



Imagine it.
Delivered.

AFRICA PROPERTY & CONSTRUCTION COST GUIDE

Our operations in Africa boast permanent offices in Botswana, Ghana, Kenya, Lesotho, Mozambique, South Africa and Uganda.



AECOM AFRICA PROPERTY &
CONSTRUCTION COST GUIDE 2018

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Message from Dean Narainsamy



Director – Cost Management Buildings + Places, Africa

Positive sentiment in the business environment seems to be the theme for 2018. Amazingly, we are already halfway through this year and, as a business, the year ahead presents many opportunities and challenges for AECOM.

As alluded to last year, investment in innovation is a key trademark for a global business. We are happy to report that our Cost Management BIM team has made significant progress in enhancing our 5D BIM capability. We can proudly say that we have local project examples that clearly illustrate the benefits of using 5D BIM. The dawn of digital transformation has enabled our team to embrace a more proactive approach, both from a cost and contract management perspective, allowing us to focus on a better service offering for our clients.

Our journey into Africa continues. As a result of our global presence and project work in Africa, our opportunities pipeline in infrastructure has created a balanced portfolio of work locally, with a more focused approach to grow our project presence in Kenya, Ghana, Uganda, Mozambique, Lesotho and Botswana. The year ahead reflects one of consolidation and building on the investments that we have made in places, people and projects. Fundamental to our success will be understanding the local economic policies of government, employing local people and embracing the culture of working in Africa.

We are proud to report that we have made significant strides in improving our broad-based black economic empowerment commitment in South Africa, and have moved from a Level 3 contributor a year ago to a Level 1 contributor in terms of the Department of Trade and Industry's (Revised Codes) scorecard. As a business we view this milestone as an ongoing goal to achieve the highest possible accreditation in support of government's empowerment policies.

The old adage that 'you are the reflection of the team that supports you' holds firm in our thinking. Our ability to retain, attract and recruit the best people remains, and will always be, a key focus for us. Our Graduate Development / Mentoring 4 Success programme has already gained significant traction, and I am pleased that we have already had successful professional registrations since its inception last year. This is truly a remarkable achievement, and enforces our commitment to growing and nurturing our young talent into professionals who will help shape the future of our industry. We have also started a strategic partnership with the Department of Public Works to house their candidate quantity surveyors in our M4S Programme in order for them to fast-track their registration process. It is our intention to grow this initiative throughout our various office locations.

As a business, we continue to evolve, and 2018 sees another chapter being written in our evolutionary process, with our main focus being on innovation, our people and clients. Our vision is to become an organisation that is respected and valued for inspiring solutions, enduring legacies and continuing to remain relevant in a constantly changing and challenging construction environment.

AECOM Imagine it.
Delivered.

Best Regards,
Dean Narainsamy

A handwritten signature in black ink, appearing to read 'Dean Narainsamy', written over a large, stylized, sweeping flourish that extends across the width of the signature area.

Section 01

Imagine it. Delivered.

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 and protect our environment and improve people's lives.

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

The difference that 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** Imagine it.
Delivered.



Our Core Values

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

SAFEGUARD We operate ethically and with integrity, while prioritising safety and security in all that we do.

COLLABORATE We build diverse teams that connect expertise to create innovative solutions.

INSPIRE We develop and celebrate our people, and elevate the communities we touch.

ANTICIPATE We understand the complexity of our clients' challenges and help them see further.

DELIVER We grow our business through operational excellence and flawless execution.

DREAM We 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**.



Quality Excellence

AECOM is a global community of professionals – different disciplines, backgrounds and perspectives – united by a common goal of delivering best-in-class solutions and services to clients.

To achieve this, we have a Quality Management System (QMS) that provides a consistent documented and auditable platform for operations with the capacity to manage risk and change.

We are committed to promoting a culture of continual improvement in the management of our business through:

- Leading quality at all levels, where everyone is encouraged and expected to do the right thing
- Delivering work and services in a manner that meet client requirements and enhance client satisfaction
- Collaborating, which enables mutually beneficial relationships with clients, suppliers and internal partners
- Anticipating and managing risks to safeguard the integrity of our work and services
- Employee empowerment, where quality is achieved through a balance between formal integrated processes and empowered employee discretion
- Organisational learning and knowledge sharing
- Providing a delivery excellence framework for establishing and reviewing appropriate business objectives and targets
- Supporting the professional development of our employees

Our QMS is certified to **ISO 9001: 2015**.

Africa has Risen

Our operations in Africa boast around 800 people, predominantly in South Africa. However, we have 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, as well as its challenges inherent in working on our wonderfully diverse, vibrant and complex continent.

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



Improving Lives

AECOM is committed to the principles of good governance and corporate citizenship. As an industry leader with a range of built environment professionals, we strongly believe in investing our resources to improve the quality of life for all.

Our corporate social investment approach includes programmes undertaken for the purpose of uplifting communities in general and those that have a strong developmental and educational approach.

Our strategy is aimed at facilitating the empowerment of talented individuals within a variety of interventions through university and into the workplace. We believe that in providing these opportunities to the identified individuals, they will realise their potential and be able to successfully enter the built environment profession.

In 2017, AECOM established the AECOM Educational Trust with the objective of providing bursaries to young, black women to further their tertiary education in the built environment field.

Bridging the Skills Divide

Disabled Learnership Programme

AECOM's Learning and Development department, in partnership with Enigma Skills College, launched its second 12 month Disabled Learnership Programme in 2018. Learnerships are intended to address the gap between education, training provision and the needs of the labour market. AECOM has to date sponsored 59 disabled learners on this work-based approach to learning that will culminate in a Business Administration NQF level 2 and 3 qualifications.

AECOM's Bursary Programme

As part of our commitment to grow skills, experience and excellence in the built environment, AECOM offers bursaries each year to aid full-time employees and meritorious students that are studying towards the main fields of our core business.

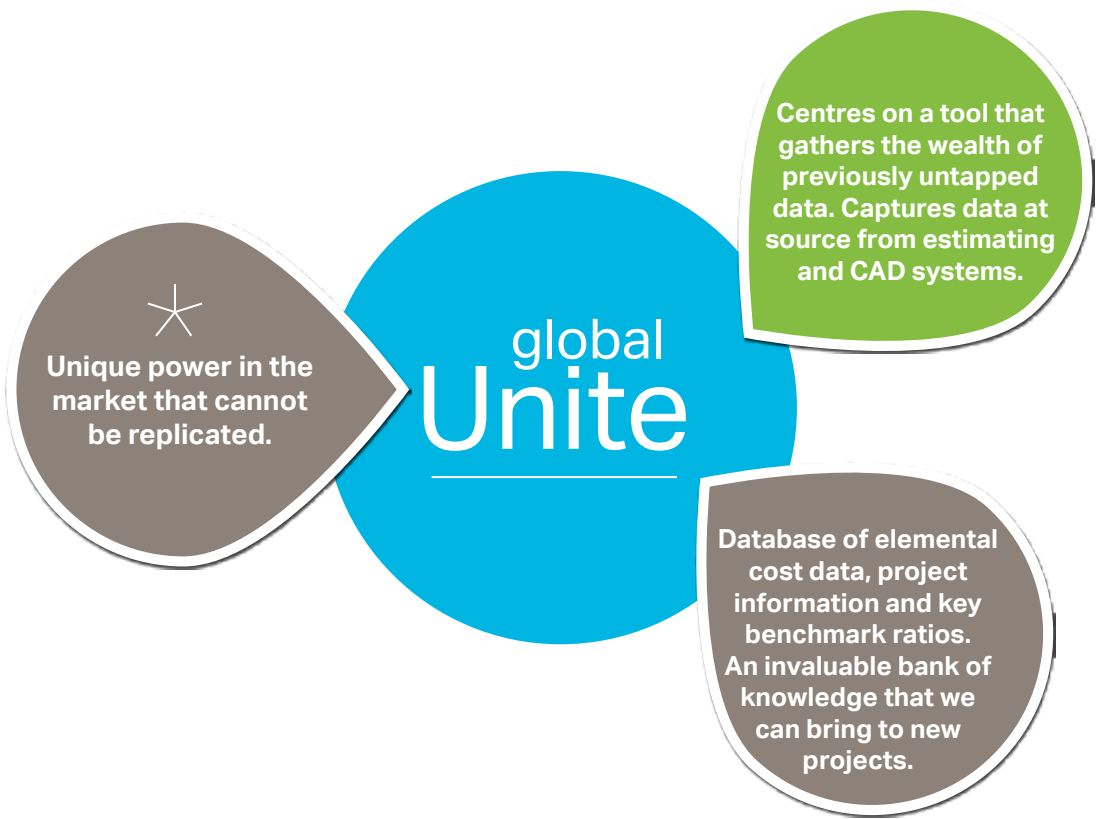


Global Unite

What is Global Unite?

Historically, cost data has existed in many different forms ranging from costs estimates to reports, spreadsheets etc.

The **Global Unite** system was designed and developed to allow us to capture and benchmark this cost data in a central location.

