CHAPTER 4

SPENCER COUNTY ENVIRONMENTAL INVENTORY AND ANALYSIS

PURPOSE

The purpose of this chapter is to assess the general environmental or physical characteristics of the land affecting development in Spencer County over the next twenty years. Further analysis will relate the physical environment to the existing infrastructure of the county to determine present capacities and limitations as well as compatibility with the physical environment.

To a certain extent, the type and degree of development that occurs in a community depends on the physiographic features of the area. The terrain, soils, water courses and other natural resources either prohibit or encourage varying development patterns. Together with the community's existing and anticipated infrastructure, i.e. the transportation network, and community facilities and utilities, the physiographic features of the planning area influence the shape of future development and/or redevelopment.

First, the existing physical environment and natural resources of the county will be analyzed in terms of its suitability for development including environmental sensitivity, soil and subsoil conditions, and the presence of steep slopes and flood prone areas. Secondly, the existing infrastructure of the county will be examined in the following chapters in terms of an inventory of what exists, service capacities and limitations. Existing utilities, the transportation network, and police and fire protection will be studied to determine both their compatibility with the physical environment and their capability for serving anticipated growth areas.

ENVIRONMENTAL INVENTORY AND ANALYSIS

Specific physiographic features of the land may limit or encourage growth and development. For example, the soils associated with a certain geographic area may be restrictive in terms of capability for sewage disposal or the availability of water as shown on Map 9 (Soils map) and Map 1 (Water map). These features could allow a high concentration of growth or limit the density of development. Topography is another example of a constraining element of growth. Steep hillsides and flood prone areas should not be developed due to the natural hazards they possess shown on Map 8 (Slope map).

At the opposite end of the spectrum, prime agricultural land that is normally level with permeable soils and could easily support development has another type of constraining characteristic. The social and economic preference toward highly productive farm lands is continued utilization for food production rather than allowing the land to be developed for other uses.

The environmental analysis, then, delineates the natural constraints to growth in the county; and shapes between the environment and the demands that necessary growth places on the environment.

CLIMATE

Spencer County is located in the Salt River Basin region of Kentucky which is characterized by warm, humid summers and no specific dry season, although late summer is normally the driest part of the year and can cause short-term droughts during this period. Temperatures are considered moderate with few days greater than 100 degrees or less than 0 degrees Fahrenheit.

The annual precipitation for the basin is approximately 45 inches, with snow contributing very little to surface runoff, as it rarely stays on the ground for more than a few days. About half of the annual rainfall occurs during the warm season months between April and September and does contribute to non-point contamination from surface runoff.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the south, and average wind speed is highest in winter at about 10 miles per hour.

TOPOGRAPHY

The topography of Spencer County is divided into two distinct surfaces. The eastern portion of the county lies in a sub – region of the Salt River Basin known as the Hills of the Bluegrass characterized by hilly terrain, with winding ridges and valleys and steep slopes that average 25-30 percent, leaving few areas of level land suitable for development as shown on Map 8 (Slope map).

The Outer Bluegrass comprises the surface of the central and western portion of the county. It is undulating or rolling and is not uniform in development. It is characterized by medium to rapid surface runoff and medium internal drainage. By contrast the Hills of the Bluegrass has very rapid surface runoff and slow internal drainage.

The ground slope aspect of the county's topography must be considered as it affects both the use and maintenance of the land in question. The relationship between slope and land use can be generally classified to help determine the appropriate land use activity. Slopes under 4 percent, i.e. rising 4 feet in 100 feet of horizontal distance, are relatively flat and are usable for all kinds of intense activity. Slopes over 10 percent seem steep and should be used only for hill sports or free play. It is more expensive to erect buildings on them, as a more complicated form and foundation and more difficult utility connections are required.

Slopes also have a bearing on drainage, erosion and maintenance. Slopes under 1 percent do not drain will unless they are paved and carefully finished. Slopes over 50 to 60 percent cannot be protected from erosion in a humid climate except by terracing or cribbing.

