
	Gautrain Rapid Rail Link Project	
	Bombela Concession Company	

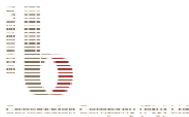

6. IMPACT MANAGEMENT MEASURES

The Gautrain construction phase did have an impact on the receiving environment and the following actions were taken to rectify the situation:

- River crossings were constructed according to the design reports and method statements with the objective to minimise the impact on the river course. Rehabilitation was undertaken and included the vegetation of the river banks; in some places silt has been removed.
- The Directive from DWA issued in December 2008 relating to the water quality management and the subsequent rehabilitation reports for the river crossings and the MFP wetland was addressed. Successful rehabilitation of the MFP wetland has been achieved and this was signed off by the relevant authority, City of Johannesburg. The close-out of the Directive on water crossings is to be done now that the construction has been completed and any remaining issues will be recorded and addressed as snag items.
- An additional groundwater report was completed regarding the quality of the drainage water from the tunnels which included an evaluation of the water quality against the standards.
- Water Management Plan Guidelines were compiled for the dolomitic areas providing measures to be followed in order to prevent the formation of sinkholes which could potentially cause damage to the track supporting structures and/or earthworks.
- A Water Management Plan has been developed for the Tunnel Water Discharge.
- The main report dealing with the environmental management during the operational phase is the Environmental Management Plan for the Operations and Maintenance (EMP O&M) phase of the project approved by GDARD.

6.1 DRAFT FINAL ENVIRONMENTAL MANAGEMENT PLAN: OPERATIONS AND MAINTENANCE

The Applicant has developed a Draft Final Environmental Management Plan for the Operations and Maintenance Phase which was submitted to GDARD in April 2010 and was approved on 30 May 2010. The purpose of this Environmental Management Plan (EMP) is to ensure that the environment is properly considered during the operations and maintenance phase of the Gautrain project. The EMP's focus is on minimizing and/or preventing negative impacts while positive impacts are enhanced. At the same time the EMP provides a logical extension of the Environmental Impact Assessment (EIA) studies and reports undertaken for the Gautrain project since 2002, and ensures that recommendations contained in the EIAs are implemented, and that the project does not deviate from the environmental

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profile that formed the basis of the assessment. In a similar vein the EMP serves to ensure that the requirements of the Project RoD, all amendment RoDs issued to date and all current applicable legislation that came into force after the Project RoD are also met and serves to provide a clear and auditable indication as to how those requirements have been implemented during project execution.

A construction specific EMP - the Draft Final EMP Revision 5 (DF EMP Rev 5) - was developed and approved by GDARD for the construction phase. The DF EMP Rev 5 is only applicable for the construction phase and it will become redundant at the end of the construction phase, which includes the period of 12 months after the commencement of the Operational Phase of the Gautrain project. Therefore, during the period that the Construction and the Operation is continuing concurrently, both EMPs will operate in tandem until the DF EMP Rev 5 falls away.

The Operations and Maintenance Environmental Management Plan (O&M EMP) is a project specific Environmental Management Plan developed in consultation with all projects licences, Interested and Affected Parties, Metropolitan Councils and all the relevant authorities. The O&M EMP has been made available to all registered stakeholders for comment for a period of 30 days as required by the Project RoD. Comments received and issues raised have been captured in the Issues and Response Report.

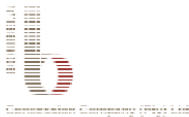

The water management plan that forms part of the O&M EMP addresses the following components and is included in **Appendix J**.

- Storm water runoff and discharge
- Viaducts and bridges crossing water courses
- Water management in the dolomite areas
- Utility and services management
- Water Release from tunnels (Dewatering)
- Removal of sludge from the attenuation ponds
- Cleaning and maintenance of oil traps
- Effluent release.

6.2 SPECIFIC MITIGATION REQUIREMENTS PER WATER USE ACTIVITY DURING THE COMPLETION OF THE CONSTRUCTION PHASE AND THE OPERATIONAL PHASE

6.2.1 Abstraction and storage of water

- The taking and/or storage of water will not impact significantly on the water resource and/or any other person's water use, property or land.

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- The quantity of water abstracted will be monitored.
- The quantity of water stored will be monitored to ensure compliance with the General Authorisations.
- Acceptable construction, operational and maintenance practices will be followed to ensure the consistent, effective, and safe performance of the taking and storage of water.

