

**Before manure is applied, check with your local health department or state water quality agency to inquire if your farm or application sites are within a protected watershed and if permits and nutrient plans are required.**

## Site Information

Possible site information sources to consider are as follows:

- USDA Farm Service Agency maps showing location and acreage of fields, crops to be grown, and locations where soil samples were collected.
- County maps from planning and zoning offices showing areas with high leaching or erosion potential, water bodies, flood plains, and any other environmental hazards.
- U.S. Geological Survey maps showing “blue line” streams where regulations may require setbacks. These maps are available on the Internet for most states.
- County tax assessor maps, which in many areas will be the most recent, highest resolution source of aerial photographs.
- USDA-Natural Resources Conservation Service (NRCS) County Soil surveys, which have aerial photos that identify types and physical properties of soils.
- County and state environmental regulatory offices.
- Cooperative Extension Service (CES) offices.

To put your options into perspective, it would be helpful to get a large map of the county or counties of interest. Some areas may be restricted by state or county regulations; these areas should be marked off first, preventing you from spending evaluation time on these areas.

Most states have developed a classification scheme for all water supply watersheds in the state. These classifications relate the size of the watershed, water demand, quality of the water source, and the dominant land uses. Each classification usually has associated restrictions on land use and types of agricultural practices such as additional buffer setback distances for applying manure or litter near streams, drainage ways, ditches, or wells. In addition, certain restrictions may apply throughout the watershed while others may apply only to designated or critical areas of that watershed. Generally, these critical areas are within ½ mile of the intake of a water supply system. Before manure is applied, check with your local health department or state water quality agency to inquire if your farm or application sites are within a protected watershed and if permits and nutrient plans are required. Watersheds that are near nutrient-sensitive natural or cultural resources, or near protected streams or rivers may have limitations on the type and management of certain agricultural practices, including manure application. Consult with your local soil conservation district or state water quality agency to inquire if the land you are considering in lies within a “special watershed.”

The next step should be to locate areas of high-density population development and other neighboring manure-sensitive areas and remove them from consideration. By removing undesirable map areas, areas that could be acceptable for manure application from the public perspective should remain.

## General considerations

Selection of a site to use for land application involves several physical and economic considerations, including

- Availability, cost of land use, and economics of transporting manure to application site.

- Distance and elevation differences for piping if using pumping methods for manure disposal.
- Manure characteristics.
- Soil and site characteristics.
- Surrounding land uses.
- Land agronomic need of manure nutrients.
- Cropping and land management practices.

### Soil and site information

A great deal of time can be saved by evaluating soil maps, even though a detailed soils evaluation will be required on the specific sites. The soil maps provide a good indication of desirable sites, as well as general areas to avoid.

The best source of site information is usually County Soil Survey books and your local CES, local conservation district office, or NRCS. If a soil survey is not available for your county, check with the local NRCS office; they may have much of the needed data and may have personnel with knowledge of area topography and soil types.

Soil surveys are reports that the NRCS has developed. They contain detailed maps that depict the occurrence of different soil types, presence of natural and man-made physical features of the landscape, and the slope of the land's surface. These reports also contain the basic information necessary for a preliminary evaluation for site suitability for manure application. Several steps must be followed to use a soil survey report correctly. These include using the

- Legal description of the property and the general location map to determine the detailed map sheet number.
- Information on the detailed map to determine the soil type and the corresponding appropriate interpretation (data) tables, assessing site suitability.

### Legal description

All land is described according to its location within a grid system that land surveyors developed. Legal description can be obtained from tax records or plat maps and soil survey maps.

**The best source of site information is usually County Soil Survey books and your local CES, local conservation district office, or NRCS.**

### EXAMPLE

**He or 214 is Herndon Soil, 0% to 2% slope.**

Note: It is important to realize that inclusions of similar and dissimilar soils may occur within any given soil map unit. These are generally too small to map, based on the scale of mapping, and are usually 3 acres or less.

### General location map

Most soil survey reports contain a general location map that is located at the front or back of the detailed soil maps. This map shows major roads, watercourses, and lakes within the county, but its primary purpose is to indicate the page on which the detailed map can be found. You must use the legal description or your knowledge of the area to find the proper detailed map page.

### Detailed soil survey maps

These maps (Figure 33-1) are aerial photographs of all property within a county. They have been altered to show

- Soil types/soil series.
- Slope and topography.
- Erosion.
- Drainage patterns and physical features.

**Soil types/soil series.** The occurrence of soil series boundaries is indicated by lines with a two-letter symbol or a number located inside the lines.

**Slope and topography.** Slope refers to the vertical rise or fall over a given horizontal distance. The slope of the land is shown by a capital letter located immediately after the soil symbol or number.

