding

It is best not to feed on the stand-off pad itself. Feeding directly onto the pad will result in high levels of feed wastage and may block the pad's drainage. If you plan to feed supplementary feed off-paddock on a regular basis, consider building a specifically designed feed area, such as a feed pad.

Some farmers keep cows on a concrete feeding area before moving them to a stand-off pad, to allow them to empty out and reduce the effluent excreted onto the pad.

Shelter

Shelter from wind may be provided by artificial shelter such as windbreak fabric or natural shelter such as shrubs and trees. A solid hedge of trees over two metres high may cause eddy effects which defeat the purpose of the shelter. A more permeable planting design which allows some air flow through the trees offers better protection. When selecting tree species, it is better to choose those without aggressive root systems to protect the pad base or drainage system. Be aware that macrocarpa, if eaten by in-calf cows, may cause abortions.

Remember, some wind is useful to dry out the pad surface material.

FARMER TIP: "Make use of natural shelter but make sure you have good air flow to dry out the pad."

DESIGN TIP: "Impermeable / thick walls or hedges higher than two metres will cause eddy effects and direct wind down onto the cow's backs."

Gateways, fencing and stock handling facilities

Gateways	Entry and exit points should be wide enough (at least 8-10m) to allow free flow of stock and vehicles. Also consider having multiple gateways and options for keeping mobs separated on the pads. Gateways are pressure areas and can get 'boggy'. Adding a gravel base to these areas can help.
Fencing	Fencing types vary from simple wire to solid wooden fence, each has its benefits. Simple wire fences are cheap and effective, while wire netting or solid fences are recommended if calving on the pad. Solid fences also offer shelter.
Stock handling facilities	Some pads have a vet race and or head crush built into or beside them to help examine, restrain and treat animals. This is particularly useful if calving on the pad.

Calving on stand-off pads

If you are planning to use the stand-off pad for calving consider the following design features:

- Wire netting or solid fences are recommended if calving on the pad.
- Provide good shelter from prevailing wind.
- Have a vet race and or head crush built into or beside the pad to help examine, restrain and treat animals.
- Keep a stockpile of surface materials and put a fresh layer of surface material on just before calving to ensure a clean surface.

Covering a stand-off pad

Farmers who are using or have used stand-off pads in the past commented that "if they could afford it, they would roof it." The main reasons for covering pads were to reduce the volume of effluent to be managed, increase the life span of the surface materials and reduce maintenance. Costs of covering stand-off pads vary greatly depending on the roof type. As a very general guide expect to pay \$130 /m².

For example:

Volume of effluent produced by 300 cows held on a pad for 12 hrs /day over a three month period = 1,102 m³ effluent

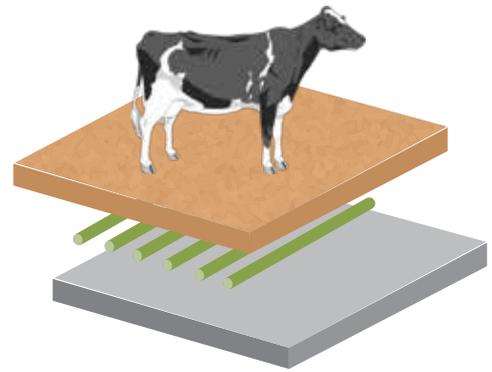
Average rainfall over three month period (140 mm) on a 800 m² pad = 336 m³ rain

If you are thinking about covering your stand-off pad, you need to consider a number of factors. For more information on covered facilities look at *The Dairy Cow Housing a good practice guide* for dairy cow housing at dairynz.co.nz.

FARMER TIP: "Investigate covered options – really weigh up the on-going costs and maintenance for a stand-off pad – look at the benefits, can you get the value? How long will it last?"

Effluent system design

Effluent management is an essential part of designing a stand-off pad. It is critical to contain and manage effluent generated on the pad well, so that untreated effluent does not enter waterways.



Capturing the effluent

There are three ways effluent is captured on a stand-off pad:

Absorbed	Soft materials like sawdust and woodchip can absorb a percentage of the total effluent.
Sub-surface drainage	Liquid effluent that is not absorbed, travels through the profile and is captured in sub-surface drainage pipes. The pipes are then directed into the farm effluent system.
Impervious liner	An impervious liner under the drainage pipes captures the remaining effluent to prevent any loss to groundwater.

Effluent absorbed into surface material

It is important that moisture drains through the pad. If water does not drain, because the material is compacted, or pipes are crushed or blocked, then the pad will be cold and muddy, risking animal health and welfare. Some water and nutrients will always be absorbed into the surface material. How much depends on the type of material. Woodchip and bark absorb more nutrients than post peelings and sawdust. The nutrient value of used surface materials is important to know when working out application rates. Go to page 36 to see nutrient data for surface materials.

FARMER TIP: “Look at your effluent first – how will you collect it? The fewer pumps the better – it only takes one pump to fail to have a major problem on your hands.”