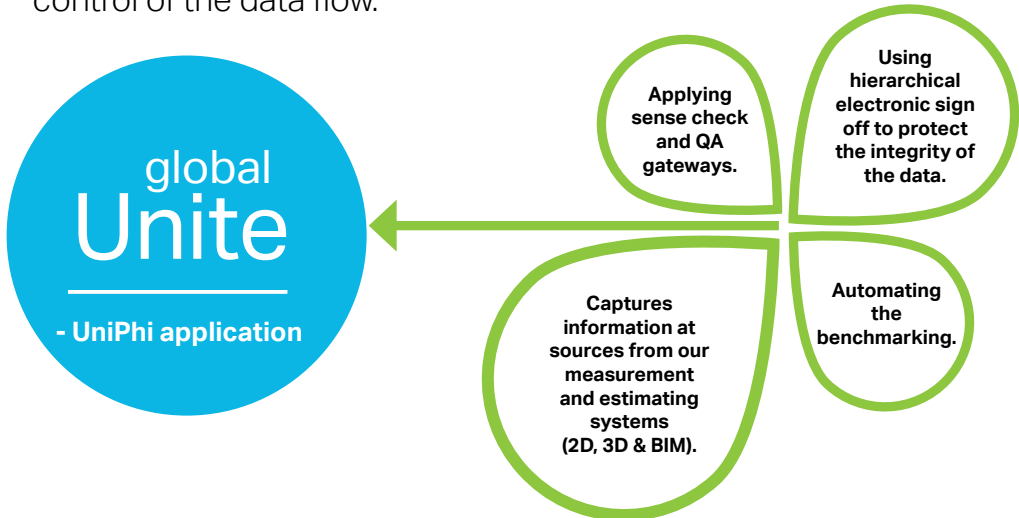


What can Global Unite do for our Clients?



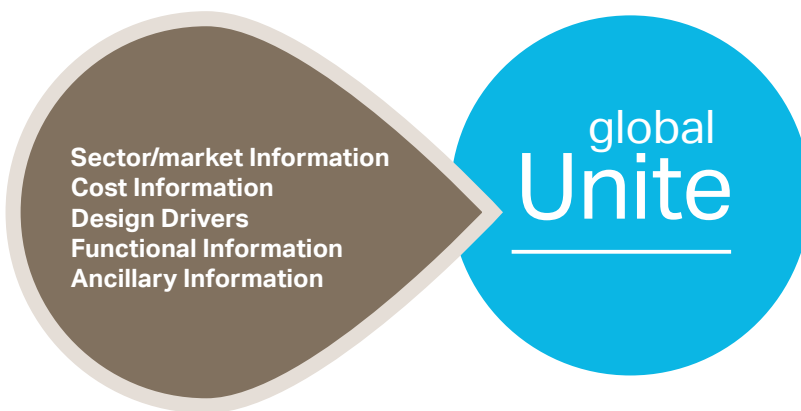
How is the Quality of Global Unite Data guaranteed?

The system contains a full electronic QA system allowing the control of the data flow.



What information can Global Unite hold?

The **Global Unite** system has been designed to hold all of the key project information, primarily cost data, but also more information about the project itself.



We are able to tailor **Global Unite** to capture any data point that is required either by the cost managers themselves or the client.

Building Information Modelling

BIM Defined

Building Information Modelling (BIM) is used to describe the process of designing and managing a building (or other design asset) in collaboration with the entire team, throughout the asset's life-cycle, by using the same system or model as compared to using separate sets of conventional drawings and information sets. BIM software is used to plan, design, construct, operate and maintain diverse physical infrastructures.

Whether we are designing or constructing bridges and roads, office towers and apartment blocks, pipelines, factories or schools, an information model or a database can be created and contains information about what will be built, how it will be built and how it will perform. Enabled by technology, we can create a synchronised, collaborative, digital representation of assets to virtually construct and test a project before we do so in reality.

A BIM model usually includes the 3D shape of the objects, but can also include things such as their cost, installation date, or operating parameters. We can attach practically infinite additional data to any object or category of objects in a BIM database, and use that data to manage information flow across multiple life-cycle phases and between multiple parties.

By creating a single source of project information and by making this available across the design, construction and operation teams, we increase our accuracy and efficiency, and can realise significant savings on the life-cycle cost of operating an asset.

Benefits of the BIM Process

- Improved visualisation
- Improved coordination and collaboration
- Improved conflict detection and risk mitigation
- Improved productivity due to easy retrieval of information
- Embedding and linking vital information for tendering scheduling and estimating
- Reduced rework costs and improved design efficiency
- Improved access to maintenance information over a building's life-cycle

The 5D BIM Process

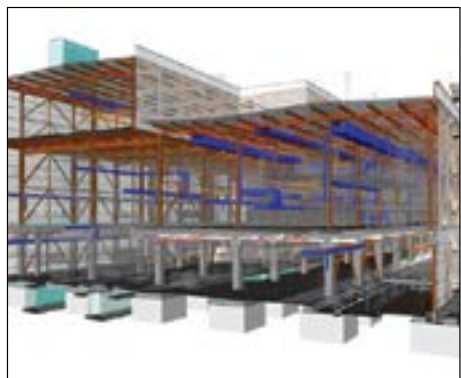
For the Cost Management team, our focus is on 5D BIM, which refers to the linking of cost information to a 3D model. The letter 'D' in connection with BIM relates to the type of information associated with the model. It refers to other dimensions, such as time (4D) or cost (5D) that is linked to a model. 2D and 3D essentially refer to CAD 2D plans and 3D Model, while 5D BIM entails the intelligent linking of individual 3D CAD components to cost-related information.

Understanding the Process

Moving over to the 5D BIM process is an enhancement to our current systems and the implementation thereof will offer a number of benefits. The process aims to automate the measuring, estimating and bill production stages. The value lies in the fact that it will enable Cost Managers to be more proactive and to rather spend time on cost engineering and management as compared to measurement and cost reporting only.

In brief, shifting our focus towards the 5D BIM process requires the following:

- Involvement with the design team prior to the start of design work to communicate our cost extraction design requirements
- Base our measures on both 2D and 3D design information
- Create a unified link between the design information, our measures and our costs
- Adopt automated estimating, bill production and cost management tools



Possible benefits of BIM from a cost management perspective

- Fast, reliable and accurate quantity take-off and cost estimation
- Auto computation of calculations, hence reduced calculation mistakes
- Categorized cost reporting and estimation via the use of zones/locations
- Improved visualisation of the elements for measurement and costing purposes
- Easy project handover between quantity surveyors
- Enhanced communication and collaboration amongst the professional and project team
- Improved cost database management
- Enables a more proactive outlook from a quantity surveying perspective with regard to cost management, contract management and cost engineering



Sustainability

AECOM is a company with a vision to build a better world. Our projects transform communities, improve lives and power growth by designing, building, financing and operating infrastructure assets globally.

From our on-site practices to initiatives in our offices, we are committed to implementing sustainability in everything we do. Our purpose is to enhance and sustain the world's built, natural and social environments. Our key goals at the heart of our commitment are:

- Embedding sustainability into all aspects of our work with our clients
- Building our capability to provide sustainable solutions for our clients in creative and innovative ways
- Conducting our business in a way that is consistent with sustainability principles



By embracing sustainability, we aim to produce sustainable outcomes across every aspect of our work including planning, design, development, production, delivery and review.

Sustainability is also at the core of how we manage our company globally. We take our responsibilities seriously, and continue to deliver improvements in our environmental performance across key performance indicators including greenhouse gas emissions, water, waste, energy and preparedness for the impacts of climate change.

For example, AECOM was a “Silver” founding member of the Green Building Council of South Africa (GBCSA), demonstrating our commitment to building sustainably. We maintain this membership each year. We have also assisted the GBCSA with 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.

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 environmental responsibilities, as well as their financial objectives in terms of infrastructure and building development.

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 ratings.



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.

Globally we have 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
- BIM cost models
- 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 and life-cycle costing
- The triple bottom line in construction and property development
- The soft landings process for buildings

We have 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 closely with industry on continuing educational workshops and in developing relevant industry reports and publications.

Candidacy Support and Mentoring Programme

The AECOM Africa Candidacy Support and Mentoring Programme has been uniquely designed for AECOM Africa by Mentoring 4 Success (M4S) to cater for the specific professional registration requirements of the whole Built Environment (encompassing 6 professional bodies) as well as two additional professional bodies relevant to AECOM's end markets.

This programme has also been designed to comply with the stringent requirements of the Department of Trade and Industry's Skills Matrix "Category C" programme requirements and has received approval from two of the most respected South African National Accreditation System-accredited B-BBEE Verification Agencies – Empowerlogic and Platinum Verifications.

The programme design includes 6 categories for graduates and applicants:

- "Bridging" applicants who need to increase their minimum academic requirements
- New graduates – prior to their candidacy application
- Recently registered or more experienced candidates
- Mature candidates (work experience exceeds the normal timeframe to registration)
- Internationally qualified and experienced candidates
- RPL candidates

The programme has been designed to incorporate a careful balance between the "process" of professional registration and the "path" to professional development – thus accelerating the development of confident, capable and competent young professionals within AECOM.



Candidates from the AECOM Africa Candidacy Support and Mentoring Programme.

The programme is supported by the unique *M4S Professional Registration Mentoring Handbook*, which has been aligned in conjunction with each of the professional bodies to demystify the road to registration and answer the many questions that young graduates and candidates have each year.

M4S provides a completely outsourced professional registration support mentoring programme methodology, as well as the full programme management, facilitation and administration resources required to support such a complex and multi-regional/multi-office project of this nature, with over 100 participants. This includes managing, monitoring and maintaining all the compliance and administration requirements for B-BBEE "Category C" and CETA verification.

The programme is further enabled via the unique M4S Mobile Knowledge Mentoring Apps and Analytic Dashboards, which enable constant collaboration between candidates and their mentors as well as their colleague candidates on common knowledge themes related to their jobs as well as professional registration. These unique technology platforms allow M4S to gather, monitor and report on the rich engagement analytics so critical to validating effective impact and accelerated professional development.