As the land becomes steeper and more impervious, more rain will run off the land's surface instead of seeping into the ground. This means a liability to erosion of the flooding and surface channels.

Slope also influences the ability to provide infrastructure services as the total system of slopes determines the capability of connecting continuous lines of suitable grade. Grades under 1 percent are difficult to drain, and large sewers may tend to "ride up" out of the ground. On steep ground, sewer pipes have to be specially designed to prevent rapid scouring flow. Roads are kept at a less than 10 percent grade as a 15 percent slope approaches the limit that an ordinary loaded vehicle can climb for a substantial period.

Thus, it is evident from the above analysis that the degree of slope of a geographic area is very critical in terms of determining appropriate land usage; and that much of Spencer County is limited for development purposes due to slopes in excess of 10 percent which produce inherent construction problems.

The following Map 8 (Slope map) is a generalized view of the entire county showing slopes in excess of 20 percent. It indicates that especially in the eastern portion of the county slopes are often in excess of 25 to 30 percent; and pose severe limitations to development due to rapid runoff, soil erosion, and slow internal drainage as well as problems associated with installation of utilities and roads.

The central and western portions of the county are somewhat less steep in terrain, although still riddled with areas in excess of 20 percent slope, and are somewhat more suitable for development purposes. This area of the county is still subject to medium to rapid surface runoff and medium internal drainage. The extreme northwest and south-central portions of the county appear to have the most contiguous acreage with slopes more suitable for development.

Map 8 illustrates more thoroughly the slopes analysis of the Taylorsville Lake area from the borders, or fee acquisition line showing Corps property, to approximately 1-2 miles in every direction from the acquisition line. This area encompasses all of the land with potential for development around the lake; as well as land following the major access routes Highway 55 and Highway 44, south and east of Taylorsville respectively, along which development is already spreading out from the city.

Moving south from Taylorsville along Highway 55 especially in the Wakefield area there are many relatively broad, flat ridges on which small residential development could be supported. Moving east from Highway 55

toward the lake along its western edge, the terrain becomes more rugged, with property bordering the lake mostly in excess of 20 percent.

Along the southern edge of the lake, the land lying between Jack's Creek and Ashes Creek has some acreage suitable for development, mostly bordering the access road. The land drops sharply, however, directly above the lake. Vistas to the water in both of these areas appear to be limited.

The land lying between Ashes Creek and the Salt River in the south central portion of the lake has a few flat ridges with slopes of 12 percent, especially at the northern end of the access road leading into this area. Most of the rest of the southern borders of the lake, and virtually all of the southeastern, east central and northeast portions of lands bordering the lake are characterized by narrow ridges and steep hillsides, have slopes in excess of 12 percent and often (especially in the east) with slopes in excess of 20 percent, presenting several limitations to development.

The land possessing the best potential for development from a slope analysis standpoint is that lying between the northern edges of the lake and Highway 44, east from Taylorsville. There are several ridges with slopes of from 0 percent to 12 percent.

SOILS

The description of soil associations of a land area provides information about the area's potential drainage, runoff, and erosion, and about the suitability for earth moving and foundations as well as suitability for agriculture and forestry. Of significant importance in determining the soils limitations for specific purposes are slope, depth to bedrock, stability, and permeability, especially as it affects the transmission and collection of sewage and the amount of storm water runoff.

The dominant soil associations of the county, their approximate locations and interpretations are shown in the following Map 9 (Soils map).

The first association, shown in the extreme western part of the county on Map 9 (Soils map), is the Beasley-Faywood Association which is characterized by moderately deep, well-drained clayey soils on hillsides.

This soil association consists of narrow ridges, and strongly sloping to steep hillsides separated by narrow valleys. The soils developed chiefly in materials weathered from limestone and calcareous shale. The Beasley soils are on the narrow ridges. The Faywood soils are on the hillsides. Beasley soils make up about 38 percent of the association and Faywood soils about 36 percent. Minor soils that make up the remaining 26 percent are Lowell, Fairmont, Woolper, Elk, Nolin, and Newark. The association makes up about 7 percent of the county.