Connecting to effluent system

Liquid effluent collected from the pad needs to be directed to the farm effluent system. The PVC collection pipe can either be gravity fed to the existing effluent system, or you need to build an effluent sump beside the pad and pump from the pad to the existing effluent system.

Stand-off pads are large catchment areas, and as all rainfall and effluent is contained and collected, you have a significant volume to deal with. If you are adding the effluent from the pad to your existing effluent system you may need to upgrade your system to store the additional effluent and you need to check any requirements relating to resource consents.

How much effluent is produced on a stand-off pad?

Step 1: Manure

An average cow will produce about 11% of her body weight in effluent on a daily basis. So for a 500 kg cow that is 55 litres of effluent per day. The table below gives an indication of some common herd sizes, length of time on pad and litres of effluent. The figures below do not include rainfall.

Herd Size	Raw effluent produced for length of time on pad (litres)			
	1hr	6hrs	12hrs	16hrs
1	3.4	20.4	40.8	54.4
100	340	2040	4080	5440
200	680	4080	8160	10880
300	1020	6120	12240	16320
400	1360	8160	16320	21760
500	1700	10200	20400	27200

	No. cows	x	Effluent produced (litres / hr)	x	Time on pad (hrs / day)	=	Volume of effluent (litres / day)
Example	300	x	3.4	x	12	=	12,240 (A)
Your figures		x	3.4	x		=	(A)

Step 2: Rainfall

The following table shows the volume of annual rainfall (m³) collected on different sized pads for different rainfalls on an annual basis.

Pad size (m ²)	Annual Rainfall (mm)						
	600	800	1,000	1,200	1,400	1,600	1,800
500	300	400	500	600	700	800	900
1,000	600	800	1,000	1,200	1,400	1,600	1,800
2,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600
5,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000

	Pad size (m ²)	x	Rainfall (mm) for period of use	÷	1,000	=	Rainwater volume (m ³)
Example	800	x	Jun	120	÷	1,000	= 96
	800	x	Jul	150	÷	1,000	= 120
	800	x	Aug	150	÷	1,000	= 120
					Total	=	336 m ³ (for three month period) (B)
Your figures		x			÷	1,000	=
		x			÷	1,000	=
		x			÷	1,000	=
					Total		(B)

