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The investigation and rehabilitation of the Pretorius Avenue sinkhole in Lyttelton Manor, Centurion

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A large portion of the Centurion area in the southern district of the City of Tshwane Metropolitan Municipality (CoT) is underlain by dolomite formations of the Malmani Subgroup of Transvaal Supergroup. Karst-related instability events are well documented and pose significant challenges to infrastructure on private land and commercial entities, as well as to the local government, the CoT in the management and rehabilitation of these occurrences. Since 2012 development on dolomite land has been controlled by standards promulgated by the South African Standards authority [1]. Notwithstanding this, instability events will continue to occur and the infrastructure of the municipality is particularly at risk due to the vast network of bulk water bearing services such as high pressure water, stormwater and sewerage networks. Major disruption is caused to the provision of municipal services due to the interruption of essential services and access in neighbourhoods.

This paper presents the case study of the investigation and repair of a sinkhole which developed on Pretorius Avenue in Lyttelton Manor. The sinkhole that developed was one of the largest sinkhole events to have occurred in the last 25 years in the Centurion area. The sinkhole measured 16m by 35m in dimension and up to 9m deep (Figure 1). The sinkhole affected the roadway, the private property, the sport facilities of the adjacent school and disrupted Municipal water, sewer and stormwater services to the area.

Figure 1: The Pretorius Street sinkhole shortly before commencement of rehabilitation.

The events that led to its formation and development as well as the approach and findings of the investigation conducted are discussed. Repair of sinkholes is also subject to minimum standards published by the South African Standards authority [2]. The adjusted repair method adopted and the challenges encountered in the rehabilitation of the Pretorius Avenue sinkhole are described. The paper concludes with a perspective on lessons learnt from the challenges experienced with rehabilitating a very large sinkhole event in a suburban setting with a multitude of municipal and private services and structures at stake as well as those challenges faced by the Municipality in managing karst-related instability events in a developed environment.

References:

[1] SANS 1936 Parts 1-4 (2012) Development of dolomite land, SABS
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