AECOM
Built to deliver a better world

AFRICA PROPERTY & CONSTRUCTION COST GUIDE 2016

AFRICA PROPERTY & CONSTRUCTION
COST GUIDE 2016

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MESSAGE FROM
DEAN NARAINSAMY

Dean Narainsamy

Executive - Business Unit Lead (Gauteng Hub),
Buildings + Places, Africa

We are delighted to share our latest AECOM *Africa Property and Construction Cost Guide 2016* with you. It has been produced by our program, cost and consultancy (PCC) team.

AECOM's PCC offer remains a key differentiator in our Africa business and further strengthens us as we progress on our journey to become Africa's premier, fully integrated construction consultancy firm.

In terms of innovation, we are very excited about our GLOBAL UNITE and GUIDE (Global Unite Indicative Design Estimator) tool which has gained significant traction since our last publication. It will provide our clients with international benchmarking data with the potential to influence design at inception of a project.

BIM (Building Information Management), with a focus on 4D - Programme and 5D – Cost Modelling, is undoubtedly the future and AECOM remains committed to pioneering this project delivery initiative.

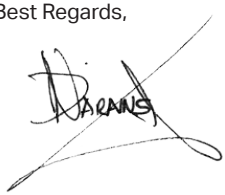
Despite the current tough economic climate, our journey into Africa remains on track and we continue to retain, attract and recruit the best people. The essence of our service delivery is based on our people. Re-tooling, up-skilling and redirecting our talent to service clients' projects is key to our delivery model.

Our market-based business approach has sharpened our focus on the commercial, retail, hotels, residential, energy & utilities, mining, transportation, healthcare, education and oil & gas sectors.

B-BBEE remains an integral part of our drive to contribute to a better South Africa and we are happy to report that we have achieved a Level 3 contributor rating for the current financial year.

Finally, in an environment where adaptability and change management has become key to remaining relevant in the market "let us be the change that we want to see".

Best Regards,



Dean Narainsamy

SECTION 1

BUILT TO DELIVER A BETTER WORLD

It's one thing to imagine a better world. It's another to deliver it.

AECOM was built to do just that. With a deep and experienced global team, we design and deliver infrastructure and services that unlock opportunities for clients and communities, to protect our environment and improve people's lives.

From urban centers to remote villages, our work is transformative. We make a positive, lasting impact by applying our global reach, connected expertise and delivery excellence to solve complex, evolving challenges.

The difference we help our clients make is felt in every region of the world. Clean water for developing communities, iconic skyscrapers that swell a nation's pride, power and security to fuel economic prosperity, transportation that brings people together and thoughtful planning that sustains cities and natural resources.

Our clients face tough, interrelated challenges that can only be solved by a company like ours - one with deep roots, diverse perspectives, and an innovative approach. One with the people, technology and vision to deliver what others can only imagine.

We are **AECOM — built to deliver a better world.**

OUR CORE VALUES

At AECOM, we are guided by six core values that we all share and that underpin everything we do.

Safeguard	Operate ethically and with integrity, while prioritising safety and security in all that we do.
Collaborate	Build diverse teams that connect expertise to create innovative solutions.
Inspire	Develop and celebrate our people, and elevate the communities we touch.
Anticipate	Understand the complexity of our clients' challenges and help them see further.
Deliver	Grow our business through operational excellence and flawless execution.
Dream	Transcend the industry by reimagining what is possible - and realising it.

SAFETY FIRST

Safety, Health and Environment (SHE) is a prized component of the AECOM culture.

Safeguarding our people, those we work with and anyone affected by our operations, as well as the environment and communities in which we work, is a business critical responsibility. It is one of our core values and central to our ability to conduct business with integrity at all times.

In order to achieve this, AECOM's senior management team leads the improvement process and continuously demonstrates support and commitment.

Our policies, procedures and processes which form part of our SHE Management System are fully aligned to the international standards for both environmental management - **ISO 14001**, and safety and health management - **BS OHSAS 18001**.

DELIVERING EXCELLENCE

Our Quality Management System (QMS) is designed to manage all aspects of our work. To consistently deliver world-class, sustainable solutions, we implement the QMS in all our offices and adhere to it in all that we do.

Our quality objectives are:

- Client satisfaction
- Operational consistency
- Staff retention
- Continuous improvement

We achieve our objectives by following our seven quality principles:

- Focus on our customer
- Collaborate and communicate with others
- Proactively manage risks and changes
- Check and continually improve
- Understand, plan and manage our work
- Follow established procedures
- Manage documentation

Our QMS is certified to **ISO 9001: 2008.**

AFRICA HAS RISEN

Our operations in Africa boast more than 950 people, predominantly in South Africa but with a growing number of permanent offices in key African countries.

We offer services to clients across the continent and maintain a project presence in more than 40 African countries. With top-level professionals in multiple strategic locations, we understand Africa's specific infrastructure needs and the challenges inherent in working on our wonderfully diverse, vibrant and complex continent.

Our multidisciplinary teams of award-winning engineers, planners, architects, environmental specialists, economists, scientists, consultants, quantity surveyors (cost managers), project managers and programme managers are committed to delivering projects that improve the quality of life of African communities.

IMPROVING LIVES

AECOM works in harmony with the communities in which it operates. As a good corporate citizen, AECOM's Corporate Social Investment (CSI) initiatives focus on:

Uplifting disadvantaged communities

Accepting that sustainable development begins with satisfying basic human needs, we support a range of charitable causes such as shelters for the homeless; homes for the disabled, orphaned and elderly citizens.

Growing the pipeline of engineers and technicians for a skills-scarce Africa

Many people in Africa face development challenges, such as a lack of water and energy security; insufficient and inadequate housing; and a lack of safe and reliable modes of transportation. Solutions to these challenges call for both financial resources and sufficient engineering expertise to plan, design, programme and build the required infrastructure.

AECOM is committed to the principles of good governance and corporate citizenship. As an industry leader with a range of built environment professionals, we invest the precious resources of time and money into improving people's quality of life.

As part of this, we have set up the **AECOM SA bursary scheme.** Through this we annually award merit bursaries to fund full-time undergraduate students in engineering-related studies at accredited universities.

GLOBAL UNITE

Global Unite is AECOM's international benchmarking and project performance indicator database. It gives us the ability to provide evidence-based, early stage construction cost and design advice based on benchmarks of similar projects – via our interactive GUIDE tool.

GUIDE (Global Unite Indicative Design Estimator) draws on project information in the Global Unite data warehouse which, given the size, scale and reach of the information library, means we are able to predict early stage construction costs.

We can now instantly analyse parameters that define how effective or efficient an asset is (or is not) against local or global standards for all asset types. This includes:

- Benchmarking against specific sector and asset types
- Comparing cost by element and sub-elements
- Conducting on-site project analysis in real-time

Each region in AECOM's Global Unite network has subtle variations that reflect the elemental breakdown structure to ensure the capture of cost and quantity data is appropriate for local projects as well as being comparable in terms of international benchmarking.

Although construction cost information is specific to a particular location, design benchmarks can be extracted and analysed for the benefit of driving efficiency across different project types globally.

For clients who have large capital programmes or who undertake numerous construction projects, AECOM can provide Global Unite as a service whereby we can create a tailored solution that will capture and manage their data and configure specific benchmarks and reports that help inform and add value to their decision-making processes.

GUIDE is available through various electronic platforms including mobile devices. It is also commercially available to clients wanting to benchmark their own projects and can be set up to suit individual needs.

SUSTAINABILITY

We embrace sustainability by striving to make a lasting and positive impact on society and the environment. Our greatest opportunity to shape the future is managing the complex economic, natural, social and human investments our clients' infrastructure assets represent. We pursue the same vision in how we operate our company and the strategic investments we make to improve peoples' lives and transform communities.

The expertise of our international partners is extensive and of great value to us locally, as sustainable practices abroad have advanced and progressed in large measures over recent years.

AECOM was a "silver" founding member of the Green Building Council of South Africa (GBCSA), demonstrating our commitment to building sustainably. We have also assisted the GBCSA on its technical working groups to launch the Green Star South Africa Office rating tool in 2008 and the Green Star South Africa Retail Centre rating tool in 2010.

In South Africa, we publish the very popular "Quick Guide to Green Design Attributes" as a service to the property and construction industry. This publication is updated annually and available at the sustainability conferences AECOM attends.

Employees from across our South African business have completed the Green Star South Africa accredited professional course and are available to help clients and colleagues to achieve their social responsibilities as well as their financial or other objectives.

Green building ratings currently undertaken by our team of sustainability consultants include: Green Star Office, Green Star Interiors, Green Star Existing Building Performance, LEED Design and Construction and LEED Interior.

RESEARCH SUPPORT

Research is a key part of AECOM's aspirations to embrace complex challenges and deliver transformational outcomes.

Through our research and knowledge creation activities we aim to stimulate beneficial cultural and business changes, resolve industry-specific problems, support our knowledge database and deliver cost-effective, high-quality and relevant services. We also undertake contract research on assignment for clients.

AECOM globally has a tradition of supporting research collaborations, and in South Africa we are currently pursuing a wide range of research studies with local academic and research institutions, professional bodies and the government.

Current research nationally and internationally centres around:

- Local, regional and international influences on construction costs and prices
- Building Information Modelling (BIM) - BIM cost models and organisational integration in the South African construction industry through BIM
- Sustainability and green buildings - drivers of green design, construction and operations within different building types
- Improving infrastructure project delivery in South Africa
- Tall, large and complex buildings - efficiencies in construction, life-cycle costing, sustainability, BIM and simulation
- The triple bottom line in construction and property development
- The soft landings process for buildings.

