

# Geology of Galaringi and the Dundas Quarry

## Mineral Resources

Galaringi is an Aboriginal word used in the Dundas area at the time of first white settlement. It means 'ours' or 'belonging to us'.

**The rocks of the Dundas to Carlingford area in the north-west of Sydney were mainly formed about 235 million years ago as sediments laid down in a shallow freshwater lake.**

After the sediments were buried to become rocks (and perhaps uplifted) they were then intruded by the neck of a volcano – maybe 175 million years ago, but no firm evidence has been found. Since then there has been a long period of gentle uplift and erosion. That erosion exposed the volcanic neck and apparently created a prominent outcrop on the slopes below Carlingford. There are, however, no known illustrations of what the outcrop looked like in 1830, but by about that time quarrying of the rock had commenced for use in building Sydney's roads.

Quarrying continued at the Dundas Quarry (also known as Pennant Hills Quarry) for over 100 years (until the 1940s). The quarry has now been converted to a playing field, this being an example of multiple or sequential land use – the more so since the site forms part of Galaringi. Portions of the volcanic rock (or diatreme) remain visible.

## Rocks at Dundas

Perhaps 300 million years ago the Earth's crust subsided in what is now the Sydney region. The ocean flooded the land and the subsidence also fractured the crust and volcanoes formed and lavas were poured out. Gradually conditions quietened, and the marine environment was 'closed-off'. In the freshwater lakes and swamps plants flourished, and gradually coals formed.

By about 235 million years ago there was a freshwater lake in the Dundas area into which sands were deposited and became the

Hawkesbury Sandstone – the oldest rocks that can now be seen around Dundas. Gradually conditions became even quieter, and very fine sediments (clays) were deposited. Those clays became claystones and shales now known as the Ashfield Shale and Bringelly Shale – the main rocks in the Dundas–Carlingford area.



*Dundas Quarry in the early days*

And then about 175 million years ago, instability was again experienced by the crust and volcanoes again were formed. Apparently not all the volcanoes were successful in forming mountains, and some only achieved the formation of a neck and vent (because we can't find much evidence of lava flows of that age). The volcanic rock at Dundas probably formed as a diatreme – as shown in the accompanying sketch below. The diatreme was apparently associated with narrow underground walls of lava – called dykes. There was strong interaction between the diatreme and the surrounding rock.

Although there may have been younger rock layers formed around Dundas, if they were ever present, all have since been eroded to leave the present landforms. Because geological processes are dynamic, if often slow, the erosion continues today.

The diatreme at Dundas was formed as a complex structure of rocks. The main rock was basalt, but the basalt magma (magma is molten rock) interacted with the rock into which it was emplaced.



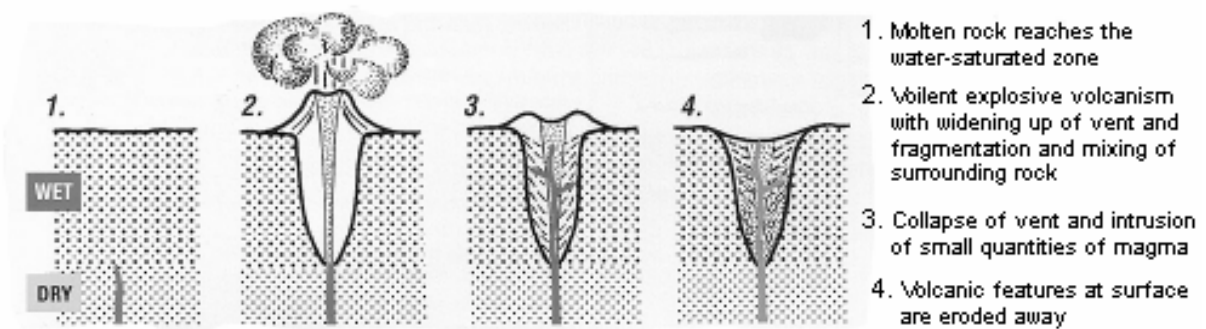


Figure 1: Formation of a diatreme

Some of the surrounding rock was broken off and blocks became mixed into the diatreme and maybe there were overlying rocks which might have partially collapsed into the diatreme, forming a crater or caldera. Apparently some pieces of rock and minerals from deep within the crust were carried up into the diatreme, the pieces being called xenoliths and xenocrysts, respectively. There was still some unaltered basalt with the altered basalt (alteration by interaction between water and the hot magma). Thus the diatreme was a mixture or breccia, that was mixed with the basalt. The rocks next to the diatreme have been heated/baked/alterated, and those changes are called contact metamorphism.

Thus the Dundas Quarry site is again a valuable resource for the community.

### Visitors – then and now

Just as visitors today can inspect the exposed rocks remaining at Dundas, geologists have visited the diatreme area since the first half of the nineteenth century. Their interest arose because the quarrying operations enabled the rocks to be studied in a relatively fresh state – in an artificial cliff. Visitors can still study many of the rocks and the relationships between the different rocks, although infilling of the quarry has covered some of the rocks again.

### Digging the Dundas rocks

A city like Sydney needs roads, and roads need rocks. Even before bitumen and concrete pavements were built, Sydney's roads used 'blue metal', which is a common term for such igneous rocks as basalt. And the diatreme at Dundas was recognised early as a major source of blue metal. At least by 1832 it seems that quarrying was carried out at Dundas Quarry – or Pennant Hills Quarry as it was also known.

Quarrying continued until the 1940s. In the early years much of the material was moved to a jetty (Pennant Hills jetty) on the nearby Parramatta River for transport to the city and inner suburbs.

By the 1940s, the Dundas (Pennant Hills) Quarry had been excavated to a depth of 40 m, and the quarry was about 90 m wide and 150 m long. In so doing most surface features of the diatreme and its rocks, some of which had apparently formed columns during cooling, had been removed.

### Dundas Quarry after the quarrying

The former Dundas Quarry is a good example of multiple or sequential land use. Any hole in the ground in Sydney is likely to attract attention as a landfill site. After a landfill site is full it can be converted to yet further use. A good use is as a public recreation area, including as playing fields.



Quarry workers

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