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Kraaifontein Integrated Waste

AT A SITE IN Kraaifontein, in the Cape Town Metropole, just off the N1, is the first integrated waste management facility of its kind in South Africa. It comprises a refuse transfer station, a compaction hall, container handling operations, garden refuse chipping facilities, materials recovery facility, domestic recycling centre and a public drop-off. It also contains a workshop, wash bay, diesel storage, security facilities, entrance building and weighbridges. Provision has also been made for a future “resource park” and for the accommodation of future “alternative technologies”, such as waste to energy.

The design capacity currently allows for a maximum 100 tonnes/day materials recovery facility and a 1 000 tonnes/day refuse transfer station.

The planning, design and implementation of the project straddled a period of three years. Construction is nearing

completion and final commissioning will commence shortly. This has been one of the most challenging, yet satisfying projects that the author has ever worked on, and I believe I speak on behalf of everyone who has been involved – the client, the Solid Waste Management Department of the City of Cape Town, the professional teams and all of the contractors – when I say that this flagship project will be handed over with a great sense of pride and achievement.

Jeffares & Green (J&G), the lead consultants, in joint venture with GJA Consultants, undertook the project management, civil, structural, rail, roads, transportation and site supervision duties. GJA was responsible for the building, electrical and mechanical duties. Several other multi-professional consultants involved included surveyors, architects, quantity surveyors, a landscape architect, and mechanical plant consultants.

The principle civil and building contactors were Haw & Inglis, and the mechanical plant and equipment were designed and installed by the Akura/Petrel Joint Venture group.

A focal point of the project is the 148 m long x 122 m wide x 18 m high structure designed by J&G’s Cape Town structures section. This structure encompasses a material recovery facility, a compaction hall and a refuse receiving hall. Some of the main features of this main structure involved:

- 248 driven piles.
- A framed and braced structure comprising reinforced concrete and structural steel elements.
- A double-pitch roof with longitudinal and transverse monitors to fit louvres and translucent sheeting for lighting and ventilation.
- Internal floor levels which vary due to the sloping nature of the site plus the



Management Facility

provision of the elevated floor for installation of impact conveyors.

- A roof structure which is supported internally at the edges of the refuse receiving hall apron and at mid-span of the compaction hall and material recovery facility rafters in order to cover the 122 m width of the building.
- A roof with a clear span of 45 m (in the RTS), with no internal columns, so as to facilitate the free movement of vehicles. The 45 m span was achieved by using steel trusses constructed with back-to-back angle sections.
- The use of 600 mm deep cellular rafter beams supported at mid-span in the roof structure of the compaction hall and material recovery facility.
- The floor of the refuse receiving hall was elevated above the compaction hall and material recovery facility floors, in order to incorporate an impact conveyor system into the design. This

was achieved by constructing 300 mm reinforced concrete retaining walls around the perimeter of the 6 000 m² receiving slab.

The construction of the facility also involved a specialised mechanical component which included the supply and installation of waste compactors, impact conveyors and containers, and the mechanisation of the refuse transfer station and materials recovery facility (by installing bag splitters, screens and balers). This section of the work was awarded to a JV between Akura Manufacturing Engineering Company and Petrel Engineering.

A community liaison officer was appointed, as this facility borders on low-income areas and the construction of the facility lends itself to the training and employment of unskilled persons.

It cannot be over-emphasised that a facility of this nature involves practically every aspect of engineering

and specialist input such as roads, civil, structural, rail and municipal engineering, together with mechanical, electronics and electrical engineering, architectural design, landscape architects, ground water specialists, traffic engineering, transportation studies, economic reviews, fire protection, telecom systems, ventilation, and financial planning.

Particular attention was paid to:

- Green engineering for the development.
- Pollution prevention.
- Special storm water inlets, traps and swales (channels) – to achieve this overseas and local technologies were incorporated into the design. □

- 1 Aerial view from the north of the new Kraaifontein Integrated Waste Management Facility in Cape Town
- 2 West elevation
- 3 Vehicle entrance
- 4 Tipping hall



Source:

http://www.saice.org.za/downloads/monthly_publications/2010/2010-Civil-Engineering-oct/#/0