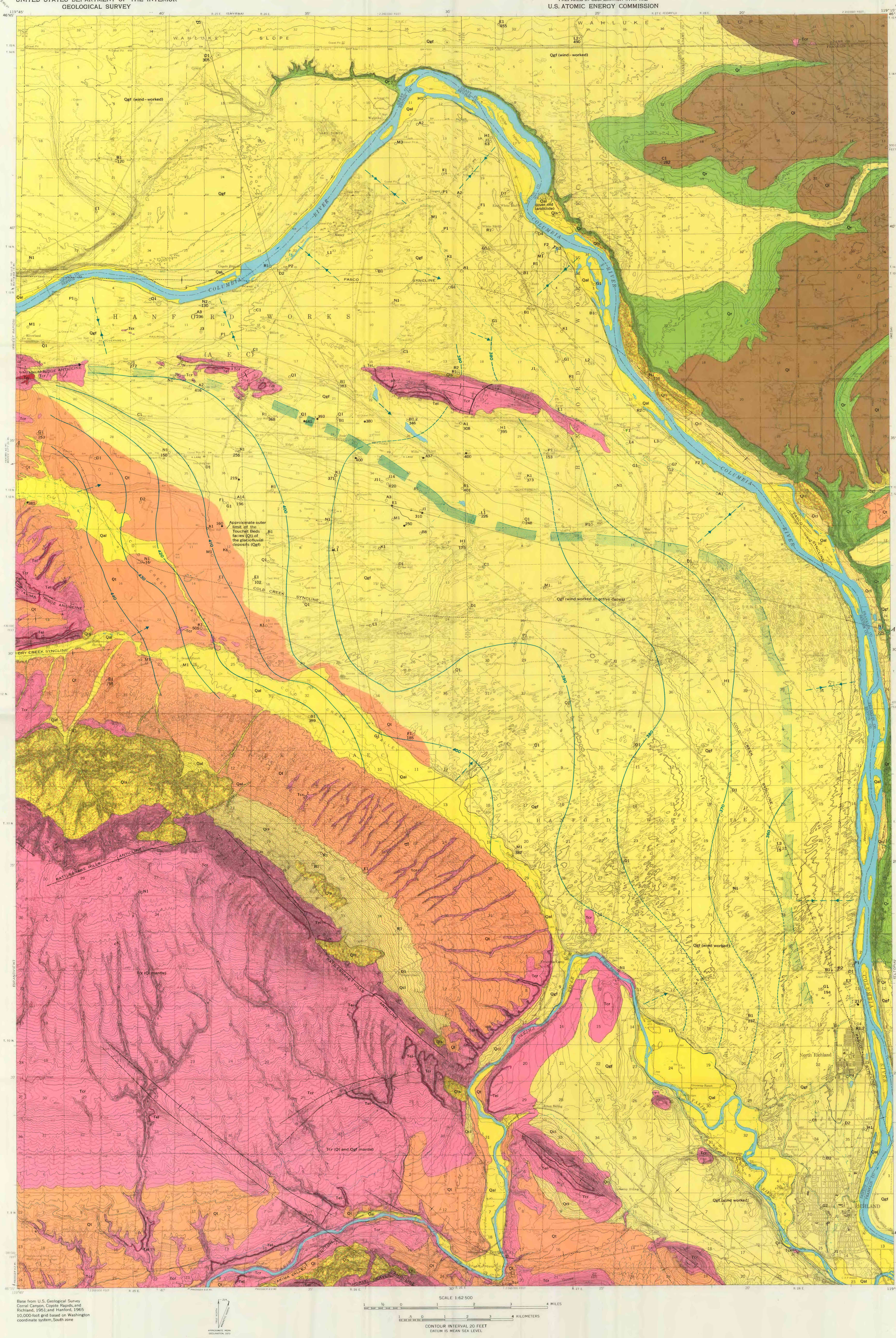
PREPARED IN COOPERATION WITH THE
U.S. ATOMIC ENERGY COMMISSION



Base from U.S. Geological Survey Corral Canyon, Coyote Rapids, and Richland, 1951, and Hanford, 1965
10,000-foot grid based on Washington coordinate system, South zone

