



Greater Johannesburg  
Metropolitan Council

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**Baralink: An Economic  
Impact Assessment  
and Implementation  
Strategy**

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Section III: Economic  
Impact Assessment  
Report

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**Arup (Pty) Ltd**  
Arup Planning & Development  
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**ARUP**

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## 1. INTRODUCTION

In February 1999, the Greater Johannesburg Metropolitan Council (GJMC) appointed a consortium of Arup (Planning & Development), Urban Studies, African Harvest Finance and Freshfields to develop an economic impact assessment and implementation strategy for the Baralink area.

### 1.1 CONTEXT FOR THE MODEL

The land use optimisation exercise resulted in a development scenario that provides a framework for attracting investment to the Baralink area. The aim of the economic impact model exercise is to:

- Estimate the expenditure associated with a 10-year development scenario based on a market demand analysis and the identification of land parcels suitable for development within the timeframe
- Estimate the potential support of employment opportunities related to the estimated expenditure

The development of a mathematical model to approximate the conditions under which development would occur has provided valuable insights into the dynamics that constrain or promote development under the prevailing conditions. In the context of Baralink, the location of the area, the lack of infrastructure and economic structures that would support the development of a formal economy, the encumbrances on land parcels, and the historical function together with investor perceptions of the area all mitigate against development being driven by the private sector alone.

This model has assisted in identifying the necessary actions that would promote investment in the area, and has provided a first approximation as to the costs involved. This analysis has also focused on the economic benefits associated with the *construction* and *operational* phases of development in the private and public sectors in terms of the employment opportunities that could be supported. The results of the analysis are also related back to the existing situation of the area as identified in the market demand analysis.

The model aims to represent the direct economic benefits that may be achieved for a particular investment scenario over a 10-year period. The model also considers secondary economic benefits that are estimated utilising empirical data on multipliers that have been derived from similar studies. We have also taken the view that substantial development over a 10-year period will materially alter the economic potential of the area and attempting to model this at this stage will not provide reliable insights.

### 1.2 DEFINITION OF THE STUDY AREA






The Baralink area is located some 13km south-west of Johannesburg and comprises an area of a radius of approximately 5km around the Chris Hani Baragwaneth Hospital. The location of the study area is shown in Figure 1.

# Palink



## LOCATION OF THE STUDY AREA

## LEGEND

-  Project Area
-  National Road
-  Floodline
-  Other Arterials
-  Farm Boundaries

Phase III  
Figure 1

ARUP  
DEVELOPMENT

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## 2. APPROACH TO THE ANALYSIS

The approach to the modelling exercise was to maximise the economic value of each land parcel within the Baralink area and to maximise the potential for creation of employment opportunities.

The potential for private sector expenditure was derived from the market-demand analysis and was incorporated into the model as take-up rates over a 10-year period. An exercise to determine land development optimisation was undertaken to provide a ranking of suitable land parcels on the basis of existing encumbrances and suitability for development; those land parcels least encumbered being considered as most suitable for development.

The forecast market demand was then reconciled with the land development optimisation exercise to match supply of land with potential development demand. In certain instances, forecast private-sector demand could not be physically accommodated within the development timeframes in terms of suitable land parcels within the Baralink area becoming available. Thus, where demand exceeded supply, the supply of land became the dependent variable in the equation.

For a detailed description of the land use exercise, the reader is referred to the Development Potential Evaluation Report: Section V and the Land Use Optimisation Report: Section VI.

The model is also structured to determine the potential economic impact within three timeframes; namely:

- immediately (within a year)
- short-term (between year 2 and 5)
- medium-term (between 6 and 10 years)

These timeframes are the basis of the land optimisation exercise and provide a timeframe for the catalytic projects that have been identified.

### 3. METHODOLOGY

#### 3.1 MARKET SECTORS

The principal market-related growth sectors within the Baralink area were identified and assessed in terms of the potential take-up rates forecast over a 10-year period.

Table 1. Estimated Take-up Rates for Market sectors in the Baralink Area

MARKET SECTOR	POTENTIAL TAKE-UP RATE	COMMENTS
Retail	18 000 m <sup>2</sup> 6 000m <sup>2</sup>	As a one-off smaller regional centre development As 3 neighbourhood centres developed within 10 years
Industrial	10 000 – 15 000m <sup>2</sup> pa	<i>Devland</i> : Development in industrial sector dependent on overall economic situation
SMME	50 x 50m <sup>2</sup> pa	1 block could provide a SMME park
Offices	6000 – 10000m <sup>2</sup> 1000 – 2000m <sup>2</sup> pa	One-off development by administrative authorities within 10 years Private sector development
Medical	1 320 beds	Total beds for Greater Soweto area within 10 years (10% allocated to Baralink area)
Residential	200 – 350 units pa between year 1 & 5 550 – 700 units pa between year 6 & 10	Mortgaged residential units in R80 000 to R120 000 range
	500 units pa	Affordable housing, based on availability of housing subsidy
	500 units pa	Low Cost housing, based on availability of housing subsidy
Hotel	60 – 100 rooms	Two hotels, each of this capacity, within 10 years

#### 3.2 INFRASTRUCTURE EXPENDITURE

For the purpose of this exercise, the estimated investment in transport and services infrastructure in the Baralink area has been linked to the development scenario timeframes.

