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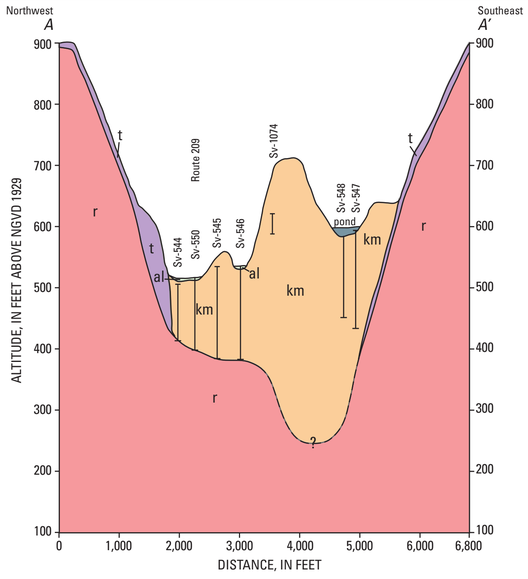
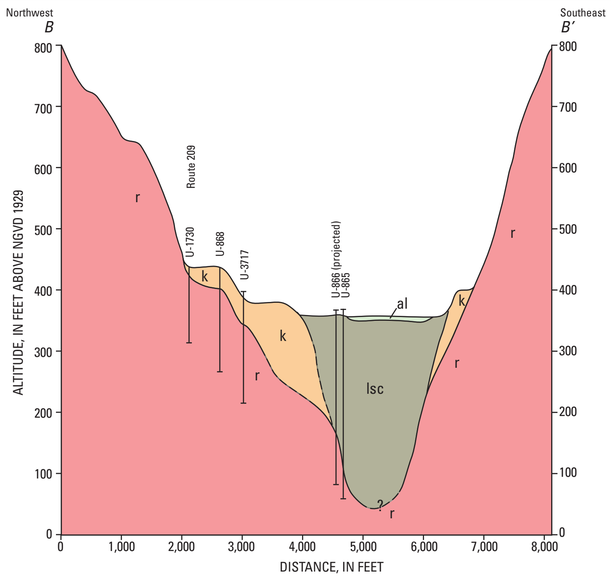
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

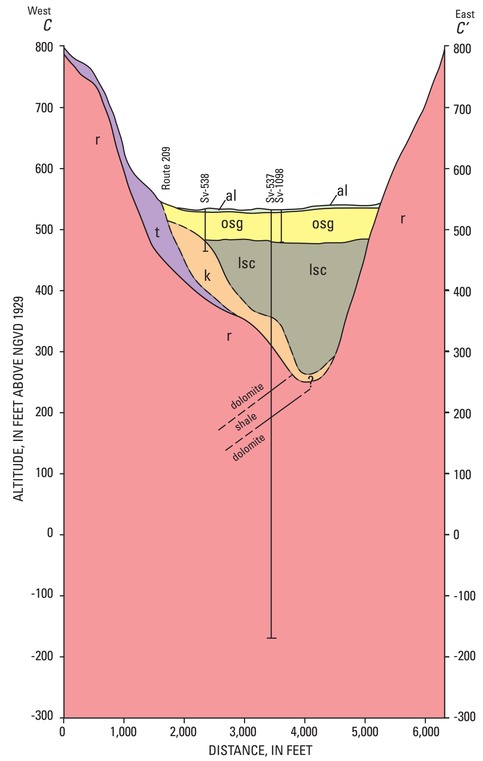
SCIENTIFIC INVESTIGATIONS MAP 2960
Geologic sections—SHEET 5 of 5
Reynolds, R.J., 2007
Hydrogeologic Appraisal of the Valley-Fill Aquifer in the
Port Jervis Trough, Sullivan and Ulster Counties, New York



GEOLOGIC SECTION *A-A′* AT PHILLIPSPORT, N.Y.
VERTICAL EXAGGERATION x10
TRACE OF SECTION SHOWN ON SHEET 1 and 3



GEOLOGIC SECTION *B-B′* BETWEEN SPRING GLEN AND ELLENVILLE, N.Y.
VERTICAL EXAGGERATION x10
TRACE OF SECTION SHOWN ON SHEET 1 and 3