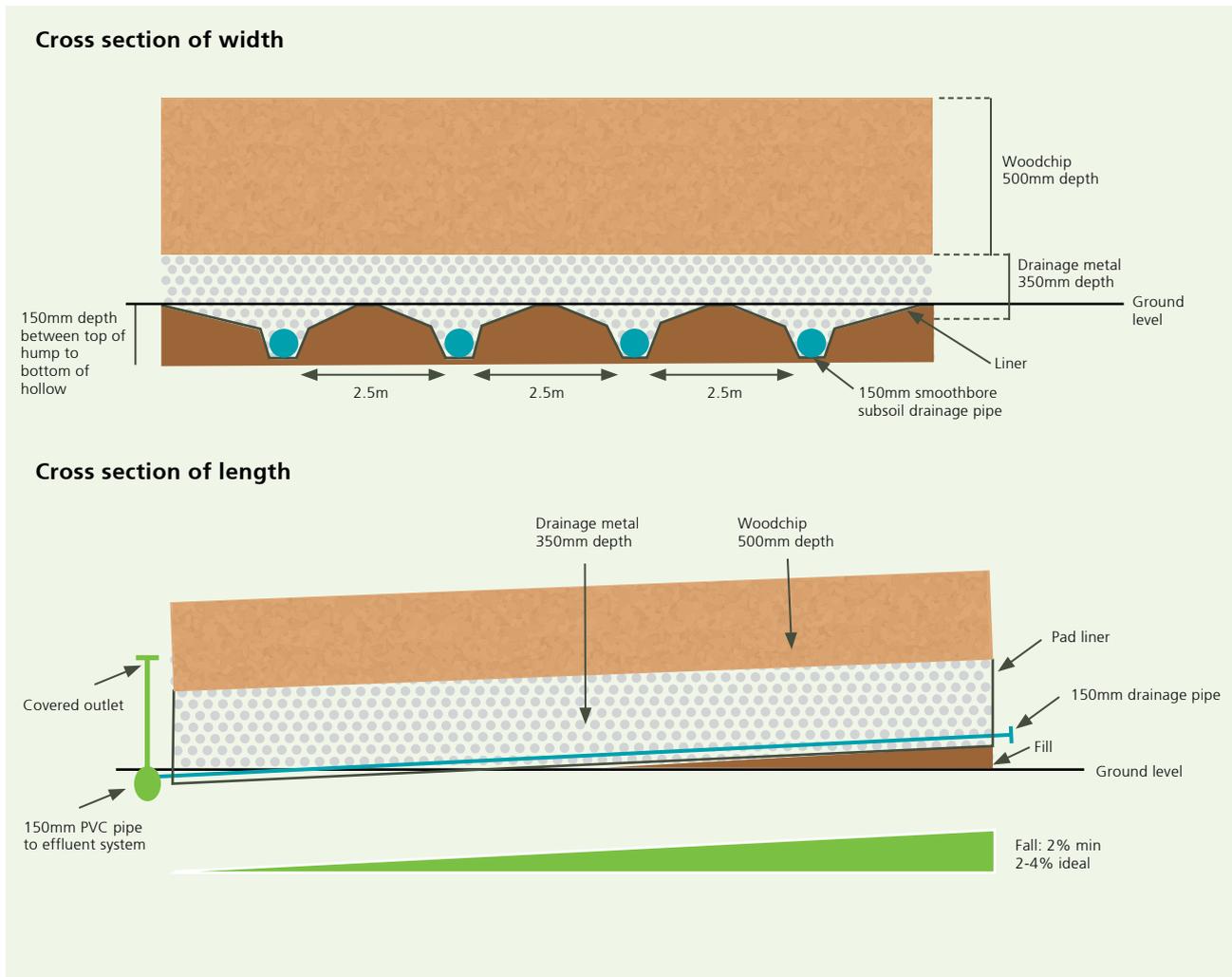
Step 3: Total Volume

Total volume of effluent produced on pad for period of use.

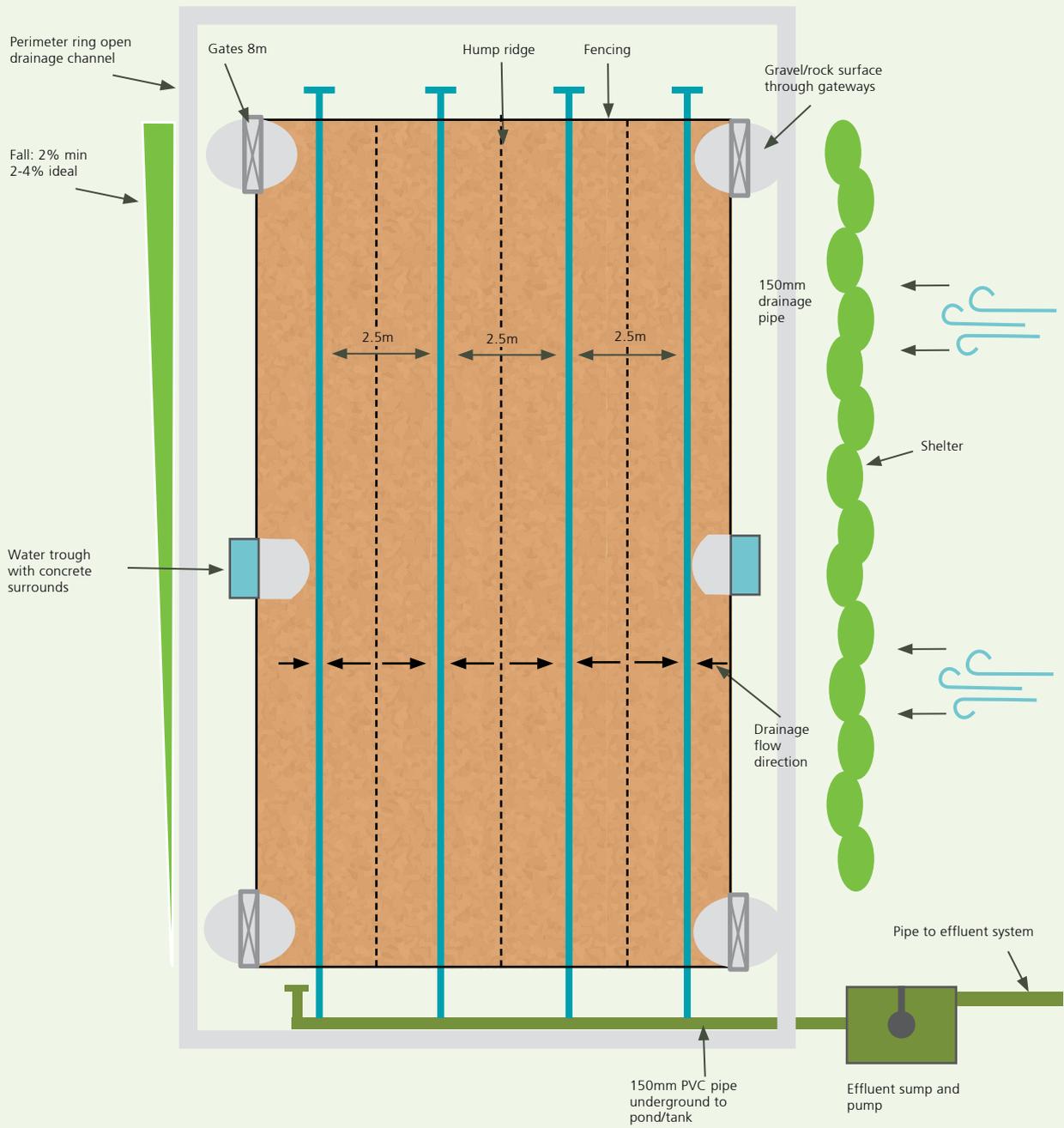
	Volume of manure (litres / day)	x	No. days on pad	÷		=	Total manure for period of use (m ³)	+	Rainwater volume for period of use (m ³)	=	Total volume of effluent (m ³)
Example	12,240 (A)	x	90	÷	1000	=	1102	+	336	=	1448
Your figures	(A)	x		÷	1000	=		+	(B)	=	

Example designs for a stand-off pad

The following diagrams show a standard design for a stand-off pad. We recommend you get specific design advice for your property, stand-off site and cow requirements.



