

Designing Transition Cow Facilities

The process of designing a transition cow facility focuses on design principles that are critical to achieving the implementation of the management plan and the protocols developed by the dairy management team in order to fully express the genetic potential of the herd. More specifically, the facility design process should consider the specific farm's transition cow management plan, including space or pens for the desired management groups. The design should provide optimal cow comfort and a low stress environment, consider competition for feed and resting space, and social stress of moving cows between groups. Finally it should be safe for cows and people, and be labor efficient.

The transition cow management plan includes defining the desired management groups, including the number of cows in the each group. The grouping is defined according to several criteria including reproductive (or calving) status, nutrition, health, and the feeding and resting space needs the dairy team has chosen. Cow movement from group to group as they move through the transition period is an important factor that is often not considered properly in facility design. Minimize pen moves to reduce social stress, especially 2-10 days before calving.

Typically, cows are grouped as:

- Far off dry cows (60-22 days before calving)
- Close up cows/heifers (21-28 days before calving)
- Maternity cows/heifers (1-3 days before calving)
- Fresh cows/heifers (10-21 days after calving)


In larger herds there may be several pens of each group in addition to pens for hospital or treated cows that provide special comfort or isolation from the rest of the herd. For small herds, the challenge is to develop appropriately sized groups with an adequate numbers of cows to justify a separate group or pen. As herd size increases, the number of management groups can be increased while still providing practical groups or pen sizes for management purposes.

The number of groups needed to implement the management plan and its effect on cow movement are both important considerations that are often overlooked. Too many groups may require frequent movement which may not be beneficial to the cow. Too few groups may not allow the desired management protocols to be implemented.

The group or pen size is one of the key design parameters and is dependent on:

- Herd size and management groups
- Time period in group/pen
- Biological nature of the herd's reproductive cycle
- Design decision with adequate capacity to provide desired management plan and protocols

The best data for planning the number of cows in a management group should come from the farm's own calving records with herd growth in mind. The table below can assist sizing pens by calculating the number of animals in each pen based on 140 percent and 130 percent of weekly calving rates.



FUTURE HERD Transition Cow Pen Size Calculator
Nigel Cook, MRCVS, and Ken Nordlund, DVM
School of Veterinary Medicine, University of Wisconsin-Madison

Complete the management and herd size data cells in **BLUE**.Calculator assumes 34% of milking herd is 1st lactation

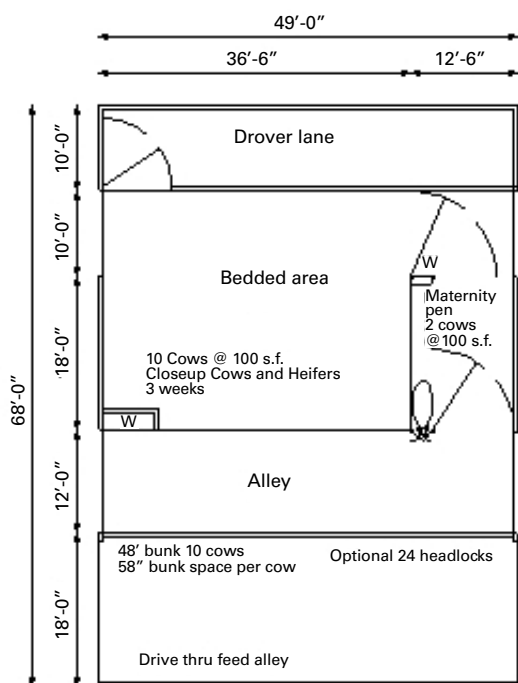
140% of average weekly calving rate				130% of average weekly calving rate			
Total Herd Size	240			Total Herd Size	240		
Weekly rate of calving	5			Weekly rate of calving	5		
140% of weekly calving rate	7			130% of weekly calving rate	6		
	Heifers	Cows	Combined		Heifers	Cows	Combined
Weekly Calvings (140% of average)	2	4	7	Weekly Calvings (140% of average)	2	4	6
Days in Pre-Fresh Pen	21	21	21	Days in Pre-Fresh Pen	21	21	21
Days in Calving Pen	1.0	1.0	1.0	Days in Calving Pen	1.0	1.0	1.0
Days in Post-Fresh Pen	21	21	21	Days in Post-Fresh Pen	21	21	21
Average Days Dry	NA	60	60	Average Days Dry	NA	60	60
Days pre-calving return to dairy	30	NA	30	Days pre-calving return to dairy	30	NA	30
Predicted Inventory				Predicted Inventory			
Far-Off Dry Cow/Heifer Inventory	3	24	27	Far-Off Dry Cow/Heifer Inventory	2	22	25
Pre-Fresh Pen Inventory	7	13	20	Pre-Fresh Pen Inventory	6	12	19
Calving Pen Inventory	1	1	2	Calving Pen Inventory	1	1	2
Post-Fresh Pen Inventory	7	13	20	Post-Fresh Pen Inventory	6	12	19
Predicted Feed Bunk Space Need				Predicted Feed Bunk Space Need			
Far-Off Bunk Space (2 ft/cow)	5	48	53	Far-Off Bunk Space (2 ft/cow)	5	45	50
Pre-Fresh Bunk Space (2.5 ft/cow)	17	33	50	Pre-Fresh Bunk Space (2.5 ft/cow)	16	31	47
Post-Fresh Bunk Space (2.5 ft/cow)	17	33	50	Post-Fresh Bunk Space (2.5 ft/cow)	16	31	47
Calving Pens Total Square Footage	120	120	240	Calving Pens Total Square Footage	120	120	240

