Prepared in cooperation with the
U. S. GEOLOGICAL SURVEY
NATIONAL GEOLOGICAL MAPPING PROGRAM

INTRODUCTION

The Hamburg quadrangle is located in northeastern Sussex County, New Jersey. Surficial deposits in the quadrangle include glacial and postglacial sediment. The glacial deposits include till and stratified sediment. The till was deposited directly by glacial ice in drumlins, moraines, and as a layer of variable thickness overlying bedrock. It is as much as 150 feet thick but is generally less than 20 feet thick. The stratified sediment consists of sand, gravel, silt, and clay deposited by glacial meltwater in glacial lakes. It is as much as 200 feet thick. Extensive but thin deposits of postglacial alluvium, colluvium, and swamp and marsh sediment also occur in the quadrangle. They are generally less than 20 feet thick.

The accompanying map and cross sections show the surface extent and subsurface relations of these deposits. A brief summary of their resource and environmental characteristics is provided below. Table 1 lists water-well and test-boring logs used to plot bedrock-surface topography and to infer the the subsurface distribution of the deposits. Table 2 lists the composition of pebbles in the glacial sediments. The correlation chart shows the temporal relationships of the deposits. Figure 1 shows recessional ice margins, shorelines of glacial lakes, and the extent of recessional glacial deposits.

The stratified glacial sediments are divided into units that represent the glacial-lake basin or glacial-stream valley in which they were deposited. Numbers on the map units indicate successively lower lakes that formed as the ice front retreated (for example, Qnc1, Qnc2, Qnc3). The descriptions, and surface-texture patterns on the map, provide basic grain-size and thickness information for the stratified units. Bedding, color, and sorting are described in the general headings for each group of sediment.

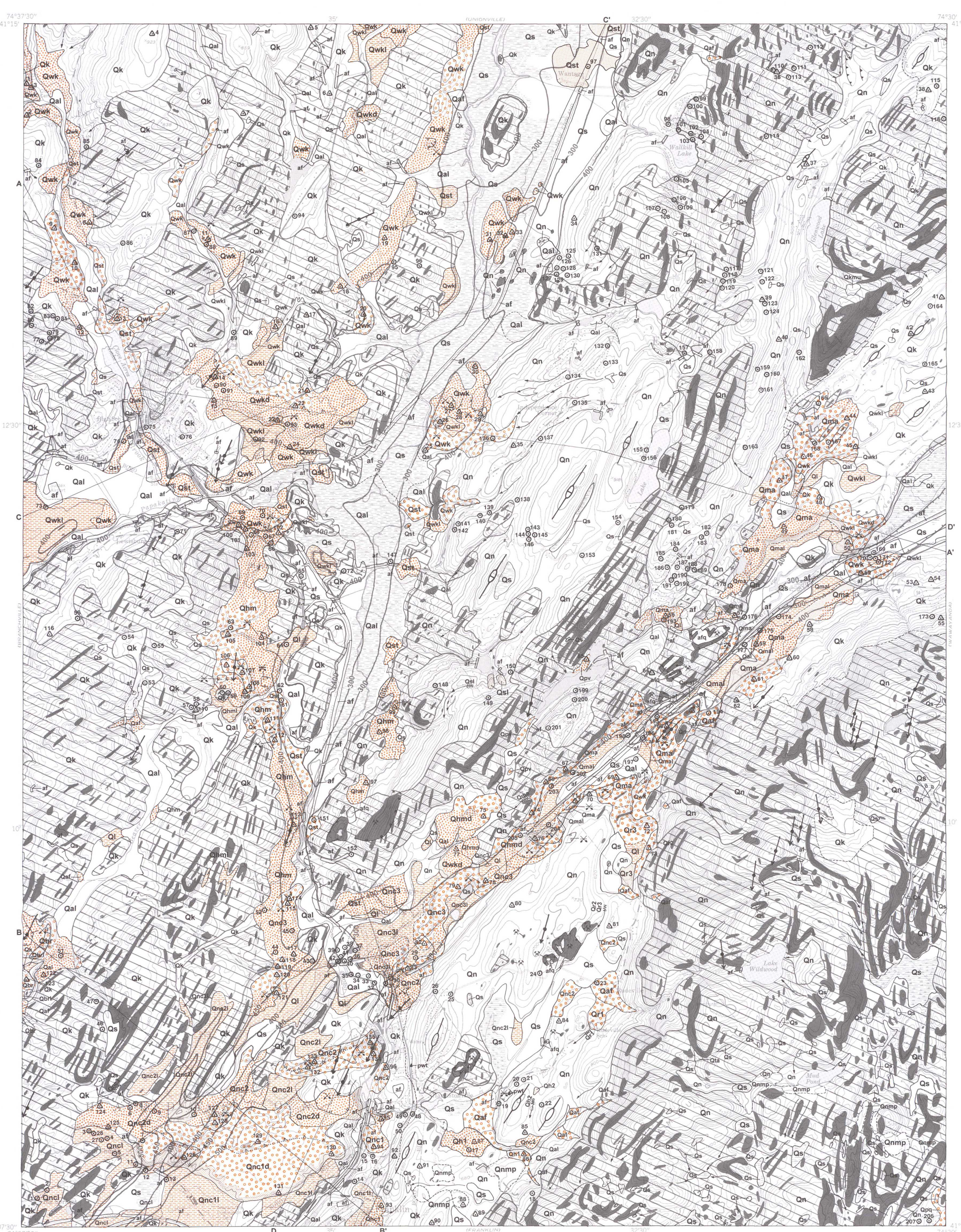
Till is divided into two units based on color, texture, and gravel-clast composition. Moraines are mapped as morphologic varieties of these units.