Bird's eye view



Construction

If you are using a contractor to help with building the stand-off pad it is important that the contractor is aware of and understands all building recommendations and best practices. Provide them with a copy of this booklet if they do not have one.

Pre-construction communication check

Before the equipment turns up on site make sure you have worked through the following checklist. It outlines the information you have to give to the contractor, installer or person supervising the work before construction begins.

Before construction	Completed	Comment
Have detailed construction drawings and specifications for the contractor to follow		
Acquired regional council consent and requirements		
Written contracts in place		
Before accepting the contractor's offer, agree and confirm a proposed construction programme including timing for completed work		
Agree with contractor on the level of project management		
Contractor is aware of regional council requirements and consents.		
Make sure contractors have appropriate insurance in place		
Agree on who will monitor the construction and how to ensure specifications are met		
Know the location, line and level of underground services, and the steps to prevent damage or accidents		
Agree on which water troughs, pipes, irrigation, or infrastructure needs to be relocated		
Are any pre-construction compaction trials required and all parties in agreement about who will pay for this work?		
Carry out a health and safety orientation		
For clay liners: have a copy of all investigation and pre-construction testing		
For synthetic liners: have a copy of all tests and warranties		

Section 3:

Management



Routine maintenance

Good maintenance of stand-off pads is as critical as good design. Many well designed stand-off pads don't work well, because they have not been well maintained. Maintaining a pad comes at a cost but is necessary to protect your investment.

What farmers recommend

The following recommendations are based on recent research studies on stand-off pad performance, and from the experiences of other farmers currently operating stand-off pads

Farmers who use stand-off pads recommend:

Before use	<ul style="list-style-type: none">• Before the season begins, the pad should be topped up with fresh bedding material.• Organise early – start in summer.• Keep heavy trucks off the pad. Either dump material elsewhere or at the end of the pad, to avoid compacting the pad and ruining the drainage.• Use high sided trucks to deliver rather than a truck and trailer.• Pads are often heavily used early on, so hold back some surface material initially to replace after first few weeks.• Faecal contamination of pads is very high, so teat seal all dry cows before using the pad.
During use	<ul style="list-style-type: none">• It may be necessary to scrape the top off the pad at some stage during the winter.• It may be necessary to rip the surface during the winter if cow compaction has reduced the ability for the pad to drain properly.• Wood product goes very alkaline (some pads measured were as high as pH 8) – do not add lime!• If calving on the pad, put a fresh layer of material on just before calving and top up regularly during calving to ensure a clean surface.• Keep the pad clean – it only takes a couple of hours a week.• Take extra care of your entrances and exits.
End of season	<ul style="list-style-type: none">• At the end of season, the stand-off pad should be scraped down and surface material should be removed.• Get it cleaned off as soon as you have finished so it can dry out.• Surface material should be removed every year – top 10-20 cm.• Replace the chip every year. If you don't, the pad will only last half as long next season.• When the pad is not in use for some time, spray any weeds on the surface.• When removing old material, leave the under layer exposed to the sun over the summer months to reduce <i>E. coli</i> bacteria.

Stand-off pad tipping point

The stand-off pad tipping point is when the moisture content of the woodchip lying surface reaches 70–75% moisture and the cows behavior changes, and lying times decrease. The moisture surface increases with the number of cows, the length of time cows are on the pad, the space the cows have and the average rain fall.



The DairyNZ off paddock calculator calculates your pad tipping point, the point at which cow behaviour will change and lying time reduces.

Find out your pad's tipping point at
dairynz.co.nz/stand-off-pad-calculator

Reduced lying times lead to poor welfare, increased lameness and reduction in feeding when returning to pasture. Cows will choose to lie down rather than graze, which leads to a drop in body condition.

You can lengthen the time it takes to reach the tipping point by altering some management factors. See the effect on the tipping point by reducing the number of hours the cows are on the pad each day and reduce the total number of days per year. If this is possible within your system, then cows will be maintain lying times for longer.

If you are not able to change the number of hours per day, or days per year the following management solutions are available:

Refresh woodchip

Each time you add a new top layer of fresh woodchip you start at day 0 again. If your calculated tipping point is 30 but you would like to use the pad for around 60 days, you will need to top up the woodchip 30 days after the cows start going onto the pad. This will maintain the lying time across the full 60 days.

Drainage

The calculator cannot see how well your pad drains. It is well worth investing in good drainage, especially in high rain fall areas to lengthen tipping points and cow comfort. See page 15 for drainage designs.

Increase the pad size

Although an investment, it might mean your pad tipping point will lengthen considerably, which reduces the requirement to top up woodchip, improves cow welfare with flow on effects to production.