APPROXIMATE MEAN DECLINATION, 1973

SCALE 1:62 500

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

EXPLANATION

UNCONSOLIDATED ROCKS

Qal — Alluvium
Silt, clay, sand, and gravel sorted in beds and intermixed. Lies mostly below highest flood stage of the streams. Largely reworked material from older materials listed below. Coarser grained beds transmit moderate to large quantities of ground water. Wind-worked material of similar age, which underlies most of the terraces, is mapped as its evident parent material

Qcl — Colluvium
Silt, sand, rock rubble, and gravel, mostly poorly bedded. Partly water-washed materials laid down on slopes, fans, and valley floors below slopes of rapidly wasting materials. Lies mostly above water table

Qls — Landslide deposits
Material of the bedrock or of the Ringold Formation that has been disturbed by gravitational block slumpage or mass movement. Most of the block movements have occurred in Quaternary time, but some of the basalt slides may have occurred as early as late Pliocene

Ql — Loess
Silt and fine sand mostly without bedding. Largely derived by wind working of glaciofluviatile and fluviatile deposits and fine-grained materials of the Ringold Formation. Occurs largely as an upland mantle and generally ranges from 3 to 20 feet in thickness

Qgf — Glaciofluviatile and fluviatile deposits
Gravel and sand with some silt, poorly sorted; irregularly bedded with much crossbedding; contain a few boulder beds; basaltic materials are slightly predominate over metamorphic and other rock types from farther upriver and are greatly predominate in the "scabland gravels" facies. Underlie main terraces, commonly 50–100 feet thick, but in places may be 300 feet thick. Yield large quantities of water to wells in a few places where below the water table. Deposited during the Wisconsin Glaciation

Qt — Touchet Beds of Flint (1958)
Horizontally bedded silt and fine sand with some zones predominantly of sand, massive to well laminated. Lake-deposit facies of glacial outwash deposits; mantles older rocks in places up to 1,150 feet altitude. Erratic boulder to granite gravel is both intermixed and scattered as surface debris. Mostly lies above the water table. Has undergone extensive wind erosion. In places small amounts of this deposit, or its wind-eroded "roots," are mapped within the glaciofluviatile and fluviatile deposits (Qgf)

Holocene; Upper Pleistocene; Pleistocene — QUATERNARY

UNCONSOLIDATED AND SEMICONSOLIDATED ROCKS

Qr — Ringold Formation
Beds of silt, sand, clay, volcanic ash, and gravel, stratified and well sorted. Upriver exotic types of rock and mineral particles predominate over local basaltic materials. Largely deposited in a current-carrying lake; maximum thickness is about 1,200 feet. Silts are partly compacted; some ribs in the main current-laid gravel ("conglomerate") train are strongly cemented. Contains numerous vertebrate fossils. Gravel ("conglomerate") and sand yield small to moderate quantities of water where below water table

Middle or upper Pleistocene

CONSOLIDATED ROCKS

Tcr — Basalt of the Columbia River Group (Tcr) with interbedded layers of the lower part of the Ellensburg Formation (Tel)
Well-stratified lava flows of dark-gray and gray-black basalt with a few layers of tuff, sandstone, conglomerate, siltstone, shale, and diatomite of the Ellensburg Formation (Tel) in the uppermost 1,000 feet. Exposed thickness 600 or 700 feet, but drilled to a depth of nearly 5,000 feet in the area mapped. Folded and faulted along parallelogrammatic belts of deformation. Yields moderate to large quantities of water to wells that penetrate several hundred feet of the flows. Perched ground water affords small yields to wells. Large yields are obtained by wells tapping confined water below the regional water table or potentiometric surfaces