GEOLOGIC SECTION *C-C′* AT WURTSBORO, N.Y.
VERTICAL EXAGGERATION x10
TRACE OF SECTION SHOWN ON SHEET 2 and 4

EXPLANATION

- al — ALLUVIUM – Postglacial river and stream flood-plain deposits consisting predominantly of clean to silty sand and gravel, generally less than 5 feet thick.
- osg — OUTWASH SAND AND GRAVEL – Stratified, well-sorted sand and gravel deposited by glacial meltwater streams as outwash fans, terraces, or deltas near the receding ice front and as valley-train outwash away from the ice front. Forms the primary stratified-drift aquifer in the Port Jervis Trough south of the Phillipsport Moraine. In the Port Jervis Trough, the outwash aquifer is underlain by thick deposits of lacustrine sand, silt, and clay. Very high permeability.
- k — KAME DEPOSITS – Isolated deposits of ice-contact sand and gravel typically emplaced high on hillsides,indicating a former glacial meltwater path. Usually unsaturated unless located on the valley floor. Also used to indicate large areas of ice-contact sand and gravel of uncertain geomorphology. Permeability highly variable.
- km — KAME MORAINE – Largely poorly sorted deposit of sand, silt, clay, gravel, and boulders deposited by stagnant glacial ice during a temporary pause (standstill) in ice retreat. Kame moraine deposits form the Phillipsport Moraine which impounded Glacial Lake Wawarsing (Heroy, 1974). Permeability highly variable but generally low due to poor sorting.
- lsc — LACUSTRINE SILT AND CLAY – Lacustrine deposits of thinly to massively bedded silt, clay, and very fine sand. Deposited as lake-bottom sediments in Glacial Lake Wawarsing that formed as result of the temporary dam created by the Phillipsport Moraine. Also underlies the outwash aquifer in the Port Jervis Trough south of Summitville. Thickness can be as much as 275 feet.
- t — TILL – Unsorted, unstratified mixture of clay, silt, sand, gravel, and boulders deposited beneath the ice as lodgment till during a glacial advance or at the edge of the ice sheet by melting ice as ablation till during a pause, or retreat, in glacial movement. Very low permeability, but mayyield adequate amounts of water for domestic use to large-diameter dug wells where sufficiently saturated.
- r — BEDROCK – Thin till soils over fine-grained sandstone, siltstone, shale, or conglomerate with numerous bedrock outcrops.

GEOLOGIC SECTIONS

The areal distribution of wells and the availability of drillers' logs at key locations permitted the construction of three geologic sections to illustrate the stratigraphy of the valley-fill deposits in the Port Jervis Trough. Section *A-A′* (trace shown on sheet 1) was constructed through the Phillipsport Moraine and was based on test borings done for the New York City Board of Water Supply for a proposed dam at that location. Section *B-B′* between Spring Glen and Ellenville (sheet 1), and Section *C-C′* (sheet 2) at Wurtsboro were constructed across the valley to illustrate the difference in the stratigraphy both above and below the Phillipsport Moraine, respectively.

Section *A-A′*

Section *A-A′* was constructed from northwest to southeast along the centerline of a once-proposed dam on the Phillipsport Moraine. The borings were drilled in the 1920s for the New York City Board of Water Supply as part of a program to explore areas for new potential dam sites. Five of the borings were drilled under this program, and a sixth was drilled in 1950 as part of the Interstate Commission on the Delaware River Basin (INCODEL) drilling program to explore areas of the Upper Delaware River Basin for possible reservoir locations. Section *A-A′* shows that the entire valley here is filled with kame moraine, except for a thick deposit of till at the western end of the section. Logs of the test borings reveal alternating layers of coarse gravel, fine sand, clay, and boulders, most of which appear to be poorly sorted and too thin to display at this scale. Of note is the V-shaped notch in the bedrock valley that is estimated to reach an elevation of about 250 feet above National Geodetic Vertical Datum of 1929 (NGVD 1929). This V-notch lies at the base of the steeply rising Shawangunk Mountains to the east, while the western side of the valley, composed of rocks of the Hamilton and Genesee Groups (Fisher and others, 1970), dips more gently. The V-notch reflects a zone of thrust faults that separates the Silurian age rocks that comprise the Shawangunk Mountains, from the Devonian-age shales and sandstones of the Catskill Mountains to the west (Soren, 1961). Thus, the deepest part of the Port Jervis Trough lies within this V-notch that can be traced southward along the eastern side of the valley as depicted in Sections *B-B′* and *C-C′*.