We also have an on-going collaboration with our international offices with specific regard to global infrastructure sentiment surveys, sector-specific research and developing global project-cost databases.

Finally, we aim to work closer with industry on continuing education workshops and in developing relevant industry reports and publications.

SECTION 2

OUR SERVICES

QUANTITY SURVEYING / COST MANAGEMENT

AECOM provides comprehensive cost-management services from project initiation to completion through all six stages of the project cycle as identified by The South African Council for the Quantity Surveying Profession, Tariff of Professional Fees, Quantity Surveying Profession Act 2000 (Act 49 of 2000), which is summarised as follows:

Stage 1

- Assisting in developing a clear project brief
- Advising on the procurement policy for the project
- Advising on other professional consultants and services required
- Advising on economic factors affecting the project
- Advising on appropriate financial design criteria
- Providing necessary information within the agreed scope of the project to the other professional consultants

Stage 2

- Agreeing on the documentation programme with the principal consultant and other professional consultants
- Reviewing and evaluating design concepts and advising on viability in conjunction with the other professional consultants
- Preparing preliminary and elemental or equivalent estimates of construction cost
- Assisting the client in preparing a financial viability report
- Auditing space allocation against the initial brief
- Providing services for which the following deliverables are applicable:
    - Preliminary estimates of construction cost
    - Elemental or equivalent estimates of construction cost
    - Space allocation audit for the project

Stage 3

- Reviewing the documentation programme with the principal consultant and other professional consultants
- Reviewing and evaluating design and outline specifications, as well as exercising cost control in conjunction with the other professional consultants
- Preparing detailed estimates of construction cost
- Assisting the client in reviewing the financial viability report
- Commenting on space and accommodation allowances, and preparing an area schedule
- Providing services for which the following deliverables are applicable:
  - Detailed estimates of construction cost
  - Area schedule

Stage 4

- Assisting the principal consultant in the formulation of the procurement strategy for contractors, sub-contractors and suppliers
- Reviewing working drawings for compliance with the approved budget of construction cost and/or financial viability
- Preparing documentation for both principal and sub-contract procurement
- Assisting the principal consultant with calling of tenders and/or negotiation of prices
- Assisting with financial evaluation of tenders
- Assisting with preparation of contract documentation for signature
- Providing services for which the following deliverables are applicable:
  - Budget of construction cost
  - Tender documentation
  - Financial evaluation of tenders
  - Priced contract documentation

Stage 5

- Preparing schedules of predicted cash flow
- Preparing proactive estimates for proposed variations for client decision-making
- Adjudicating and resolving financial claims by contractors
- Assisting in the resolution of contractual claims by contractors
- Establishing and maintaining a financial control system
- Preparing valuations for payment certificates to be issued by the principal agent
- Preparing final accounts for the works on a progressive basis
- Providing services for which the following deliverables are applicable:
  - Schedules of predicted cash flow
  - Estimates for proposed variations
  - Financial control reports
  - Valuations for payment certificates
  - Progressive and draft final accounts

Stage 6

- Preparing valuations for payment certificates to be issued by the principal agent
- Concluding final accounts
- Providing services for which the following deliverables are applicable:
  - Valuations for payment certificates
  - Final accounts

ENGINEERING COST MANAGEMENT

Mining and engineering cost management operates as a specialist service within AECOM. It comprises specialist skills and applications that enhance the risk and value management techniques required by the mining, infrastructure, minerals, metallurgical and petro-chemical sectors of the industry.

Our mining and engineering cost management group includes dedicated independent teams specialising in and responsible for the estimation, procurement, cost management and contract administration activities relating to the abovementioned sectors.

The mining and engineering cost management team operates throughout Africa using infrastructure support from our other local offices in all major centres in South Africa, Mozambique and Botswana. Our group employs professionally-qualified quantity surveyors, cost managers, cost engineers, contract administrators, construction programmers and building surveyors.

Mining, infrastructure, minerals, metallurgical and petro-chemical projects are generally of a high monetary value. It therefore is most beneficial to involve the mining and engineering cost management team at an early stage in the project cycle. Imposing robust financial discipline from a very early stage of a project will result in accurate and structured estimating, timely and cost-effective procurement, accurate and up-to-date maintenance of costs to completion, including the cost management of design changes and the prompt close-out of contracts. The implementation of these principles of financial management will thereby deliver maximum shareholder value and it is in this area that the engineering cost management team strives to significantly influence project outcomes to benefit all stakeholders.

Our mining and engineering cost management group provides a depth of experience, expertise and independence, which will contribute to and complement the client's team. This is critical, particularly in the early stages of a project when the opportunity to add value, as well as recognise and define cost is established. Simultaneously, formalising project principles is equally critical throughout the project with cost management continuing through to the post–contract period and final closeout.

BUILDING SERVICES COST MANAGEMENT

Every client wants rigorous control of overall building costs and to ensure that every Rand spent is optimised. Building services such as electrical, air-conditioning, fire protection and the various electronic installations are part of every building project and usually comprise 25 to 40 per cent of the total construction cost. It therefore follows that effective cost management of the building services is just as essential as for any other part of the construction costs.

Our building services cost management team draws upon its unique expertise to provide financial management and contract administration of building services. These services include:

- Electrical installation
- Heating, ventilating and air-conditioning (HVAC) installations
- Fire protection systems
- Fire detection and evacuation systems
- Access control
- Closed circuit television (CCTV)
- Lifts, escalators and travellators
- Communication systems
- Building management systems
- Security systems
- Data systems

We have offered cost advice and quantity surveying services for all building services for many years, with a track record which includes many major projects. Meticulous procurement and cost management practices are part of our standard methodology. Independent cost management ensures transparency of costs and a dedicated service not linked to the specific design consultant.

Working in close conjunction with the appointed mechanical, electrical and fire protection consultants, our building services team provides a comprehensive service encompassing the following:

- Cost planning at an early stage prior to detailed design
- Cost studies to compare alternative materials and designs in terms of capital, operating, maintenance and depreciation costs
- Monitoring and evaluating design as it evolves to ensure compatibility with the approved cost plan
- Advising on contractual arrangements and preparing tender procurement documents
- Adjudicating tenders in conjunction with the consultant team
- Cash-flow predictions
- Cost management and reporting
- Valuation of work done during construction
- Determining final costs
- Settling final costs with the contractor and sub-contractors

SECTION 3

AECOM IN SOUTH AFRICA

BROAD-BASED BLACK ECONOMIC EMPOWERMENT
TRANSFORMING SOUTH AFRICA

AECOM recognises and fully endorses Broad-Based Black Economic Empowerment (B-BBEE) as an integral part of our contribution to a better South Africa. B-BBEE is a cornerstone for the continued success of our company. We strive to advance on our status level through a B-BBEE strategy that sets continuous improvement targets on all the BEE scorecard criteria in order to maintain a leading role in the built environment and our positive impact on society.

AECOM SA has been assessed in terms of the Construction Sector Codes Gazetted on 5 June 2009:

B-BBEE Status Level:	Level 3 contributor
Element Points Obtained	EO: 16.65 points; MC: 10 points; EE: 6.2 points; SD: 17.88 points; PP: 20 points; ED: 5.64 points; SED: 5 points
Black Ownership	20% Black Ownership; 4.13% Black Women Ownership
Value Adding Vendor	Yes
BEE Procurement Recognition	110%

SECTION 4

SOUTH AFRICAN COST DATA

KEY FACTORS INFLUENCING BUILDING COST RATES

Inherent difficulties and pitfalls

This section highlights the inherent difficulties and pitfalls that may occur when inclusive or single rates are used to establish the estimated cost of a particular building.

Construction cost estimation is complex. Comprehensive exercises based on detailed and accurate information are required to achieve reliable levels of comfort. For various reasons, however, decisions are often based on inclusive rate estimates, i.e. rate per square metres (m²) of construction area or rate per unit in number.

The most widely-used method of quick approximate estimating to obtain an indication of the construction cost of a building is by the rate/m²-on-plan method. This is often also referred to as the "order of magnitude" method of cost estimation. It certainly is both quick and convenient, but it can be very misleading if used indiscriminately and without taking care when calculating the construction area and selecting the rate.

Cost comparisons of various buildings are often made by comparing the individual rates/m² without due consideration of a number of factors that can affect the rate/m² to a substantial degree.

Very often the cost of a building is expressed in R/m² and the unit cost is ignored, if calculated at all. This rate/m² is then used as the sole yardstick for what the building costs. For example, a security guard's shelter measuring 2m x 2m consisting of brick walls with windows, one door and a simple roof construction may cost R9,000/m². This rate, when compared with the rate for a 200m² house containing plumbing, carpets, etc. at R7,000/m² would seem very expensive. However, the unit cost of the shelter is R36,000 compared with R1,4 million for the house.

Below are a few criteria to be taken into account when considering rates/m² :

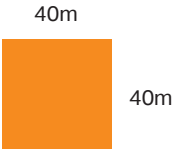
Specification

Two buildings of the same shape and with identical accommodation can have vastly different R/m² rates should the one building have finishes of a differing standard. For example, expensive carpets in lieu of vinyl floor tiles can increase the rate by R150/m².

