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Kaytech Reinforces Site of new Mamelodi Mall

Kaytech's quality separation, basal reinforcement and subgrade stabilisation solutions for the new Mamelodi Mall, east of Pretoria, resulted in significant savings for New Africa Development. With the planned Mall strategically situated in the centre of Mamelodi, a township of over half a million inhabitants, it is destined to become a leading commercial and social hub.

Upon inspection of the site, D & G Consulting Engineers encountered extremely weak clay subgrade that could neither support massive stormwater pipes nor future construction of the platforms for the structures. With the only conventional option being an expensive layer of dumprock (over one metre thick) to compensate for the low bearing capacity of the in-situ soil, Danie Herbst of **Kaytech** was consulted to recommend a favourable solution.

It was decided that **RockGrid PC 100/100**, **Kaytech's** composite geotextile, would be installed as a separation and reinforcement layer in the bedding of the stormwater pipes. This solution helped facilitate a reduction in the layer of dumprock required. The PC 100/100 composite geotextile was used as the combination of a nonwoven separation layer in conjunction with high tenacity, bi-axially orientated multifilament polyester yarns, gives **RockGrid PC** its exceptional characteristics; a high tensile modulus providing excellent reinforcement properties and, compared to polyethylene or polypropylene grids or woven fabrics, minimal creep deformation. The contractor Renico installed a total of 16 000 m^2 of **RockGrid PC 100/100.**

In addition to the separation and basal reinforcement, a drainage system comprising 1.6 km of **Flo-Drain** was installed alongside the stormwater trench to protect the integrity of the platforms. The **Flo-drain** system is **Kaytech's** solution for highly effective subsoil drainage in a wide variety of applications. Compared to a conventional aggregate drain, pre-assembled and lightweight **Flo-Drain** offers several advantages, including ease of transportation, ease and speed of installation, flexibility, as well as quality assurance.

Kaypipe geopipe, positioned at the base of the **Flo-Drain** fin, accommodates high localised flows since its 70% open area allows for a significant increase in the infiltration rate of water. Manufactured from HDPE, **Kaypipe geopipe** is lightweight and flexible, making it far easier to install than other drainage pipes. Its exceptional infiltration rate, coupled with its ability to tolerate extremely high stresses, places **Kaypipe geopipe** in a class of its own.

For optimum subgrade stabilisation of the platform created for the mall, Kaytech recommended a combination of **their TriAx TX 160** and **bidim A2**. The **TriAx** provides a mechanical stabilised layer and the **bidim A2** beneath fulfils the separation function to the soft clayey subgrade. This creates a stable platform for the building.

The rigid polypropylene triangular geometry of **TriAx** is a revolutionary geogrid design providing near uniform stiffness through 360^{o}. Compared to bi-axial geogrids, **TriAx** enables greater reduction in aggregate layer thickness which in turn, reduces the quantity of natural aggregates required as well as the volume of material to be excavated. This completely multi-directional product with near isotropic properties produces a mechanically stabilised layer of unsurpassed performance.

After technical advice from Tensar UK, the manufacturer of **TriAx**, Kaytech proposed that all dumprock be removed from the layerworks and completely replaced with the **TriAx TX 160** and **bidim A2** combination layer. This design resulted in on-site material now becoming usable due to the excellent compaction facilitated by the geogrid (G6 fill at 370 mm, the minimum depth as per TRH14, was compacted to 95% MOD AASHTO), and by using **bidim** as a separation layer, up to 50% less fill material was needed.

Manufactured in **Kaytech's** ISO 9001 registered factory in Atlantis, Western Cape, and meeting stringent civil engineering and industrial specifications, **bidim** has become the leading geotextile in Africa. Over the last decade, **Kaytech** has processed over 25 million kilograms of high grade polyester from discarded plastic cooldrink bottles, converting this 100% recycled material into eco-friendly A-grade **bidim**, a continuous filament, nonwoven, needlepunched geotextile. It is the needlepunching process that gives **bidim** its unique characteristics including appreciable thickness, high porosity and a high drainage capacity

both transverse and normal to the plane. 101 081 PET bottles were effectively recycled to manufacture the bidim for this project.

Kaytech's solution for this project not only provided considerable economic benefits for the developer, but also greatly impressed the engineer and, with 22 000 m^2 of both **TriAx TX 160** and **bidim A2** providing the ultimate in subgrade stabilisation, there's no doubt that the Mamelodi Mall will be built on solid ground.

For more information on Kaytech products and systems, visit www.kaytech.co.za

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