Pasture and hay are the main crops in this soil association. A small acreage of row crops is grown on the ridge tops and in the narrow valleys. About one-third of the acreage is in woods.

Sources of water include streams, farm ponds, springs, and wells. Sites for water impoundment structures are available in most valleys in the area.

Hazard of erosion, shallow soil depth, equipment limitations, seedling mortality, plant competition, and steepness of slopes are the main factors limiting use of the soils for crops. The steep and very steep soils are best suited to woodland and to use as wildlife habitat.

Brief descriptions of the dominant soils and some features important to some uses follow:

Beasley soils normally have a grayish-brown silt loam surface layer and a strong-brown, sticky clay subsoil. Gray calcareous shale's are below a depth of about 30 inches.

Slope Range: 2 to 20 percent, mostly 6 to 12 percent

Drainage: Well-drained

Permeability: 0.2 to 0.63 inches per hour

Shrink-swell: Moderate

Limitations for septic tank filter fields are severe because of the slow permeability. Limitations for most other non-farm uses range from moderate to severe because of steepness of slopes and moderate shrink-swell potential.

Faywood soils normally have a very dark grayish-brown silty clay loam surface layer and a yellowish-brown to olive brown clay subsoil.

Slope range: 6 to 50 percent, mostly 12 to 30 percent

Drainage: Well

Percent coarse fragments: 5 to 20 percent

Available moisture capacity: Moderate

Depth to rock: 20 to 40 inches

Limitations for most non-farm uses are severe because of shallow depth to rock, steepness of slope and moderately slow permeability.

The second association, known as the Nolin- Elk- Newark Association is shown in the flood plain and stream terrace areas on Map 9, predominantly in the central and west-central portion of the county. The association is characterized by nearly level and sloping, deep, well-drained, loamy soils and level, somewhat poorly drained, loamy soils with a fragipan.

The Nolin soils are on the flood plains, and the Elk and Lawrence soils are on the stream terraces. Nolin soils make up about 30 percent of the association, Elk about 22 percent and Newark about 19 percent. The association makes up about 8 percent of the county.

Most of the acreage in this association is used for row crops, corn, soybeans, tobacco, and hay and pasture, very little acreage is used for urban areas.

The main sources of water are streams and wells. Suitable sites for water impoundment structures are scarce except near the edges of the area and in some of the deepest drains.

The main limitations to use of the soils for crops is flooding of the Nolin soils and wetness of the Newark soils. Elk soils have a moderate hazard of erosion when cultivated.

Brief description of the dominant soils and some features important to some uses are:

Nolin soils normally have a dark brown silt loam surface layer and brown silt loam subsoil.

Slope Range:	0 to 4 percent
Drainage:	Well-drained
Flood Hazard:	Very frequent flooding in winter and spring, occasional flooding in summer
Depth to rock:	More than 4 feet

Limitations for most non-farm uses are moderate to severe because of very frequent flooding.

Elk soils normally have a brown silt loam surface layer and thick, dark brown silt loam subsoil.

Slope Range:	0 to 12 percent, mostly 2 to 6 percent
Drainage:	Well-drained
Permeability:	.63 to 2 inches per hour
Depth to rock:	More than 5 feet

Limitations for non-farm uses are generally only slight or moderate because of slope. Low lying areas of Elk may flood occasionally during high floods.

Newark soils normally have a dark grayish-brown silt loam surface layer and yellowish-brown, gray mottled silt loam subsoil.

Slope Range:	0 to 2 percent
Drainage:	Somewhat poorly drained
Permeability:	Moderate
Depth to seasonal high water table:	6-18 inches
Depth to rock:	60 inches

Limitations for septic tank filter fields, building sites, camp sites, athletic fields and sanitary landfills are severe because of slow permeability and high water table. Limitations for most other non-farm uses are moderate.