Progress monitoring and reporting processes, such as the M4S Candidacy Mentoring Action Plans (C-MAPS), Heat Maps and the "Journaling Process", are also built into the programme so that once a quarter, a consolidated "running progress record" can be maintained and documented for all appropriate stakeholders. External experts and industry champions are invited to present insights and narratives on a quarterly basis in order to build increased contacts, contextual understanding, situational relevance and industry knowledge.

Engaged mentors are also incentivised to participate pro-actively via the comprehensive number of possible CPD accreditations that both AECOM and M4S provide via the programme. There are seventeen managers and mentors who have been registered as professional mentors with an official professional designation from SA Board for People Practices, which is a unique and industry first benefit for mentors only available through this programme.

It has been particularly pleasing to witness the multiple mentoring relationships developed.

Section 02

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.

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 and contract administrators.

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

The importance of Cost Management

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% of the total construction cost, thus effective cost management of the building services is essential to ensure the client's budget is met.

Independent cost management of building services ensures transparency of costs and a dedicated service not linked to the specific design consultant.

Expertise

Our building services cost management team draws upon its unique expertise to provide financial management and contract administration of all building services including:

- Electrical installation
- Heating, ventilating and air-conditioning (HVAC) installations
- Fire protection systems
- Fire detection and evacuation systems
- Electronic systems such as access control, surveillance, structured cabling and the like
- Lifts and escalators

Our track record stretches over the last 30 years, during which period, we have successfully cost-managed the full complement of building services on many major projects.



Services provided

Working in close conjunction with the appointed mechanical, electrical and fire protection consultants, our building services team provides a comprehensive service which will cover all aspects of procurement and cost management such as:

- Cost planning at an early stage prior to detailed design
- Cost studies to compare alternative materials and designs
- Evaluating design as it evolves to ensure compatibility with the approved cost plan
- Procurement from tender documentation to adjudication
- Cost management, monitoring and reporting
- Valuation of work done during construction
- Settling final costs with the contractor



Section 03

AECOM in South Africa

Broad-Based Black Economic Empowerment (B-BBEE)

Transformation is an important factor in South Africa's democratic transition towards the vision of a non-racial, non-sexist, democratic and prosperous society as summarised in the Freedom Charter. AECOM believes that, in order to realise the vision of the Constitution, South Africa needs transformation that opens a path to inclusive economic growth and development.

As a responsible business and a leader in the built environment industry, AECOM acknowledges that to be a good corporate citizen we need to embrace fully the principles of transformation.

We strive to advance on our status through a B-BBEE strategy that sets continuous improvement targets on all the B-BBEE scorecard criteria in order to maintain a leading role in the built environment.

AECOM's most recent B-BBEE assessment is indicated hereunder:

B-BBEE Level Status:	Level 1
Procurement Recognition Level	135%
Black Ownership	30% Black-Owned
Black Women Ownership	20.33% Black Women-Owned
Scorecard Information:	
• Ownership	25 points
• Management Control	12.5 points
• Skills Development	20.33 points
• Enterprise & Supplier Development	41.97points
• Socio-Economic Development	5 points
Total	104.8 points
Empowering Supplier	YES
Designated Group Supplier	NO
Scorecard	Generic – B-BBEE Revised Codes of Good Practice (Gazette no 36928 of 11 October 2013)

Section 04

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 (m^2) 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/ m^2 -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/ m^2 without due consideration of a number of factors that can affect the rate/ m^2 to a substantial degree.

Very often the cost of a building is expressed in R/ m^2 and the unit cost is ignored, if calculated at all. This rate/ m^2 is then used as the sole yardstick for 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 :

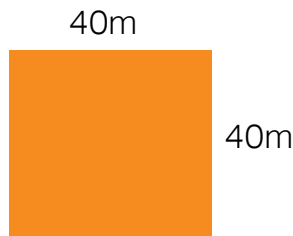
Specification

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	1,600m ²
Wall length	160m
Wall height	3m
Wall area	480m ²
Wall floor ratio	480/1,600
Cost of external façade in terms of R/m ² of floor area to each R/m ² of façade area	30.0%

Case B

Area	1,600m ²
Wall length	232m
Wall height	3m
Wall area	696m ²
Wall floor ratio	696/1,600

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

The rate/m² on plan of a façade 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, this is 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

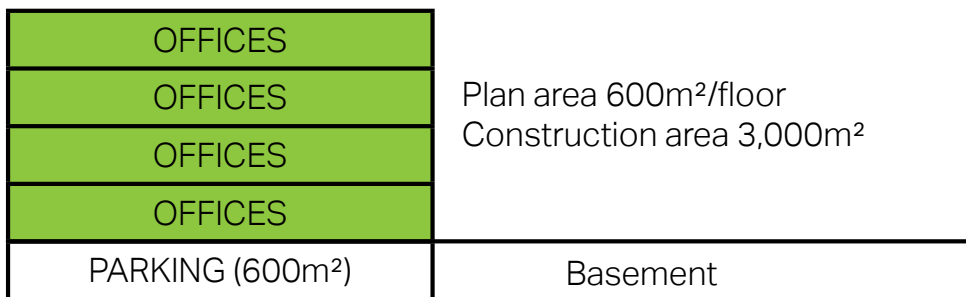
The rate/m² for open plan offices should not be compared directly with the rate/m² for offices with internal partitions without the relevant adjustments being made. The inclusion of partitions can increase the overall rate/m² by up to R300/m² of office area.

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	2,400m ² @ R15,000 = R	<u>36,000,000</u>
Parking	600m ² @ R6,000 = R	<u>3,600,000</u>
Total		<u>R 39,600,000</u>
Average rate/m ²		<u>R 13,200</u>

Case B

Building having parking outside the building structure and on grade



Cost of building

Offices	2,400m ² @ R15,000 = R	<u>36,000,000</u>
Parking	600m ² @ R 800 = R	<u>480,000</u>
Total		<u>R 36,480,000</u>
Average rate/m ²		<u>R 15,200</u>

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, a 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 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 2018, and therefore represent the average expected building cost rates for 2018. 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, Second Edition* (effective from 7 November 2007), 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, however, been based on data received from Gauteng, where possible. Be mindful 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	<i>Rate per m² (excl. VAT)</i>
Low-rise office park development with standard specification	R 7,700 – R 9,500
Low-rise prestigious office park development	R 10,000 – R 14,800
High-rise tower block with standard specification	R 11,100 – R 14,800
High-rise prestigious tower block	R 14,800 – R 18,600

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

Parking	<i>Rate per m² (excl. VAT)</i>
Parking on grade, including integral landscaping	R 500 – R 600
Structured parking	R 3,800 – R 4,100
Parking in semi-basement	R 4,100 – R 5,600
Parking in basement	R 4,400 – R 6,800

Retail	<i>Rate per m² (excl. VAT)</i>
Local convenience centres (Not exceeding 5,000m ²)	R 7,600 – R 10,000
Neighbourhood centres (5,000 – 12,000m ²)	R 8,200 – R 10,500
Community centres (12,000 – 25,000m ²)	R 9,000 – R 11,600
Minor regional centres (25,000 – 50,000m ²)	R 10,000 – R 12,300
Regional centres (50,000 – 100,000m ²)	R 10,500 – R 12,800
Super regional centres (exceeding 100,000m ²)	R 11,100 – R 14,400

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 3,800 – R 5,600
- Steel frame, brickwork to ceiling, steel cladding above and roof sheeting (heavy-duty) R 4,400 – R 6,300
- Administration offices, ablution and change room block R 7,200 – R 9,100
- Cold storage facilities R 13,300 – R 19,000

Residential

Rate per site (excl. VAT)

Site services to low-cost housing stand (250 - 350m²) R 33,100 – R 50,600

Rate per m² (excl. VAT)

- RDP Housing R 1,900 – R 2,200
- Low-cost housing R 2,900 – R 5,000
- Simple low-rise apartment block R 7,100 – R 9,800
- Duplex townhouse
- Economic R 7,100 – R 10,100
- Prestige apartment block R 13,400 – R 20,800



Residential

Rate per m² (excl. VAT)

Private dwelling houses:

— Economic	R 5,000
— Standard	R 6,300
— Middle-class	R 7,600
— Luxury	R 10,800
— Exclusive	R 17,000
— Exceptional ('super luxury')	R 26,000 – R 54,000

Outbuildings	R 3,600 – R 5,100
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Rate per no. (excl. VAT)

Carport (shaded)	– single	R 4,300
	– double	R 8,300
Carport (covered)	– single	R 6,800
	– double	R 12,400

Rate per no. (excl. VAT)

Swimming pool

— Not exceeding 50 kl	R 90,000
— Exceeding 50 kl and not exceeding 100 kl	R 84,000 – R 148,000

Tennis court

— Standard	R 368,000 – R 500,000
— Floodlit	R 442,000 – R 632,000

Hotels

Rate per key (excl. VAT)

— Budget	R 1,000,000 – R 1,500,000
— Mid-scale (3 Star)	R 2,000,000 – R 2,500,000
— Upper scale (4 Star)	R 2,500,000 – R 3,500,000
— Luxury (5 Star)	R 3,500,000 – R 4,500,000

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

Studios

Rate per m² (excl. VAT)

Studios - dancing, art exhibitions, etc.	R 13,300 – R 19,000
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Conference centres	<i>Rate per m² (excl. VAT)</i>
Conference centre to International standards	R 23,900 – R 31,000
Retirement centres	<i>Rate per m² (excl. VAT)</i>
Dwelling houses	
— Middle-class	R 7,900
— Luxury	R 11,100
Apartment block	
— Middle-class	R 8,100
— Luxury	R 12,600
Community centre	
— Middle-class	R 10,600
— Luxury	R 15,600
Frail care	R 12,600
Schools	<i>Rate per m² (excl. VAT)</i>
Primary school	R 6,300 – R 7,300
Secondary school	R 7,500 – R 8,000
Hospitals	<i>Rate per m² (excl. VAT)</i>
District hospital	R 26,000
<i>Hospital rates exclude allowances for furniture, fittings and equipment (FF&E).</i>	
Stadiums	<i>Rate per seat (excl. VAT)</i>
Stadium to PSL standards	R 33,000 – R 50,000
Stadium to FIFA standards	R75,000 – R 100,000
	<i>Rate per pitch (excl. VAT)</i>
Stadium pitch to FIFA Standards	R 21,000,000 – R 25,300,000

Prisons*Rate per inmate (excl. VAT)*

1,000 Inmate prison	R 563,000 – R 599,000
500 Inmate prison	R 599,000 – R 670,000
High/maximum security prison	R 894,000 – R 1,197,000

Infrastructure airport development costs

Rates exclude any future escalation, loss of interest, professional fees, VAT and ACSA direct costs.