##### 3.2.1 Transport Infrastructure

We have taken the view that lack of access to an area is co-incident with a lack of investment, and the improvement of access into and within the Baralink area will support investment opportunities. Transport infrastructure has focused in the immediate term on the upgrading and implementation of a traffic management system along Old Potch Road to facilitate improved traffic flows, particularly during peak hours. In the short and medium term, the improvement of access to the freeways and the construction of major internal roads within the area is recommended.

To determine the transport infrastructure for the land development scenario, the number of vehicle trips generated by the recommended land use was calculated using standard values. The transport modal split was then factored in to estimate the need for road infrastructure investment.

### 3.2.2 Services Infrastructure

The investment in services infrastructure to support the development scenario was also estimated from the proposed land uses. Water supply, sewerage disposal and stormwater were considered and where it was apparent that no excess capacity exists in existing infrastructure for the areas earmarked for development, infrastructure needs were assessed and costs calculated.

These calculations provided the primary inputs to the model together with secondary data taken from literature sources or from current market levels.

For a complete description of the review of the current status of the transport and services infrastructure, the reader is referred to the report entitled Baralink: Framework for an Economic Impact Assessment and Implementation Strategy: Section II.

## 4. MODEL ASSUMPTIONS

In common with economic impact methodologies used in the UK and the USA a number of assumptions have been made in the modelling exercise. They include:

### 4.1 AREA OF IMPACT

An important element of the economic impact assessment is the identification of the area over which the impacts of the development are likely to be spread. While the direct benefits of the development will occur within a defined area, the overall net benefits will depend on the extent to which the indirect and induced effects can be captured within the area. The wider the area chosen the more likely that the benefits will be captured, i.e. they are unable to "leak" out of the area because larger areas are more likely to include the residential areas of employees and because the opportunities for local sourcing of inputs to the development are likely to be greater.

### 4.2 ADDITIONALITY

In studies of this kind it is usual to consider impacts in terms of the additional impact that the development will have within the defined study area. The reason for seeking to identify the net impact represents an acknowledgement that, in common with other developments of this kind, an element of the economic benefits generated will represent relocations from elsewhere within the region. The net benefit is usually termed the "additionality" of the benefit and is a measure of the true worth of the project to the wider economy. Conversely, the element of the project that represents a relocation of existing economic activities is usually termed the "displacement" effect.

The additionality/displacement approach is widely used by international funding bodies including the European Commission to assess the wider economic benefits of projects. Good practice considerations mean that such an approach should be applied to the assessment of developments in the South African context.

In general terms, additionality is likely to be greatest within smaller study areas where the scope for relocations is likely to be lowest. In contrast, at the national level additionality will depend

#### 4.6 LAND PARCEL DEVELOPMENT OPTIMISATION

Every land parcel within the Baralink area has a particular land zoning. Some of the land parcels will have to be re-zoned in order to meet the relevant demand at the particular time horizons. Such a zoning has been defined as a proposed land use.

As described in the land parcel analysis report, the proposed land usage has been allocated to meet the demand, as outlined in Table 1. Land allocation was undertaken using the following rules as guidelines:

- Only correctly zoned land, available within a particular time horizon may be allocated to meet the given demand for a particular market sector to match demand within the same time horizon
- Available land parcels are allocated according to their overall potential rating, in descending order
- Land not used within a particular time horizon, due to sub-optimal take-up, is carried over to the following time horizon. However, rule 2 still takes precedence
- Demand not met, due to lack of supply within a particular time horizon, is not carried forward to the next time horizon. It is thus lost as it is assumed that the demand will find an alternative area to invest in, outside the Baralink area

These rules aim to represent what we believe will be the reality in terms of land being identified by potential developers as suitable for their purposes, it being available for development and how the Baralink area will compete with other areas that have land parcels available for development.