The Lowell-Faywood Association is shown in the north central and south central portions of Spencer County on Map 9. It is characterized by deep, well drained, gently to strongly sloping soils on ridges, and moderately deep, to deep, well drained to moderately well drained, sloping loamy soils on hillsides and on ridges and side slopes.

This soil association consists of undulating to rolling uplands bordered by moderately steep to steep hillsides and narrow to moderately broad valleys. Many small drains and streams traverse the area. The soils developed chiefly in materials weathered from thin-bedded limestone and capped in some places by a thin blanket of loess. The Lowell soils for the most part are on the narrow ridges and on upper side slopes, which are on the broader ridges. The Faywood soils are on the hillsides. Lowell soils make up about 34 percent of the association, Faywood about 34 percent. The association makes up about 54 percent of the county.

The ridges in this association are used for the production of row crops, hay and pasture. The hillsides are used chiefly for pasture but brush land and woods are quite common especially on the steepest slopes.

The major sources of water are cisterns, farm ponds and streams. Sites suitable for water impoundment structures are available in most of the valleys.

Hazard or erosion and shallow soil depth are the main factors limiting use of the soils from crops. Moderate to high yields of corn, tobacco, alfalfa and other crops are produced on the Lowell soils. The main limitations for urban developments are shallowness to rock in the Faywood, narrow ridges and steep slopes.

Lowell soils normally have a brown silt loam surface layer and yellowish brown sticky clay subsoil.

Slope Range:	2 to 20 percent, mostly 6 to 12 percent
Drainage:	Well-drained
Permeability:	.2 to 0.63 inches per hour
Shrink-swell potential:	Moderate
Depth to rock:	More than 4 feet

Limitations for most non-farm uses are severe because of shallow depth to rock, steepness of slope and slow permeability.

The Eden Association shown in the east and southeast portions of the county on Map 9 are characterized by strongly sloping to steep, well drained clayey soils on the Eden Hills, and deep, well drained, sloping, clayey soils on narrow ridges.

This soil association consists of long, narrow ridges, steep to strongly sloping hillsides and narrow valleys. The ridges commonly rise as high as two hundred feet above the valley floor. The soils developed chiefly in materials weathered from thin-bedded limestone, siltstones and calcareous shale. For the most part the Lowell soils are on the ridges and the Eden soils are on the hillsides. Eden soils make up about 70 percent of the association; the additional 30 percent is made up of minor extent soils. Eden soils make up about 30 percent of the county.

Small acreage of corn, tobacco and alfalfa are grown on the ridges. Most of the acreage on the hillsides is in pasture, but brush thickets and young stands of Red Cedar and locust are quite common.

The main sources of water in the association are cisterns, farm ponds and streams. Suitable sites are available for water impoundment structures in the narrow valleys.

Eden soils normally have a dark grayish-brown silty clay loam surface layer and light olive-brown, sticky clay subsoil.

Slope Range: 6 to 50 percent, mostly 12 to 30

Drainage: Well-drained

Percent coarse fragments: 15 to 45 percent

Permeability: 0.2 inches per hour or less

Shrink-swell potential: Moderate

Depth to rock: More than 60 inches

Limitations for most non-farm uses range from moderate to severe because of slow permeability, moderate shrink-swell potential and steepness of slopes.

The following Table 4-1 offers a summary of the above interpretations of the dominant soil associations of Spencer County.

TABLE 4-1
SELECTED SOIL INTERPRETATIONS
SPENCER COUNTY

Soil Association	Percent of Associations	Dominant Slope %	Wastewater-Land Application	Hydrologic Soil Group	Potential Sediment Runoff	Septic Tank Absorption Field
1. Beasley	38	6-12	Moderate(1)	C	Medium	Severe(1)
Faywood	36	12-30	Moderate(1)	C	Medium	Severe(1)
2. Nolin	30	0-4	Severe(4)	B	Low	Severe(4)
Elk	22	2-6	Slight	B	Low	Slight
Newark	19	0-2	Severe(4)	C	Medium	Severe(1)
3. Lowell	34	6-12	Moderate(1)	C	Medium	Severe(1)
Faywood	39	12-30	Moderate(1)	C	Medium	Severe(1,5,6)
4. Eden	70	12-30	Severe(1)	C	Medium	Severe(1,5)

(1) Slow Percolation
(2) Low Available Water
(3) Medium Available Water Capacity
(4) Flooding
(5) Excessive Slope
(6) Depth to Bedrock

Source: The Salt River Basin Water Quality Management Plan for Kentucky Schimpeler – Corradino Associates, Louisville, Kentucky.