RESOURCES AND ENVIRONMENTAL CHARACTERISITICS

Surficial deposits in the Hamburg quadrangle supply ground water to wells; influence the movement of water and pollutants from the land surface into lakes, streams, and underlying bedrock and glacial aquifers; and provide sand and gravel for construction uses. Glacial sediments yield ground water to domestic and public-supply wells at several places. Yields and screened intervals for these wells are provided in table 1. A few wells tap glaciolacustrine sand and gravel near North Church (wells 8, 9, 10, 12). Several industrial and public-supply wells draw from glaciolacustrine sand and gravel near Hamburg (wells 31, 36, 40, 42). Similar deposits are also tapped in Vernon Valley (wells 175, 196, 203). In each of these three locations, water is withdrawn chiefly from lacustrine-fan deposits (units Qnc1, Qnc3, and Qma) that are overlain by fine-grained lake-bottom sediments. The lake-bottom sediments may act as a confining layer for the lacustrine-fan aquifers. Similar deposits are likely also present in the Wallkill Valley north of the junction with Papakating Creek, particularly below the 300-foot bedrock-surface contour. A few domestic wells also withdraw water from either till, sand and gravel buried beneath till, or weathered gneiss. Several wells east of Hardistonville (wells 17, 21, and 22) are completed either in till or in beds of sand and gravel within or beneath thick till. A number of wells on Pochuck Mountain (wells 128, 133, 136, 153, 154, 184, 185, 186, 190, 191) are completed within granular weathered gneiss.

Sand and gravel deposits are highly permeable (estimated hydraulic conductivity between about 100 and 1300 feet per day [ft/d]). Their outcrops may be recharge areas for glacial or bedrock aquifers. Sandy till is also permeable (estimated hydraulic conductivity between 0.1 and 100 ft/d). Silty to sandy silt till is moderately permeable (estimated hydraulic conductivity between 10^{-4} to 10^{-1} ft/d). Lake-bottom sediment is of low permeability and will retard ground-water flow, particularly if clay is abundant (estimated vertical hydraulic conductivity of silty-clayey material is 10^{-5} to 10^{-3} ft/d; sandy-silty material is generally 10^{-3} to 10^{-1} ft/d). The hydraulic conductivities cited here are based on aquifer-test and laboratory permeability data from glacial sediments in New Jersey, including published data summarized in Stanford and Witte (in press) and unpublished data on file at the N. J. Geological Survey (R. Canace, written communication).

Sand and gravel have been extensively mined from glacial delta and lacustrine-fan deposits. The location and extent of these mining operations are shown by the excavation-scarp symbols on the map. In places, for example, between McAfee and Hamburg, the mining has completely removed small deltas and lacustrine fans and the topography shown on the map (based on aerial photographs taken in 1951) no longer exists. Sand and gravel have also been mined from a few small