Wall-to-floor ratio — plan shape

The most economical shape for a building is square. This shape requires the minimum wall length to enclose a given floor area, e.g.

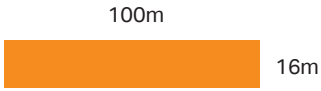
Case A



Area	1,600m²
Wall length	160m
Wall height	3m
Wall area	480m²
Wall floor ratio	480/1,600

Cost of external facade in terms of R/m² of floor area to each R/m² of facade area	30.0%

Case B



Area	1,600m²
Wall length	232m
Wall height	3m
Wall area	696m²
Wall floor ratio	696/1,600

Cost of external facade in terms of R/m² of floor area to each R/m² of facade area 43.5%

The rate/m² on plan of a facade costing R800/m² on elevation in each case is:

Case A R800 x 30.0% = R240/m²
Case B R800 x 43.5% = R348/m²

The reader with a good knowledge of mathematics will fault the above argument correctly by stating that a circle is the geometric shape requiring the minimum wall length to enclose a given floor area. In very few cases however is this the most economical plan shape of a building as, due to various reasons, the cost of constructing a circular as opposed to a straight external envelope, is generally greater than the saving in terms of the quantities required by the envelope.

Floor to ceiling heights

Two buildings of an identical plan shape and area but with different floor-to-ceiling heights will have different rates/m² due to the additional cost of walling, finishes, etc. in the building with the greater floor-to-ceiling height.

Plumbing, mechanical and electrical installations

The concentration of plumbing installations has a marked effect on the rate/m² of the building. The cost of a toilet block per m² is much greater than that of a house containing one bathroom as the high cost of the bathroom area is spread over the less expensive remaining areas of the house.

Similarly, in office blocks, factories, etc., the rate/m² will depend greatly on whether air-conditioning, security systems, sprinklers, smoke-detection systems, specialised electrical installations, acoustic treatment or other specialised installations are incorporated into the design.

Construction areas

The rate/m² for a building with large balconies or access corridors included in the construction area cannot be compared with the rate/m² for a building without similar low cost areas.

Internal subdivisions

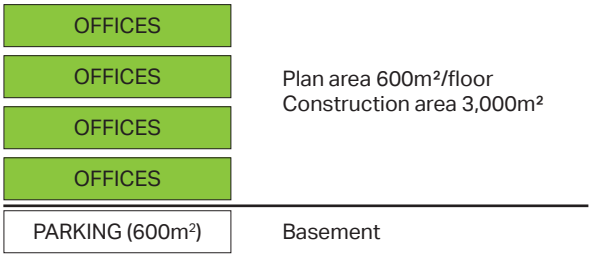
The rate/m² for open plan offices should not be compared directly with the rate/m² for offices with internal partitions without the relevant adjustments being made. The inclusion of partitions can increase the overall rate/m² by up to R300/m² of office area.

Parking

Should the building in question contain certain parking areas, the average rate/m² will be less than for a building with identical accommodation but with parking outside the building structure. See the following example:

Case A

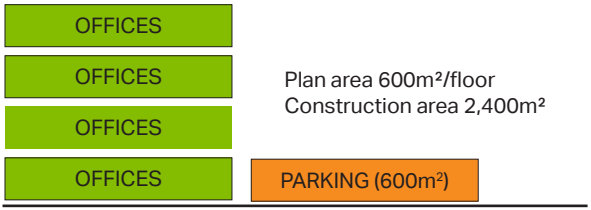
Building with parking in the building area



Cost of building		
Offices	2,400m² @ R15,000 =	R 36,000,000
Parking	600m² @ R6,000 =	R 3,600,000
Total		R 39,600,000
Average rate/m²		R 13,200

Case B

Building having parking outside the building structure and on grade



Cost of building		
Offices	2,400m² @ R15,000 =	R 36,000,000
Parking	600m² @ R 800 =	R 480,000
Total		R 36,480,000
Average rate/m²		R 15,200

Under Case B, the parking area is not included as part of the construction area for the purposes of calculating the rate/m². Similarly, the rate/m² for supermarket/hypermarket shopping centres should be qualified as to whether the cost of on-site parking and ancillary site development has been included, said cost which could be in the region of R800/m² of construction area.

There are numerous further points of consideration in addition to those given above. Amongst these are site works particular to each specific contract, the number of storeys, floor loadings, column spans, concentration of joinery and other fittings, overall height of building, open-atrium upper volumes, etc.

In conclusion, rates/m² must be used with circumspection. The degree of accuracy of the answers provided must be in direct proportion to the research and surveys undertaken to establish the rate for the building in question.

APPROXIMATE INCLUSIVE BUILDING COST RATES

Building cost rates

This section provides a list of approximate inclusive building cost rates for various building types in South Africa.

Rates are current to 1 July 2016, and therefore represent the average expected building cost rates for 2016. It must be emphasised that these rates are indicative only, and should be used circumspectly, as they are dependent upon a number of assumptions. See inclusive rate estimates herein.

The area of the building expressed in m² is equivalent to the construction area where appropriate, as defined in *Method for Measuring Floor Areas in Buildings, First Edition* (effective from 1 August 2005), published by the South African Property Owners' Association (SAPOA).

Regional Variations

Construction costs normally vary between the different provinces of South Africa. Costs in parts of the Western Cape and KwaZulu-Natal, specifically upper class residential, for example, are generally significantly higher than Gauteng due to the demand for this type of accommodation. Rates have therefore been based on data received from Gauteng, where possible. Be mindful, however, that cost differences between provinces at a given point in time are not constant and may vary over time due to differences in supply and demand or other factors. Specific costs for any region can be provided upon request by any AECOM office in that region.

Building Rates

Rates include the cost of appropriate building services, e.g. air-conditioning, electrical, etc., but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and Value Added Tax (VAT).

Offices	Rate per m² (excl. VAT)
Low-rise office park development with standard specification	R 6,900 - R 8,500
Low-rise prestigious office park development	R 9,000 - R 13,400
High-rise tower block with standard specification	R 10,000 - R 13,400
High-rise prestigious tower block	R 13,400 - R 16,800

Note: Office rates exclude parking and include appropriate tenant allowances incorporating carpets, wallpaper, louvre drapes, partitions, lighting, air-conditioning and electrical reticulation.

Parking	Rate per m² (excl. VAT)
Parking on grade, including integral landscaping	R 500 - R 600
Structured parking	R 3,400 - R 3,700
Parking in semi-basement	R 3,700 - R 5,000
Parking in basement	R 4,000 - R 6,200

Retail	Rate per m² (excl. VAT)
Local convenience centres (Not exceeding 5,000m²)	R 6,800 - R 9,000
Neighbourhood centres (5,000 – 12,000m²)	R 7,400 - R 9,500
Community centres (12,000 – 25,000m²)	R 8,100 - R 10,400
Minor regional centres (25,000 – 50,000m²)	R 9,000 - R 11,100
Regional centres (50,000 – 100,000m²)	R 9,500 - R 11,600

Retail

	Rate per m² (excl. VAT)
Super regional centres (exceeding 100,000m²)	R 10,000 - R 13,000

Note: Super regional centres and regional centres are generally inward trading with internal malls, whereas convenient, neighbourhood and community centres are generally outward trading with no internal malls.

Retail rates include the cost of tenant requirements and specifications of national chain stores.

Retail costs vary considerably depending on the tenant mix and sizing of the various stores.

Industrial

	Rate per m² (excl. VAT)
Industrial warehouse, including office and change facilities within structure area (architect/engineer designed):	
- Steel frame, steel cladding and roof sheeting (light-duty)	R 3,400 - R 5,000
- Steel frame, brickwork to ceiling, steel cladding above and roof sheeting (heavy-duty)	R 4,000 - R 5,700
- Administration offices, ablution and change room block	R 6,500 - R 8,200
- Cold storage facilities	R 12,000 - R 17,100

Residential

	Rate per site (excl. VAT)
Site services to low-cost housing stand (250 - 350m²)	R 29,800 - R 45,700
	Rate per m² (excl. VAT)
RDP housing	R 1,700 - R 2,000
Low-cost housing	R 2,700 - R 4,400
Simple low-rise apartment block	R 6,400 - R 8,800
Duplex townhouse	
- Economic	R 6,400 - R 9,100
Prestige apartment block	R 12,100 - R 18,800

Residential

	Rate per m² (excl. VAT)
Private dwelling houses:	
- Economic	R 4,350
- Standard	R 5,700
- Middle-class	R 6,800
- Luxury	R 9,800
- Exclusive	R 15,100
- Exceptional ('super luxury')	R 24,100 - R 48,300
Outbuildings	R 3,200 - R 4,600

		Rate per no (excl. VAT)
Carport (shaded)	- single	R 3,900
	- double	R 7,500
Carport (covered)	- single	R 6,200
	- double	R 11,200

	Rate per no (excl. VAT)
Swimming pool	
- Not exceeding 50 kl	R 81,200
- Exceeding 50 kl and not exceeding 100 kl	R 75,900 - R 134,200
Tennis court	
- Standard	R 290,000
- Floodlit	R 377,600

Hotels

	Rate per key (excl. VAT)
Budget	R 973,300 - R 1,378,300
Mid-scale (3 star)	R 2,034,200 - R 2,515,900
Luxury (5 star)	R 3,516,700 - R 4,479,900

Note: Hotel rates include allowances for furniture, fittings and equipment (FF&E).