Miocene and Pliocene; Miocene and lower Pliocene — TERTIARY

GEOLOGIC SYMBOLS

Contact
Dashed where approximately located

Strike and dip of beds and layering of the basalt

Basalt layers virtually horizontal

Anticline
Dashed where approximately located; dotted where concealed

Syncline
Dashed where approximately located; dotted where concealed

Fault
Dashed where approximately located; U, upthrown side D, downthrown side

Well — Observation point
Number is subsurface altitude of top of basalt bedrock at well or point indicated, in feet above or below mean sea level

HYDROLOGIC SYMBOLS

Well
Described in tables in text

Water-table contours
Show altitude of the water table as reconstructed approximately for the preplant situation, 1944. Long dashed where recharge from bank storage is important; short dashed where recharge by transfer from the vicinity of the Yakima River is important. Contour interval 10 feet

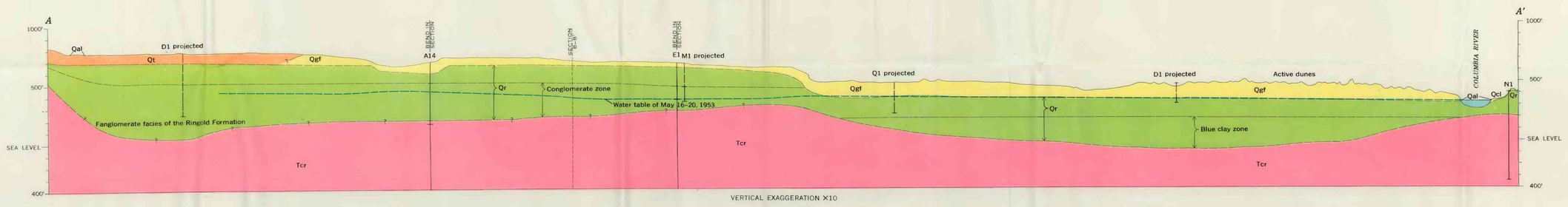
Inner edge of area of annual bank-storage rise and fall of the ground water
Pattern on outside of area of the bank storage

Approximate inner edge of area where ground water is substantially recharged by bank-storage additions

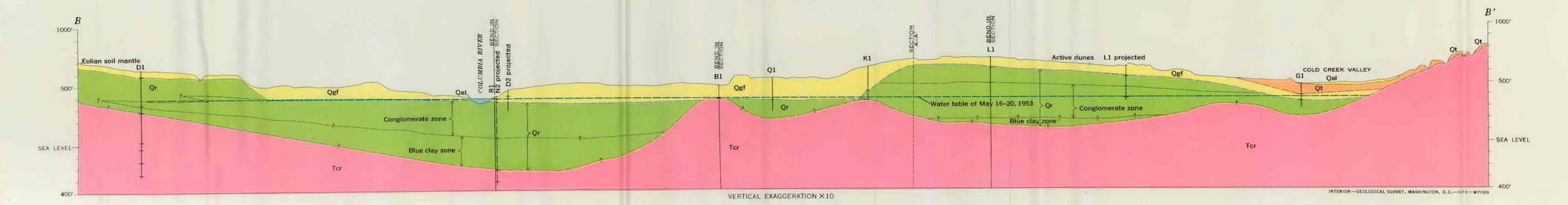
Direction of pressure transfer and percolation of ground water in the area of bank storage
From some of these areas ground water percolates away from zone of bank storage

General direction of movement of ground water where important natural recharge occurs at sites of infiltration, lateral percolation, or pressure transfer

NOTE
Since closure of McNary Dam (1953) normal pool of the Columbia River is at 340-foot altitude upstream to about Wooded Island, 5 miles above North Richland. The boundaries between the many areas of alluvium (Qal) and the river are not shown; above McNary Reservoir they are merely the shorelines shown on the topographic base, along McNary Reservoir they are on the 340-foot contour



VERTICAL EXAGGERATION ×10



VERTICAL EXAGGERATION ×10

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1973—W71169

GEOHYDROLOGIC MAP OF THE HANFORD RESERVATION OF THE U.S. ATOMIC ENERGY COMMISSION, WASHINGTON