



## An inspection of sinkholes at Railton

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An on-site visit was made in November to investigate sinkholes that had developed on a property at 49 Latrobe Road, Railton (451700 mE, 5423350 mN) over the previous 18 months. Three sinkholes, in various stages of development, were observed. These were estimated to lie some 30–50 m to the south and southwest of the house.

The two sinkholes developed in the vicinity of the horse stables are currently 'active' and pose an immediate threat to the safety of the structure. The largest of these two features is elongate (15 m × 5 m × 3 m deep) and it is felt that in time it will coalesce with the second actively forming sinkhole (3–4 m diameter) some five metres to the south. The third sinkhole has been filled previously (reportedly twelve months or more) and lies some 30 m to the east of the others; this hole shows no signs of further development.

Sinkholes in this region are a fairly common occurrence. They are associated with the limestone that underlies some 15–25 m of silty and clayey gravel (GM–GC) deposits similar to the material that has been left exposed by the recent sinkhole collapses.

The formation of solution cavities from groundwater moving through the limestone over the ages is seen in the nearby Goliath and Blenkhorn quarries. The upper limestone surface is typically highly irregular with pinnacles or peaks being a regular feature. The corresponding dips between the pinnacles probably represent former collapsed cavities which have been subsequently filled with the overlying clay and gravel deposits. This process is still operating today as shown by the recent collapses in the area.

The cause or causes for the recent spate of sinkholes developing in the area is uncertain, although it is possibly related to changing groundwater conditions. An appreciable lowering of the regional groundwater table would result in the dewatering of cavities formed in the limestone and cause the overlying clay and gravel deposits to settle and eventually collapse around these features.

It is possible that the deep open-cut pit at the Goliath quarry (300 m west) may have induced a local dewatering situation and lowered the long-term regional groundwater table in the immediate vicinity. The same effect could also result from a period of abnormally low rainfall.

The irregular shape of the contact between the limestone and overlying gravel makes it difficult to satisfactorily investigate this sinkhole phenomenon. Geophysical techniques (seismic refraction, resistivity) have been employed over the past twelve months in an adjacent area and although the results showed some potential they were not sufficiently conclusive to consider these techniques as successful exploration tools. Sinkholes have been successfully located by diamond drilling methods but without other exploration methods as a guide for drill hole sites, this method is a rather hit and miss approach and is therefore prohibitively expensive.

Unfortunately there is little the Department can offer in terms of delineating the extent of sinkholes in the area, and more specifically, on this property. The most effective short term solution is to backfill the existing holes. This will help lessen the undermining and collapse around the edges and prevent both people and livestock falling into the holes.

The minor cracks which have developed in the house over the past 12 to 18 months, together with the more prominent vertical crack in the centre of the garage wall, may or may not be related to sinkhole development. Features similar to these are often seen associated with expansive clay areas throughout Tasmania and are often associated with seasonal soil moisture variations, but in this case may be related to the drying out of the soil brought about by the lowering of the regional groundwater table. The cracking is obviously of concern to the landowner but can, at this stage, be classified as relatively minor and it is considered that the house is not in any immediate danger.

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