KENTUCKY GEOLOGICAL SURVEY
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UNIVERSITY OF KENTUCKY

KGS MAP AND CHART 91
Series XII, 2005

Generalized Geologic Map for Land-Use Planning: Hopkins County, Kentucky

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Acknowledgments

Geology adapted from Ashcraft (2005), Ashcraft and Hosey (2005), Crawford (2005), Mullins (2005), Nelson (2005), Smith (2005a–c), Solis and Terry (2000), Toth (2005a–d), and Tyra and Venard (2000).

Thanks to George Kelley, Hopkins County Agriculture and Natural Resources Agent; Keith Curneal, Madisonville Water Treatment Plant; David and Shawn Brumfield, Brumfield Farms; Doug Brown, Doug Brown Farm, for photo assistance; and Doug Blair, Dotiki Mines, for photo assistance.

Planning Guidance by Rock Unit Type

Rock Unit	Foundation and Excavation	Septic Tank Disposal System	Residence with Basement	Highways and Streets	Access Roads	Light Industry and Malls	Intensive Recreation	Extensive Recreation	Reservoir Areas	Reservoir Embankments	Underground Utilities
1. Alluvium and or lacustrine deposits	Fair foundation material; easy to excavate. Refer to soil report (Fehr and others, 1977).	Severe limitations. Refer to soil report (Fehr and others, 1977).	Seasonal high water table. Refer to soil report (Fehr and others, 1977).	Poorly to moderately well drained. Steep slopes. Refer to soil report (Fehr and others, 1977).	Refer to soil report (Fehr and others, 1977).	Refer to soil report (Fehr and others, 1977).	Moderate to severe limitations. Refer to soil report (Fehr and others, 1977).	Moderate limitations. Refer to soil report (Fehr and others, 1977).	Refer to soil report (Fehr and others, 1977).	Moderate permeability; erodes easily. Refer to soil report (Fehr and others, 1977).	Refer to soil report (Fehr and others, 1977).
2. Gravel	Excellent foundation material. Moderate excavation. Unit is very thin.	Slight to moderate limitations. Variable thickness and permeability.	Severe to moderate limitations. Shallow water table may be present.	No limitations.	No limitations.	No limitations.	No limitations.	No limitations.	Severe limitations.	Severe limitations.	Slight limitations. Variable thickness.
3. Loess (clayey silt)	Fair to good foundation material. Easily excavated; may swell and compact differently depending on moisture content (Finch, 1968).	Slight to moderate limitations. Variable thickness and permeability.	Severe limitations. Shallow water table may be present. May swell and compact differently depending on moisture content (Finch, 1968).	No limitations.	No limitations.	No limitations.	No limitations.	No limitations.	Slight limitations. Unit does not compact well; sandy-silty ridges.	Slight limitations.	No limitations.
4. Sandstone, limestone, shale, and coal*	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils and impermeable rocks.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes. Coal and clay layers may present problems.	Moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate to severe limitations. Steep slopes. Clay layers may be unstable.	Slight to moderate limitations.	Slight limitations. Reservoir might leak where rocks are fractured.	Severe limitations. Coal beds and expanding clays may present problems.	Moderate limitations. Highly variable types of rock and earth excavation.
5. Shale and sandstone	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils and impermeable rocks.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes. Coal and clay layers may present problems.	Moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate to severe limitations. Steep slopes. Clay layers may be unstable.	Slight to moderate limitations.	Slight limitations. Reservoir might leak where rocks are fractured.	Severe limitations. Coal beds and expanding clays may present problems.	Moderate limitations. Highly variable types of rock and earth excavation.
6. Sandstone, shale, limestone, and coal*	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils and impermeable rocks.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate to severe limitations. Steep slopes. Clay layers may be unstable.	Slight to moderate limitations.	Slight limitations. Reservoir might leak where rocks are fractured.	Severe limitations. Coal beds and expanding clays may present problems.	Moderate limitations. Highly variable types of rock and earth excavation.
7. Sandstone, shale, and coal*	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils and impermeable rocks.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate to severe limitations. Steep slopes. Clay layers may be unstable.	Slight to moderate limitations.	Slight limitations. Reservoir might leak where rocks are fractured.	Severe limitations. Coal beds and expanding clays may present problems.	Moderate limitations. Highly variable types of rock and earth excavation.
8. Sandstone, silty shale, and coal*	Fair to good foundation material. Difficult to excavate.	Severe limitations. Thin soils and impermeable rocks.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate limitations. Rock excavation. Steep slopes.	Severe to moderate limitations. Difficult excavation; upper few feet may be rippable. Steep slopes.	Moderate to severe limitations. Steep slopes.	Slight to moderate limitations.	Slight limitations. Reservoir might leak where rocks are fractured.	Severe limitations. Coal beds and expanding clays may present problems.	Moderate limitations. Highly variable types of rock and earth excavation.