Apron stands (incl. associated infrastructure)*Rate per m² (excl. VAT)*

Code F Stand (85m long x 80m wide = 6,800m ²)	R 4,800
Code E Stand (80m long x 65m wide = 5,200m ²)	R 5,100
Code C Stand (56m long x 40m wide = 2,240m ²)	R 6,400

Taxi lanes (incl. associated infrastructure)*Rate per m (excl. VAT)*

Code F taxi lane (101m wide)	R 159,000
Code E taxi lane (85m wide)	R 134,500
Code C taxi lane (49m wide)	R 78,000

Service Roads*Rate per m (excl. VAT)*

Service road (10m wide)	R 16,500
Dual carriage service road (15m wide)	R 21,100



Taxi ways (incl. associated infrastructure)*Rate per m (excl. VAT)*

Code F taxi way (70m wide)

R 114,000

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

R 265,000

Parking (excluding bulk earthworks)*Rate per bay (excl. VAT)*

Structured parking

R 175,000

Basement parking

R 267,000

Perimeter fencing / Security gates*Rate per m (excl. VAT)*

Perimeter walls with perimeter intrusion detection (PIDS), etc.

R 8,100

Rate per no. (excl. VAT)

Security gate

R 15,300

Super security gate

R 45,800

Terminal & other buildings (excl. bulk earthworks, external site & services works)*Rate per m² (excl. VAT)*

Terminal building (excl. terminal building baggage & X-ray)

R 27,100

Pier terminal building (excl. telescopic air bridges, seating & aircraft docking system)

R 28,400

Rate per unit (excl. VAT)

Telescopic air bridges

R 10,395,000

Aircraft docking system

R 1,525,000

Building services

The following rates are for building services (mechanical and electrical), which are 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	<i>Rate per m² (excl. VAT)</i>
Offices	
— Standard installation	R 550 – R 750
— Sophisticated installation	R750 – R 1,000
— UPS, substations, standby generators to office buildings	R 350 – R 500
Residential	R 500 – R 750
Shopping centres	R 750 – R 1,000
Hotels	R 850 – R1,150
Hospitals	R 1,200 – R 1,600

Electronic installation	<i>Rate per m² (excl. VAT)</i>
Offices	
— Standard installation	R 350 – R 500
— Sophisticated installation	R 500 – R 700
Residential	R 300 – R 450
Shopping centres	R 700 – R 900
Hotels	R 650 – R 850
Hospitals	R 700 – R 900

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 250 – R 350

Air-conditioning installation*Rate per m² (excl. VAT)*

Ventilation to parking/service areas

R 400 – R 550

Offices

— Console units

R 750 – R 950

— Console/split units

R 900 – R 1,300

— Package units

R 1,200 – R 1,800

— Central plant

R 1,750 – R 2,750

— Variable refrigerant flow (VRF)

R 1,600 – R 2,750

Residential - split units

R 900 – R 1,400

Shopping centres

— Split units

R 1,000 – R 1,400

— Package units

R 1,200 – R 1,800

— Evaporative cooling

R 750 – R 1,100

Hotels - public areas

R 1,750 – R 2,750

Hospitals central plant

R 2,250 – R 3,550

Hotels

Rate per key (excl. VAT)

— Console units

R 19,000 – R 26,000

— Split units

R 26,000 – R 40,000

— Central plant

R 60,000 – R 85,000

Rate per theatre (excl. VAT)

Hospitals - operating theatres

R 500,000 – R 800,000

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 05

Global Sentiment and Building Costs

Africa Outlook 2018

Through the implementation of sound macroeconomic policies, Africa's economies have generally remained resilient, thus enabling the continent to maintain its expected growth throughout 2017.

Although Africa's overall growth is expected to be moderate in 2018, it remains one of the fastest growing continents with Ethiopia, Ghana and Côte d'Ivoire being three of the fastest growing economies globally in terms of increased GDP. Africa's growth is being further helped with a number of East African countries contributing collectively through increased exports and cross border trade to grow this region's economy.



There is an ever growing need to finance infrastructure on the continent. A number of countries are now prioritising this following a realisation of the importance of industrialisation to not only maintain growth in their economies but to also diversify through the exportation of goods and services. Consequently, creating jobs that are needed for an increasing, younger population. A developing industrial sector on the continent will require more infrastructure investment, particularly in power, water and transportation services that are already over stretched.

An increase in oil prices and stabilisation of commodity prices have helped strengthen the forecast for GDP growth on the continent with predictions of collective growth of 3.2% to 3.8% for 2018, with individual countries increasing by as much as 7.4% to 8.5%.

Although we have seen some growth in the construction sector in North Africa, this has been restricted to a few countries that have stabilised following the Arab Spring. In sub-Saharan Africa, we are seeing steady growth in the infrastructure and construction sectors, as well as in East and West Africa.

Over the last year we have seen a number of national elections across Africa that have been free and fair and the transition of leadership has been stable; including for some of Africa's more high-profile leaders. This has shown the world Africa's willingness to implement good governance and curb corruption at all levels.

These changes will help to encourage further foreign direct investment across the continent, which has been increasing steadily over a number of years and is a catalyst for positive growth in demand for Africa's imports and exports.

Africa continues to grow and there is a steady increase of larger infrastructure and construction projects coming to market that will provide the opportunities for investment and service providers for 2018 and beyond.