Section *B-B′*

Section *B-B′* extends from west to east across the valley about 3 miles north of the Phillipsport Moraine between Spring Glen and Ellenville. This section shows a large collapsed section of kame terrace on the western side of the valley, over 100 feet of which lies beneath the valley floor. Because kame terraces are composed largely of well sorted beds of sand and gravel, collapsed portions of these ice-contact deposits that lie beneath the valley floor form localized aquifers that can be highly productive. The collapsed kame terrace abuts a large thickness of lacustrine silt, clay, and fine sand that occupy the deepest part of the valley here and are the result of deposition into Glacial Lake Wawarsing. This section of the valley contains no surficial outwash aquifer as lacustrine silt and clay deposits are exposed at land surface in the valley floor, and, in some areas, are overlain by a thin veneer of post-glacial alluvium (Connally, 1985). Well U-865 penetrates over 275 feet of lacustrine sediments and intercepts the bedrock valley floor at 95 feet above NGVD 1929. Based on this data, it is estimated that the bottom of the V-notch here extends downward to at least 50 feet above NGVD 1929 and possibly to sea level.

Section *C-C′*

Section *C-C′* extends from west to east across the valley at Wurtsboro, N.Y. Test wells drilled for a proposed agricultural facility (mushroom growing plant) at this location provided the first new data on the thickness and character of the valley fill since Frimpter's 1972 study of Orange and Ulster Counties. This section shows a collapsed and buried deposit of kame sand and gravel (or sub-aqueous fan) emplaced along the western valley wall; it is overlain by about 50 feet of outwash sand and gravel and, further east, by about 120 feet of lacustrine silt and clay. This collapsed kame sand and gravel forms a localized, confined, sand and gravel aquifer. Well Sv-537, a test well drilled for the proposed mushroom plant was screened in this deposit between 204 and 214 feet below land surface and was test pumped at 100 gallons per minute (gal/min); however that yield is from both the screened zone and the open bedrock borehole beneath it. This borehole extends to a depth of 700 feet and penetrates alternating zones of dolomite and shale. The log of this well indicates that the surficial outwash, which is about 50 feet thick, is underlain by about 125 feet of lacustrine silt and clay at this location. This indicates that previous estimates of the thickness of coarse permeable aquifer material here (Frimpter, 1972) are greatly overstated. The V-notch in the bedrock surface here caused by differential erosion of the fractured rock in the thrust fault zone at the base of Shawangunk Mountain brings the bedrock surface to about 250 feet above NGVD 1929 at this location. Well Sv-1098, a test well screened in the surficial outwash aquifer is 8 inches in diameter and is constructed with 11 feet of well screen. This well was test pumped at 420 gal/min, with a drawdown of only 3.24 feet, yielding a specific capacity of 129.6 gallons per minute per foot [(gal/min)/ft] of drawdown, thus indicating the high transmissivity of the aquifer in this area.

AQUIFER PROPERTIES

The outwash sand and gravel aquifer that occupies the Port Jervis Trough from the Phillipsport Moraine south to Westbrookville (and beyond) averages about 50 feet thick and is underlain by as much as 275 feet of fine-grained lacustrine sediments in places. This outwash aquifer serves as the main aquifer in the valley and is under unconfined (water table) conditions. North of the Phillipsport Moraine there is no outwash aquifer within the Port Jervis Trough, and lacustrine silts and clays are exposed on the valley floor (Connally, 1985). Valley-fill aquifers in this northern section of the Trough are composed largely of the coarse beds of the three major glaciolacustrine deltas discussed earlier, or of ice-contact sand and gravel deposits such as kame terraces and deltas.