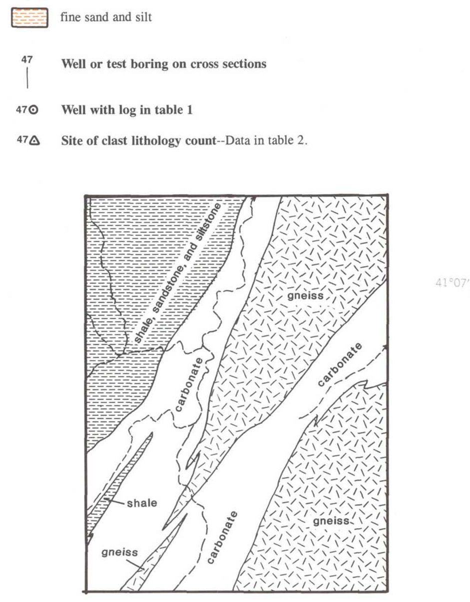


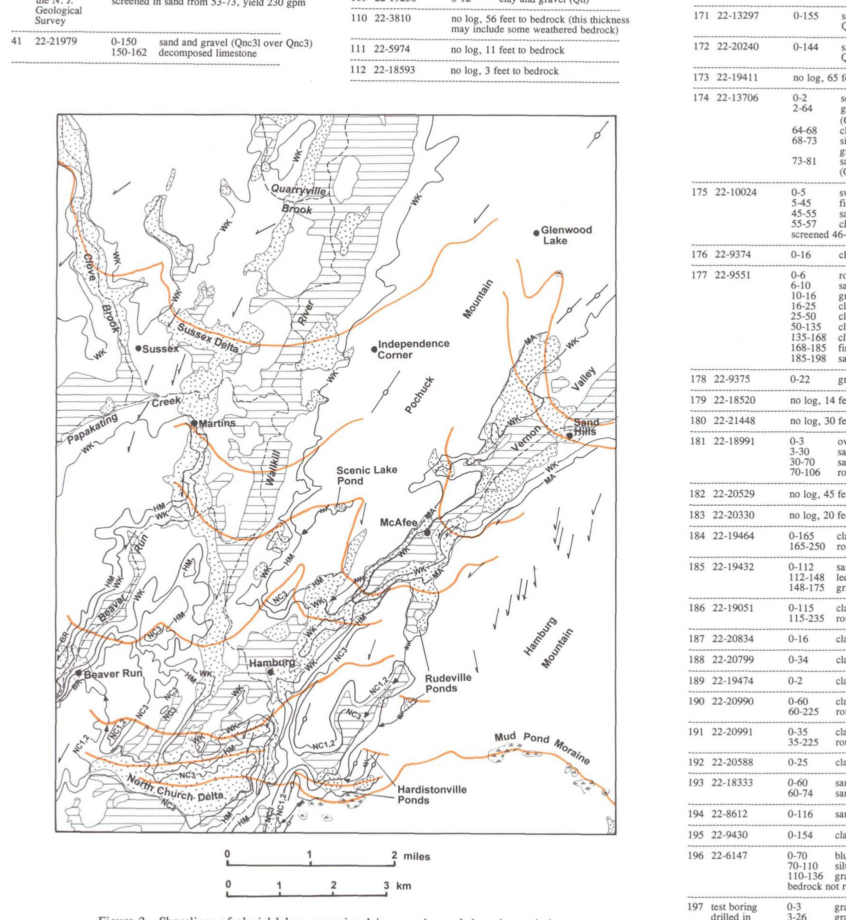
SURFICIAL GEOLOGIC MAP OF THE HAMBURG QUADRANGLE, SUSSEX COUNTY, NEW JERSEY