Calving

The calculator will not take into consideration the fluid cows produce during calving. Tipping points are likely to be shorter if you calve on your pad. Top up woodchip during calving much more regularly than for dry cows.

RESEARCH SNAPSHOT

Hikurangi, Northland – High level maintenance

- 600 cows
- Two identical pads: 1,600 m² each
- Bedding: 1 m depth post peelings
- 537 mm rain (May 28 – Sept 22)

Maintenance

- Surface layer (100 mm) was removed and replaced in Jun, Jul, Aug.
- Surface of the pad was ripped to 20 cm in late August.
- Cost – \$60,000 on post peel – (\$100 /cow for maintenance throughout the season; other farms had indicated \$50 /cow).

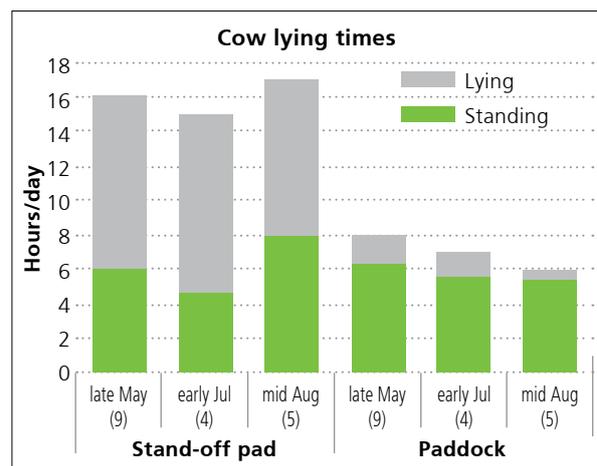
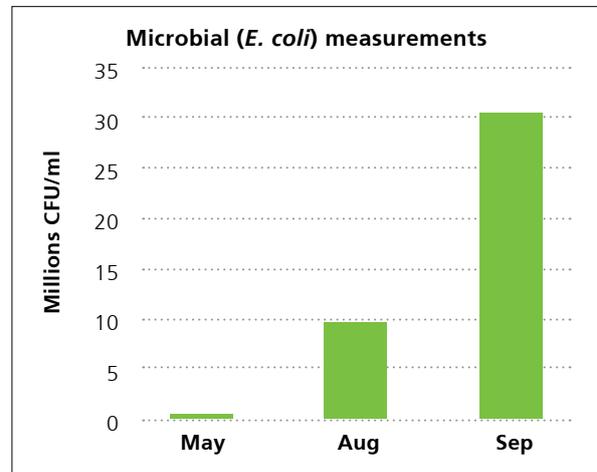
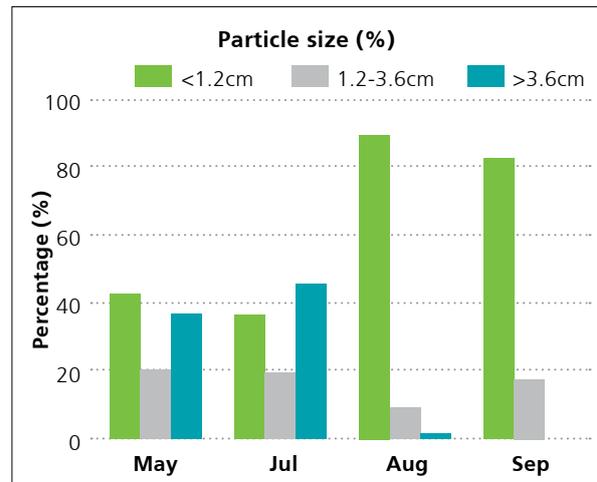
What happened to the surface material?

- Dry bulk density (kg /m³) in the top 30 cm decreased over time and usage. This means the wood product got wetter over time.
- The size of the wood particles got smaller and smaller over the months of use.
- *E. coli* (a faecal bacteria that can cause mastitis) concentration was similar to fresh faeces and increased with use both on the surface and at depth.
- The temperature was warmer, deeper in the pad. Temperatures were high 20-25°C.
- Carbon/nitrogen ratio of 80 plus was higher than for other farms as the level of new replacement material is higher.
- Surface was very alkaline pH 8.
- The pad lasted 258 cow hours /m² – that's a very long time.

What does this mean?

Excellent maintenance throughout the period of use meant the pad remained warm, dry and comfortable enough for cows to lie on the pad through the entire stand-off time.

Lying times were maintained throughout and there was no evidence of cows lying in the paddock instead of grazing.



RESEARCH SNAPSHOT

Southern Waikato – No maintenance

Overview

- 200 cows
- Bedding: wood chip
- Space allowance: 5.4 m²/cow
- Pad used: 18 hrs /day
- Rainfall: 116 mm (May 25 – June 30)

What happened to the surface material?