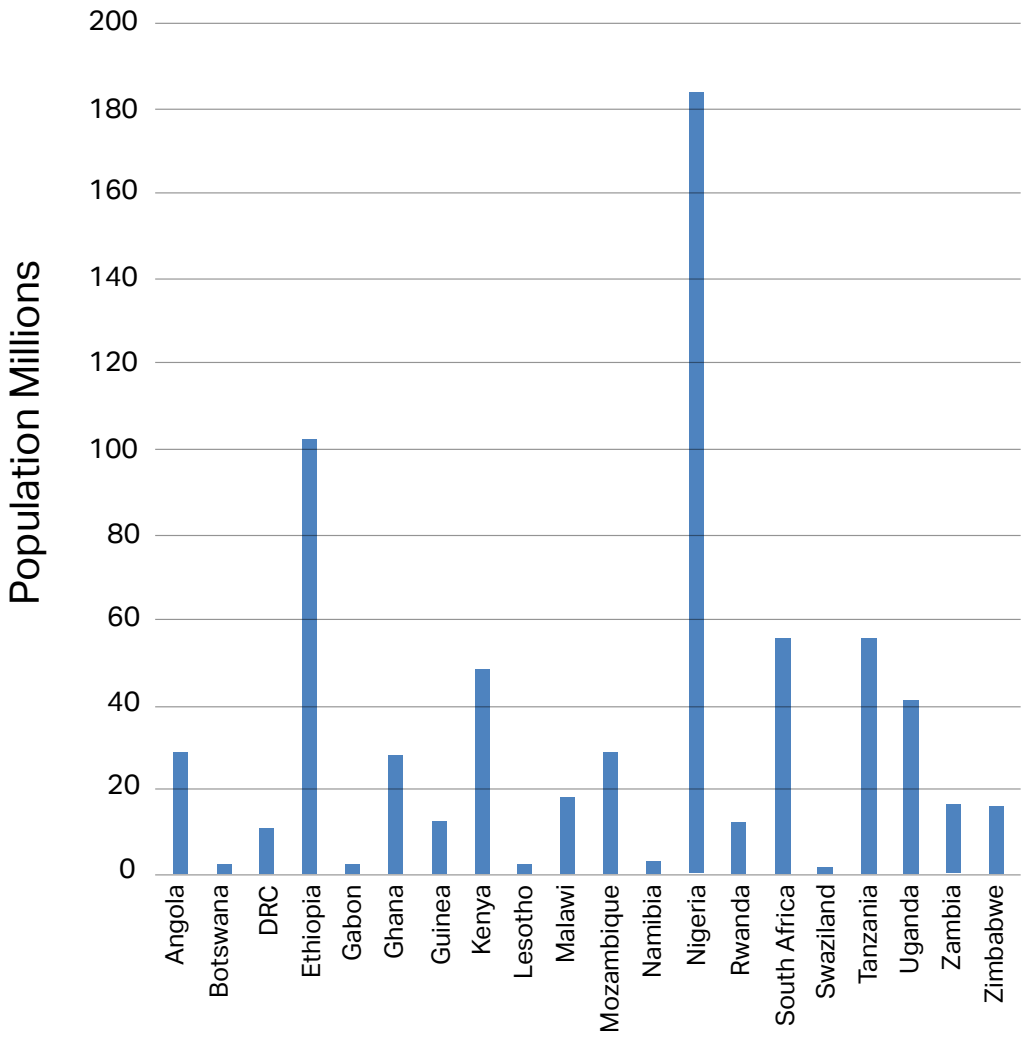
Africa in Figures

Area and Population

Country	Land area (000km ²)	Population			
		Millions, 2016 (est.)	Average annual % population growth rate, 2000 - 2016	Density, people per km ² , 2016	Prevalence of HIV, total (% of population 15 - 49)
Angola	1247	28.81	3.4	23.1	1.9
Botswana	567	2.25	1.8	4	21.9
DRC	48	10.65	1.1	220.4	1
Ethiopia	1000	102.40	2.5	102.4	1.1
Gabon	258	1.98	2.5	7.7	3.6
Ghana	228	28.21	2.2	124	1.6
Guinea	246	12.40	2.5	50.4	1.5
Kenya	569	48.46	2.6	85.1	5.4
Lesotho	30	2.20	1.3	72.6	25
Malawi	94	18.09	2.9	191.9	9.2
Mozambique	786	28.83	2.9	36.7	12.3
Namibia	823	2.48	2.2	3	13.8
Nigeria	911	185.99	2.6	204.2	2.9
Rwanda	25	11.92	2.4	483.1	3.1
South Africa	1213	55.91	1.6	46.2	18.9
Swaziland	17	1.34	1.8	78.1	27.2
Tanzania	886	55.57	3.1	62.7	4.7
Uganda	201	41.49	3.3	206.9	6.5
Zambia	743	16.59	3.0	22.3	12.4
Zimbabwe	387	16.15	2.3	41.7	13.5

Source: World Development Indicators 2016

Population 2016



Source: World Development Indicators 2016

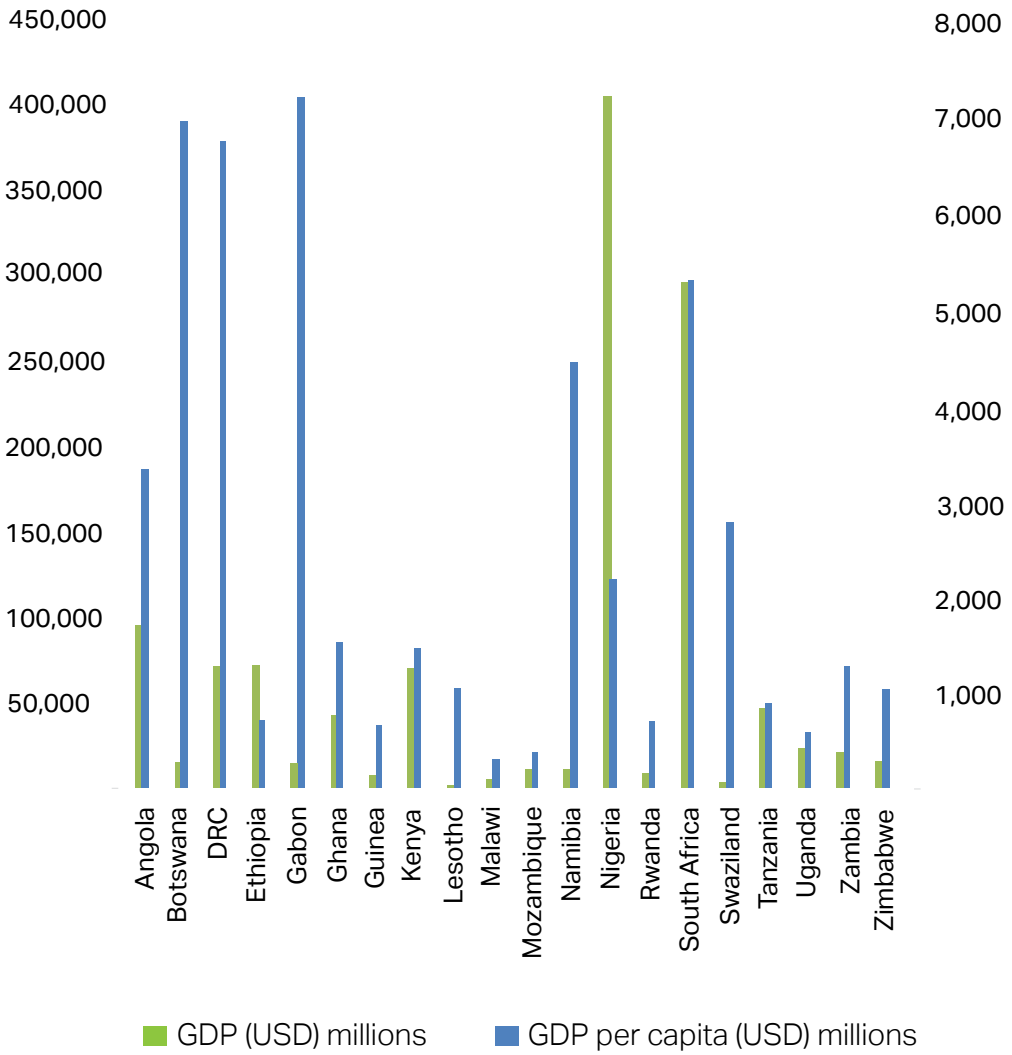
Gross Domestic Product (At Constant 2000 Prices)

Country	GDP (USD) millions	GDP growth (annual % since 2000)	GDP per capita (USD)	Gross capital formation (% of GDP)	Inflation, consumer price (annual %)
Angola	95 335	-0.7	3 309	8.4	34.7
Botswana	15 581	4.3	6 924	24.4	3.8
DRC	71 584	6.6	6 722	23	1.6
Ethiopia	72 374	7.6	707	39.8	7.3
Gabon	14 214	2.3	7 179	31.9	2.1
Ghana	42 690	3.6	1 514	22.8	17.5
Guinea	8 200	6.6	662	*	8.1
Kenya	70 529	5.8	1 455	17.2	6.3
Lesotho	2 291	2.4	1 040	28.3	6.6
Malawi	5 433	2.5	300	15.2	21.7
Mozambique	11 015	3.8	382	42.7	10
Namibia	10 948	1.1	4 415	25.7	6.7
Nigeria	404 653	-1.6	2 176	*	15.7
Rwanda	8 376	5.9	703	26.1	5.7
South Africa	295 456	0.3	5 725	19.4	6.3
Swaziland	3 721	1.4	2 770	12.4	7.8
Tanzania	47 340	7.0	878	24.6	5.2
Uganda	24 079	4.7	580	25.5	5.5
Zambia	21 064	3.6	1 270	38	17.9
Zimbabwe	16 620	0.6	1 029	12.2	-1.6

