

## Facility planning

By Peter Wright and Tim Terry

Dairy farming is a constantly changing business. Farming for the long-term requires a facility that changes as well. Expansion, new technology, and new enterprises may all be in every sustainable farm's future. Planning for a new or additional facility is best done carefully and thoughtfully. We have all seen farms laid out in a chaotic array of buildings and driveways that are inefficient and make future improvements difficult.

### **DETERMINE THE MISSION OF THE FARM.**

Are you depreciating your buildings and just need an upgrade to get you into retirement? Or, are you setting the stage for a business that will continue to be viable and last a generation? Will there be room for new technology and additions as the need arises? Of course none of us can predict the future, but we do know it likely will mean we have to be flexible in the layout, so that changes can be more easily made when desired.

### **GET THE FACTS ON THE FARM SITE AND FARM.**

How much land, funding, management, and labor are available? Land limits both where the farmstead can expand and how many acres of crops will be needed for feeding and manure recycling. Expansion will not work without the means to pay for it.



Photo by Tim Terry.

With thoughtful planning, construction of new facilities can position a farm for the future.

One key is to build quickly and utilize (populate) the expansion quickly to start getting a payback as soon as possible. Proper planning helps achieve this. The management ability of the farm needs to be evaluated. Do you have the right people in the key areas to manage the expanded farm, new technology, or a new business? Also, can your team manage the trauma during the construction phase? Changes on the farm may make labor more efficient but also may require additional skills that aren't present now.

### **THE EXISTING SOILS, GEOLOGY, TERRAIN, AND INFRASTRUCTURE MAY BE LIMITING FACTORS.**

Gravel soils support driveways and provide good drainage under and around buildings, but tight clay soils are

preferred for earthen manure storages and can save the expense of a liner. Bedrock near the surface can increase excavation costs considerably. Determine the ground water level to make sure the farm will have good drainage while reducing the potential for groundwater pollution. Karst topography adds an unknown factor as solution channels may move water to and from unknown areas. Look at the way water flows. Check to see if watersheds above the farmstead can be diverted safely around. Always try to make gravity work for you as you lay out the manure management system. Avoid getting too close to water sources. Evaluate how wind direction impacts ventilation as well as odor impact on neighbors. Can you have good access

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to roads without being too visible? Conversely, do farm lane intersections at municipal roads have adequate sight distances (greater than 500 feet) for safe ingress and egress? What electric service is available and at what cost?

**THE LAYOUT OF ANY FACILITY SHOULD INCLUDE EFFICIENCY, SAFETY, BIOSECURITY, THE ENVIRONMENT, AND SOCIAL-MINDEDNESS.**

Dairy farming is a mass transfer enterprise. Moving cows, feed, milk, and manure efficiently and safely should be a major goal. Cow traffic considerations are paramount. Moving cows safely, without crowding and providing adequate access to water, feed and resting in a clean, well-ventilated barn is critical. The plan should configure the gates and alleys for cows, feed, and manure movement. People passage, footing, visibility, and pinch points all need to be considered carefully. Design the milking and manure systems to minimize confined spaces.

**COW TRAFFIC, VENTILATION, AND PEOPLE FLOW SHOULD CONSIDER BIOSECURITY.**

Sensitive areas such as newborn / maternity pens and wet calves should be isolated from much of the farm's activities. Efficient traffic patterns may have a significant influence on the placement of these facilities. They should be kept away from traffic routes that consistently come from the high-pathogen sick pen and manure storage. Control the flow of air and manure as much as possible. The flow of these fluids should always be from most-susceptible

new calves to least-susceptible old cows, or better yet, no flow connection at all. If possible, avoid chasing manure from one area into another. One way to achieve this is to spread the buildings out to afford some physical isolation and better ventilation, as well as more opportunity for expansion or new technology. Mixer wagons/trucks, payloaders, skid loaders and manure pumps can still efficiently move feed and manure short distances. Control where traffic coming from other farms (feed truck, milk truck, vet, and renderer) has access to your farm. Isolating these access routes from common farm operational routes minimizes the potential for cross-farm contamination.