For example, a supply well, U-939, located at an industrial site just north of Ellenville is screened in a collapsed kame deposit at a depth from 72 to 87 feet with 10 inch screen, and pumps 300 gal/min. It was tested at 325 gal/min with 60 feet of drawdown to yield a specific capacity of 5.4 (gal/min)/ft. Farther north, at Napanoch, a test hole (U-1621) drilled at the New York State Correctional Facilty penetrated up to150 feet of fine-grained lacustrine sediments before penetrating 30 feet of gravelly sand, which are probably coarse-grained beds of the Napanoch Delta. A nearby supply well at the correctional facilty, U-215, is 105 feet deep, 8 inches in diameter, and is pumped at 300 gal/min with 36 feet of drawdown for a specific capacity of 8.3 (gal/min)/ft. Three supply wells for the village of Ellenville (U-2279, U-917, U-895) range between 39 and 101 feet in depth and are all screened in collapsed parts of nearby kame deposits. Well U-2279 is 12 inches in diameter, is 66.5 feet deep, is equipped with 20 feet of screen, and pumps 830 gal/min. Similarly, nearby well U-917 is only 39 feet deep but pumps 870 gal/min, while nearby U-895 is screened from 90 to 101 feet and yields 150 gal/min. These large well yields illustrate that the ice-contact and coarser fractions of the glaciolacustrine deltas can provide adequate well yields for a variety of needs.

In the southern section of the Trough, south of the Phillipsport Moraine, wells that are screened in the outwash aquifer also demonstrate high yields. As mentioned earlier, a test production well installed for a proposed mushroom plant just north of Wurtsboro is 48 feet deep, 8 inches in diameter, and is equipped with 11.5 feet of screen. This well was test pumped at 420 gal/min for 24 hours with only 3.24 feet of drawdown, yielding a specific capacity of 130 (gal/min)/ft. Similarly, a 6 inch supply well (Sv-519) for a trailer park north of Wurtsboro is 70 feet deep, is sceened in the outwash aquifer, and was test pumped at 100 gal/min with only 1 foot of drawdown, yielding a specific capacity of 100 (gal/min)/ft.

SUMMARY

The hydrogeology of the valley-fill sediments in a 16 mile reach of the Port Jervis Trough from Westbrookville in Sullivan County to Napanoch in Ulster County was evaluated through a compilation of drillers' logs, a compilation of surficial geology, and three geologic sections. Deep test borings used for a geologic section at Phillipsport show that the bedrock valley here is only about 150 feet deep and filled with kame moraine deposits. At Wurtsboro, south of the moraine, the depth to rock in the valley center is about 215 feet. The valley here consists of a 50 feet thick surficial aquifer, underlain by 125 feet of lacustrine silt and clay, which in turn is underlain by a 25 feet thick sand and gravel aquifer that overlies bedrock. North of Phillipsport, at Napanoch, test borings show the depth to bedrock at about 185 feet, with silty fine sand being the predominant valley fill. North of the Phillipsport Moraine, no surficial outwash aquifer exists, and lacustrine silts and clays are exposed on the valley floor. In this reach of the Trough, localized confined aquifers are formed by collapsed ice-contact (kame) deposits and coarse-fraction beds of three glaciolacustrine deltas that had prograded into Glacial Lake Wawarsing. Nevertheless, these deposits are very transmissive. Supply wells for the Village of Ellenville are all screened in these ice-contact deposits and have yields ranging from 150 to 870 gal/min. South of the Phillipsport Moraine, a 50 feet thick surficial outwash aquifer extends southward as far as Port Jervis and is underlain by as much as 275 feet of lacustrine sediments. A narrow V-notch in the bedrock floor lies at the base of Shawangunk Mountain and probably correlates with a zone of thrust faults. Transmissivity of the outwash aquifer is apparently high as evidenced by aquifer test results from a 420 gal/min production well at Wurtsboro with a specific capacity of 130 (gal/min)/ft.

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Hydrogeology by R.J. Reynolds, 2005

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by
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2007