Bolton Notch, in the western foothills of the Green Mountains, is a narrow, steep-sided, U-shaped valley that extends northward from its intersection with the much-larger Winooski River valley. Subglacial and subaerial meltwater, associated with the thinning and northward-retreating ice sheet in the notch, created a number of erosional and depositional landforms including a large delta, channels cut by ice-marginal streams, and an esker that was subsequently draped with lacustrine sediments. The sediments comprising the delta and the lacustrine system are well exposed in two gravel pits located at, respectively, the south and north ends of the notch. We imaged the subsurface sedimentary and collapse structures occurring in these two pits using ground penetrating radar. We conducted surveys using both 100 MHz and 200 MHz antennae to compare the depth and resolution of the imaged reflectors.

The pit at the southern end of Bolton Notch faces the Winooski River Valley. The active pit face exposes large-scale topset and foreset beds recording the rapid construction of a delta into a glacial lake that occupied the Winooski River valley. The GPR scans elucidate the inner structure of this delta and the transition from foreset to topset beds. We were able to trace the contact between topset and foreset beds and an overlying bed of fine sand ~50 m north of the active pit. The pit at the northern end of Bolton Notch lies just north of the drainage divide. A system of nested ice-marginal channels documents northward ice retreat. Extensive exposures of lacustrine sand and silt indicate that the retreating ice dammed a small lake. Excellent GPR images show bedding draping the western side of an esker, cut and fill structures (subaqueous channels), and normal faults. A closely spaced grid of survey lines permits accurate interpretation of the 3-dimensional geometry of these structures.