Studios

	Rate per m² (excl. VAT)
Studios - dancing, art exhibitions, etc.	R 12,000 - R 17,100

Conference centres	Rate per m² (excl. VAT)
Conference centre to International standards	R 21,600 - R 27,900

Retirement centres	Rate per m² (excl. VAT)
Dwelling houses	
- Middle-class	R 7,100
- Luxury	R 10,000
Apartment block	
- Middle-class	R 7,300
- Luxury	R 11,400
Community centre	
- Middle-class	R 9,600
- Luxury	R 14,100
Frail care	R 11,400

Schools	Rate per m² (excl. VAT)
Primary school	R 5,700 - R 6,600
Secondary school	R 6,700 - R 7,200

Hospitals	Rate per m² (excl. VAT)
District hospital	R 23,500

Note: Hospital rates exclude allowances for furniture, fittings and equipment (FF&E).

Stadiums	Rate per seat (excl. VAT)
Stadium to PSL standards	R29,200 - R 45,800
Stadium to FIFA standards	R67,400 - R 90,300
	Rate per pitch (excl. VAT)
Stadium pitch to FIFA Standards	R 19,000,000 - R 23,000,000

Prisons	Rate per inmate (excl. VAT)
1,000 Inmate prison	R 508,100 - R 540,500
500 Inmate prison	R 540,500 - R 604,000
High/maximum security prison	R 806,500 - R 1,079,800

Infrastructure
airport development costs

Rates exclude any future escalation, loss of interest, professional fees, Value Added Tax (VAT) and ACSA direct costs.

Apron stands (incl. associated infrastructure	Rate per m² (excl. VAT)
Code F Stand (85m long x 80m wide = 6,800m²)	R 4,400
Code E Stand (80m long x 65m wide = 5,200m²)	R 4,600
Code C Stand (56m long x 40m wide = 2,240m²)	R 5,800

Taxi lanes (incl. associated infrastructure)	Rate per m (excl. VAT)
Code F taxi lane (101m wide)	R 143,800
Code E taxi lane (85m wide)	R 121,300
Code C taxi lane (49m wide)	R 70,000

Service Roads	Rate per m (excl. VAT)
Service road (10m wide)	R 14,900
Dual carriage service road (15m wide)	R 19,000

Taxi ways (incl. associated infrastructure)	Rate per m (excl. VAT)
Code F taxi way (70m wide)	R 102,500

Runways (incl. associated infrastructure)	Rate per m (excl. VAT)
Code F Runway (3,885m long x 60m wide = 233,100m²)	R 238,800

Parking (excluding bulk earthworks)	Rate per bay (excl. VAT)
Structured parking	R 157,500
Basement parking	R 241,300
Shade net on grade parking	R 24,100

Perimeter fencing / Security gates	Rate per m (excl. VAT)
Perimeter walls with perimeter intrusion detection (PIDS), etc.	R 7,300
	Rate per no (excl. VAT)
Security gate	R 13,800
Super security gate	R 41,300

Terminal & other buildings (excl. bulk earthworks, external site & services works)	Rate per m² (excl. VAT)
Terminal building (excl. terminal building baggage & X-ray)	R 24,400
Pier terminal building (excl. telescopic air bridges, seating & ads)	R 25,600
	Rate per unit (excl.VAT)
Telescopic air bridges (rate per unit. excl. VAT)	R 9,375,000
Aircraft Docking System (ADS) (rate per unit)	R 1,375,000

Building services

The following rates are for building services (mechanical and electrical) applicable to typical building types in the categories indicated. Rates are dependent on various factors related to the design of the building and the requirements of the system.

In particular, the design, and therefore the cost of air-conditioning, can vary appreciably depending on the orientation, shading, extent and type of glazing, external wall and roof construction, etc.

Electrical installation	Rate per m² (excl. VAT)			
Offices				
- Standard installation	R	450	- R	725
- Sophisticated installation	R	575	- R	1,000
- UPS, substations, standby generators to office buildings	R	325	- R	525
Residential	R	475	- R	800
Shopping centres	R	675	- R	900
Hotels	R	800	- R	1,250
Hospitals	R	1,050	- R	1,450

Electronic installation	Rate per m² (excl. VAT)			
Offices				
- Standard installation	R	475	- R	625
- Sophisticated installation	R	550	- R	850
Residential	R	250	- R	400
Shopping centres	R	550	- R	800
Hotels	R	500	- R	675
Hospitals	R	500	- R	750

Note: Electronic installation includes access control, CCTV, public address, fire detection, data installation, WiFi , CATV, PABX (Private Automatic Branch Exchange) and Building Management System (BMS).

Fire protection installation (offices)	Rate per m² (excl. VAT)		
Sprinkler system, including hydrants and hose reels (excluding void sprinklers)	R 200	- R	325
Air-conditioning installation	Rate per m² (excl. VAT)		
Ventilation to parking/service areas	R 275	- R	500
Offices			
- Console units	R 600	- R	925
- Console/split units	R 600	- R	1,050
- Package units	R 950	- R	1,600
- Central plant	R 1,350	- R	2,500
- Variable refrigerant flow (VRF)	R 1,200	- R	2,500
Residential - split units	R 950	- R	1,600
Shopping centres			
- Split units	R 950	- R	1,250
- Package units	R 1,050	- R	1,700
- Evaporative cooling	R 475	- R	950
Hotels - public areas	R 1,400	- R	2,400
Hospitals Central plant	R 2,000	- R	3,200
	Rate per key (excl. VAT)		
Hotels			
- Console units	R 17,000	- R	23,000
- Split units	R 28,000	- R	40,000
- Central plant	R 48,000	- R	74,000
	Rate per theatre (excl. VAT)		
Hospitals - operating theatres	R400,000	- R1,100,000	

Note: For guidance with regard to the cost of buildings rated under the Green Star South Africa rating tool system, see the latest edition of the AECOM publication entitled "Quick Guide to Green Design Attributes."

SECTION 5

GLOBAL SENTIMENT AND BUILDING COSTS

AFRICA OUTLOOK

Africa generally continues to enjoy strong economic growth despite the stagnant performance of Western economies. Africa's economic growth fell from 2013 on the back of the North African uprisings, but should see a rebound in 2017 and 2018.

Relatively stable commodity and oil prices, stable macro-economic environments, a growing middleclass and rising internal consumer spending drive this growth. Africa's real GDP growth rates are forecast to be between 4.5% and 6.0% in 2016 as a result. Most of the top-ten fastest-growing economies globally between 2013 and 2018 are expected to be from Africa. This will be contingent on continuing strong foreign investment flows, investment in natural resources and infrastructure, increasingly sound macroeconomic policies and good governance.

The continent continues to benefit from relatively high growth in the BRICS economies (Brazil, Russia, China, India and South Africa). Weak growth in Europe, Japan and the US; and uncertainty in China's growth outlook are causes for concern. Although most commodity prices have declined due to weaker demand and increased supply, prices are still above the average levels over the last decade. World economic activity is expected to strengthen in 2017 providing positive growth for Africa´s commodity exporters.

While growth is expected to remain stagnant in North African countries, Sub-Saharan Africa continued to grow by more than 3%. Growth in the oil-exporting economies is projected to remain high. Growth in South Africa is projected to be lower than the continent's average. Low-income economies face varying outlooks but are mostly favourable.

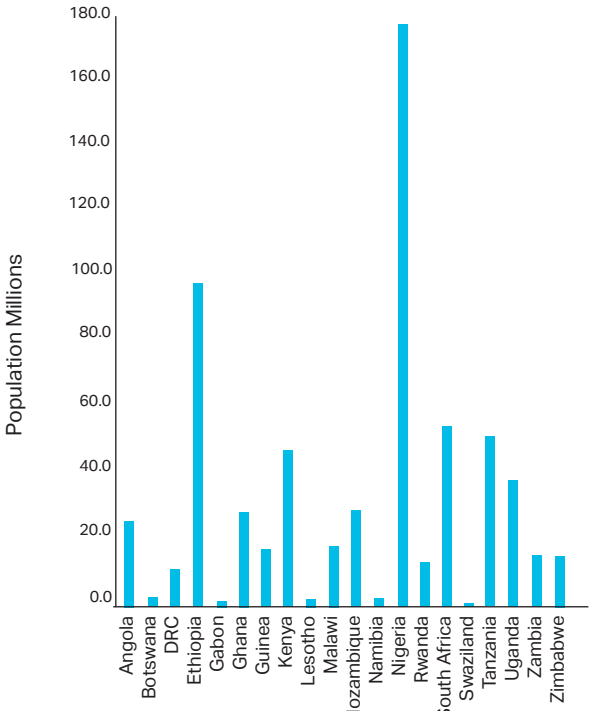
AFRICA IN FIGURES

Area and Population

Country	Land area (000km²)	Population			
		Millions, 2014 (est)	Average annual % population growth rate, 2000 - 2014	Density, people per km², 2014	Prevalence of HIV, total (% of population 15 - 49)
Angola	1247	24.23	3.3	19	2.4
Botswana	567	2.22	2	4	25.2
DRC	48	10.41	1.2	215	1
Ethiopia	1000	96.96	2.5	97	1.2
Gabon	258	1.69	2.2	7	3.9
Ghana	228	26.79	2.4	118	1.5
Guinea	246	12.28	2.7	50	1.6
Kenya	569	44.86	2.6	79	5.3
Lesotho	30	2.11	1.2	69	23.4
Malawi	94	16.70	3.1	177	10
Mozambique	786	27.22	2.8	35	10.6
Namibia	823	2.40	2.4	3	16
Nigeria	911	177.48	2.7	195	3.2
Rwanda	25	11.34	2.4	460	2.8
South Africa	1213	54.00	1.6	45	18.9
Swaziland	17	1.27	1.5	74	27.7
Tanzania	886	51.82	3.2	59	5.3
Uganda	201	37.78	3.3	188	7.3
Zambia	743	15.72	3.1	21	12.4
Zimbabwe	387	15.25	2.3	39	16.7