#### 4.7 RESIDENTIAL

For the purpose of the model, demand for residential development was divided into three categories of housing, namely:

- Mortgaged: ranging from R80000-R120000
- Affordable: ranging from R40000- R80000
- Low Cost: up to R40000

Given the available land parcels that could be suitable for residential zoning, the housing demand was allocated to areas so that the mortgaged housing was placed in higher rated areas as compared to the other two housing categories. The location of affordable housing often acted as a buffer between the low cost and mortgaged housing.

The demand for residential areas could not be met in its entirety for all three housing categories according to our proposed zoning allocation; which was allocated on an iterative basis. However, most of the shortfall is envisaged only in the final year of the model (year 10), and many changes to the development scenarios could occur before this time horizon is encountered. The deficit in residential supply is not seen as a major problem but is a factor to be considered in urban planning. The model takes the deficit into account and only includes the total area allocated to residential development.



4.8 THE SMME SECTOR

The SMME sector does not have a dedicated zoning for town planning purposes. This is due to the sector operating across other market sectors such as retail, industrial and commercial. For the purposes of this analysis, it is assumed that the SMME component operates in these three sectors and the SMME allocation across these sectors is based on the following assumptions:

- SMME contributes to 25% of all retail activity
- The balance of SMME activity is then distributed as:
  - 60% commercial activity
  - 40% industrial activity

This formula also ensures that the SMME component is factored into the economic activity of the area, and that allowances are made for rezoning of land parcels for mixed land use.

4.9 BULK INFRASTRUCTURE DEVELOPMENT

The necessary infrastructure to facilitate the proposed development was investigated from existing data sources, and in assessing the proposed timeframes for development. In summary, the following figures were the results of the analysis and used as EIA input.

Table 2. Services Infrastructure Provision for the Baralink Area.

Timeframe	Detail	Cost
Immediate	Reservoir	R4 000 000
	Water reticulation	R1 095 470
	Sewerage systems	R680 000
Short	Water reticulation	R1 228 590
	Sewerage systems	R1 915 000
Medium	Water reticulation	R4 683 591
	Sewerage systems	R2 140 000
<b>Total</b>		<b>R15 742 651</b>

4.10 ASSESSMENT OF TRANSPORTATION INFRASTRUCTURE DEVELOPMENT

The table below gives the summarised transportation cost calculated for the relevant development timeframes.

Table 3. Trip Rates Calculated for the Development Timeframes.

Timeframe	Vehicle Trips (Unadjusted)	Cost
Immediate	2451	R2 700 000
Short	3065	R14 400 000
Medium	4325	R33 800 000
<b>Total Overall</b>	<b>9841</b>	<b>R50 900 000</b>

4.11 LABOUR

For the purpose of the modelling exercise we have assumed that:

- All unskilled and semi-skilled labour for the construction phase will be drawn from the Greater Soweto area

- All skilled labour would be sourced from within the Greater Johannesburg metropolitan area

As part of the analysis, estimates have been made as to the likely on-site employment associated with the construction and operational phases of the development. For construction, about 40% of the development costs are assumed to be contributed to on-site employment. This represents the total construction wage-bill of R598 151 795. The remaining 60% will be used to source other inputs including building materials. The additional employment has been estimated through the application of employment multipliers, the basis of which is explained in more detail in a later section.

## 5. RESULTS OF THE ECONOMIC MODEL

The primary output of the economic model is an estimate of the expenditure associated with the construction and operational stages of the development scenario over a 10-year period; from which an estimate of the potential employment opportunities that can be supported can be made.

### 5.1 EXPENDITURE EFFECTS

A percentage of the expenditure that accrues to resident and non-resident employees is retained in the area; together with the expenditure on non-labour inputs that is also retained locally. This expenditure of income has an induced effect, which is estimated by means of an expenditure multiplier. The total expenditure thus calculated is then divided by an empirically derived expenditure-to-jobs ratio calculated from statistical data on sectoral expenditure and total employment over a given period.

A generic process flow for the estimation of the expenditure for the construction and operations modules of the model is given in Figure 2.

#### 5.1.1 Construction-Related Expenditure

Construction-related expenditure across all market sectors, and the related employment opportunities is summarised in the table below.

Table 4. Construction-related Expenditure and Employment Opportunities.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
EXPENDITURE (R MILLION)	65	89	58	58	123	159	110	119	119	97
DIRECT EMPLOYMENT SUPPORTED	909	1239	807	807	1703	2202	1530	1651	1655	1353
INDIRECT EMPLOYMENT SUPPORTED	158	349	317	407	905	1285	932	1018	1034	858

Although they were calculated as part of the modelling exercise, the above table does not include the number of employment opportunities relating to maintenance work that would be undertaken throughout the lifetime of the building. Temporary work opportunities associated with construction expenditure have also not been included in the calculations.