

# Massive retaining wall project at FNB-Wesbank development

THE NEWLY COMPLETED FNB-Wesbank administrative centre in Fairland, Johannesburg, is a development which has generated considerable interest among construction professionals and members of the public alike, owing primarily to some highly innovative architecture used in its design by Kim Fairbairn of Continuum Architects (Pty) Ltd.

Having been built on a site with a marked and varied slope, it is a development which required extensive retaining wall support.

A total of eight retaining walls were built, some of which reached heights of 7,5 metres. These cover an area of some 3 000 m<sup>2</sup> and used close on 30 000 concrete retaining blocks (CRBs) in their construction. CRB walls are more cost-effective than conventional reinforced concrete walls and are considerably more attractive, facilitating as they do varying shapes and contours, as well as the growth of plants in the soil-filled blocks.

All the walls were built by Kalode Construction using INFRASET's Terrace Block retaining system, the one exception being an internal wall in the Basement 3, which was built using Concor Technicrete's Envirowall block system. This wall comprised a geogrid-reinforced fill structure built at 85° – the

Envirowall block is best suited to this type of application.

The walls were built in two phases. Phase 1, which comprised the Basement 3 wall and the fire escape structured fill wall on the northern side of the project, was designed by John Joubert of Foundation and Slope Stability Engineering, and Phase 2, which consisted of the remainder of the walls, was designed by Herman Pietersen of Herman Pietersen and Associates.

Anyone visiting the site for the first time will immediately be confronted by a retaining wall at the Wilson Street entrance. Although not part of the FNB-Wesbank development per se, it was also constructed by Kalode Construction on behalf of Brian Wescott Construction. Completed in 2006, the wall was built on the southern slope of the feeder road which serves both the FNB-Wesbank development and Worldwear Shopping Centre adjacent to the FNB development. A pure gravity structure, the wall is 60 metres end-to-end and reaches three metres at its highest point.

Further evidence that retaining walls play a crucial role at this site becomes apparent at the gatehouse where 5 000 CRBs were used to create an attractive 80 metre wall. Once plants and flowers are established on this section of wall it will form an extremely attractive feature. The wall itself entailed a standard



design and installation. It rests on a concrete strip footing 200 mm deep by 600 mm wide, tops 4,5 metres at its apex, and for the most part, slopes at an angle of 70°. Blasting was necessary on parts of this section and the exposed rock face was covered with CRB blocks.

One of the more challenging CRB projects at the FNB site was a wall built to support a fire escape on the north-western side of the development. Seventy metres long and seven metres high, it was built at an angle of 70°. The fill in this wall is well compacted and reinforced with high strength polyester geogrids supplied by Kaytech. The fire escape sits directly on the structural fills and applies loadings on these fills of 150 kPa.

The wall built with Concor's Envirowall blocks is a vertical structure situated in the basement, which houses the building's fire fighting equipment. Approximately 14 000 blocks were used on this wall and Kalode were responsible for all the fills and the stabilising.

This wall was offered as an alternative to the originally proposed retaining wall as it was much more cost effective, by approximately 40%. Just on 100 metres long and reaching a height of 6,8 metres, the top half of the structure was reinforced with tensioned polyester geogrids which extend into the backfill. The bottom 2,5 metre section of the wall is constructed with a 5% cement-stabilised fill reinforced with tensioned polyester grids.

Kalode Construction managing director, Jan Pienaar, says Envirowall blocks were used on this wall as they are ideal for vertical structures that are heavily loaded. The bottom two metre section of the wall is cement-stabilised and soil-reinforced with stretched geogrids supplied by Kaytech. The top 4,5 metres is a conventional stretched soil reinforced structure with the blocks acting more as a facing than a structural element.

On the south-eastern and south-western section of the building a sunken wall 6,5 metres high and 93 metres long was built at a slope of 70°. A composite wall, it was constructed with a double skin up to a height of four metres and a standard geogrid reinforced fill was used above that to maintain the weight.

Another wall section, the south-western pod, was built around a staircase. It is also a composite structure in which cement-stabilised soils and geogrids, as well as plain geogrid-reinforced fills and terraced stepbacks were used to accommodate the staircase landings and to break the stark lines of a high CRB wall situated in confined surroundings. It is 125 metres long, varies between three and eight metres in height, and has a 70° slope.

All structures were built with adequate subsoil drainage consisting of clean stone wrapped in horizontally-laid Kaytape A2. Wick drains 250 mm wide were laid on the face of the exposed embankment and these act as sub-soil cut-off and collector drains.

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► INFO

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- 1 This 70 m x 7 m high retaining wall, built with INFRASET Terrace Blocks, supports a fire escape and is situated on the northern side of the FNB-Wesbank development in Fairland, Johannesburg
- 2 A 140 m x 7,5 m retaining wall built with INFRASET Terrace Blocks on the southern side of the FNB-Wesbank development in Fairland, Johannesburg

Source:

[http://www.saice.org.za/downloads/monthly\\_publications/2008/CivilAug08/#/0](http://www.saice.org.za/downloads/monthly_publications/2008/CivilAug08/#/0)