6.2.2 Discharge of wastewater

- Water discharged into the Sandspruit will comply with the general limits of the General Authorisation standards with the exception of Ortho Phosphate (PO₄) which must comply with 1 mg/l.
- The volume of water, found underground, discharged will not exceed 15 M³/day on any given day.
- The discharge will not significantly impact on the water resource or any other person's water use, property or land and is not detrimental to the health and safety of the public in the vicinity of the activity.
- The water quality will be monitored on a monthly basis as set out in the monitoring programme.
- Aquatic impact assessments will be undertaken as set out in the monitoring programme.
- The levels of groundwater will be monitored until it can be determined whether the lowering is permanent.

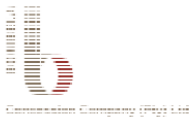

6.2.3 Altering the bed, banks, course or characteristics of a water resource

The following mitigation and rehabilitation measures have been implemented:

- The necessary measures will be undertaken to ensure that the natural patterns of aquatic biota and sustainable ecological functioning of the system are not interfered with.
- The necessary measures to stabilise the alteration and surrounding areas have been undertaken.
- The riparian zone have been rehabilitated using indigenous shrubs and grasses.
- Alien vegetation growth will be monitored during the Operations period and the recruitment of new alien vegetation will be controlled.

6.3 MONITORING SYSTEMS

Surface and groundwater monitoring programmes were in place throughout the construction phase. Monthly surface water samples were taken upstream and downstream of the river crossings during the construction phase, and will continue for

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a period of three (3) months after construction or at least one wet season. Groundwater levelling has been conducted until it could be established that the water levels have stabilised.

6.3.1 Monitoring objectives

A surface water monitoring programme was implemented to monitor and measure the impacts associated with the construction of the river crossings and the discharge of water from the tunnel. The objective of the monitoring programme was to (DWAF, 2006):

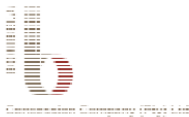

- To ensure that the water management plan is based on impact and incident monitoring.
- Generation of baseline information in order to establish the current status quo.
- Identification of pollution sources other than the construction activities associated with the project.
- Monitoring water abstraction to ensure water usage is optimised.
- Assessment of impact on receiving environment.

6.3.2 Surface and groundwater monitoring

The surface water monitoring was conducted on a monthly basis during the construction phase where there was water in the rivers. These monitoring points were selected to ensure that potential impacts be monitored upstream and downstream from the construction of river crossings and discharges to the watercourse.

During the construction phase it was established that the impact were limited in terms of the impact on surface water quality. All construction activities and rehabilitation of the affected areas will be completed by the end July 2011, except for the activities of snagging nature which would require limited monitoring during the first 12 months of the operation of the Gautrain system. It is further suggested that limited monitoring continue into the operational phase of the Gautrain until it can be proofed that there is no changes in the surface water quality and the rehabilitation has stabilised.

Groundwater levels' monitoring was conducted as required by the current Integrated WUL and the results were reported in the Geotechnical Instrumentation Report, March 2010. However groundwater level monitoring indicated that ground levels have stabilised. It is further recommended that groundwater level monitoring be continued to establish whether groundwater levels have recovered.

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The following monitoring is therefore suggested for the operational phase as set out in **Table 6-1**.



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Table 6-1: Environmental Monitoring for the Gautrain Rapid Rail Link

Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
Soil								
Visual inspection	Soil erosion	Rehabilitated surface at all river crossings, camp sites and affected areas etc			X		Continue from the construction phase	At least for three years once construction is completed or rehabilitation has established and is sustainable
Flora								
Alien invasive species	Declared weeds and alien species	Disturbed areas and rehabilitated areas			X		Continue from the construction phase	At least for three years once construction is completed or rehabilitation has established and is sustainable
Water Quality								
Surface water quality	pH Ec, TDS, Ca, Mg, SO ₄ , Na, Cl, PO ₄ , NO ₃ , NH ₄ SS Oils & greases	50 m Upstream and downstream of river crossings 100 m upstream and downstream of the discharge points and the discharged water at: E2 E4 Sandton Sandspruit		X			Surface water monitoring at the river crossing is to cease after the completion of all construction activities.	Upstream and downstream monitoring will be required at all river crossings until such time that rehabilitation is completed and sustainability of vegetation cover is achieved. Monitoring of impacts from dewatering from the tunnels will continue upstream and downstream of the discharge