Source: *World Development Report 2014*

POPULATION 2014



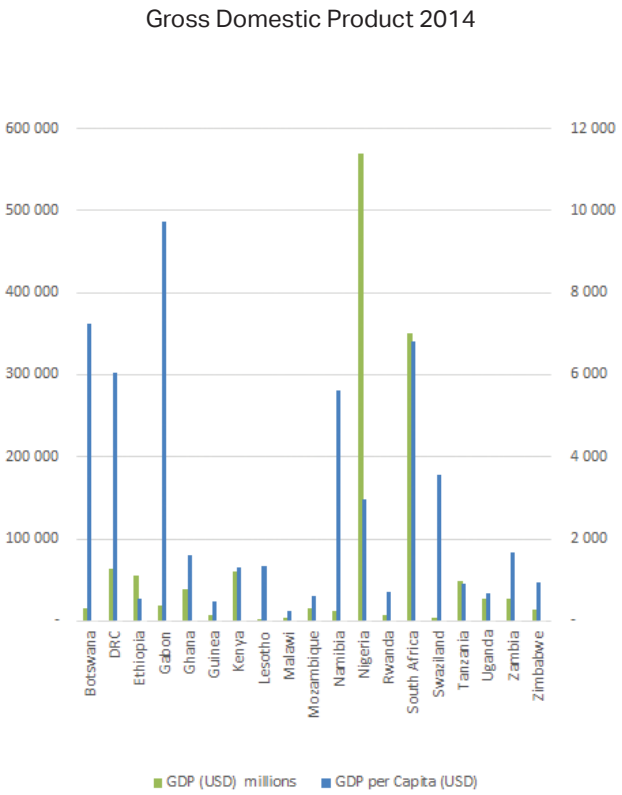
GROSS DOMESTIC PRODUCT (AT CONSTANT 2000 PRICES)

Country	GDP (USD) millions	GDP growth (annual % since 2000)	GDP per capita (USD)	Gross capital formation (% of GDP)	Inflation, consumer price (annual %)
Angola	*	*	*	*	7.3
Botswana	15 813	4.4	7240	31	4.4
DRC	64 138	7.3	6040	22	3
Ethiopia	55 612	10.3	550	38	7.4
Gabon	18 180	4.3	9720	27	4.7
Ghana	38 617	4.0	1590	27	15.5
Guinea	6 624	0.4	470	14	9.7
Kenya	60 937	5.3	1290	21	6.9
Lesotho	2 181	3.6	1330	*	5.3
Malawi	4 258	5.7	250	15	24.4
Mozambique	15 938	7.2	600	51	2.6
Namibia	12 995	6.4	5630	34	5.4
Nigeria	568 508	6.3	2970	16	8.1
Rwanda	7 890	7.0	700	26	1.8
South Africa	350 141	1.5	6800	20	6.4
Swaziland	4 413	2.5	3550	*	5.7
Tanzania	48 057	7.0	920	31	6.1
Uganda	26 998	4.8	670	27	4.3
Zambia	27 066	6.0	1680	*	7.8
Zimbabwe	14 197	3.8	840	13	*

Source: *World Development Report 2014*

* Figures not available

GROSS DOMESTIC PRODUCT 2014



AFRICA BUILDING COSTS

This section makes provision for comparisons of African building costs, international building costs and international rental rates.

The following table (Africa Building Cost Comparison, page 41, summarises the approximate estimated building costs for different types of buildings in various locations in Africa. Rates are based on projected 1 July 2016 costs and provide an indicator for the expected building cost rates over 2016. Exchange rates are as at 1 April 2016.

Rates include the cost of appropriate building services, e.g. air-conditioning, electrical, etc. but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and VAT. These rates are of an indicative nature and therefore the qualifications dealt with elsewhere in this publication would apply.

These are estimated costs only and should be considered in the context of acceptable building standards in each relevant country. These standards, both at a technical level and pertaining to quality, do vary from country-to-country. Therefore the building costs must be seen as being for the normal standards prevailing in each particular region. This being the case, these costs must be used circumspectly.

	US DOLLAR											
Building Type	**Angola Luanda**	**Botswana Gaborone**	**Ghana Accra**	**Kenya Nairobi**	**Mozambique Maputo**	**Nigeria Lagos**	**Rwanda Kigali**	**Senegal Dakar**	**South Africa Johannesburg**	**Tanzania Dar es Salaam**	**Uganda Kampala**	**Zambia Lusaka**
Residential (US$ / m²)												
Average Multi Unit High Rise	1 286	918	1 800	660	1 350	1 800	1 037	1 181	635	716	759	903
Luxury Unit High Rise	2 093	1 297	2 200	1 060	2 100	2 500	1 385	1 849	1 104	957	1 220	1 501
Individual Prestige Houses	3 891	1 952	2 000	1 250	2 625	2 200	1 492	2 825	1 064	1 031	1 440	1 501
Commercial/Retail (US$ / m²)												
Average Standard Offices High Rise	1 420	970	1 600	900	1 200	1 800	1 274	1 206	793	881	1 080	1 215
Prestige Offices High Rise	2 443	1 625	2 500	1 550	1 300	2 500	1 612	1 965	1 023	1 114	1 860	1 501
Major Shopping Centre (CBD)	2 055	1 350	2 300	750	1 500	2 500	1 185	1 580	678	818	900	1 203
Industrial (US$ / m²)												
Light Duty Factory	1 293	865	1 000	650	950	1 000	954	1 078	339	659	750	447
Heavy Duty Factory	2 112	1 329	1 200	1 050	1 150	1 350	1 703	1 734	386	1 177	1 210	516
Hotel (US$ / key)												
3 Star Budget	181 100	138 400	320 000	325 000	165 000	250 000	176 600	158 200	154 100	124 900	400 000	77 600
5 Star Luxury	344 100	446 800	450 000	575 000	250 000	450 000	422 300	373 500	270 900	294 700	700 000	185 500
Resort Style	495 100	499 000	550 000	700 000	480 000	550 000	563 500	467 600	Not available	389 400	850 000	247 000
Other (US$ / m²)												
Multi Storey Car Park	1 191	675	800	450	1 050	1 300	759	1 014	241	524	520	447
District Hospital	Not available	Not available	1 200	975	2 500	1 800	Not available	Not available	1 575	Not available	1 200	Not available
Primary & Secondary Schools	Not available	Not available	1 200	825	1 350	7 500	Not available	Not available	437	Not available	950	Not available
(As at 1 April 2016)	AOA	BWP	GHS	KES	MZN	NGN	RWF	XOF	ZAR	TZS	UGX	ZMW
US$1 =	159.87	10.74	3.82	99.72	50.45	197.50	737.91	576.70	14.76	2142.34	3330.24	10.92

Prices exclude land, site works, professional fees, tenant fitout and equipment. Rates exclude GST/VAT. Hotel rates include FF&E

GLOBAL BUILDING COSTS

The cost data under the heading International Building Cost Rate Comparison (see page 43) was made available through a survey by the relevant AECOM offices in these locations. Their assistance in this regard is acknowledged with thanks.

COSTS BASED ON 1 JULY 2016
EXCHANGE RATES TO USD AS AT 1 APRIL 2016

Building Type	US DOLLAR													
	Australia Sydney	China Hong Kong	China Beijing	China Shanghai	Malaysia Kuala Lumpur	Singapore	South Africa JHB	Thailand Bangkok	UAE Dubai	USA Los Angeles	USA San Francisco	USA New York	United Kingdom London	Vietnam Ho Chi Minh
Residential (US$ / m²)														
Average Multi Unit High Rise	3 412	2 900	741	765	514	3 150	635	1 025	1905	3 500	3 850	4 420	3 979	825
Luxury Unit High Rise	3 987	4 050	1 659	1 702	841	4 550	1 104	1 525	2310	4 500	4 950	5 790	5 578	1 000
Individual Prestige Houses	4 641	5 850	810	929	720	5 200	1 064	1 600	Not available	4 000	4 400	4 480	5 535	675
Commercial/Retail (US$ / m²)														
Average Standard Offices High Rise	4 248	2 900	1 057	1 045	841	3 050	793	925	1498	3 200	3 520	3 952	4 450	1 000
Prestige Offices High Rise	4 967	3 650	1 482	1 625	1 245	4 050	1 023	1 100	1940	4 200	4 620	5 117	5 500	1 200
Major Shopping Centre (CBD)	3 569	4 200	1 428	1 518	1 310	3 900	678	800	1635	3 228	3 712	3 874	4 850	700
Industrial (US$ / m²)														
Light Duty Factory	758	1 850	540	286	501	1 075	339	550	820	1 227	1 329	2 440	1 824	350
Heavy Duty Factory	954	2 050	Not available	Not available	539	1 325	386	875	955	1 743	1 888	3 461	3 130	450
Hotel (US$ / key)														
3 Star Budget	346 405	353 500	135 800	100 980	160 600	100 000	154 100	60 000	50 916	73 449	76 397	81 000	94 000	Not available
5 Star Luxury	704 575	611 000	301 500	236 050	288 850	450 000	270 900	235 000	162 004	419 203	433 166	478 260	570 000	187 500
Resort Style	Not available	Not available	393 000	279 348	256 600	450 000	Not available	262 500	190 865	263 402	273 875	210 000	350 000	225 000
Other (US$ / m²)														
Multi Storey Car Park	980	1 500	Not available	Not available	334	900	241	575	585	1479.5	1546.75	1494	894	350
District Hospital	6 111	5 750	Not available	1 431	988	4 350	1 575	Not available	2860	6 000	6 600	8 100	4 495	Not available
Primary & Secondary Schools	2 510	2 650	Not available	Not available	353	1 325	437	Not available	1470	3 800	3 900	4 397	2 279	Not available
(As at 1 April 2016)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP	VND
US$1 =	1.30	7.78	6.48	6.48	3.90	1.35	14.76	35.21	3.67	1.00	1.00	1.00	0.70	22425.00