**THE PLAN SHOULD BE AWARE OF THE POSSIBILITY OF POTENTIAL POLLUTION FROM SPILLS OR OVERFLOWS AS WELL AS THE PERCEPTION OF ENVIRONMENTAL ISSUES.**

Keeping the manure system away from water sources and out of sight from the public can reduce the chance of conflict over environmental concerns. Locating some pasture for a few heifers behind a white fence in view of the public will provide a nice image for the milk-consuming public to reflect on. Odors moving with the prevailing winds and air drainage on still nights should also be considered. Certainly having a plan you can present to neighbors and municipal leaders that shows the steps you are taking as a responsible member of the community will help win social acceptance.

**SERVICES ARE AVAILABLE TO HELP WITH THE PLANNING PROCESS.**

Although Google Earth gives a good plan view of the existing site, a survey showing elevations and utilities with the chance to draw in to scale the proposed buildings, driveways and drainage systems is useful. Building plans need to be detailed enough to show cow traffic and fixtures so working routines can be thought through and evaluated.

**GET ACCURATE COST ESTIMATES AND TIMELINES.**

Use past experience to predict future performance. Look to your own or similar jobs to predict costs and time. Use bids (or past bids) to estimate costs. Both building materials and labor vary from place to place and over time. Be conservative and always have a Plan B (risk management). Ask a trusted consultant if they think the plan is feasible and realistic, both cost-wise and timewise. Set milestones for the dates you will have completed parts of the construction so you can check whether they will be finished on time.

**YOUR BEST SOURCE OF GOOD LAYOUTS FOR FARMSTEADS WILL COME FROM BOTH THE GOOD (AND BAD) LAYOUTS YOU SEE FROM OTHER FARMS.**

Planning requires visits to other farms with time for questions and discussions of what they considered and what they wished they considered.

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Some considerations:

- Neonates, maternity and nurseries should be in highly-visible but low farm traffic areas. Then the odor and fly pressure can be minimal, and animal care will be more convenient.

- Place manure storages, compost piles, bunker silos, and feed centers as far away and downwind as practical. Access roads should travel around the farmstead and not through it. Placing these paths on the periphery leaves options open for future expansion.

- Traffic patterns should never interfere with each other. The milk truck shouldn't interfere with the feed truck, which shouldn't interfere with the manure tanker, which shouldn't interfere with the vet, etc.

- In the barn, traffic to and from the parlor should be two-way. All outside farm lanes should be wide enough to accommodate two vehicles passing each other.

- Place shop and fuel storage together, a safe distance away from residences, but well-lit and visible to discourage theft and vandalism.

- Space the buildings out for adequate ventilation, surface water drainage, snow removal and/or storage, fire prevention, and biosecurity. (Space naturally ventilated barns five to 10 times the ridge height of the upwind structure.)

- Plan for a doubling of the herd size on all the facilities or understand the

growth limits of the farm.

- Figure in flexibility so if the mission of the farm changes, converting is easier.

- Never place a barn so that it has a dead end. Backing up is time-consuming and inefficient. This situation frequently compromises expansion.

- Use an engineer or a building company that employs an engineer for design. (New York does not require one.) Although agricultural buildings often don't have to comply with any building code, you don't want to have your equipment, animals or people at risk during high-winds or snow-load. Over-design is costly in materials. Repurposing older buildings may require an engineer to evaluate the condition of the structure. Also evaluate the cost of retrofitting versus tearing down. Retrofit costs are often underestimated, and living with inefficient facilities can be costly in the long run.

### **THE PLANNING EFFORT IS VITAL FOR ANY REVISION ON A FARMSTEAD.**

Evaluate your conditions carefully. Use the support and advice of dairy experts. Visit and evaluate facilities similar to the one you propose. The future will be brighter with a facility that can conform to the mission of your farm. ■

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