

AFRICA

# PROPERTY & CONSTRUCTION COST GUIDE

2020  
2021

AECOM AFRICA PROPERTY &  
CONSTRUCTION COST GUIDE 2020/21

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## 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, as well as protecting our environment and improving 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 and evolving challenges.

By providing 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 - the difference that we help our clients make is felt in every region of the world.

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

We are AECOM. Imagine it. Delivered.



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## Message from Dean Narainsamy

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**Director - PCC, Africa**

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Welcome to our Africa Property and Construction Cost Guide 2020/21. As we currently face the Coronavirus pandemic, our focus has shifted towards re-prioritising how we work as a business, how we interact with our teams and clients, and how we strive to keep business agility. This is all in order for us to survive what has undoubtedly been one of the toughest years we have endured in the last decade.

What we have learned during this testing time is to re-think our workplace strategy with a renewed emphasis on the safety, wellbeing and performance of our people. Staying in touch and remaining accessible to our most important commodity has been a key feature of my Leadership Team's performance, and I would like to personally thank each of them.

We have worked hard to re-set our behaviours and educate our employees on how we need to engage in a post-pandemic world. As a business we have also identified how certain markets have shifted. We have kept close to our clients by looking at their specific needs and tailoring solutions to meet renewed expectations from a project delivery point of view.

Our teams have transitioned to digital working platforms, and I am happy to report that we have recorded great success in our remote-working capability. The deployment of cloud-based file storage platforms and collaborative team applications have enabled our teams to be effective no matter where they are working from. As a business we have embraced a digitised workspace.

We continue to develop and enhance our 5D BIM capabilities. With access to industry-leading software already in our toolkit, our focus over the last year has been collaborating with the various design disciplines at AECOM. Through this, we have been able to further our understanding of the requirements of each discipline, and in turn, we are able to advise the design teams on the requirements to achieve a 5D-friendly design environment. This collaboration has been enhanced by our global reach, as our teams now share knowledge and develop capabilities alongside our colleagues in the US, UK, and Middle East. We now move our focus to distilling these process

improvements down to all members of our cost management to ensure that all of our teams are able to focus on providing a fuller service offering for our clients.

We are proud to report that we have maintained our level one B-BBEE scorecard in terms of the Department of Trade and Industry's revised codes; a reaffirmation of our commitment to contributing to a better South Africa. Diversity and inclusion are fundamental ingredients in supporting the National Development Plan. With this, we are currently re-looking at our strategy to address diversity by including more female empowerment initiatives, the retention of our young talent, religious inclusion, disabilities and LGBTQIA+. I am looking forward to providing you with positive feedback in our next Cost Guide update.

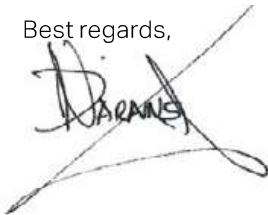
As part of our commitment to improving skills, experience and excellence in the built environment, our Graduate Development Programme (GDP) has also undergone a transformation during the pandemic. In line with our Mentoring for Success Partner initiative, we have introduced a Digital Candidacy Support and Training Solution series. This has been well received by both sides and is a tool that will be further adopted as we move into the post-coronavirus working environment.

I would also like to take the opportunity to thank the Bureau for Economic Research (BER) at the Stellenbosch University, our strategic partner in this yearly publication. Their respected building cost reports provide much credibility to our cost escalation forecasting.

To conclude—our strategy and business plan has great service delivery for our clients at its core. In the year ahead we look forward to being of service to you and delivering your projects by turning your opportunities into reality.

*"You must never confuse faith that you will prevail in the end — which you can never afford to lose — with the discipline to confront the most brutal facts of your current reality, whatever they might be." — James Stockdale*

Best regards,

A handwritten signature in black ink, appearing to read 'D. Daniels', is written over a large, stylized, scribbled-out signature that has been crossed out with a large 'X'.

# 01

## Section

### Africa has risen

Our operations in Africa are dominated by our presence in South Africa. However, we have a growing number of permanent offices in key African countries.

With top-level professionals in multiple strategic locations, we understand Africa's specific infrastructure needs, as well as the challenges when working on our wonderfully diverse, vibrant and complex continent. We currently have a project presence in more than 40 African countries.

Our multidisciplinary team 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

The South African culture is one of the most diverse in the world and has given rise to the term 'the Rainbow Nation'. With 11 official languages and eight others recognized, the rich culture of each of these groups brings its own vibrancy to our diverse country.

As a relatively new democracy, South Africa must deal with many challenges as result of the past, as well as the new challenges which will have a major impact on the social wellbeing of the country. The key challenges facing South Africa are:

- Unemployment
- Poor, and lack of, education
- Ailing public health systems
- Poorly located and inadequate infrastructure
- Inadequate water resources
- Basic service delivery
- High crime rates (especially against women and children)

AECOM's Corporate Social Investment (CSI) platform, BluePrint for a Better World, is inspired by the positive changes our employees are making around the world. This platform is built on three pillars: *Opening Doors*, *Creating Opportunity* and *Protecting Tomorrow*, and aligns with our core values and strategic priorities. BluePrint for a Better World provides a chance for us to create a safer, more secure and more resilient world that is better prepared for the future.