NOTES (reference table 4-1):

1. Degree of slope was not considered. Soils rate slight or moderate may warrant a rating of severe if the slope is steep enough to increase run-off potential. The extent to which the slope will influence potential for land application of wastewater will depend upon the method of application used.

2. U.S. Department of Agriculture, Engineering Field and Design Manual, Ky. Addendum, 1970. Soil types throughout the state were classified into four hydrological soil groups by the Soil Conservation Service according to their infiltration and transmission rates. The categories are as follows:

   A. Soils having high infiltration rates when thoroughly wetted-these consist chiefly of deep, well to excessively drained sands or gravel. These soils have a high rate of water transmission.

   B. Soils having moderate infiltration rates when thoroughly wetted-these consist chiefly of moderately deep to deep, moderately well to well to drained soil, with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

   C. Soils having slow infiltration rates when thoroughly wetted-these consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rat of water transmission.

3. U.S. Department of Agriculture, Soil Conservation Service, "Soil Interpretation for Town and Country Planning", 1973. Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Permeability, high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

From the above analysis it is evident that soil limitations to development are problematic in many parts of the county. Those soils with only slight to moderate limitations to urban development are the Elk soils located downstream from Taylorsville on the stream terraces (the low lying Elk areas are subject to flooding).

The soils in the lake area (Eden Association) range from moderate to severe limitations to most forms of urban development because of steepness of slope, slow permeability, and moderate shrink-well potential.

GEOLOGY

The geology of the county is considered for several reasons. Perhaps, the most important reason is because geological characteristics influence the efficiency with which septic tanks can be utilized as a sewage disposal technique. Bedrock type and depth affect the construction costs of providing collection, transmission and disposal sewage facilities. Shallow depths to bedrock will especially escalate these costs.

Geological characteristics also influence the quantity and level of groundwater resources as the permeability and the porosity of materials lying below the surface directly affect groundwater supplies. The greater the

permeability of the rock type, the greater its capacity for storing water. In addition, groundwater quantities and levels are closely related to the potential for infiltration of groundwater into sewage systems.

The county is characterized by the oldest rock formations of the Salt River Basin known as the upper Ordovician Period. The Outer Bluegrass area (central and west portions of the county) is underlain by a higher proportion of shale to limestone and is thus more subject to erosion. The Hills of the Bluegrass is similar to a geologic region known as the Eden shale belt, and with its predominance of shale is inclined toward more rapid gulling, inferior soils and steep slopes; and compares unfavorably to the Outer Bluegrass area.

When kept under cultivation, these steep slopes erode rapidly, removing shale deposits and leaving scattered limestone shale.

GROUNDWATER

Perhaps the most important subsurface variant is the presence or absence of water: the moisture content of the soil, its internal and surface drainage, and the position of the water table.

The water table is the underground surface below which all interstices between soil grains are filled with water. Normally this is a sloping, flowing surface, which roughly follows the ground levels above and slopes down to ponds, lakes, streams, seeps or springs, where it intersects the ground surface. Its depth below ground can vary markedly, however, and can fluctuate seasonally or over longer periods.

The water table is important for water supply and for vegetation. A high table causes difficulty in excavation work, as well as flooded basements, flooded utilities, and unstable foundations. A high table is indicated by the water levels in existing wells and diggings, by seeps and springs, by a mottled soil, and by the presence of water loving plants. A 6 foot test pit in the wet season will reveal the presence of a table high enough to cause trouble in an ordinary residential development.