Prices exclude land, site works, professional fees, tenant fitout and equipment. Rates exclude GST/VAT. Hotel rates include FF&E

INTERNATIONAL PRESTIGIOUS OFFICE RENTAL COMPARISON

Country	City	USD/m² per annum
Angola	Luanda	1740
Australia	Adelaide	630
Australia	Brisbane	1110
Australia	Melbourne	690
Australia	Perth	1050
Australia	Sydney	1270
Austria	Vienna	367
Bahrain	Manama	191
Belgium	Brussels	298
Botswana	Gaborone	350
Cameroon	Yaoundé	300
China	Beijing	580
China	Guangzhou	400
China	Hong Kong	1850
China	Shanghai	640
Czech Republic	Prague	321
Democratic Republic of Congo	Kinshasa	360
Denmark	Copenhagen	275
Egypt	Cairo	420
England	Birmingham	480
England	Cambridge	460
England	Leeds	410
England	Liverpool	360
England	London (City)	1110
England	London (West End)	1830
England	Manchester	540
England	Oxford	380
France	Paris	791
Germany	Berlin	344
Germany	Frankfurt	430
Germany	Hamburg	367
Germany	Munich	390
Ghana	Accra	444
Greece	Athens	229
Hungary	Budapest	275
India	Bangalore	310
India	Mumbai	1130
Indonesia	Jakarta	420

Country	City	USD/m² per annum
Ireland	Dublin	550
Italy	Rome	458
Italy	Milan	562
Lebanon	Beirut	350
Malaysia	Kuala Lumpur	452
Namibia	Windhoek	220
Netherlands	Amsterdam	430
New Zealand	Auckland	470
New Zealand	Christchurch	440
New Zealand	Wellington	470
Nigeria	Abuja	909
Nigeria	Lagos	1119
Norway	Oslo	544
Oman	Muscat	218
Philippines	Manila	260
Poland	Warsaw	344
Portugal	Lisbon	212
Qatar	Doha	560
Romania	Bucharest	252
Russia	Moscow	573
Russia	St Petersburg	344
Saudi Arabia	Riyadh	454
Saudi Arabia	Jeddah	403
Scotland	Edinburgh	540
Scotland	Glasgow	520
Singapore	Singapore	1050
South Africa	Cape Town	230
South Africa	Durban	220
South Africa	Johannesburg	300
South Africa	Port Elizabeth	210
South Africa	Pretoria	220
Spain	Barcelona	241
Spain	Madrid	332
Sweden	Stockholm	607
Switzerland	Zurich	774
Thailand	Bangkok	420
Turkey	Istanbul	267
United Arab Emirates	Dubai (Central Dubai)	688
United Arab Emirates	Dubai (New Dubai)	506
United Arab Emirates	Dubai (Old Dubai)	449

Country	City	USD/m² per annum
United Arab Emirates	Abu Dhabi	544
United States of America	Atlanta	298
United States of America	Boston	669
United States of America	Chicago	340
United States of America	Houston	385
United States of America	Los Angeles	536
United States of America	Miami	415
United States of America	New York (Manhattan)	1100
United States of America	Philadelphia	290
United States of America	Sacramento	270
United States of America	San Francisco	749
United States of America	Seattle	415
United States of America	Washington DC	627

Note: Rates are applicable as at 1 January 2016 and exclude VAT, but include GST where applicable. Above are gross rentals and include operating cost and municipal cost, but exclude VAT and electricity/water consumption.

SECTION 6

BUILDING COST ESCALATIONS

Building cost

The meaning of "building cost" depends on the application and context. A building contractor, for example, may refer to the cost of labour, material, plant, fuel and supervision. In contrast, a developer may refer to either the tender price from the contractor or the ultimate cost of the project, which could include professional fees, plan approval fees, escalation, loss of interest, etc.

For the purposes of this document, building cost shall be deemed to mean the tender price (or negotiated price) submitted by the building contractor.

Escalation rate

There seems to be two popular methods of calculating and expressing percentage annual increases, namely the average rate and the year-on-year rate. The average rate is of no real use in calculating escalation and is of general interest only. The year-on-year rate should be used in escalation calculations, taking cognisance of actual project programmes.

The average rate compares the indices for each month (or quarter) of the year with those of the corresponding months (or quarters) of the preceding year and calculates the average of these, which is then quoted as the average annual increase for that particular year.

The year-on-year rate compares the January (or December) index with the index for the corresponding month of the previous year, and reflects the increase over that year.

There could be a significant difference in the two rates in question. For example, in 2013 the year-on-year rate (January 2013 to January 2014) of building cost inflation in South Africa was only 4.6% while the average annual rate (comparing monthly indices) was 7.3%.

Calculation of estimated escalation of construction contracts

Pre-contract

Construction cost changes on an ongoing basis for various reasons. Provision should therefore be made for changes in tender prices during the period from the date of the estimate to the expected tender date. Adding the estimated current building cost to the total equals the anticipated tender amount.

This is calculated by multiplying the estimated current building cost by the average estimated monthly percentage increase and by the number of months from date of estimate to tender date.

Contract price adjustment

Provision is made for escalation in building cost during the contract period. The Contract Price Adjustment Provisions (CPAP) formula provides for 85% of the contract amount to be subject to escalation adjustment with the remaining 15% fixed. Furthermore, a factor must be introduced to take account of the cash flow of payments during the construction period. 0.6 is usually acceptable if a short method of calculation is employed.

The total escalation during the contract period is therefore calculated by multiplying the anticipated tender amount by 0.85 and 0.6 and then by the estimated monthly percentage increase as indicated by the relevant indices in the CPAP formula and by the contract period expressed in months.

Tender price escalation

The annual year-on-year increase in building costs (i.e. tender prices) based on the indices published by the Bureau for Economic Research, University of Stellenbosch (BER) (January-to-January of each year) and for CPAP formula (Work Group 181 Commercial/Industrial buildings) published by Statistics South Africa (P0151), are as follows:

COST INDICES APPLICABLE TO THE BUILDING INDUSTRY

YEAR	BER		CPAP		TMI
	Index (Jan=100)	Year on Year increase	Index (Jan=100)	Year on Year increase	
2011	100.0		100.0		1.00
2012	109.3	+9.3%	107.2	+7.2%	1.02
2013	119.6	+9.4%	113.0	+5.4%	1.06
2014	125.1	+4.6%	120.3	+6.5%	1.04
2015	139.3	+11.4%	126.3	+5.0%	1.10
2016	142.5	+2.3%	129.8	+2.7%	1.10
2017	153.8	+7.9%	136.8	+5.4%	1.12
2018	163.6	+6.4%	143.1	+4.6%	1.14
2019	173.6	+6.1%	150.2	+5.0%	1.16
2020	189.2	+9.0%	158.9	+5.8%	1.19

Note: The average annual increases indicated by the BER in its publications are the average of the quarterly increases for that particular year and will not correspond to the above year-on year increase.

The difference between tender price escalation and escalation according to the indices incorporated in the CPAP formula for any one period may be attributed to the market factor, which incorporates the contractors mark-up, productivity, availability of materials, etc.

* Forecast based on information provided by Medium-Term Forecasting Associates Building Economists, Stellenbosch.

Tender climate

The column marked Tender Market Indicator (TMI), gives an indication of the tender climate. The building cost index, as published by the BER based on tender prices, has been deflated by the index for CPAP Work Group 181, based on the cost of labour and material. The result is the movement of tender prices excluding the influence of market costs of labour and material, giving an indication of competitiveness of tendering. It represents a comparison or rate of change of BER and CPAP indices.

When the TMI (see graph on page 54) shows a downward gradient, this indicates a favourable tender market, i.e. the next point is numerically less, resulting from the calculation of BER divided by CPAP indicating that the increase in BER (tender index) is less than the increase in the CPAP index. Therefore, there is a favourable tender market from the viewpoint of the employer.

Conversely, if the graph has an upward gradient, the increase in BER is greater than the increase in CPAP indices, indicating an unfavourable tender market from the viewpoint of the employer. Thus it would be prudent to recommend negotiation as opposed to tendering.

This tendency is also apparent on the cost indices graph (see page 53). When the two lines (CPAP and BER) converge, i.e. CPAP is dropping and BER is rising, you should negotiate. When the two lines diverge, i.e. CPAP is rising and BER is dropping, proceed to tender instead.