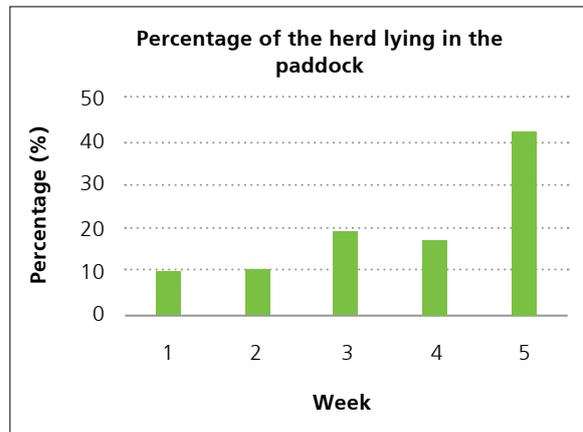
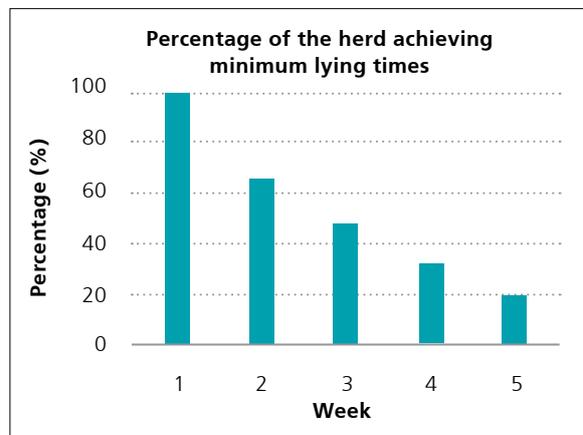
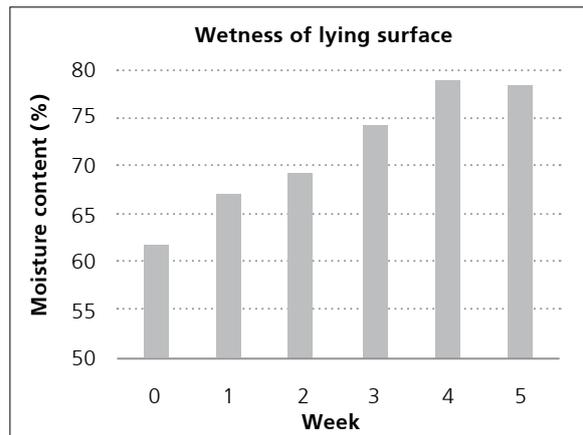
- Moisture content of the lying surface increased to over 75% by third week of use.
- As bed bedding quality deteriorated, cows got dirtier

What happened to cow comfort?

- Daily lying time declined over the five weeks.
- Heavy rainfall events (>5 mm) coincided with drops in lying time.
- Most of the herd did not achieve the minimum 8 hours lying time requirement for the last 2 weeks.
- As the pad deteriorated, more cows sacrificed grazing time to lay down in the paddock.

What does this mean?

- Once bedding moisture content is over 75% it is no longer a comfortable lying surface.
- The accumulated effects of an unsuitable lying surface and continuous use resulted in cows being deprived of lying, to such an extent that welfare was compromised.
- Standoff pads need to be maintained to protect cow lying time and welfare.



Managing lying surface for better lying times.

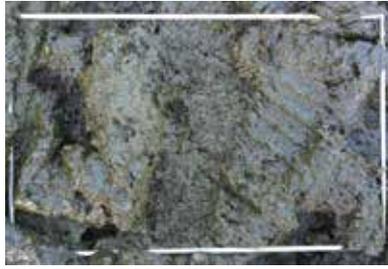
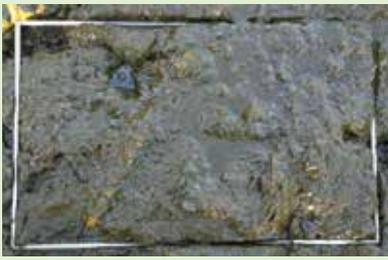
Cows will stop lying down when the lying surface of the pad is uncomfortable. Wet surfaces as well as hard surfaces are uncomfortable for the cow.

The following score card provides a visual assessment to help measure the comfort level of the woodchip pad. Taking action before the lying surface gets too wet means cows will maintain at least 8 hours of lying per day.

If cows cannot lie down for long enough it is a risk to their welfare. In response to uncomfortable lying surfaces cows will often lie down rather than graze when they spend time back at pasture.

The three areas to look at to measure the comfort level of the lying surface are:

- the ability for your gumboot to make an imprint
- how easy it is to see whole woodchips
- the level of pooling water.

Areas	Sample	Description	Tick
1. Low/ Dry		<ul style="list-style-type: none"> • Boot imprint stays there • Woodchip easily seen • No pooling water 	
2. Medium/ Wet		<ul style="list-style-type: none"> • Boot imprint starts to disappear • Woodchip starts to disappear • Wet but little pooling liquid 	
3. High/ Sodden		<ul style="list-style-type: none"> • Boot imprint disappears straight away • Woodchip cannot be recognised • Pooling liquid obvious 	

Understanding the normal grazing and lying pattern for your herd is a great way to check if they are lying down on the stand off pad. If your herd usually lies down after about three hours of grazing, check your cows two hours after grazing. If most of the herd are lying down, it is highly likely your stand off pad is uncomfortable.