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Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
								points into the operations
Surface water quality	pH Ec, TDS, Ca, Mg, SO ₄ , Na, Cl, PO ₄ , NO ₃ , NH ₄ , SS Oils & greases Fe, Mn, Al, Pb, Cr(VI) Cr	50 m Upstream and downstream of river crossings 100 m upstream and downstream of the discharge points at: E2 E4 Sandton Sandspruit					Continue from the construction phase	Upstream and downstream monitoring will be required biannually in the Sandspruit
Emergency Monitoring	pH Ec, TDS, Ca, Mg, SO ₄ , Na, Cl, PO ₄ , NO ₃ , NH ₄ , SS Oils & greases	Tunnels	X				As and when required	In the case of an incident that might impact on the surface water quality.
Biomonitoring								
	Aquatic Macro invertebrates Habitat Integrity Assessment Riparian and Aquatic Vegetation	100 m upstream and downstream of the discharge points at: E2 E4 Sandton				X	Continue from the construction phase	Aquatic biomonitoring will be undertaken bi annually during a period of low and high river flows.





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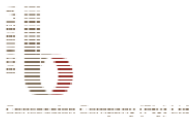

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Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
	Assessment	Sandspruit						
Water quantity								
Dewatering quality	Ec, Oils & grease, SS, TDS, SO4 PO ₄ , Na, Cl, Mg, FC, NO ₃	E2 E3 E4 Sandton Sandspruit		X			Continue from the construction phase	
Dewatering quality	Full spectrum, bi-annual	E2 E3 E4 Sandton Sandspruit						
Dewatering volumes	Volumes cubic metre/ pumping hours	E2 E3 E4 Sandton Sandspruit		X			Continue from the construction phase	
Emergency monitoring	Volumes cubic metre	E2 E3 E4 Sandton Sandspruit	X				Continue from the construction phase	Monitoring will be required as and when a situation arises. This volume must be monitored on a daily basis or as long as the situation remains.

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Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
Land capability								
Visual inspection	Basal Cover Aerial Cover Species diversity Proportional of annual: perennial plants present	Rehabilitated areas			X		Once the construction activities and rehabilitation of affected areas are completed.	
Drainage channels, culverts and pipes								
Visual inspection	Sedimentation of channels, debris	All river and drainage crossings, especially in the dolomitic area in Centurion			X		Once the construction activities and rehabilitation of affected areas are completed.	Regular inspection will be required in order to ensure that all drainage channels, culverts and pipes will be able to handle the volume of water it was designed for.

D – Daily; M – Monthly; Q – Quarterly; Y - Yearly

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7. MOTIVATION IN TERMS OF SECTION 27 OF THE NATIONAL WATER ACT (ACT 36 OF 1998)

7.1 SOCIO ECONOMIC OVERVIEW

Bombela Concession Company (BCC or Bombela) holds the 20 year Concession to design, build, part-finance, operate; and maintain the Gautrain Rapid Rail Link. As the private partner, BCC has contributed some R 3.2 billion towards the financing of the project.

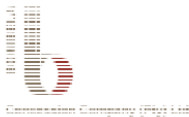

Bombela is responsible for ensuring:

- effective delivery of the rail systems, major civil infrastructure as well as the integration of the electro-mechanical works;
- the design and implementation of the civil works component of the project;
- the design, manufacture and installation of railway components and deliverables; and
- the 15 year contract for operating and maintaining the Gautrain system

7.2 BOMBELA SHAREHOLDING

The shareholders of Bombela include:

- **Murray & Roberts Limited** - Murray & Roberts is South Africa's leading engineering, contracting and construction services company. It has created employment, developed skills, installed infrastructure, delivered services, applied technology and built capacity throughout South and Southern Africa for 105 years, making a significant contribution to socio-economic development in the region. Murray & Roberts operates in Southern Africa, Middle East, Southeast Asia, Australasia and North America. Murray & Roberts is based in Johannesburg South Africa with a public listing on the JSE Limited.
- **Bouygues Travaux Publics** - Bouygues Travaux Publics is one of the world's top global design-and-build civil engineering and building contractors with extensive experience in concession projects. Bouygues Construction has successfully carried out over 200 km of tunnel projects and recently completed the world's largest tunnel, excavated with a tunnel boring machine under a design and build contract for the high-speed train in the Netherlands.
- **Bombardier UK** - Canadian company Bombardier is a world leader in the aerospace and rail transportation sectors. Its proud record consists of eight 'Private Rail' projects, two for the London Underground. Subsidiary Bombardier Transportation is the global leader in the field of rail equipment

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manufacturing and servicing. It has a construction presence in 21 countries and is involved in 46 production sites.