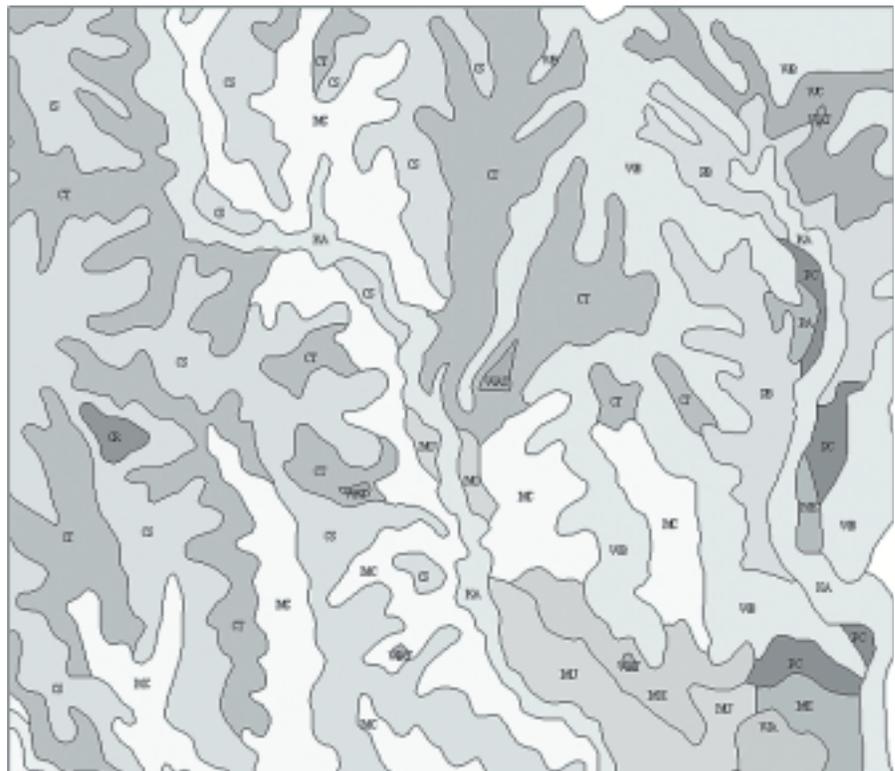


Figure 33-1. Soil map.

**Erosion.** The one-digit number located immediately after the slope designation indicates the extent of existing soil erosion. The extent of erosion must be considered in determining a site's suitability for manure application. Eroded areas are more difficult to manage with a manure injection or incorporation program. The heavier clay soils typical of eroded areas can also be difficult to manage when the soil or sod cover is disturbed. The heavier soils are less ideal as a seedbed for newly planted vegetation and are more difficult to achieve uniform manure applications without significant soil disturbance.

**Drainage patterns and physical features.** The symbols for these items are included in the key located in Figure 33-2.

### Soil data sheets

Soil data tables are normally located before the soils maps in the survey. These tables contain important information necessary to evaluate a given soil's suitability for manure application. Tables 33-1 and 33-2 are examples of soil data tables necessary to evaluate a site for manure and wastewater application.

Soil data tables contain alphabetically or numerically sequenced lists of soil types within the mapped area. The columns indicate soil characteristics needed to evaluate the site. These are as follows:

- Depth to and type of water table
- Depth to and type of bedrock
- Texture, thickness, and permeability of each soil horizon
- Limitations for manure storage/lagoon construction

#### EXAMPLE

**HeB.** The letter B indicates the slope. Slope letters normally range from A to F with A being the flattest slope and F being the steepest slope. No letter or the letter A indicates that the land slopes less than 2%.

#### EXAMPLE

**HeB2.** The number 2 indicates that the soil surface has been eroded. A number 3 indicates severe erosion. No number indicates that minimal detectable erosion has occurred.

**The extent of erosion must be considered in determining a site's suitability for manure application.**

**Soil data tables are normally located before the soils maps in the survey. These tables contain important information necessary to evaluate a given soil's suitability for manure application.**