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

We continue to embrace this responsibility through our emphasis on work ethics, diversity and inclusion, sustainability, health and safety, the environment and employee engagement.

### **Bridging the skills divide:**

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 identified individuals, they will realise their potential and be able to successfully enter the built environment professions.

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.

AECOM's Learning and Development department, in partnership with Enigma Skills College, launched its fourth 12-month Disabled Learnership Programme in 2020. Learnerships are intended to address the gap between education, training provision and the needs of the labour market. To date AECOM has sponsored 79 disabled learners on this work-based approach to learning that will culminate to a Business Administration NQF level two and three qualification.

As part of our commitment to improve 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. On average, eight full-time bursaries are annually awarded to talented students from disadvantaged backgrounds.

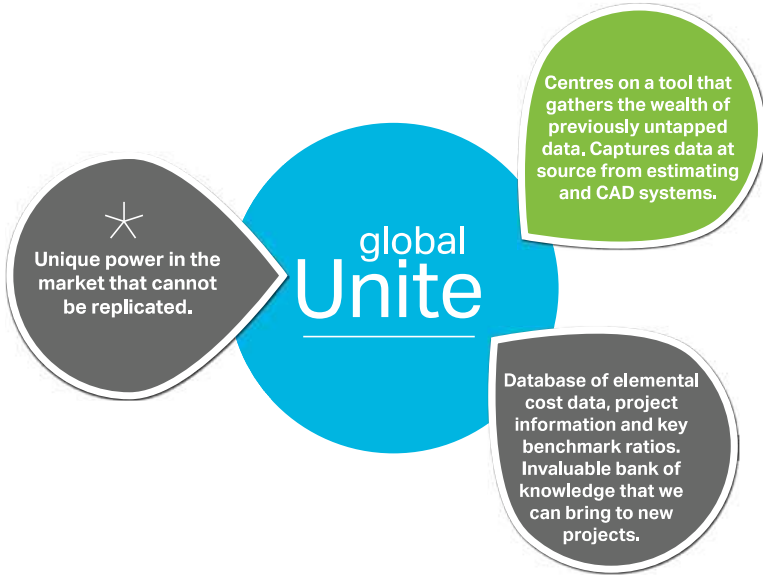


# Global Unite

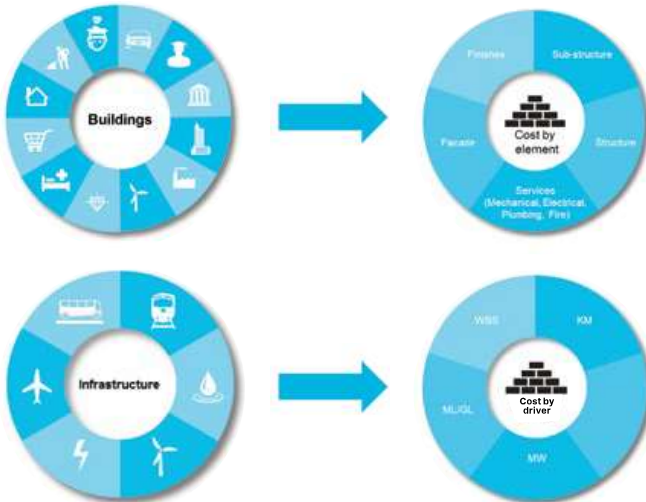
## What is Global Unite?

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

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



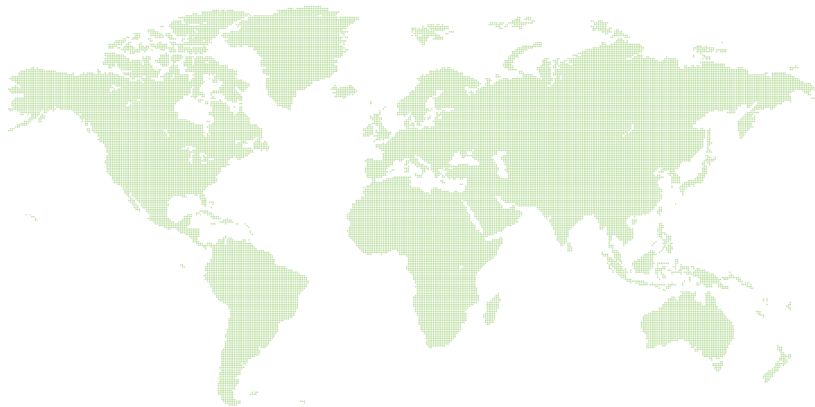
## What information can Global Unite hold?





## Where does Global Unite data come from?

Everywhere. Global Unite allows the capture of data from all of the AECOM key geographies into one central database.