Base dates: To allow for comparison of indices, a factor has been introduced resulting in an equal base for both BER and CPAP indices (i.e. January 2011 = 100).

Unique large-scale projects

Building cost estimation seems to become more complex when unique circumstances prevail. For example, when a FIFA World Cup, Olympic Games or similar event takes place in a particular country, many new construction works and associated infrastructure projects are awarded.

Projects of such magnitude can only be constructed by major contractors possessing the required expertise and resources. It is often experienced that the unit costs of these projects are significantly higher than anticipated originally. Selected contractors at this level have little competition. Based on a favourable supply and demand, they price costs accordingly, resulting in client cost overruns and severe pressure on budgets.

Value added tax (VAT)

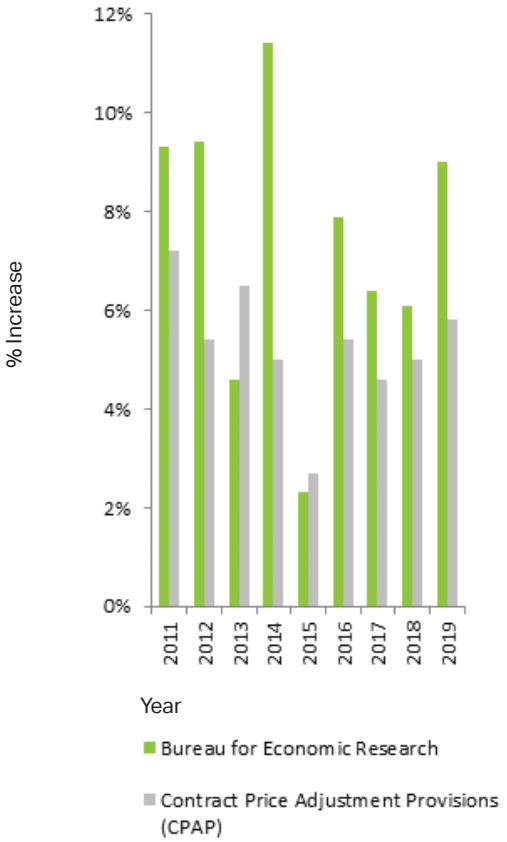
As the majority of developers are registered vendors in the property industry, any Value Added Tax (VAT) on commercial property development is fully recoverable. Therefore, to reflect the net development cost, VAT should be excluded. Should the gross cost (i.e. after VAT inclusion) be required, then VAT at the ruling rate (currently 14%) should be added.

Cognisance should be taken, however, of the effect of VAT on cash flow over a period of time. This will vary according to the payment period of the individual vendor. In all cases however, it will add to the capital cost of the project to the extent of interest on outstanding VAT for the VAT cycle of the particular vendor.

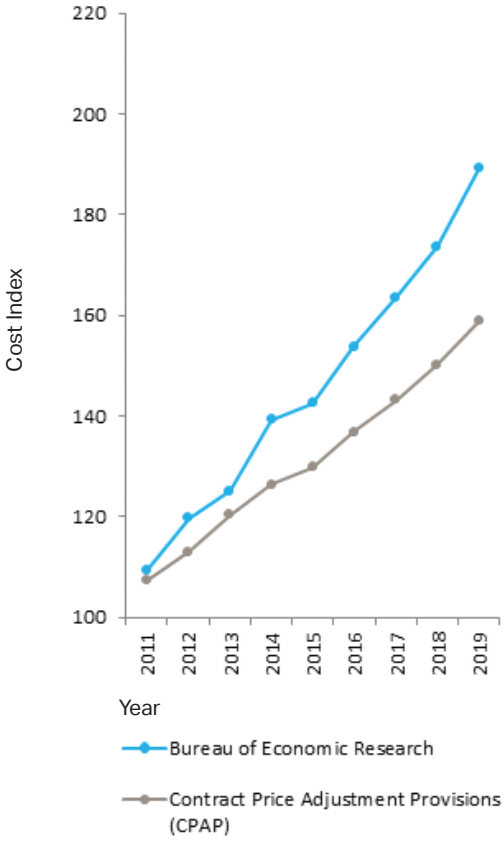
GRAPHS: BER AND CPAP

January to January

Building cost % change

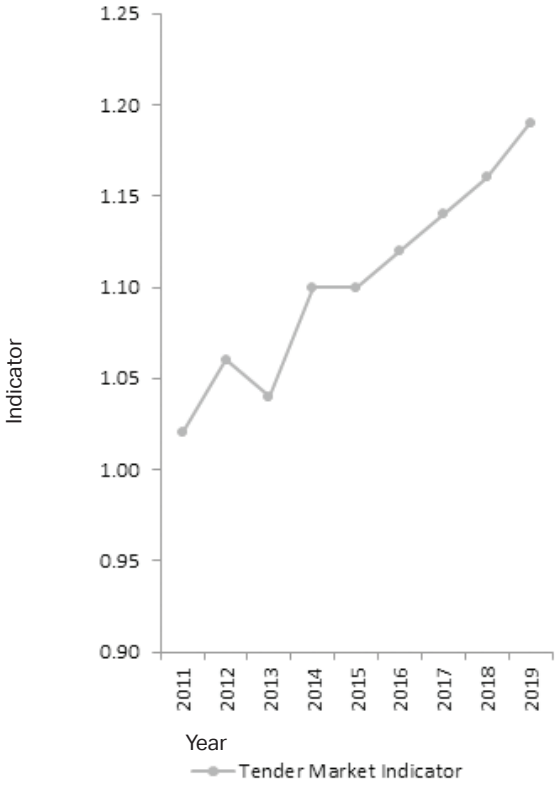


January building cost indices



Tender market indicator

BER deflated by CPAP



Note: This graph gives an indication of the tender climate. It is the result of the relationship between BER and CPAP. Refer section on tender climate, page 50.

SECTION 7

METHOD FOR MEASURING RENTABLE AREAS

SAPOA methods

In the past, many landlords and developers have derived methods for calculating the rentable areas in buildings. Most common is the method recommended by SAPOA entitled *Method for Measuring Floor Areas in Buildings, First Edition* (effective from 1 August 2005). This replaces, *The SAPOA Method for Measuring Floor Areas in Commercial and Industrial Buildings* (updated August 1991). It should be noted, however, that the latest edition is approved for use from 1 August 2005 and should not be applied retrospectively.

Notwithstanding or detracting from the above publication, and by kind permission of SAPOA, we have abbreviated and simplified for easier understanding the definitions contained in that document, together with our comments on the use of rentable areas, as follows:

The document provides separate methods for measuring floor areas of:

- Offices of all types
- Retail developments, including malls, stand-alone, strip and value centres/warehouses
- Industrial developments, including factories, warehouses, mini-units and trading warehouses, multi-storey and the like
- Residential buildings, including houses, flats/apartments, townhouses, cluster houses, etc.

For offices of all types , the following definitions and explanations are applicable:

The basis

The basis used in calculating the rentable area, is the measurement of useable area together with common and supplementary area as determined at each level. Unless otherwise indicated, the unit of measurement is square metres (m^2).

Area definitions

Construction area

The construction area is the entire covered built area. This is the sum of the areas measured at each floor level over any external walls to the external finished surface.

Only the lowest levels of atria are included, and all openings on other levels to form atria, are to be excluded.

Rentable area

The rentable area is the total area of the building enclosed by the dominant face, adjusted by deducting major vertical penetrations. No deduction is made for columns.

Its intended use is in determining the revenue-producing area of a building, which comprises rentable area, supplementary area and parking. It is also used by those analysing the economic potential of a building.

Rentable area has a minimum floor-to-ceiling height of 1.5 metres.

Rentable area comprises useable area plus common area.

Rentable area excludes supplementary area, which may produce additional revenue.

Useable area

The useable area is the area capable of exclusive occupation by the tenant i.e. the total area of the building enclosed by the dominant face, adjusted by deducting all common area and major vertical penetrations. No deduction is made for columns.

Its intended use is to be the essential part of rentable area and the basis for apportioning common area.

Common area

Common area is an area to which the tenant has access and/or use, and is part of the rentable area. The primary common area of the building is apportioned to tenancies pro-rata to the useable area of that tenancy. The secondary common area is apportioned only to tenancies that it services.

The common area has two components:

- The primary common area comprises all rentable area on a given floor that is not useable area, together with remote common area, which comprises entrance foyers, plant and service rooms, or any other portion of rentable area not located on the given floor.
- The secondary common area comprises areas beyond primary common area giving access to multiple tenancies. Accordingly, this may vary over the life of a multiple tenancy building.

Supplementary area

Supplementary area is any additional revenue-producing component that falls outside of the definition of rentable area. Supplementary area need not be weather proof. For example, it includes storerooms, balconies, terraces, patios, access/service passages and signage/advertising areas and parking areas demarcated for tenant use. Parking bays shall be given in number.

GENERAL DEFINITIONS

Atrium

An atrium is a weather proof interior space, accessible and capable of use by the tenant at the lowest level. Voids in floors above the atrium space are not included in the rentable area.

Entrance foyer

The entrance foyer is a portion of remote common area, including associated adjacent rooms and lobby.
Lift lobby and entrance foyers that occur together with parking floors (not adjacent to office areas) comprise remote common area.

Major vertical penetrations

Major vertical penetrations, stairs and landings, lift shafts, flues, pipe shafts, vertical ducts, and the like, and their enclosing walls, exceeding 0.5m² in area, are deducted from the rentable area.

