Big Points about Nashville’s Geologic setting --- controlled by events at 3 different times

I. ~470 = 330 million years ago the rocks were formed by accumulation of sediment in ocean on continental shelf
   Unit #3 – shells of marine animals deposited in a warm, shallow sea (think Bahamas, not Miss Delta) to form LIMESTONE
   Unit #2 - a stagnant sea on the continental shelf, with abundant floating algae that sank to the bottom to form SHALE
   Unit #1 - more well-mixed ocean water on the continental shelf, with silt and clay delivered by rivers to form SILTSTONE

II. 330 million years ago to later – much of the time above sea level
   Unit #1’s silt had pores between grains and it was flushed with silica-rich water that deposited CHERT
   Unit #2 organic matter transformed into natural gas and oil, and uranium from ground water attached to organic matter
   Units #1, 2, and 3 were gently folded into a broad upwarp (dome)

III. Current processes that have been acting for millions of years
   EROSION – Units #1, 2, & 3 erode in very different styles
   Unit #3 – dissolves; calcium carbonate dissolves in weak acid formed by rain + carbon dioxide; leaves very little soil
   Nashville has lots of rain, so limestone dissolves rapidly – has formed a big basin
   Unit #2 – breaks down quickly – rarely see unit #2 rocks (Old Hickory Blvd in Bellevue, I-24 Joelton)
   Unit #1 –TOUGH to erode because CHERT resists breakdown. Remains standing, forms steep slopes.

How this history affects Nashville today
   – Limestone dissolves leaving little soil, so no soil for landfill sites, little soil for septic drain fields – large yards originally
   – Limestone dissolves, little soil so bedrock near surface: causes runoff, exacerbates flooding; prohibits burial of electric lines
   – Unit #1 is tough to erode so that steep slopes form, are landslide prone, especially when water saturated
   – Unit #2 is eroded, moved downhill to form soil; its uranium decays to form radon gas; its organic matter = oil & natural gas
   (produced by Molly Miller, Vanderbilt University; for more information about TN geology go to http://www.tn.gov/environment/tdg/; http://tn.water.usgs.gov/)