History

Redtone Quarry was active until the 1930s. Many buildings in Burlington, particularly on the UVM campus, were built with this stone. The Quarry is currently owned by the University of Vermont.

Geology

The rock exposed at the Quarry is the Cambrian (~544-470 million year-old) Monkton Quartzite. The lower unit of the Monkton formation is white quartzite interbedded with dolostone. The quartzite was initially deposited as medium-fine grained sand, silt and/or mud in a shallow, tidal marine environment. The dolostone is composed of magnesium- and calcium carbonate-rich, sandy sediments. The upper unit is exposed at the Quarry; this is a coarse grained, red to purple quartzite. Very thin layers of argillaceous (clay-rich) material are observed at the top of the unit. The red color of these rocks is due to the presence of small amounts of the mineral hematite (iron oxide). Other minerals include quartz, dolomite (magnesium-calcium carbonate), and orthoclase feldspar (potassium-feldspar). The sediment deposited at this location was eroded from the Adirondack Mountains, which were much higher during Cambrian time, and transported to the marine shoreline, which is now western Vermont. The Quarry is located on the west side of a syncline (U-shaped fold), so all the beds (layers of sediment) dip, or tilt, to the east.

Primary Features

These are structures that formed as the sediments that became this rock were being deposited. Primary features indicate some of the conditions present in the environment at that time. **Interference ripples**: these are ripple marks formed by a change in the direction of flowing water. Instead of being aligned in rows, the crests of the ripples are scattered and disrupted. As the current changed direction, it began to form new ripples with a different orientation from earlier ones, forming hummocks and hollows in the sediment. **Mudcracks**: these polygonal shapes on the quarry floor are 8-10 inches across and formed as the sediment dried in the sun at low tide. As water evaporated, the muddy sediment dried, shrank, and cracked. The cracks were filled with sand at the next high tide. **Rip-up clasts**: elongated clasts (chunks) of fine-grained silt are sometimes seen included in coarser sand layers. These were torn up by the incoming tide and re-deposited when the water slowed down (at lost energy).

Trace fossils: these are not the physical remains of an ancient creature, but instead are tracks and burrows formed as creatures disturbed the sediments. These look like squiggly lines on the surface of the beds, and as small (~1 inch-long) disturbed areas within the layers.

Secondary Features

These are structures that were created after the sediment lithified (solidified to form solid rock). **Joints**: these parallel sets of long, vertical, linear fractures are simple cracks in the brittle rock. These joints resulted from extensional stress exerted on the rock during the opening of the Atlantic Ocean in the Cretaceous (~110 mya). **Dikes**: these long, dark grey to black features in the northern part of the Quarry follow the same east-west orientation as the joints. These formed when magma (molten rock) intruded along the joints and cooled and solidified to form an igneous rock known as basalt. Vesicles (small bubbles of trapped gas) are observed, as well as xenoliths (fragments of country rock included in the melt). **Contact metamorphism** of the quartzite was caused by heat transferred from the largest dike. The altered (baked) area appears as an orange border along the intrusion. Cylindrical holes, 1-2 inches in diameter, in the walls and floor of the quarry are **drill holes** in which dynamite was placed during quarrying operations. This blasting technique created **radial fracture patterns** on the floor of the quarry. These are also visible on the walls, at the base of drill holes. Other man-made features include scrapes and gouges left by heavy machinery operating in the quarry.

References

This brochure was compiled by Robert Zimmermann from information in the Perkins Geology Museum archives, originally compiled by Sharon O'Loughlin and Doug Geller.