Managing your used surface material

Nutrient value of used surface material /solids

Used surface materials from stand-off pads are high in nutrients and an excellent source of organic matter and fertiliser.

RESEARCH SNAPSHOT

Nutrient content of different stand-off surface materials – (% wet weight)

Stand-off surface material	Wood chip	Bark chip	Post peelings	Sawdust	Chipped pallet	Mean
Number samples	10	12	40	6	6	74 samples
Dry matter %	26	30	30	27	30	28.6
pH	7.1	8.2	7.5	7.9	7.7	7.68
Total Nitrogen (N)	0.26	0.26	0.18	0.15	0.20	0.21
Total Carbon (C)	11.9	17.7	13.9	13	12.1	13.72
C/N ratio	48	62	99	121	69	79.8
Phosphorus	0.05	0.06	0.04	0.03	0.07	0.05
Potassium (K)	0.18	0.33	0.15	0.17	0.23	0.21
Sulphur	0.04	0.05	0.03	0.02	0.04	0.03
Calcium	0.14	0.16	0.15	0.08	0.14	0.13
Magnesium	0.05	0.05	0.06	0.04	0.04	0.05
Sodium	0.01	0.14	0.02	0.03	0.02	0.04

Nutrient values of used post peelings on stand-off pad through season

		% DM	% Nitrogen	% Phosphorus	% Potassium	% Carbon	C/N ratio	pH
Post peelings sampled at different times throughout the season	Stockpile (not used on stand-off)	80	0.07	<0.02	0.07	39.3	544	5.9
	July	25	0.24	0.07	0.26	11.2	54	7.7
	August	34	0.19	0.03	0.09	16.3	107	7.5
	September	32	0.19	0.04	0.11	15.1	83	7.5

- The nutrient values above were taken over a three-month period of use on the stand-off pad.
- The proportion of nutrients absorbed depends on the type of material. Coarser materials (woodchip and bark) absorb more nutrients than post peelings and sawdust.
- %K concentration is similar to %N. There was also very high K concentration in pad drainage water (2-3 times higher than in normal dairy effluent).
- Consider animal health risks when spreading effluent high in K. High levels of K on pasture are associated with metabolic disorders.

How to store solids

If you remove solids from the pad and do not them spread immediately, they need to be stored on a sealed surface, with an effluent capture system.

Application

Applying this nutrient rich surface material to paddocks and crops is recommended.

Step 1 Get your used surface material tested for nutrient value.

Step 2 Go to dairynz.co.nz/effluent and use the dairy effluent spreading calculator or download the dairy effluent spreading calculator app to your phone.

Step 3 Using the calculator, work out the area of land needed for your material.

- Step 4**
- When soil and weather conditions are suitable, apply the used surface materials with a muck spreader to either pasture or crop paddock at the recommended depth and rate. Often farmers plough the used surface materials into the paddocks before planting crops or in some cases re-grassing.
 - Used surface materials should be applied when there is a window of fine weather ahead. Avoid application if rainfall is forecasted within two days (i.e. 48 hours). The preference is for 10 days without rainfall post application.
 - The greater the time between application and rainfall, the lower the risk of nutrient loss.

What affects the breakdown of the material?

- This depends on the state of the material and the rate of application.
- The higher the carbon / nitrogen (C/N) ratio, the longer it will take to breakdown.
Dung = 12 C/N ratio, solids from a stand-off pad may be as high as 80 C/N ratio.

Stand-off surface material	Woodchip	Bark chip	Post peelings	Sawdust
C/N ratio	48	62	99	121

Animal care and comfort

How to recognise signs of stressed or sick cows on off paddock facilities

Observation	What does that mean
Cows do not lie down when they return to the stand-off pad after grazing.	Pad does not have enough space, or surface is not comfortable i.e. too wet, too cold.
Mastitis levels increase when using pad.	Pad may not be draining well, or may need surface material replacement. Are cows teat sealed? Do cows have enough space?
Changes in posture (the way they stand or sit).	Could be showing signs of thermal stress (either too hot or too cold). Surface might not be optimal for lying.
They show excessive stiffness or lameness.	Cows may not get enough time lying down. Cows need a minimum of 8 hours of lying time a day.
Lack of confidence when lying down or trying to stand up.	Surface is likely to be too slippery or too hard.
Cows choose to lie down instead of graze when in the paddock after being stood-off.	Rest becomes more important than hunger. This indicates the stand-off facilities are not adequate, either the surface of the pad or the space available needs to be addressed.
Sunken eyes.	A sign of dehydration. If a number of cows have sunken eyes check water flow. If cows are queuing for water troughs there may not be enough. Remove individual cows to the sick mob and check other signs of ill health.

