UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER-RESOURCES INVESTIGATIONS REPORT 85-4149
PLATE 3--GENERALIZED WATER-TABLE ALTITUDE

78°52'30" 50' 47'30" 45' 42'30" 40' 78°37'30"

42° 12' 30" — 07' 30" — 05' — 42° 03' 30"

WATER-TABLE ALTITUDE

This map shows the average configuration of the water-table in the surficial sand and gravel aquifer. The map was drawn from shallow-well data (less than 30 feet) collected mostly from well inventories made during the late 1940's, early 1950's, and in 1967. Data collected during the 1930's and since 1967 were used to a lesser extent, and the altitudes of perennial streams were used to augment well data, mainly in the tributary valleys. Water-table contours are drawn with a 10-foot interval because the water levels change through time and fluctuate seasonally and because the number of wells measured is small. Fluctuations in the water-table altitude also occur at times of high flow, when the rising stage of both the river and the flood-control reservoir downstream of Salamanca may temporarily reverse local water-table gradients. Areas below 1,365 feet above NGVD of 1929, mainly in the western part of the mapped area, are subject to inundation from backwater caused by regulation of the flood-control reservoir.

Ground-Water Flow

Ground water in valley aquifers normally flows downvalley and toward major streams under steep cross-valley gradients and lesser downvalley gradients. In the Salamanca area, ground water in the Allegheny River valley flows predominantly cross-valley (toward the river), with a small gradient downvalley. Frimpter (1974) reported that the average downvalley gradient in the Allegheny River valley, between Salamanca and Olean is about 2.4 ft/mi. Tributaries to the Allegheny River, such as Little Valley and Great Valley have much steeper downvalley gradients; Frimpter (1974) reported that the average downvalley gradient in Great Valley is 25 ft/mi. Ground-water movement in these tributary valleys is thus predominantly downvalley toward the Allegheny River valley.

Ground-Water Recharge

The outwash aquifer in the Allegheny River valley and its major tributaries receive approximately 15 inches of recharge per year from direct precipitation and runoff from adjacent hillsides, or 0.46 (Mgal/d)/mi². This is equal to about 30 percent of the average annual precipitation (Frimpter, 1974, p. 27) calculated from records collected during 1950-64. In addition to areal recharge from precipitation, the outwash aquifer in the Allegheny River valley and its major tributaries receive additional recharge through streamflow losses in losing reaches of major streams. These losing reaches occur principally where small streams that drain the bedrock uplands enter the valley floor. For example, Great Valley Creek loses water to the underlying aquifer between Great Valley (north of the study area) and its mouth at Salamanca. Discharge measurements made in July 1965 show that the area of greatest streamflow loss is between the hamlets of Perth and Kill Buck, where the creek loses an average of 1.4 ft³/s per mile of channel (Frimpter, 1974, p. 48). Such seepage losses along Great Valley Creek could account for at least 13 Mgal/d in additional recharge in this valley (Frimpter, 1974, p. 48).

The high permeability of the valley-fill aquifer in this area and its hydraulic connection to overlying rivers and streams provides potential for large-capacity supply wells near a river or stream to induce infiltration from the stream as an additional water source. Data from a pumping test (Simpson, 1981) of a well 100 ft from Great Valley Creek suggest that the pumping effects of a properly constructed large-capacity supply well near the stream would induce infiltration readily.

WELLS AND TEST HOLES REPORTED AS FLOWING ARTESIAN PRIOR TO THE CONSTRUCTION OF RED HOUSE LAKE

SELECTED REFERENCES

Frimpter, M. H., 1974, Ground-water resources, Allegheny River basin and part of the Lake Erie basin, New York: New York State Department of Environmental Conservation Basin Planning Report ARB-2, 87 p.

Simpson, L. C., 1981, Ground water evaluation--Great Valley Creek--Board of Public Utilities, Salamanca, New York: Mendville, Pa., Moody and Associates, Inc., 8 p. [unpublished].

EXPLANATION

—1380— WATER-LEVEL CONTOUR--line of equal water-table altitude, approximately located. Contour interval is 10 feet. Number is altitude, in feet. Datum is NGVD of 1929.

×1368 OBSERVATION WELL--marks the location of well from which water-level data were obtained. Number is water-table altitude, in feet above NGVD of 1929.

○ PUBLIC-SUPPLY WELL--identification number is shown in plate 1.

AQUIFER BOUNDARY--approximately located.

DIRECTION OF GROUND-WATER FLOW--shows general direction of ground-water flow.

Base from New York State Department of Transportation, 1:24,000 series: Limestone, N.Y., 1975; Little Valley, N.Y., 1975; Red House, N.Y., 1975; Salamanca, N.Y., 1975

NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level".

HYDROGEOLOGY OF THE SALAMANCA AREA, CATTARAUGUS COUNTY, NEW YORK

by
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GENERALIZED WATER TABLE ALTITUDE

0 ½ 1 2 MILES
0 ½ 1 2 KILOMETERS