



Site Evaluation for Dairy Housing Systems

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A successful dairy production system starts with a good site. Whether you are expanding an existing dairy or building a new dairy, a few basic steps are important to assure a site that is good now and for many years into the future. The goal is to provide a site that allows for growth and prosperity of the operation in the years to come. Plan investments to allow you to build towards the future, not just spend more money on continuing the past. Answers to the following questions are needed before you proceed to evaluate sites for dairy construction.

- Why is the project being considered? Is it to allow for another member to be brought into the operation, is it simply that the operation must expand to be economically viable, or are the old facilities worn out and replacement is required?
- If you could build your dream operation, what would it be? What are logical steps that can be taken to reach this goal?
- What are your goals for the next 5, 10, and 15 years. This is needed to give an idea of approximate sizes for needed facilities. The site needs to be large enough to allow room for future changes and expansion. Consider the amount of change that has occurred on dairy farms in the last 15 years.
- How is the area surrounding your farm likely to change in the next 5 - 15 years? Will the area remain agricultural or are nonagricultural users creeping into the area?

For good planning, you need a description (maps, photos, words) of all possible sites and locations along with an evaluation of any existing facilities and their expected use. A simple map of the possible building sites is a must! This should indicate existing buildings, roads, streams, property lines, utility lines, drainage ways, wells, neighbors, and any other sensitive areas. With these resources and a team approach, site evaluation can be done very efficiently and effectively.

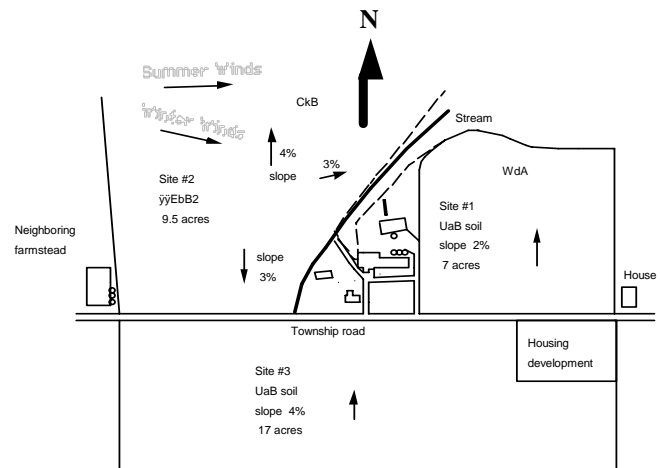


Figure 1. Site map of existing facilities, possible sites, and neighboring land.

Resources for Site Evaluation

There are several resources available for site evaluation. Conservation maps, ASCS aerial maps, topographical maps, and soil survey maps not only provide valuable information, but give a different perspective of the site to be evaluated. Many farms have aerial display photographs that provide a good view of the existing farmstead and potential nearby sites.

Various people with different expertise can provide more ideas and view points than one person alone. Outsiders may see possibilities that you have missed. A team approach to site evaluation is very helpful. This team may consist of yourself, a cooperative extension agent, someone from your local Natural Resources Conservation Service (NRCS) or Conservation District office, a design engineer, your veterinarian, and your lending institution or financial advisor.