*Coal beds and underclays should not be used for foundations or reservoir embankments because of the presence of expanding pyrite in coal and underclays and the weakness of the underclays when they become wet.

Definitions

FOUNDATION AND EXCAVATION

The terms "earth" and "rock excavation" are used in the engineering sense; earth can be excavated by hand tools, whereas rock requires heavy equipment or blasting to remove. The term "rippable" means excavation with a ripper attachment on a bulldozer.

LIMITATIONS

Slight – A slight limitation is usually one that requires some corrective measure but can be overcome without a great deal of difficulty or expense.

Moderate – A moderate limitation is one that can normally be overcome but the difficulty and expense are great enough that completing the project is commonly a question of feasibility.

Severe – A severe limitation is one that is difficult to overcome and commonly is not feasible because of the expense involved.

LAND USES

Septic tank disposal system – A septic tank disposal system consists of a septic tank and a filter field. The filter field is a subsurface tile system laid in such a way that effluent from the septic tank is distributed with reasonable uniformity into the natural soil.

Residences – Ratings are made for residences with and without basements because the degree of limitation is dependent upon ease and required depth of excavation. For example, excavation in limestone has greater limitation than excavation in shale for a house with a basement.

Highways and streets – Refers to paved roads in which cuts and fills are made in hilly topography, and considerable work is done preparing subgrades and bases before the surface is applied.

Access roads – These are low-cost roads, driveways, etc., usually surfaced with crushed stone or a thin layer of blacktop. A minimum of cuts and fills are made, little work is done preparing a subgrade, and generally only a thin base is used. The degree of limitation is based on year-around use and would be less severe if not used during the winter and early spring. Some types of recreation areas would not be used during these seasons.

Light industry and malls – Ratings are based on developments having structures or equivalent load limit requirements of three stories or less, and large paved areas for parking lots. Structures with greater load limit requirements would normally need footings in solid rock, and the rock would need to be core drilled to determine presence of caverns, cracks, etc.

Intensive recreation – Athletic fields, stadiums, etc.

Extensive recreation – Camp sites, picnic areas, parks, etc.

Reservoir areas – The floor of the area where the water is impounded. Ratings are based on the permeability of the rock.

Reservoir embankments – The rocks are rated on limitations for embankment material.

Underground utilities – Included in this group are sanitary sewers, storm sewers, water mains, and other pipes that require fairly deep trenches.