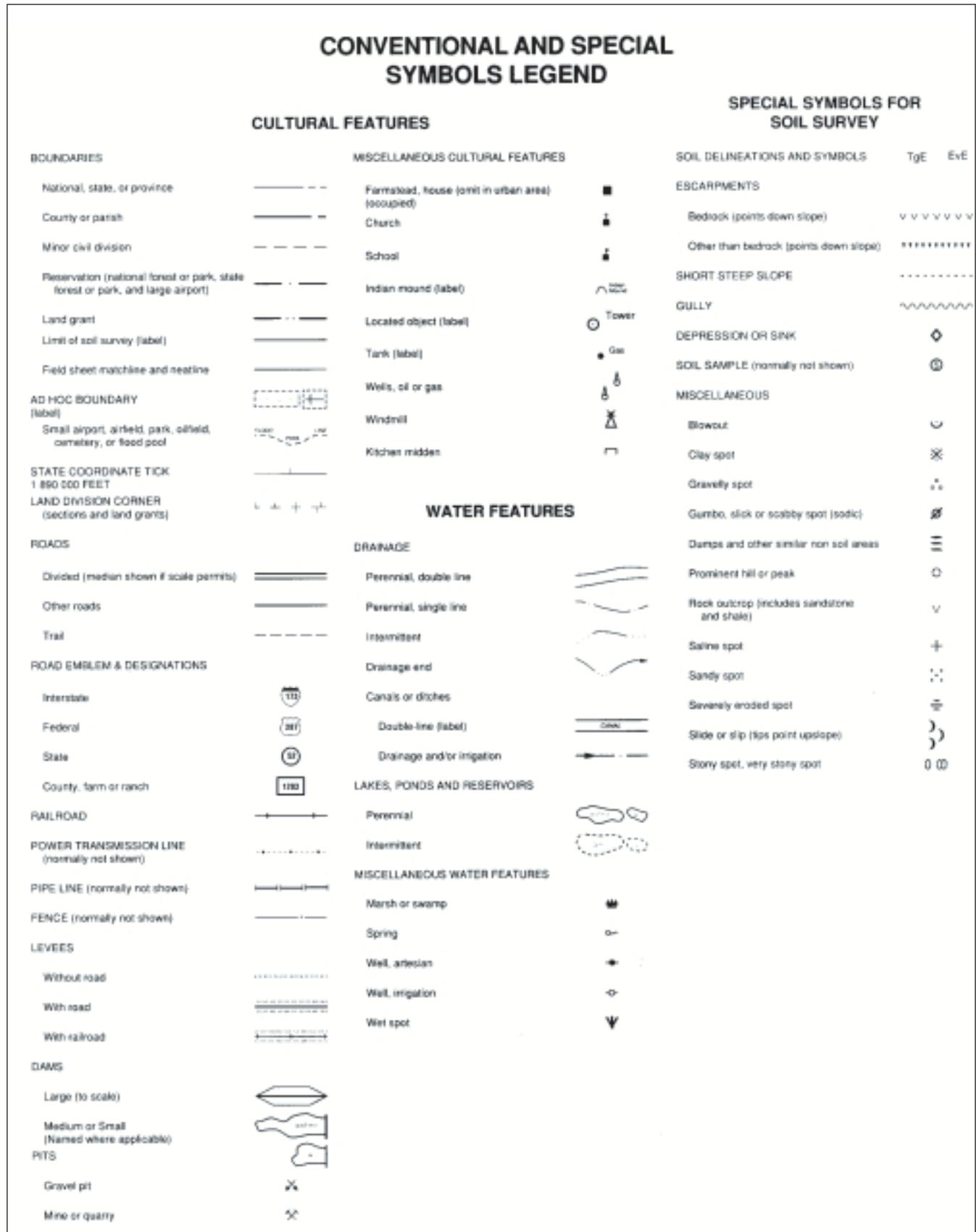


Figure 33-2. Map symbols.

Table 33-1. Excerpt of "Physical and Chemical Properties of Soils" (scanned from a soil survey).

(The symbol < means less than; > means more than. Entries under \*Erosion factors--T\* apply to the entire profile. Entries under \*Wind erodibility group\* and \*Organic matter\* apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