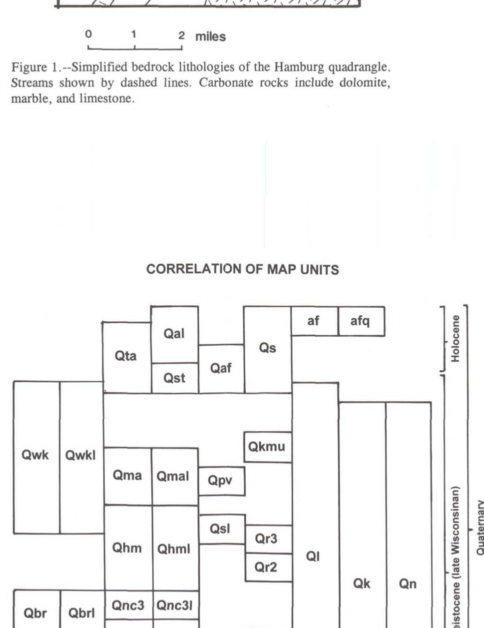
by

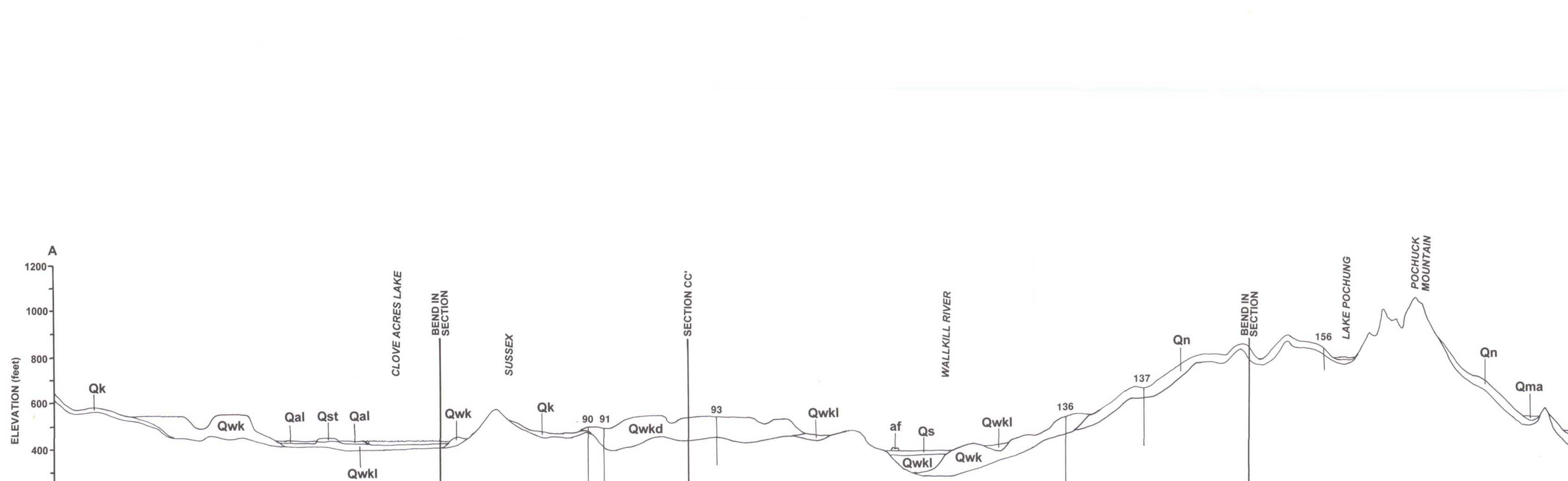
Scott D. Stanford[1], David P. Harper[1], and Byron D. Stone[2]