The overall goal of the transition cow facility is to:

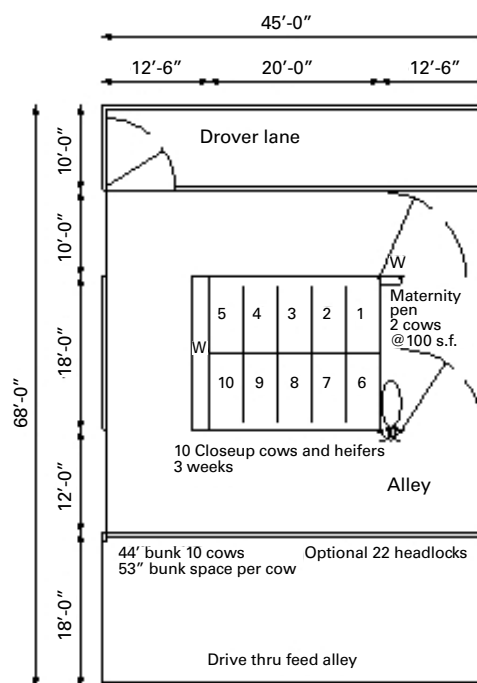
- Maximize dry matter intake by giving feed access of 18-24 inches to dry cows; 24 inches to milking cows; and 30-36 inches to pre/post fresh cows.
- When working with existing facilities, priority should be given to feed access. **A general rule of thumb: 80% stocking density if pre/post fresh cows have feed access of 24 inches, 100% stocking density if pre/post fresh cows have feed access greater than 30 inches.**

- Optimize cow comfort with appropriate stall size or space per cow and non-slip walking surface.
- Reduce social stress by reducing the number of moves between groups; minimize moves between 2-10 days of calving; and separating heifers and cows.

When designing bedded packs, use freestall pen dimensions as the basis. This allows conversion to freestall pen design in the future, if desired. The following diagram depicts an effective layout for a bedded pack design on the left and a freestall design on the right.



100 cow herd
Bedded pen design
Freshening pen
10 closeup cows and heifers
2 maternity cows
12 cows total



100 cow herd
Freestall pen design
Freshening pen
10 closeup cows and heifers
2 maternity cows
12 cows total

Design freestalls with 50-52 inches wide with a 10 foot long platform with brisket board and neck rail 72 inches from the curb. The stall base should be deep bed sand, deep bed organic solids, or a cushioned mattress.

Maternity pen design is dependent on:

- Just-in-time calving management with hourly observation, more typical in 3x milking
- Minimal calving observation with 4-6 hours between observation, more typical in 2x milking
- Group maternity pens (socially stable)

Acknowledgements

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