| Soil name and map symbol       | Depth |       | Moist bulk density | Permeability | Available water capacity | Soil reaction | Shrink-swell potential | Erosion factors |   | Wind erodibility group | Organic matter |
|--------------------------------|-------|-------|--------------------|--------------|--------------------------|---------------|------------------------|-----------------|---|------------------------|----------------|
|                                | In    | Pct   |                    |              |                          |               |                        | K               | T |                        |                |
| AeB, AeC-----<br>Ailey         | 0-22  | 5-10  | 1.35-1.45          | 6.0-20       | 0.03-0.05                | 4.5-6.5       | Low-----               | 0.15            | 4 | 2                      | <1             |
|                                | 22-40 | 15-35 | 1.55-1.70          | 0.6-2.0      | 0.09-0.12                | 4.5-5.5       | Low-----               | 0.24            |   |                        |                |
|                                | 40-54 | 18-35 | 1.70-1.80          | 0.06-0.2     | 0.06-0.10                | 4.5-5.5       | Low-----               | 0.24            |   |                        |                |
|                                | 54-62 | 15-30 | 1.80-1.95          | 0.06-0.2     | 0.04-0.08                | 4.5-5.5       | Low-----               | 0.15            |   |                        |                |
| BaB, BaC-----<br>Badin         | 0-4   | 10-27 | 1.40-1.60          | 0.6-2.0      | 0.14-0.20                | 3.5-6.5       | Low-----               | 0.15            | 3 | 5                      | 1-3            |
|                                | 4-33  | 35-55 | 1.30-1.50          | 0.6-2.0      | 0.14-0.19                | 3.5-5.5       | Moderate----           | 0.24            |   |                        |                |
|                                | 33-45 | ---   | ---                | ---          | ---                      | ---           | -----                  | ---             |   |                        |                |
| BdB2, BdB2-----<br>Badin       | 0-6   | 27-40 | 1.20-1.45          | 0.6-2.0      | 0.14-0.19                | 3.5-6.5       | Low-----               | 0.28            | 2 | 7                      | .5-2           |
|                                | 6-28  | 35-55 | 1.30-1.50          | 0.6-2.0      | 0.14-0.19                | 3.5-5.5       | Moderate----           | 0.24            |   |                        |                |
|                                | 28-42 | ---   | ---                | ---          | ---                      | ---           | -----                  | ---             |   |                        |                |
| BgB*, BgC*, BgD*-----<br>Badin | 0-4   | 10-27 | 1.40-1.60          | 0.6-2.0      | 0.14-0.20                | 3.5-6.5       | Low-----               | 0.15            | 3 | 5                      | 1-3            |
|                                | 4-33  | 35-55 | 1.30-1.50          | 0.6-2.0      | 0.14-0.19                | 3.5-5.5       | Moderate----           | 0.24            |   |                        |                |
|                                | 33-45 | ---   | ---                | ---          | ---                      | ---           | -----                  | ---             |   |                        |                |
| Goldston-----<br>Goldston      | 0-5   | 5-27  | 1.40-1.60          | 2.0-6.0      | 0.10-0.16                | 3.5-5.5       | Low-----               | 0.15            | 2 | 8                      | .5-2           |
|                                | 5-15  | 5-27  | 1.40-1.60          | 2.0-6.0      | 0.06-0.12                | 3.5-5.5       | Low-----               | 0.05            |   |                        |                |
|                                | 15-23 | ---   | ---                | ---          | ---                      | ---           | -----                  | ---             |   |                        |                |
|                                | 23    | ---   | ---                | ---          | ---                      | ---           | -----                  | ---             |   |                        |                |

Table 33-2. Excerpt of "Soil and Water Features" (scanned from a soil survey).

(\*Flooding\* and \*water table\* and terms such as \*rare,\* \*brief,\* \*apparent,\* and \*perched\* are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

| Soil name and map symbol           | Hydro-logic group | Flooding     |                |         | High water table |          |         | Bedrock |           | Risk of corrosion |           |
|------------------------------------|-------------------|--------------|----------------|---------|------------------|----------|---------|---------|-----------|-------------------|-----------|
|                                    |                   | Frequency    | Duration       | Months  | Depth            | Kind     | Months  | Depth   | Hard-ness | Uncoated steel    | Concrete  |
| AeB, AeC-----<br>Ailey             | B                 | None-----    | ---            | ---     | >6.0             | ---      | ---     | >60     | ---       | Moderate          | Moderate. |
| BaB, BaC, BdB2, BdB2-----<br>Badin | B                 | None-----    | ---            | ---     | >6.0             | ---      | ---     | 20-40   | Soft      | High-----         | High.     |
| BgB*, BgC*, BgD*-----<br>Badin     | B                 | None-----    | ---            | ---     | >6.0             | ---      | ---     | 20-40   | Soft      | High-----         | High.     |
| Goldston-----<br>Goldston          | C                 | None-----    | ---            | ---     | >6.0             | ---      | ---     | 10-20   | Soft      | Moderate          | High.     |
| CaB, CaC-----<br>Candor            | A                 | None-----    | ---            | ---     | 4.0-6.0          | Apparent | Dec-Mar | >60     | ---       | Low-----          | High.     |
| CeB2, CeC2-----<br>Cecil           | B                 | None-----    | ---            | ---     | >6.0             | ---      | ---     | >60     | ---       | High-----         | High.     |
| ChA-----<br>Chewacla               | C                 | Frequent---- | Brief to long. | Nov-Apr | 0.5-2.0          | Apparent | Nov-Apr | >60     | ---       | High-----         | Moderate. |
| ChA*-----<br>Chewacla              | C                 | Frequent---- | Brief to long. | Nov-Apr | 0.5-2.0          | Apparent | Nov-Apr | >60     | ---       | High-----         | Moderate. |
| Chastain-----<br>Chastain          | D                 | Frequent---- | Very long      | Nov-Jun | 0-1.0            | Apparent | Nov-May | >60     | ---       | High-----         | High.     |