

# Small details to big picture – field study of a glacio-fluvial gravel quarry near Rotterdam Junction, New York

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Vertical view of gravel quarry on the north side of Route 5 north of the Mohawk river 1 mile northwest of Rotterdam Junction, NY (Google Earth)

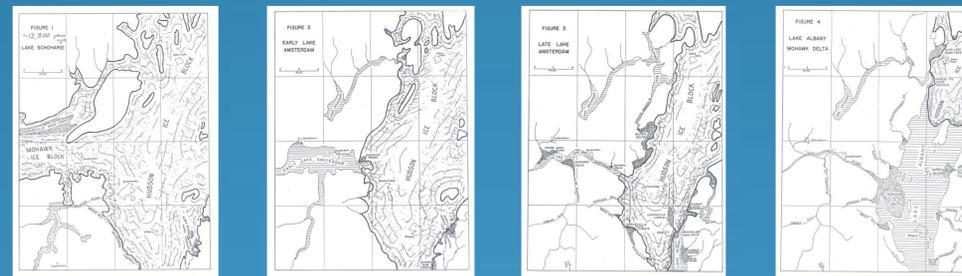
A gravel quarry, easily accessible along Route 5 on the north side of the Mohawk River just west of Rotterdam Junction, NY, provides an outstanding field laboratory for the study of sediments deposited during glacial retreat in eastern New York. Melt-water from the retreating Mohawk glacial lobe flowed rapidly eastward to the edge of glacial Lake Albany in the Hudson Valley, depositing a thick sequence of coarse fluvial-deltaic gravel in the lower reaches of the Mohawk Valley. Remnants of this depositional sequence (including delta foreset and topset gravel beds) are superbly exposed in 3D pillars around the quarry. The pebbles and cobbles are diverse in size, shape, and composition; predominantly metamorphic and igneous clasts from a more distant Canadian provenance, and various sedimentary clasts from a closer NY provenance. This gravel is incompletely cemented with calcite, retaining high porosity and permeability. The gravel deposits along the flanks of the present Mohawk River make up the surficial unconfined aquifer system that provides a high quality water source to many communities of the Capital District, including Schenectady. This gravel quarry is an ideal locality for an extended field trip stop or project for students in a variety of geosciences disciplines (Introductory classes, Historical Geology, Geomorphology, Hydrogeology, Stratigraphy and Sedimentary Petrology). Specific study goals can be adapted for each discipline. However, some common interdisciplinary goals should be emphasized to promote higher order reasoning: Students should understand the general sequence of glacial retreat in eastern NY. Students should understand the relationships of clast size, shape and composition to provenance (source) and transport distance. Students should understand the process of gravel deposition in time and space. Students should understand the early stages of the lithification process of gravel deposits. Students should understand the relationships of gravel structure to aquifer quality and productivity. Assessment can be made by analyzing responses to a series of specific questions.



View eastward along the Mohawk River showing gravel quarry on left and small airport on right of Route 5 (Google Earth)



3D pillars in quarry showing fluvio-deltaic foreset and topset gravel beds



Sequence of glacial retreat in eastern New York State (from LaFleur, 1979)  
Diagram on far right shows the ancestral Mohawk melt water flowing into Lake Albany, forming fluvial deltaic gravel sequence



Surveying sample sites using a targetless laser gun (Laser Atlanta) and tablet field computer with PenMap software.



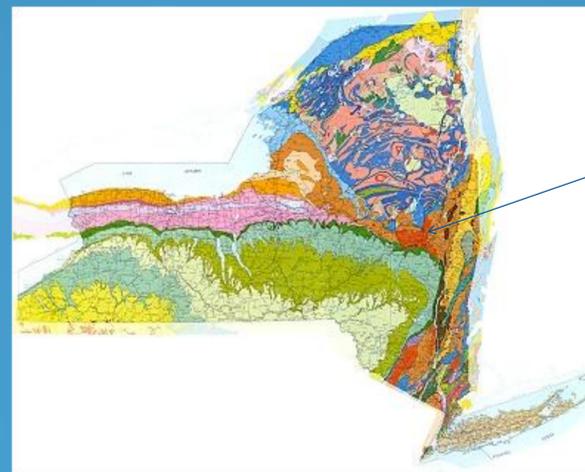
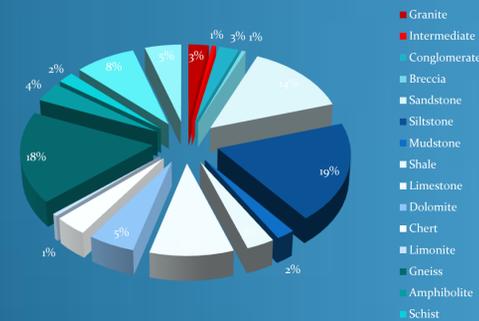
Square meter grid for pebble counts



Sorting gravel clasts by composition



Calcite cement surrounding gravel clasts



Geologic map of New York showing quarry location