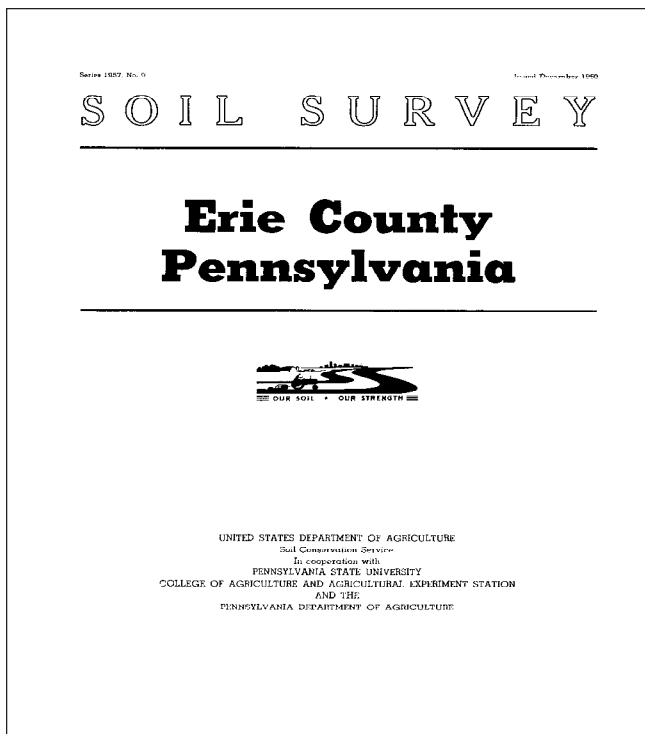


Figure 2. Soil survey maps are an excellent source of information on soil characteristics such as type, slope, drainage, water table, etc.

Site Characteristics

After identifying possible sites, develop a list of their characteristics. These preliminary sites are simply picked as possibilities and should not be ranked in preference until the last step of the evaluation process. Evaluate each site against a list of site factors. This list should include: water, drainage, required area, off-farm factors, utilities and access, climate, wastes, regulations/zoning, and personal preferences. Once the list of characteristics has been established, the selection of a site is more logical and objective.

Essential Site Factors

Sites that cannot meet the following four essential site factors should be eliminated.

- 1) **Water:** Water needs to be available at the site in the quality and quantity needed. If this cannot be met don't even consider the site. Twenty to twenty-five gallons per day per cow of drinking water is needed in addition to that used in the milking center and household.
- 2) **Drainage:** An animal facility needs to have proper surface and subsurface drainage. The topography of the site needs to allow clean water diversion away

from the animal facility. A slope of 2 to 6% will provide drainage without erosion. Good subsurface drainage will help prevent frost heaving of foundations. Don't build in a hole!

- 3) **Required area:** This includes more than the size of the animal housing unit. The feed area, machine storage, vehicular traffic, water and electric upgrade, youngstock housing, manure handling, and adequate separation from neighbors must also be considered. Room will be needed to collect and control contaminated water from the animal units. Separation of the buildings is needed to prevent fire spread and allow good natural ventilation. How much grading will be required to develop an adequate building site?
- 4) **Off-farm factors:** These factors include the surrounding environment such as urban developments, building codes, and pollution requirements. The site needs to meet building codes and pollution requirements and should provide isolation from the surrounding environment.

Other Site Factors

Several other site factors are also important and may vary with different building systems.

- 1) **Access:** How hard will it be to construct drives and lanes to the new facilities? Is there access to crop fields for bringing in crops and hauling out manure? Fire prevention and protection, safety, and security are often related to access.
- 2) **Utilities:** What are the distances that electric, gas, and telephone lines need to be run?
- 3) **Restrictions:** Does the site have any easements, power lines, buried pipelines, or buried fuel tanks that may cause problems?
- 4) **Climate:** What are the prevailing wind directions in the summer and winter? Is the site prone to drifting snow problems? Will excessive rainfall cause any problems? Will buildings be exposed to summer breezes for optimum cow comfort? Can the orientation of the building allow the sun to warm and dry surfaces in the winter, but provide shade in the summer?
- 5) **Manure and Liquid Wastes:** Can the site conform with all environmental regulations? Is the topography satisfactory for control of runoff from outside animal lots? Is there a satisfactory location for a manure storage to be built now or in the future? Can manure flow by gravity to the storage or will pumping be necessary? A soils evaluation will help tell what type of manure storage can be built on the site. Are prevailing winds, air drainage, and distance to sensitive areas such that the odors are directed any from sensitive areas?

6) Relation to Existing Facilities: Does the location of the site in relation to existing buildings allow incremental expansion? How far will the cows need to be moved and over what type of terrain?

Steps for Evaluation

Use 5, 10 and 15 year goals, space required for building systems, and site factors to work through the following four steps.

- 1) Make a scale map, including existing facilities if applicable, and locate the possible sites for construction. Include slopes, soil types, and size. Also, identify direction to fields, roads, off-farm influences such as neighbors, and critical environmental areas.
- 2) Use the four essential site factors to evaluate possible sites. This process may eliminate one or more of the possible sites identified.
- 3) Use the remaining site factors to finish the list of characteristics. See the check list on the back page of this fact sheet.
- 4) From this list of site characteristics the selection of a preferred site can be determined.