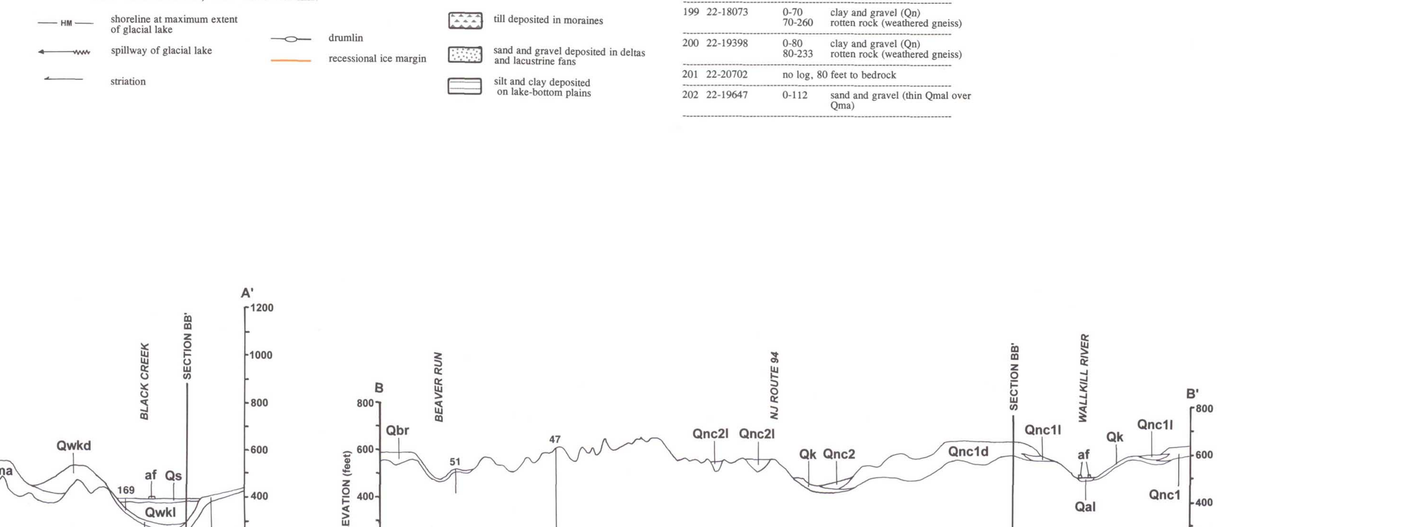
1998

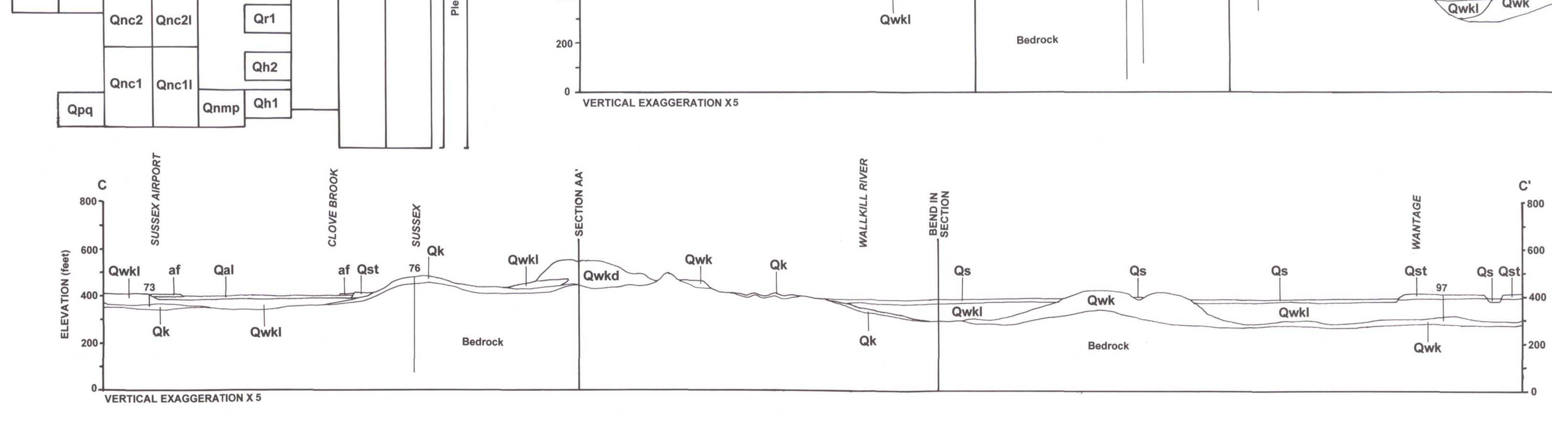












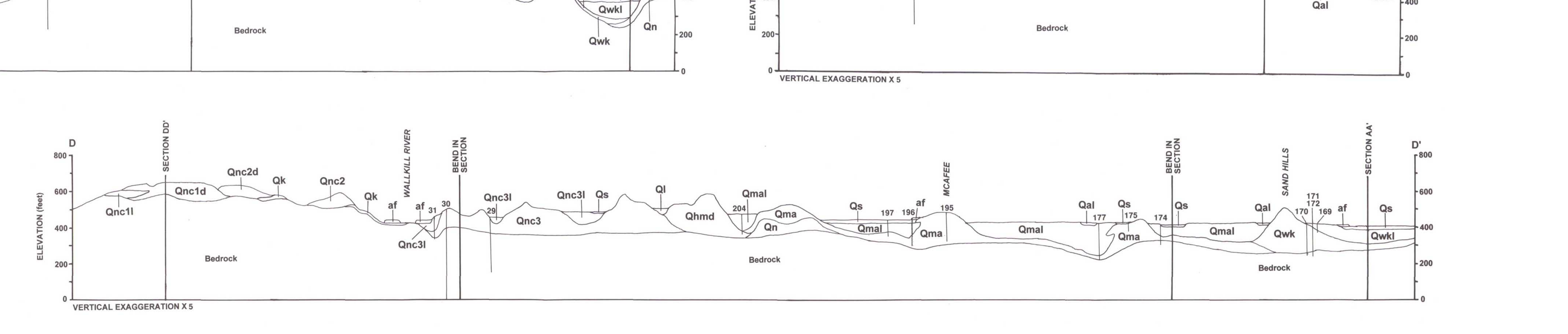


Table 1.--Selected Well Records