Source: World Development Indicators 2016

*Figures not available

Gross Domestic Product 2016



Source: World Development Indicators 2016

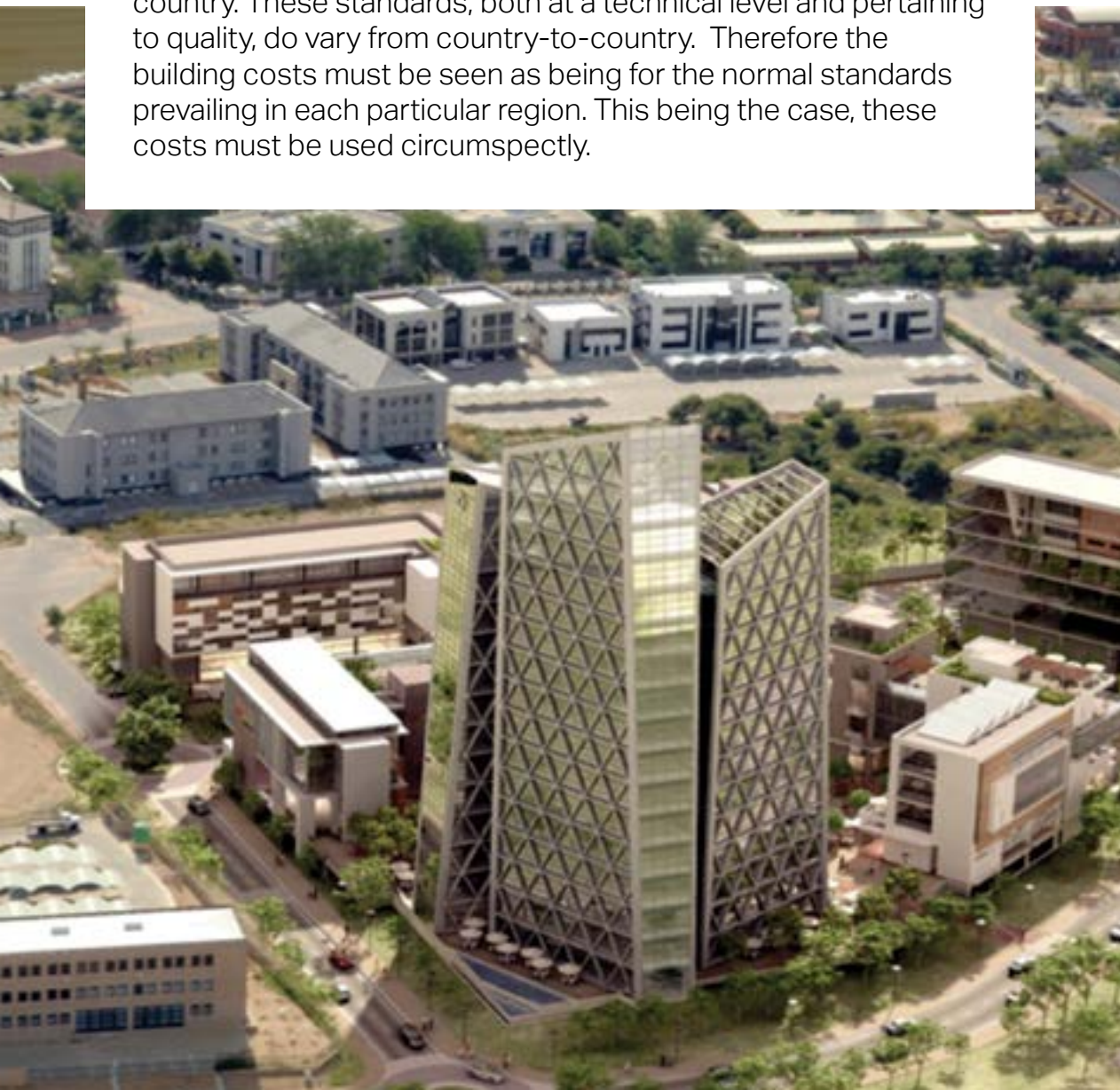
Africa Building Costs

This section makes provision for comparisons of Africa's building costs, international building costs and international rental rates.

The Africa Building Cost Comparison table (page 52), summarises the approximate estimated building costs for different types of buildings in various locations in Africa. Rates are based on projected 1 July 2018 costs and provide an indicator for the expected building cost rates during 2018. Exchange rates are as at 1 April 2018.

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.



Africa Property & Construction Cost Guide
Africa Building Cost Comparison

Costs based on 1 July 2018
Exchange Rates to US\$ as at 1 April 2018

Building Type	US DOLLAR											
	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\$ / m ²)												
Average Multi Unit High Rise	1 665	1 032	1 850	770	1 294	2 520	1 232	1 300	978	811	839	1 189
Luxury Unit High Rise	2 700	1 458	2 200	1 144	1 646	3 495	1 645	2 045	1 442	1 082	1 344	1 756
Individual Prestige Houses	5 025	2 194	2 100	1 404	1 764	3 070	1 770	3 120	1 408	1 165	1 586	1 718
Commercial/Retail (US\$ / m ²)												
Average Standard Offices High Rise	1 840	1 091	1 700	1 040	1 235	2 520	1 515	1 330	1 092	993	1 190	1 329
Prestige Offices High Rise	2 810	1 826	2 500	1 804	1 470	3 495	1 915	2 170	1 408	1 258	2 014	1 718
Major Shopping Centre (CBD)	2 645	1 518	1 400	874	1 470	3 490	1 405	1 745	1 075	926	994	1 308
Industrial (US\$ / m ²)												
Light Duty Factory	1 675	972	1 000	754	850	1 395	1 135	1 195	472	744	829	573
Heavy Duty Factory	3 738	1 494	1 250	1 196	1 294	1 880	2 020	1 915	531	1 331	1 334	648
Hotel (US\$ / key)												
3 Star Budget	232 200	155 566	325 000	378 560	147 003	345 000	209 400	175 000	189 713	140 941	442 900	295 144
5 Star Luxury	446 000	502 216	455 000	655 200	270 485	630 000	501 000	412 000	337 268	332 540	772 500	518 601
Resort Style	642 600	560 891	570 000	780 000	529 209	765 000	670 000	520 000	Not available	439 400	936 785	Not available
Other (US\$ / m ²)												
Multi-storey Car Park	1 528	759	850	494	850	1 800	865	1 125	333	593	577	405
District Hospital	Not available	Not available	1 700	1 040	2 940	2 515	Not available	Not available	2 192	Not available	1 324	2 702
Primary & Secondary Schools	Not available	Not available	1 100	910	1 150	Not available	Not available	Not available	613	Not available	1 051	735
(As at 1 April 2018)	AOA	BWP	GHS	KES	MZN	NGN	RWF	XOF	ZAR	TZS	UGX	ZMW
US\$1 =	217.00	9.53	4.41	100.00	61.65	360.00	870.00	535.00	11.86	2290.00	3705.00	9.55

Prices exclude land, site works, professional fees, tenant fit-out 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 54) was made available through a survey by the relevant AECOM offices based in these locations. Their assistance in this regard is acknowledged with thanks.



Africa Property & Construction Cost Guide
International Building Cost Comparison

Costs based on 1 July 2018
Exchange Rates to US\$ as at 1 April 2018

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\$ / m ²)														
Average Multi Unit High Rise	3 566	3 300	860	820	544	1 900	978	1 057	1 752	3 900	4 000	4 600	4 322	724
Luxury Unit High Rise	4 167	4 600	1 672	1 530	913	3 300	1 442	1 572	2 265	4 900	5 100	5 900	6 059	890
Individual Prestige Houses	4 850	6 300	955	900	788	3 100	1 408	1 649	Not available	4 600	5 200	5 500	6 012	650
Commercial/Retail (US\$ / m ²)														
Average Standard Offices High Rise	4 439	3 200	1 115	1 030	875	2 400	1 092	954	1 539	4 300	4 500	5 000	4 833	824
Prestige Offices High Rise	5 191	4 000	1 513	1 560	1 338	3 100	1 408	1 134	1 993	4 600	4 800	5 200	5 974	1 250
Major Shopping Centre (CBD)	3 730	4 600	1 274	1 500	1 400	3 400	1 075	905	1 679	3 500	3 900	4 000	5 268	850
Industrial (US\$ / m ²)														
Light Duty Factory	792	2 500	570	525	525	700	472	567	822	1 500	1 500	2 800	1 981	360
Heavy Duty Factory	997	Not available	Not available	Not available	575	900	531	902	1 454	1 900	2 000	3 600	3 400	463
Hotel (US\$ / key)														
3 Star Budget	362 020	225 000	139 331	Not available	166 900	57 100	189 713	65 000	90 000	80 500	81 200	84 600	101 992	Not available
5 Star Luxury	736 336	480 000	302 548	298 500	310 000	321 400	337 268	250 000	350 000	465 700	462 600	503 500	618 463	192 777
Resort Style		Not available	421 975	Not available	281 300	214 300	Not available	300 000	650 000	290 800	289 900	300 100	379 758	231 333
Other (US\$ / m ²)														
Multi-storey Car Park	1 024	1 700	Not available	Not available	345	700	333	593	601	1 300	1 600	1 500	971	360
District Hospital	6 386	5 800	Not available	1 500	1 025	2 900	2 192	Not available	2 938	6 500	6 900	8 400	4 882	Not available
Primary & Secondary Schools	2 623	2 800	Not available	Not available	375	Not available	613	Not available	1 510	4 200	4 100	4 600	3 128	Not available
(As at 1 April 2018) US\$1 =	AUD 1.30	HKD 7.85	CNY 6.28	CNY 6.28	MYR 4.00	SGD 1.40	ZAR 11.86	THB 31.00	AED 3.68	USD 1.00	USD 1.00	USD 1.00	GBP 0.72	VND 22786.00

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

Section 06

International Prestigious Office Rental Comparison

Continent	Country	City	USD/m ² per annum
Africa	Angola	Luanda	1200
	Botswana	Gaborone	368
	Cameroon	Yaoundé	315
	Democratic Republic of Congo	Kinshasa	378
	Egypt	Cairo	336
	Ethiopia	Addis Ababa	176
	Ghana	Accra	452
	Kenya	Nairobi	164
	Mozambique	Maputo	358
	Namibia	Windhoek	250
	Nigeria	Abuja	252
		Lagos	1008
	Rwanda	Kigali	240
	South Africa	Cape Town	178
		Durban	176
		Johannesburg	225
		Port Elizabeth	150
		Pretoria	204
	Tanzania	Dar Es Salaam	176
	Uganda	Kampala	252
Zambia	Lusaka	284	
Asia	China	Beijing	1040
		Guangzhou	471
		Hong Kong	1959
		Shanghai	848
	India	Bangalore	191
		Chennai	137
		Mumbai	517
		New Delhi	299
	Indonesia	Jakarta	253
	Japan	Tokyo	821
	Malaysia	Kuala Lumpur	136
	Philippines	Manila	243
	South Korea	Seoul	528
	Singapore	Singapore	711
	Thailand	Bangkok	237

International Prestigious Office Rental Comparison

Continent	Country	City	USD/m ² per annum
Australia	Australia	Adelaide	127
		Brisbane	202
		Melbourne	276
		Perth	204
		Sydney	607
	New Zealand	Auckland	373
		Christchurch	259
		Wellington	256
Europe	Austria	Vienna	370
	Belgium	Brussels	369
	Czech Republic	Prague	310
	Denmark	Copenhagen	314
	England	Birmingham	539
		Cardiff	385
		Leeds	462
		London (City)	1077
		London (West End)	1616
		London (Docklands)	600
		Manchester	570
		Sheffield	385
	France	Paris	935
	Germany	Berlin	443
		Frankfurt	561
		Hamburg	391
		Munich	546
	Greece	Athens	220
	Hungary	Budapest	300
	Ireland	Dublin	886
	Italy	Rome	517
		Milan	677
	Netherlands	Amsterdam	492
	Norway	Oslo	546
	Poland	Warsaw	339
	Portugal	Lisbon	230
	Romania	Bucharest	255
	Russia	Moscow	769
		St Petersburg	355
	Scotland	Aberdeen	462
		Edinburgh	523