With the site selected, check the layout of the desired facilities to see if they will fit. This is an iterative process, and some changes may need to be made in the facilities layout to fit them to the site. The facilities and dimensional sizes used in the site evaluation were only to give a rough idea of size requirements and may need altered to conform to the site. However, if compromises are made to the point that the facilities are no longer useful, then another site needs to be considered. After a layout is determined, stake out the buildings on the site. This will give a much better feeling for how the facility will look. Do areas left for drainage ways, turning trucks and equipment look adequate?

Site evaluation is not a process that will be done in an hour, but it is a very important step in a farm building project. The site selected will affect future decisions for years to come and should reflect the long-term goals of your operation. Site evaluation is best done with a team approach to bring out as many ideas and view points as possible. Some extra time planning now will save headaches and money in the future. Make your mistakes with pencil and paper, not concrete and re-bar. Remember, be sure to leave room for future growth or changes. A farmstead is always changing. Plan this project to be the first step in your future modern dairy production system, not just an addition to the past!

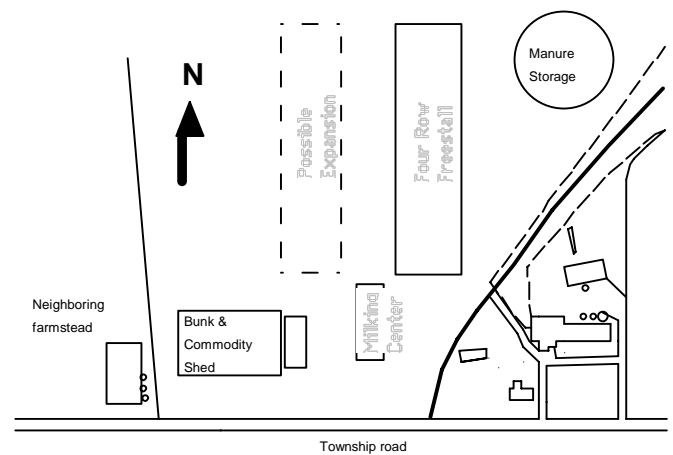


Figure 3. Proposed layout of new facilities, with additional expansion, in relation to the existing farmstead.

Other fact sheets may be found on our website at www.abe.psu.edu. Click on Extension and choose fact sheets.

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Site Factors Checklist

Yes	No		Yes	No	
		Water			Utilities and Access
___	___	quality	___	___	distance from electric, gas,
___	___	quantity (20-25 gal/day/cow plus milking center and household)	___	___	telephone, and main road terrain that must be crossed to get to the site
		Drainage	___	___	easements, power lines, or buried pipelines
___	___	slope 2-6%	___	___	fire prevention and protection
___	___	subsurface	___	___	safety
___	___	high ground	___	___	security
___	___	critical areas (wells, fish streams, public/private water supplies)			Climate
		Required area	___	___	prevailing winds for ventilation
___	___	animal units	___	___	snow drifting, removal, and storage
___	___	milking center	___	___	excessive rainfall problems
___	___	convenient access for milk hauler with no backing	___	___	orientation to the sun
___	___	cow traffic to present and future animal housing			Wastes
___	___	wastewater disposal	___	___	environmental regulations
___	___	feed center	___	___	topography for drainage of manure area for storage
___	___	bunker silos	___	___	soils evaluation for type of storage
___	___	commodity sheds	___	___	prevailing winds, air drainage, and distance to dilute odors
___	___	grain bins			Location
___	___	manure storage	___	___	relation to existing buildings for incremental expansion
___	___	separation for ventilation and fire vehicular traffic	___	___	distance and terrain to be traveled by cows
___	___	parking for cars, trucks, and equipment			
___	___	youngstock			
		Off-farm factors			
___	___	building codes/regulations			
___	___	zoning/set back requirements			
		highways, streams and property lines			
___	___	pollution requirements			
___	___	isolation from surrounding environment			
___	___	public or private water supply protection zones			

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