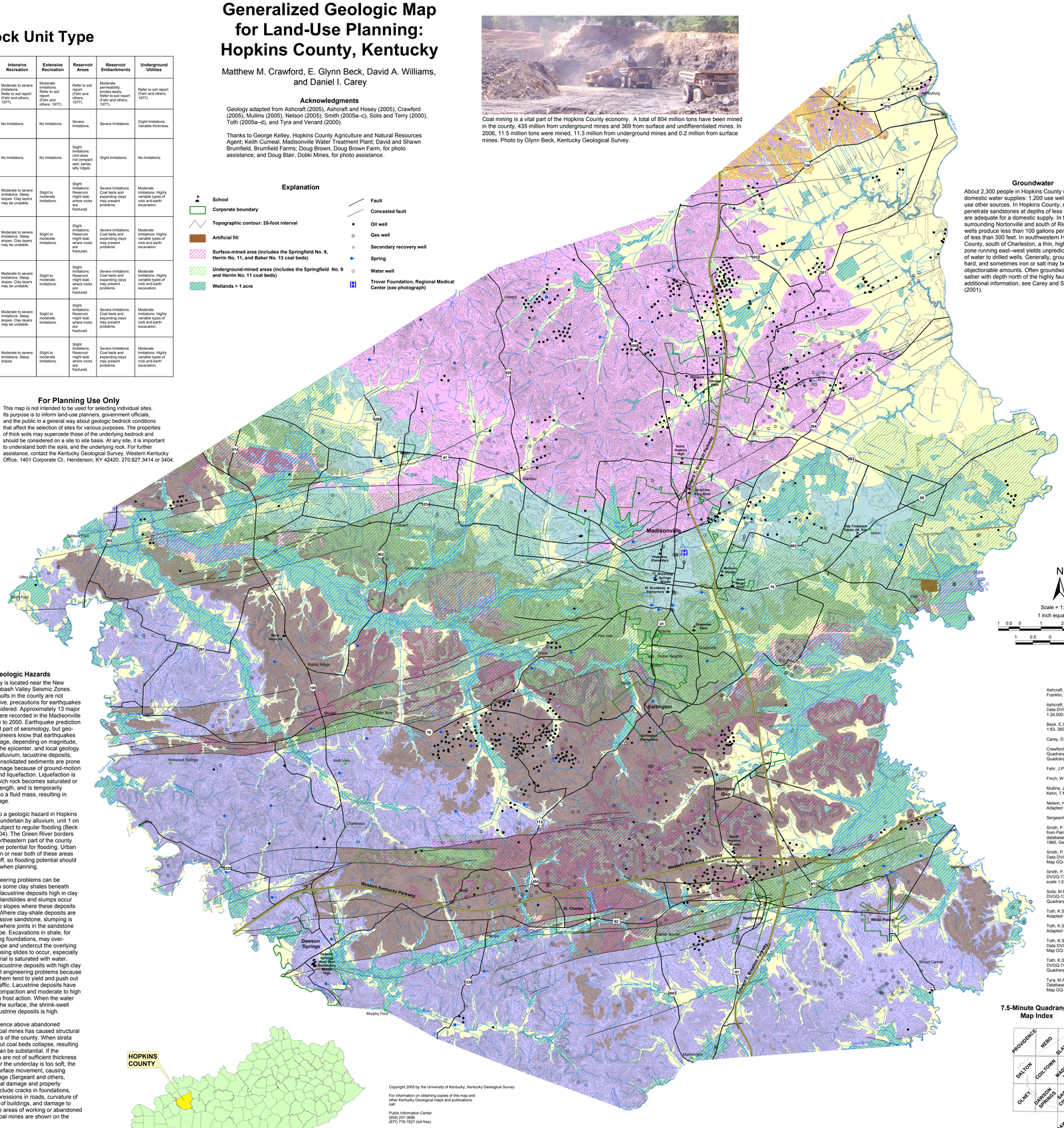
For Planning Use Only

This map is not intended to be used for selecting individual sites. Its purpose is to inform land-use planners, government officials, and the public in a general way about geologic bedrock conditions that affect the selection of sites for various purposes. The properties of thick soils may supercede those of the underlying bedrock and should be considered on a site to site basis. At any site, it is important to understand both the soils, and the underlying rock. For further assistance, contact the Kentucky Geological Survey, Western Kentucky Office, 1401 Corporate Ct., Henderson, KY 42420. 270.827.3414 or 3404.

Coal mining is a vital part of the Hopkins County economy. A total of 804 million tons have been mined in the county, 435 million from underground mines and 369 from surface and undifferentiated mines. In 2006, 11.5 million tons were mined, 11.3 million from underground mines and 0.2 million from surface mines. Photo by Glynn Beck, Kentucky Geological Survey.

Explanation

- School
- Corporate boundary
- Topographic contour: 20-foot interval
- Artificial fill
- Surface-mined area (includes the Springfield No. 9, Herrin No. 11, and Baker No. 13 coal beds)
- Underground-mined areas (includes the Springfield No. 9 and Herrin No. 11 coal beds)
- Wetlands > 1 acre
- Fault
- Concealed fault
- Oil well
- Gas well
- Secondary recovery well
- Spring
- Water well
- Trover Foundation, Regional Medical Center (see photograph)


Madisonville
Earlington
Nortonville
Mortons Gap
Dawson Springs
White Plains
Hanson
Anton
Jesup
Mannington
Western Kentucky Parkway
Pennyrile Parkway
Green River
Tradewater River
Pond River
Saint Charles
Mount Carmel
Murphy Ford
Baldwin Ford
Utley Ford
Rabbit Hedge
Fiddle Bow
Kirkwood Springs
Charleston
Manitou
Nebo
Dalton
Coiltown
Madisonville-Hopkins Co. Airport
Pennyrile Forest State Resort Park
Pennyrile Forest Elementary
Dawson Springs High
Hopkins Co. Jail
Hopkins Co. Courthouse
Hopkins Co. Coal Museum
Earlington Elementary
Nortonville Elementary
Mortons Gap High
Jesup Elementary
Hanson Elementary
Anton Elementary
Jesup Elementary
Water Treatment Plant
Sewage Pt. Sta.
Sheriff's Boys Ranch
Pond River Elementary
Madisonville Elementary
Madisonville Middle
Madisonville High
Madisonville Elementary
W. Broadway Elementary
Hopkins Co. Fairgrounds
Hopkins Co. Sheriff
Hopkins Co. Sheriff
Hopkins Co. Sheriff