International Prestigious Office Rental Comparison

Continent	Country	City	USD/m ² per annum	
Europe		Glasgow	477	
		Spain	Barcelona	343
			Madrid	360
		Sweden	Stockholm	876
		Switzerland	Zurich	776
Middle East	Bahrain	Manama	270	
		Lebanon	Beirut	388
		Oman	Muscat	171
		Qatar	Doha	538
		Saudi Arabia	Riyadh	332
			Jeddah	266
		Turkey	Istanbul	249
		United Arab Emirates	Dubai (Central Dubai)	599
			Dubai (New Dubai)	366
			Dubai (Old Dubai)	366
	Abu Dhabi		480	
North America	Canada	Montreal	316	
			Toronto	600
			Vancouver	444
		Mexico	Mexico City	593
		USA	Atlanta	283
			Boston	396
			Chicago	365
			Houston	332
			Los Angeles	446
			Miami	407
			New York (Manhattan)	807
			Philadelphia	284
			Sacramento	255
			San Francisco	803
		Seattle	412	
	Washington DC	445		
South America	Argentina	Buenos Aires	366	
	Brazil	Sao Paulo	390	
			Rio de Janeiro	582

Rates are applicable as at 1 January 2018 and exclude VAT, but include GST where applicable. Above are gross rentals and include operating cost and municipal cost, but exclude electricity and water consumption.

Section 07

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 for 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 cognizance 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 costs 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 payments during the construction period and 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 (BER), University of Stellenbosch (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	
2013	100.0		100.0		1.00
2014	104.6	+4.6%	106.5	+6.5%	0.98
2015	116.5	+11.4%	111.8	+5.0%	1.04
2016	115.8	-0.6%	115.1	+2.9%	1.01
2017	125.4	+8.3%	124.6	+8.3%	1.01
2018	132.1	+5.3%	131.6	+5.6%	1.00
2019	144.0	+9.0%	140.2	+6.5%	1.03
2020	154.6	+7.4%	147.7	+5.4%	1.05
2021	168.9	+9.2%	155.4	+5.2%	1.09
2022	182.2	+7.9%	165.5	+6.5%	1.10

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 contractor’s 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 65) 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 64). 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 2013 = 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 events take 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

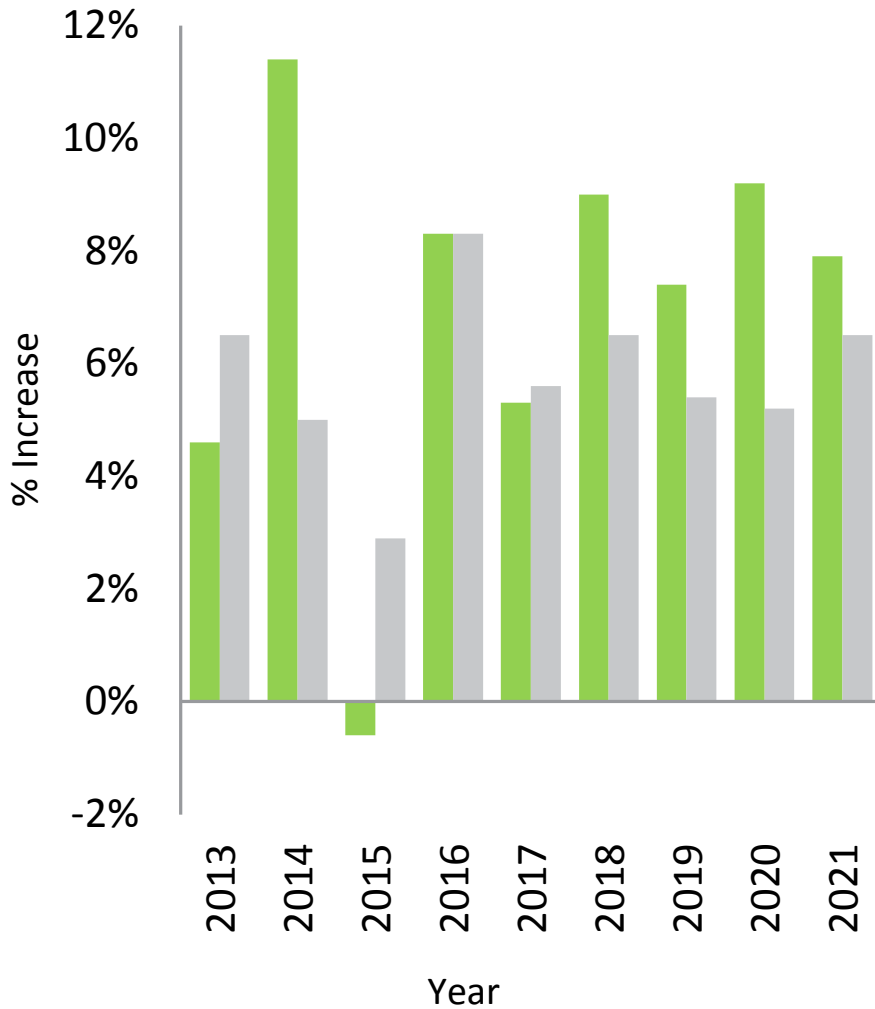
As the majority of developers are registered vendors in the property industry, any VAT on commercial property development is fully recoverable. Therefore, to reflect the net development cost, VAT should be excluded. Should the gross cost (i.e. after VAT inclusion) be required, then VAT at the ruling rate (currently 15%) should be added.

Cognizance 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

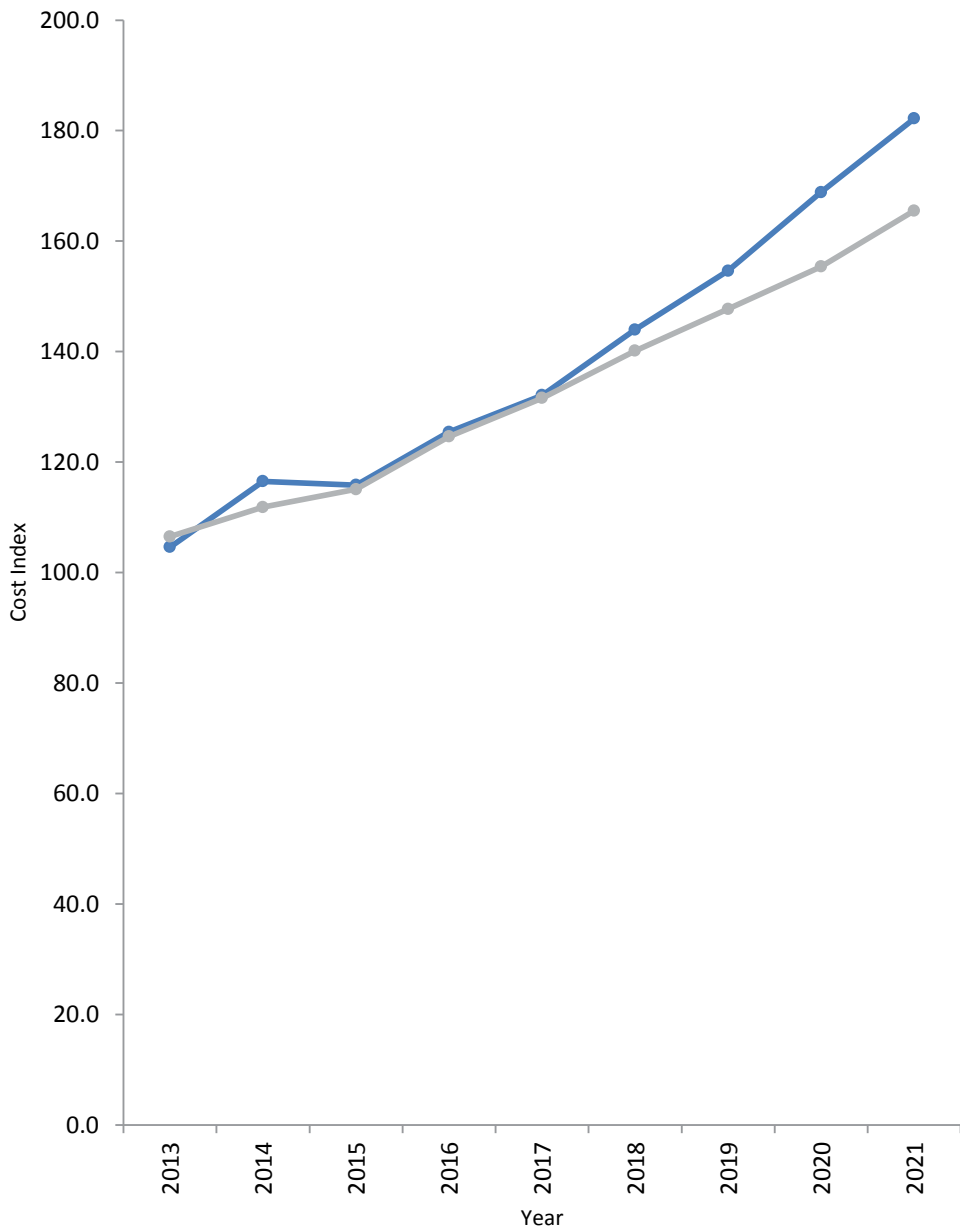
January-to-January building cost % change