What you can do to keep cows healthy

		Tips from other farmers
Mastitis	<p>Mastitis can be a problem during standing-off. Mastitis-causing bacteria grow best in wet, dirty and warm environments.</p> <p>Reducing the amount of muck is something you can control in stand-off pad design, management and maintenance.</p> <p>Research shows that faecal contamination on pads is very high and teat sealing is advised.</p> <p>Check out dairynz.co.nz/mastitis for more information on managing mastitis.</p>	<ul style="list-style-type: none"> • Teat seal dry cows before using pad. • Regularly check and maintain drainage. • Replace surface materials throughout the season. • Lactating cows need more space per cow and more regular pad maintenance and material replacement in order not to get too dirty. • Keep cows off lying surfaces for 30 minutes after milking to allow time for the teat canal to close. • Calve on a clean surface, such as fresh woodchip or grass, to minimise mastitis risk.
Lameness	<p>The longer the time on a hard or wet surface, the greater the risk of a cow suffering stress or getting lame.</p> <p>You can minimise lameness by designing the pad from the start to give cows enough space and a soft, clean, non-slippery surface to lie down.</p>	<ul style="list-style-type: none"> • Ensure your pad has enough space – refer to page 11. • Keep on top of maintenance to ensure the surface is dry and clean. • Watch your cows as they move to and from the paddock to pick up any lameness. • Visit dairynz.co.nz/lameness
Tiredness and lying requirements	<p>Cows need to lie down for at least 8 hours every day. Not being able to lie down will make them tired and eventually exhausted.</p>	<ul style="list-style-type: none"> • Ensure your pad has enough space – refer to page 13. • Regular maintenance during the use period is important to make sure the surface does not get too wet, as this will deter cows from lying down. • If cows spend a lot of their paddock grazing time lying down, the stand-off pad is not comfortable for lying or they do not have enough space.
Managing herd behaviour and bullying	<p>Bullying can be a problem on stand-off pads. It can influence tiredness and the willingness to lie down, especially for younger stock.</p>	<ul style="list-style-type: none"> • Cows with enough space will be less likely to bully. • Have enough gates to deal with different mobs.
Meeting nutritional requirements	<p>Stand-off pads generally do not have feeding facilities on them. So cows must return to the paddock or crop to graze or get feed from a different feeding facility.</p> <p>Cows must have water at all times on a stand-off pad.</p>	<ul style="list-style-type: none"> • Dry cows need at least four hours, and lactating cows at least eight hours grazing on the paddock each day to meet their daily feed requirements. (Assuming no other feed is provided).

		Tips from other farmers
Environmental conditions	<p>Providing shelter and/or shade for animals on off-paddock systems is important.</p> <p>If a stand-off pad is used for calving, providing shelter from wind is even more important.</p>	<ul style="list-style-type: none"> • If holding cows off-paddock in summer conditions and the pad has no shade they may need a break outside of the facility, especially during the middle of the day, to allow them to cool down and maintain body temperature. • Make sure all cows can access drinking water at all times. • Make the most of your natural shelter belts. • Provide as much shelter as possible.
Adapting to facility	<p>Cows need to be slowly introduced to new facilities and monitored carefully for the first few days to ensure all animals are adapting to the facilities.</p>	<ul style="list-style-type: none"> • Introducing cows to a new stand-off surface in short stints will reduce stress on the cows. • When cows are first introduced to the facility, observe them carefully and regularly for the first day or two to ensure that herd behaviour and hierarchy settle and none of the younger cows are being bullied. This shouldn't be a problem if you have provided space and designed well. • Remove any cow that does not adapt well to the facility (she isn't lying enough, has difficulty accessing water, or shows signs of lameness).
Observation of cows	<p>Understanding what normal and abnormal behaviour looks like is important to maintaining good animal health.</p> <p>By taking time regularly to observe your cows you will pick up problems earlier when they are less severe which will speed up recovery.</p>	<ul style="list-style-type: none"> • Ensure the farm team knows what to look for. Go to dairynz.co.nz for more information. • Make "watching the cows behaviour and walking" and watching the cows in the paddock a specific weekly task for a staff member. • Have a good system to record problem cows or concerns.
Management of sick or injured animals	<p>If a sick or injured animal is identified, separate her from them mob and treat her as soon as possible.</p>	<ul style="list-style-type: none"> • Have a vet race or head crush nearby the pad to make treatment easier.
Staff skills	<p>Ensuring your whole farm team has the knowledge and skills to manage a stand-off pad is important for its success.</p> <p>Skills include recognising abnormal behaviour and knowing what to do next.</p>	<ul style="list-style-type: none"> • Provide appropriate training to all new staff.
Calving cows	<p>If you are using a stand-off pad to calve on, you will need to manage it differently.</p>	<ul style="list-style-type: none"> • If you have already used the stand-off pad before calving then you should remove the top layer of material and resurface with clean wood product. • Check on calving animals frequently. • Restrict usage to small groups of cows that are due to calve rather than general herd use over the calving period. • Provide extra shelter if calving on the pad. • Use netting or solid fences to stop calves getting out. • Remove calved cows to a clean grass paddock as soon as possible. Calves separated according to farm policy.



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