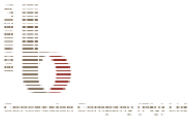

- **Strategic Partners Group** - Strategic Partners Group (SPG), a BEE company, holds 25% of the Bombela Concession Company. SPG participates meaningfully in the Gautrain Project through its involvement in all Bombela entities including the Bombela Turnkey Contractor, the Bombela Civils Joint Venture, the Bombela Electrical and Mechanical Works and the Bombela Operating Company.
- **The J&J Group** - founded in February 2000, is a BEE investment holding and management company with investments in a select group of companies. The Group holds investments in companies operating in the financial services, healthcare, information technology and industrial sectors. The shareholding of the J&J Group is broad-based and extends to well over 200 000 individuals and their families. J&J hold 8% of the Bombela Concession Company.

7.3 SOCIO ECONOMIC PERFORMANCE OF BOMBELA

Gautrain has contributed significantly to the acceleration of socio-economic growth, black economic growth, black economic empowerment and skills development within Gauteng. It has created significant job opportunities and has stimulated business activities both directly and indirectly in the construction, manufacturing, services and communications industries.

To date Bombela has achieved the following:

- BEE companies hold 32% of the shares in the Bombela Concession Company
- More than R 5 200 million was spent on procurement from sub-contracting to BEE companies. More than 380 BEE companies have benefited from the project to date
- More than R 2 530 million was spent on procurement and sub-contracting to new BEE. More than 110 new BEE companies have benefited from the project to date
- More than R 1 360 million was spent on procurement and sub-contracting to SMMEs. More than 300 SMMEs have benefited from the project to date.
- More than R 3 520 million of South African materials, plant and equipment have been purchased
- Unskilled staff and semi-skilled staff attended more than 16 330 courses to improve their skills levels
- Top management, senior management, middle management and junior management of Bombela attended more than 3 410 training courses.

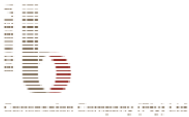

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At the end of May 2011 Bombela has increased its labour force and significantly exceeded its obligations. This can be summarized as follows:

- 35 755 jobs were created
- 31 900 local people were employed, compared to an obligation of 17 940
- 27 460 HDI's were employed, compared to an obligation of 12 730
- 3 090 women were employed, compared to an obligation of 190
- 202 people with disabilities were employed, compared to an obligation of 158.

At the end of May 2011, Bombela had already created or sustained more than 31 900 local direct jobs; and an estimated total of 111 700 direct, indirect and induced jobs to date.

All of these statistics have been independently verified by the Independent Socio-Economic Monitor (ISEM) appointed in an oversight role on the Gautrain project.

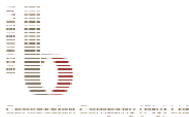

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8. CONCLUSION

The Gautrain Rapid Rail Link Project is in its final stages of implementation with the trains on the line to ORTIA being in operation for more than a year now and the commuters' services between Rosebank and Hatfield operating since August 2011. The water uses that have been required during the construction phase will no longer be required and the impacts that have occurred as a result of the construction are in the process of being rehabilitated.

The impacts foreseen during the operational phase of the Gautrain are different from those that occurred during the construction and necessary mitigation measures have been implemented. A detailed Operational and Maintenance EMP has been compiled and approved by GDARD and measures recommended therein are being implemented.

Therefore it is recommended that the water uses be authorised and a licence be issued to the applicant.

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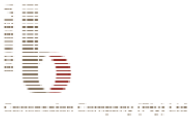

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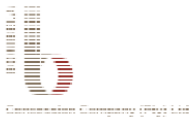

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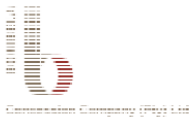

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**Appendix A
Licensing forms**

**Appendix B
Studies on the wetlands**

**Appendix C
Surface Water Quality Monitoring**

**Appendix D
Groundwater level monitoring
Piezometer Monitoring Results**

**Appendix E
Final Schedule for Water Uses**

**Appendix F
Stormwater management and attenuation pond designs
Oil separator reports**

**Appendix G
River crossing design reports**

**Appendix H
Groundwater Dewatering
Report MFP Spring flow May 2010
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