■ Bureau for Economic Research

■ Contract Price Adjustment Provision (CPAP)

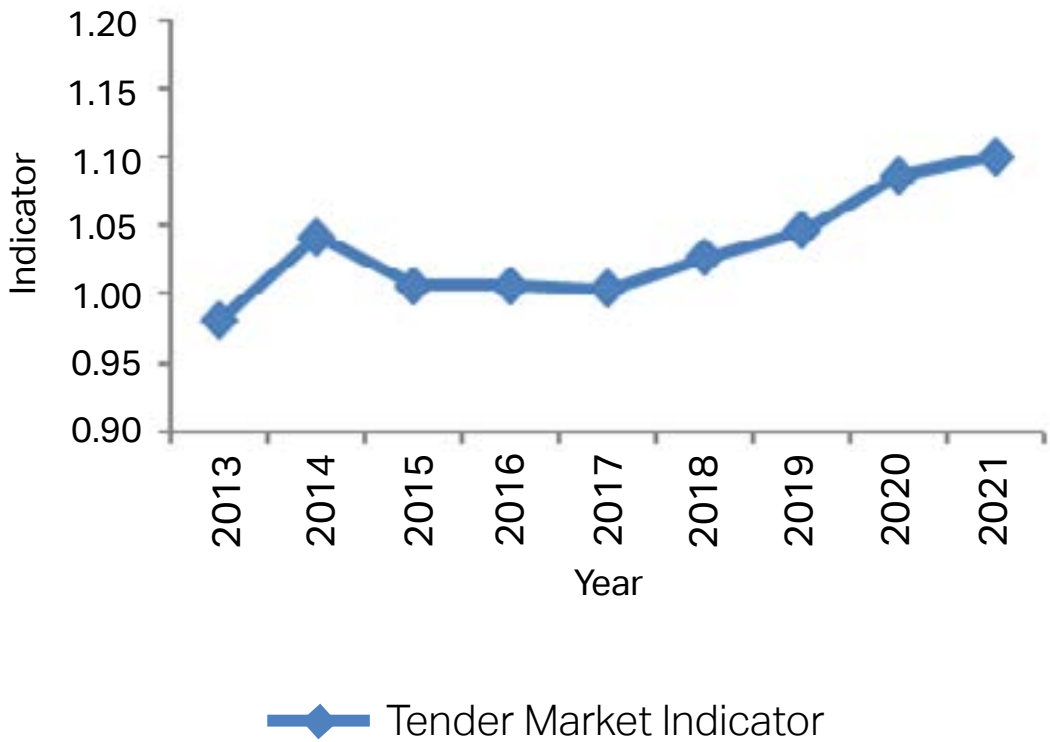
January building cost indices



- Bureau for Economic Research
- Contract Price Adjustment Provision (CPAP)

Tender market indicator

BER deflated by CPAP



This graph gives an indication of the tender climate. It is the result of the relationship between BER and CPAP. Refer to the section on tender climate, page 61.

Section 08

Method for Measuring Rentable Areas

SAPOA methods

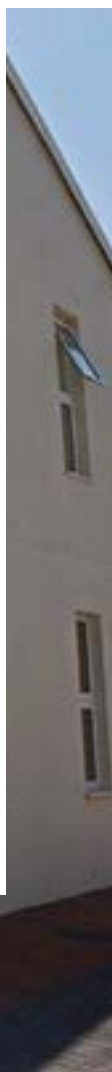
In the past, many landlords and developers have derived methods for calculating the rentable areas of buildings.

Most common is the method recommended by SAPOA entitled *Method for Measuring Floor Areas in Buildings, Second Edition* (effective from 7 November 2007). 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 7 November 2007 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 usable area, together with common and supplementary area, as determined at each level. Unless otherwise indicated, the unit of measurement is square metres (m²).

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 usable area plus common area.

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

Usable area

The usable 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 usable 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 usable 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 weatherproof. 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 weatherproof 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.

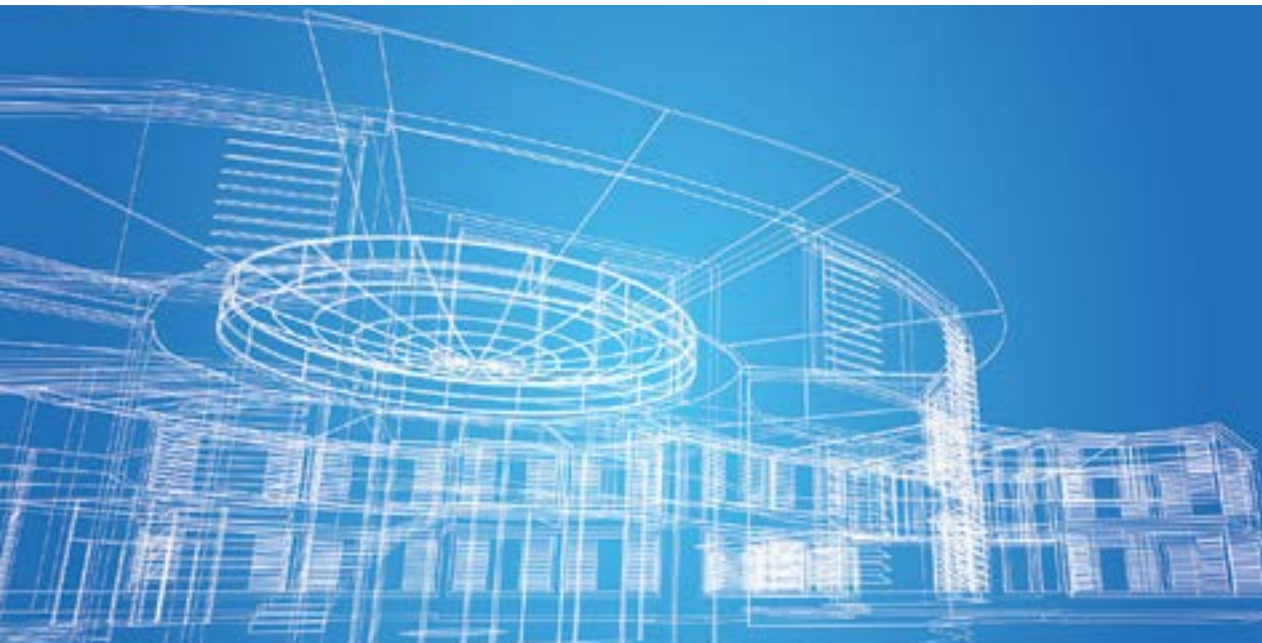
Remote service areas and plant rooms

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 usable area are included as usable 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 on page 66. 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.

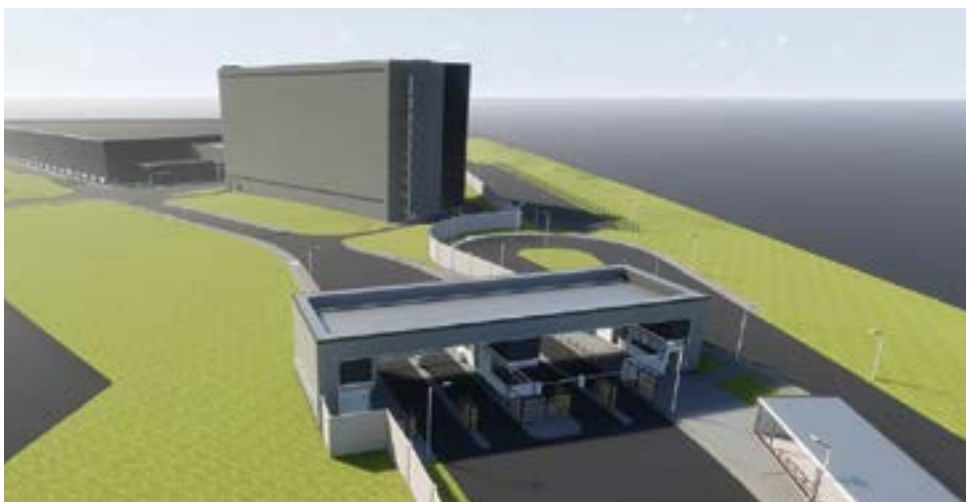
In General

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, Second 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 09

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 monetary 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 of 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%.

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:

$$\begin{aligned} \text{Return} &= \frac{\text{Net Annual Income}}{\text{Total Capital Outlay (TCO)}} \\ &= \frac{\text{Net Annual Income}}{y + x} \end{aligned}$$

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

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

$$\begin{aligned} \text{Now } x &= \text{Land Value} + \text{Loss of Interest} \\ &= \text{Future Value of Land} \end{aligned}$$

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

$$\begin{aligned}
 x &= \frac{\text{Net Annual Income} - y}{\text{Return}} \\
 &= \frac{\text{R6,000,000} - \text{R47,365,000}}{0.10} \\
 &= \text{R12,635,000}
 \end{aligned}$$

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). Consideration should be given carefully, taking into account the risk profile of the proposed development.

Section 10

Directory of Offices in Africa

**Africa Corporate Head Office
Centurion, Pretoria
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T +27 12 421 3500**

SOUTH AFRICA OFFICES:

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Bellville, Cape Town

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Centurion, Pretoria

T +27 12 421 3500

George

T +27 44 873 5070

Sandton, Johannesburg

T +27 11 666 2000

Umhlanga Ridge, Durban

T +27 31 204 3800

Accra, Ghana

T +233 575 444 554

Gaborone, Botswana

T +267 39 007 11

Kampala, Uganda

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Maseru, Lesotho

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