Remote service areas and plant rooms

Remote refuse rooms, electrical sub-stations, transformer rooms, central air-conditioning plant rooms and lift motor rooms are included in the primary common area.

Storage areas

Dedicated storage areas within the useable area are included as useable area.

Dedicated storage areas are listed separately as supplementary areas.

Retail, Industrial, Residential and Other Developments

Similar provisions have been made for measuring the floor areas of retail, industrial and residential buildings referred to above. For detailed information, it is suggested that the relevant sections of the said document be studied carefully.

The above method is designed to accommodate the measurement, as far as practical, of most building types. However, certain building types such as hotels, leisure and sport centres, petrol stations, hospitals, law courts, retirement villages and others may only utilise the underlying principles of this method.

Generally

Developers and financiers are constantly attempting to either reduce building costs or increase rental levels to achieve higher returns. When these parameters are exhausted, it becomes incumbent on the architects and designers to design more efficiently. One must therefore understand the complete *SAPOA Method for Measuring Floor Areas in Buildings, First Edition*, and implement the various facets of the definitions to achieve higher efficiencies between the various areas.

The initial return is more sensitive to an increase in rental income (which can be affected by increasing the rental area) than the corresponding percentage reduction in construction costs.

Once again, the above has been published as a quick guideline only, and should not be used in preference to the SAPOA publication, which is far more comprehensive and detailed. We acknowledge and thank SAPOA for its permission to use extracts from this publication.

SECTION 8

RETURN ON INVESTMENT

Criteria to be employed

There are two distinct criteria generally used for evaluating the financial viability of a property investment, namely:

- The initial return and
- The cash flow analysis

The initial return

The initial return is based on the net income during the first year of operation of the development. The return is expressed as a percentage per annum of the anticipated capital investment. Escalation in construction cost and cost of capital are both taken into account in an effort to incorporate the time value of money.

The major advantage of employing the initial return method is that expenses and income do not have to be escalated too far into the future. Therefore these are relatively accurate and easily understood in today's money terms. The fact that the first year of operation may have a higher vacancy factor than subsequent years should be ignored when the initial return is calculated in order to reflect long-term potential more accurately.

The initial return should be qualified as follows:

- All expenses and income have been escalated to the construction completion date
- Interim income received prior to the construction completion date has been deducted from the capital investment after adjusting for operating expenses and cost of capital

- The returns are expressed as percentages of the escalated capital investment and do not take into account loans, loan repayments or interest charges on loans
- The calculated returns are for the first complete year of operation only and do not cater for the following:
    - When the project may not reach full maturity during the first year of operation
    - Vacancies
    - Recoupment of capital during the income-bearing period of the investment or realisation value of the investment at the end of the investment period
    - Income tax.

Cash flow analysis over a predetermined period

In the cash flow method, the income and expenditure cash flow over the economic lifespan of the investment is taken into account. Usually an Internal Rate of Return (IRR) and/or a Net Present Value (NPV) is employed to evaluate the financial viability.

The NPV (discounted cash flow) method works as follows: Determine the sum of all cash flows (inflows, outflows and initial investment) and discount to present values at the project's cost of capital. With a positive NPV the project can be accepted and it should be rejected if the NPV is negative.

The IRR is the rate of interest that equates the present value of the expected future net income with the present value of the cost of the investment. The NPV would therefore be exactly zero if the IRR is used as the discount rate. The IRR of an investment is generally used by institutional investors, as it is a comparative indication of the profitability of alternative investment options.

A weakness of the IRR calculation is the fact that an implicit assumption is made that cash flows are reinvested at the project's own IRR. The Modified Internal Rate of Return (MIRR) overcomes this by assuming that cash flows are reinvested at the cost of capital rate (or any other given rate), and may be calculated in addition. As the cost of capital rate is normally determined at a lower rate than the IRR, it can be assumed that the MIRR calculation will always render a lower result.

The assumptions on which the cash flow return is based must be listed. These should include the assumed investment period (e.g. 20 years after the construction completion date), that income has been taken into account at the beginning of each month and expenditure at the end of each month, the terminal value, and escalation in rental and operating expenses over the investment period, etc.

It is suggested that, where applicable, a comprehensive financial viability analysis should incorporate both the initial return and the cash flow method of evaluation. It is significant to note that there is a close relationship between the initial return and the IRR. However, this is to be applied with care by an experienced analyst.

EXAMPLE

Total capital expenditure (investment)	R 100,000,000
Rental in first year (net income)	R 10,500,000
Initial return in first year	10.50%
Escalation in net rental income	9.00% per annum

		Net cash flow
Year 0		-100,000,000
Year 1		10,500,000
Year 2		11,445,000
Year 3		12,475,050
Year 4		13,597,805
Year 5		14,821,607
Year 6		16,155,552
Year 7		17,609,551
Year 8		19,194,411
Year 9		20,921,908
Year 10		22,804,879
Year 11		24,857,319
Year 12		27,094,477
Year 13		29,532,980
Year 14		32,190,948
Year 15		35,088,134
Year 16		38,246,066
Year 17		41,688,212
Year 18		45,440,151
Year 19		49,529,764
Year 20	53,987,443	
(+ terminal value)	560,441,075	614,428,518

The IRR with a 9.00% annual escalation in rental is 19.50%.

The terminal value is subjective and in this example has been assumed as the capitalised value of the anticipated rental in Year 21 (i.e. R53,987,443 + 9.00% = R58,846,313) capitalised at the initial yield, i.e. 10.50%.

Should the terminal value be assumed to be nil (this is unlikely as the land parcel will always have a value), the IRR drops to 16.92%.

A rule of thumb for the calculation of the approximate IRR off an investment is that it is equal to the sum of the initial return plus the escalation rate (assumed to be constant over the investment period), provided that the terminal value is calculated as in the given example, i.e. the capitalised value of the anticipated rental in the year after disposal, assuming a capitalisation rate equal to the initial return.

Thus, in the given example, the initial return is 10.50%, the escalation rate is 9.00%, and the approximate IRR is the sum of the two, i.e. 19.50%.

Note: Where Green Star South Africa ratings are a requirement, cash flow analyses over longer time periods have become essential. Capital expenses are normally higher due to investment in "green" technology and more expensive methods employed. Therefore, the long-term effect on the operation and maintenance of buildings due to better energy efficiency and the like should be demonstrated to building owners and tenants in order to determine the viability scientifically.

RESIDUAL LAND VALUE

The formula

The calculation of the residual land value for a predetermined rate of return i.e. what a developer can afford to pay for a parcel of land given a specified return for a particular development.

The formula is determined as follows:

$$\text{Return} = \frac{\text{Net Annual Income}}{\text{Total Capital Outlay (TCO)}}$$

$$= \frac{\text{Net Annual Income}}{y + x}$$

(where "y" = TCO excluding land value and its corresponding loss of interest and "x" = land value and its corresponding loss of interest)

$$\text{Therefore } x = \frac{\text{Net Annual Income}}{\text{Return}} - y$$

Now x = Land Value + Loss of Interest
= Future Value of Land

Therefore to obtain the present land value, i.e. land value excluding its corresponding loss of interest, simply discount "x" at the interest rate and period used in the previous TCO calculations.

EXAMPLE

What price should be paid for land to obtain a return of 10.00% p.a. with a net annual income of R6 million and the following capital outlay?

Estimated escalated building cost	R 38,150,000
Professional fees	5,725,000
Legal and plan approval fees	45,000
Interim rates on ground during construction period	265,000
Loss of interest and/or bond interest at 10.5% p.a. compounded monthly over a 15 month construction period	3,180,000
Total capital outlay excluding land cost (y)	R 47,365,000

$$x = \frac{\text{Net Annual Income}}{\text{Return}} - y$$

$$= \frac{R6{,}000{,}000}{0.10} - R47{,}365{,}000$$

$$= R12{,}635{,}000$$

Therefore land value is R12,635,000 discounted at 10.5% p.a. over 15 months = R11,087,204 (say) R11 million

The above residual value is very sensitive to changes of the required rate of return, otherwise known as the capitalisation rate (CAP rate), and careful consideration should be considered carefully, taking into account the risk profile of the proposed development.

SECTION 9
DIRECTORY OF OFFICES IN AFRICA

Africa Corporate Head Office
Pretoria (Centurion), South Africa
T +27 12 421 3500

South Africa
Bloemfontein
T +27 51 448 2721

Cape Town (Bellville)
T +27 21 950 7500

Cape Town (V&A Waterfront)
T +27 21 418 1405

Durban
(Umhlanga Ridge)
T +27 31 204 3800

George
T +27 44 873 5070

Johannesburg (Sandton)
T +27 11 666 2000

Port Elizabeth
T +27 41 585 2514

Pretoria (Centurion)
T +27 12 421 3500

Botswana
Gaborone
T +267 39 007 11

Ethiopia
Addis Ababa
T +251 929 179 344

Ghana
Accra
T +233 575 444 554

Kenya
Nairobi
T +254 205 137 054

Lesotho
Maseru
T +266 2232 0735

Liberia
Monrovia
T +231 886 818982

Mozambique
Maputo
T +258 21 498 797

Nigeria
Lagos
T +234 802 417 4152

Senegal
Dakar
T +221 33 821 47 22

Uganda
Kampala
T +256 313 673 217

Principal Author
Dr. Gerhard Brümmer

Co-ordination and Administration
Michael Yelverton

Editing, Marketing and Design
Rashree Maharaj

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