The groundwater availability in the Salt River Basin is low. Wells which yield 100 gpm are rare, and the majority of wells produce 50 gpm or less. The expected groundwater yield in gallons per minute from single vertical wells for Spencer County is less than 5 gallons per minute. This limited availability of groundwater, and the “knob” topography are factors causing extremely low flows which frequently occur during the dry months of the year.

Geologic investigation concludes that most wells drilled to depths of less than 100 feet in valley bottoms of the Salt River, Brashears Creek, Beech Creek and Little Beech Creek, will yield 100 to 500 gallons per day. Most wells drilled in

the remainder of this area will yield less than 100 gallons per day. (This area includes the City of Taylorsville and surrounding environs).

The area including the southeastern part of Taylorsville Lake close to the County- Spencer County line will yield 100 to 500 gallons per day from wells drilled in the valley bottoms. Wells drilled on hillsides and ridge tops will yield almost no water.

The lands lying roughly east of Little Mount to Mount Eden and south to Highway 248 and the upper reaches of the lake in the eastern part of the county are variable in groundwater availability. Wells drilled in the valleys of Beech Creek, both Little Beech Creeks and the Salt River will generally produce enough water at depths of less than 100 feet for a domestic supply, but most wells drilled elsewhere will not.

The lands lying in the southwest portion of the county, bordered on the north by the Salt River and on the south by the Spencer County line, and on the west by Spencer County, and on the east approximately 3 miles from KY 55, will produce 100 to 500 gallons of water per day from wells drilled in bottoms of larger valleys with a hand pump from depths of less than 100 feet. On the uplands, most drilled wells will produce less than 100 gallons per day.

The area bounded roughly on the north by Highway 1314, on the west by the Spencer County line and on the east by Elk Creek, and on the south by the Salt River (and containing Waterford) have variable groundwater availability. Wells drilled along the Salt River and its larger tributaries can be expected to produce 100 to more than 500 gallons per day at depths of less than 100 feet. Elsewhere, drilled and dug wells will produce very little water. Groundwater is hard to very hard and may contain objectionable concentrations of salts or hydrogen sulfide at depths greater than 100 feet.

Sink holes may occur intermittently in the western part of this area, indicating possibly cavernous conditions that may result in engineering and foundation problems. The dumping of rubbish in sinkholes may contaminate groundwater supplies.

In summary, the most critical subsurface problems are as follows: a high water table; the presence of peat and other organic soils or of soft plastics clay, loose silt or fine water-bearing sand; rock lying close to the surface; lands previously used as dumps or containing new and unconsolidated fill; or any evidence of slides, floods or subsolidated fill; or any evidence of slides, floods or subsidence. Total site improvement costs may increase 25% in rocky land and 85% in peat or muck. The latter may also substantially increase foundation costs.

FLOOD PRONE AREAS

Serious flooding has affected areas of Spencer County in the past, and has prohibited development in those areas have been alleviated somewhat by the construction of the dam and reservoir of Taylorsville Lake. Flood control benefits will result from the reductions of flood elevations downstream from the project.

Flood damage reduction (benefits) are computed by a statistical analysis, method, which relates the frequency of flooding to various heights throughout the range of flooding (both with and without the project) to the expected damages at comparable heights of flooding. The Salt River was divided into three reaches for study purposes.

A stage (or elevation) damage relationship was developed for each stream reach by field investigation and evaluations. For the Salt River Basin, this data was integrated with the natural and modified stage (or elevation) frequency data to determine the natural average annual flood damages and those with the project in operation. The difference represents an economic determination of the reduction in average annual damages attributable to the project.

From mile 47.6 to the bridge over the Salt River at U.S. 31E (this is part of reach S-2, mile 25.5 to 55.9) the modified flood elevation is expected to produce a gradual tapering down from 3 feet to 2 feet. At the Highway 55 Bridge over the Salt River at Taylorsville, hypothetical stage-frequency curves were developed for conditions expected with the project in operation (modified) by determining how much the project would reduce the stage of various floods, and applying this incremental reduction to the stage for natural conditions. The following Table 4-2 indicates the anticipated reduced elevations.