For information about other geological teaching outcrops in Vermont, please contact

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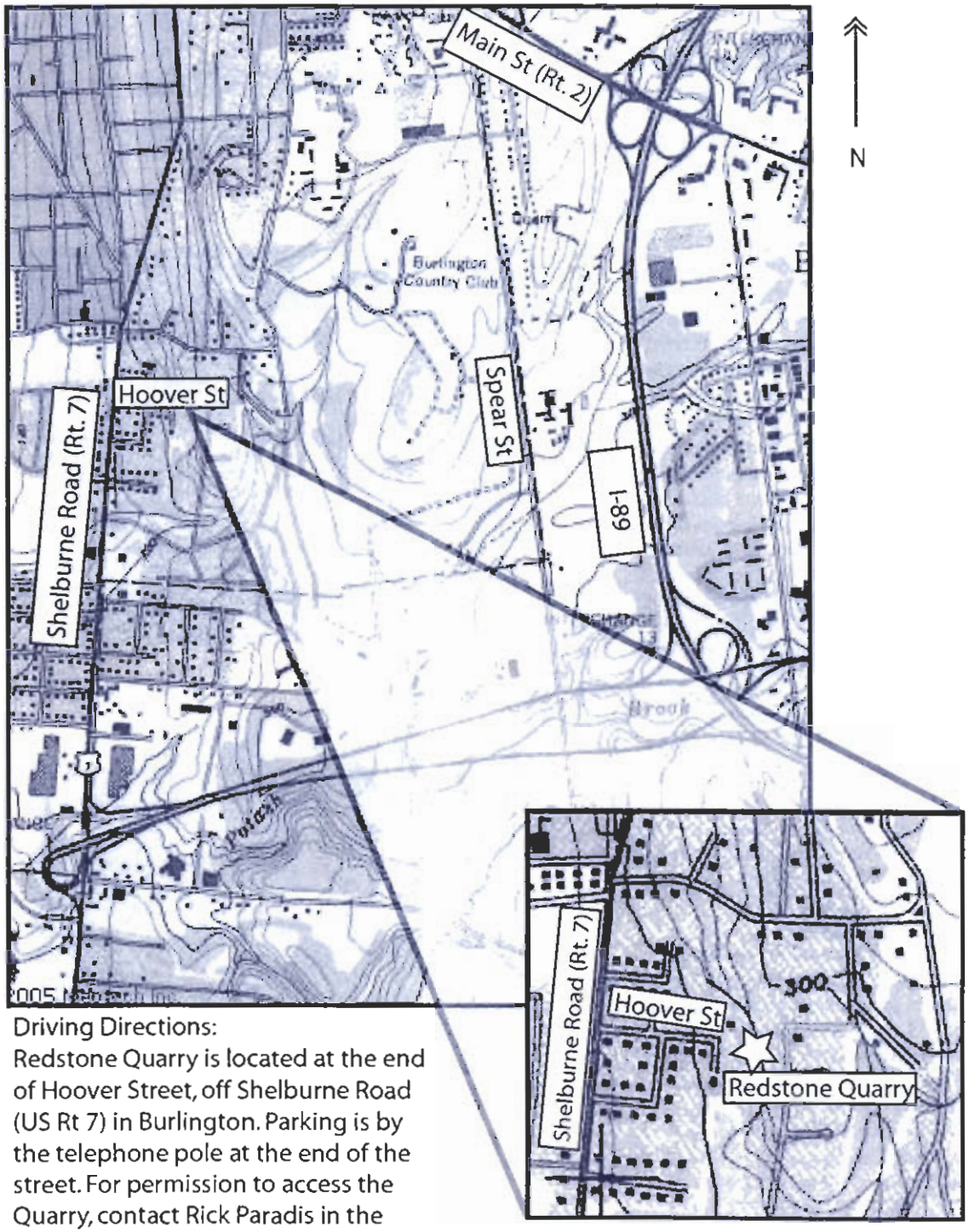
Redstone Quarry

Burlington, Vermont

University of Vermont Natural Area



Driving Directions:
Redstone Quarry is located at the end of Hoover Street, off Shelburne Road (US Rt 7) in Burlington. Parking is by the telephone pole at the end of the street. For permission to access the Quarry, contact Rick Paradis in the UVM Environmental Studies Program at 656-4055.