TABLE 4-2

STAGE-FREQUENCY RELATIONSHIP

Flood Frequency	Natural Conditions	Modified by Project	Anticipated Reduction
1 year	486 msl	481.7 msl	4.3’
10 year	494.4 msl	489.1 msl	5.3’
50 year	499.1 msl	494 msl	5.1’
100 year	501 msl	496.3 msl	4.7’

Source: Hydrological Section; District 5 office – Louisville, Army Corps of Engineers.
NOTE: Mean Sea level is denoted as msl. Anticipated reduction in flood elevation at the Highway 55 Bridge over the Salt River at Taylorsville

Map 7 illustrates the present flood prone areas without impoundment of the Salt River. At the present time there are no maps available that illustrate the reduced flood prone areas with project operation. Operation of the lake for flood control would control the maximum flood of record at the dam site, and would reduce the stage of a flood equal in magnitude to the May 1961 flood by 5.2 feet

at Taylorsville and 3 feet at Shepherdsville (Source: Final Updated Environmental Impact Statement – Taylorsville Lake). There is an anticipated 1/3 reduction in the present average annual damages (millions of dollars) in the downstream Salt River reach considering both headwater and backwater flooding.

The flooding along the creeks above Taylorsville shown on Map 7 that feed into the Salt River may be reduced somewhat due to the reduced elevation of the river downstream from the dam, but by an unpredictable amount.

Plum Creek Watershed is Kentucky's oldest watershed, a 24,000 acre project in north central Kentucky in Shelby and Spencer counties. It was completed under the Pilot Watershed program. Five of these flood control dams are located in Spencer County and were built between 1954 and 1958. These dams provide flood protection for about 23,688 acres. Listed below are the structures located in Spencer County and the Plum Creek Watershed. Refer to Map 6 for Watershed and dam locations.

FRS #2	Heady
FRS #15	Crenshaw
FRS #16	Herndon
FRS #17	Schultz
FRS #18	Featherbed

SUMMARY

The analysis of the environmental inventory of Spencer County, i.e. the analysis of the limitations as well as suitability for development of the topography, soils, geology and availability of groundwater, and the flood prone areas, should be utilized in selecting suitable sites for development of residential, commercial, industrial, institutional and recreational properties.

Basic ground rules to consider are as follows:

1. An adequate groundwater or surface water supply not subject to excessive pollution that can be developed into a satisfactory supply at an accessible and convenient location on the property is necessary if an adequate public water supply is not available. The installation of cisterns, if feasible, will alleviate this consideration to some degree.

2. A permeable soil that will readily absorb rainwater and permit the disposal of sewage and other wastewater by conventional subsurface means is most desirable, if not essential, for the smaller establishment, where public sewage is not available. Such soil will contain relatively large amounts of sand and gravel, perhaps in combination with some silt, clay, broken stones, or loam. The underground water should not be closer than 4 feet of the ground surface at any time, and there

should be a porous earth cover of not less than 4 or 5 feet over impervious subsoil or rock. A suitable receiving stream or land area is needed if a sewage treatment plant is required.

3. Land to be use for housing or other structures should be well above flood or high water level. There should be no nearby swamps.

4. Elevated, well-drained, dry land open to the air and sunshine part of the day, or gently sloping, partly wooded hillsides or ridges, should be available for housing or other buildings. The cleared land should have a firm, grass-covered base to prevent erosion and dust. A slope having a southern or eastern exposure protected from strong winds on the north and west is desirable.

The favorable and unfavorable natural environmental conditions have been shown and analyzed, and should be considered in conjunction with the following man-made environment or infrastructure analysis when development in Spencer County is proposed. When a needed or desired improvement is under consideration, the environmental factors that must be overcome or improved to eliminate certain hazardous or annoying conditions must be included in the overall development scheme.