## How is Global Unite data presented?

The system has a number of output and reporting options. These range from a tablet-based app, GUIDE (online web-based access), to inbuilt reports, charts and graphs, MS Excel, as well as access via analysis services or other data analysis tools.





# Building Information Modelling

## **BIM defined**

Building Information Modelling (BIM) is used to describe the process of designing, constructing and managing a building (or other design asset) in collaboration with the entire team. The BIM develops throughout the asset's lifecycle, and represents a single source of truth by using the same system or model as compared to using separate packs of conventional drawings and information sets. BIM is used to plan, design, construct, operate and maintain diverse physical infrastructures.

Whether designing or constructing bridges and roads, office towers and apartment blocks, pipelines, factories or schools, an information model or a database can be created that 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 then use that data to manage information flow across multiple lifecycle 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 can increase our accuracy and efficiency. We can also realise significant savings on the lifecycle cost of operating an asset.

## **The 5D BIM process**

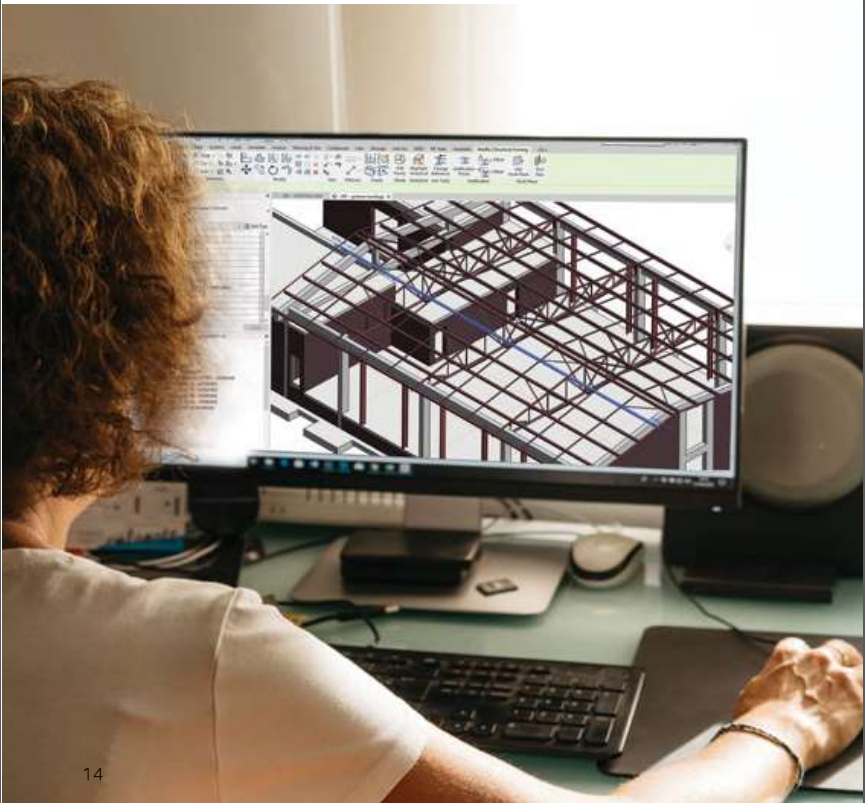
For the cost management team, our focus is on 5D BIM. This refers to the linking of cost information to a 3D model. The number "3, 4 or 5", in connection with BIM, relates to the type of information associated with the model. It refers to other dimensions, such as time (4D) or cost (5D). 2D and 3D essentially refer to CAD 2D plans and 3D models, 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 implementation. The process aims to automate much of 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 spend more 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:

- Cost manager contribution and buy-in to the development of the BIM execution plan.
- Involvement with the design team prior to the start of design work to communicate our cost extraction design requirements.
- The application of a cost database as a parameter to the objects contained in the 3D model.
- Base our measures primarily on 3D design information.
- Creating a unified link between the design information, our measures and our costs.



### **The 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.
- Categorised cost reporting and estimation via the use of zones/locations.
- Improved visualisation of the elements for measurement and costing purposes.
- Enhanced communication and collaboration amongst the professional and project team.





## 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.

Employees 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 innovative 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 ongoing 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 the industry on continuing educational workshops and in developing relevant industry reports and publications.

## Candidacy support and mentoring programme

Our candidacy support and mentoring programme has been uniquely designed for AECOM Africa by Mentoring 4 Success (M4S). The programme aims to cater for the specific professional registration requirements across the whole built environment (encompassing six professional bodies), as well as two additional professional bodies relevant to the AECOM end markets.

This programme framework incorporates the stringent monitoring and reporting requirements for DTI Skills Matrix 'Category C' programmes, and has received approval from two respected SANAS accredited B-BBEE verification agencies in South Africa.

The programme design includes six categories for graduates and applicants:

- 'Bridging' applicants who need to increase their minimum academic requirements.
- New graduates — prior to their initial candidacy application.
- Recently registered or more experienced candidates up to 'submission-ready' level.
- Mature candidates (work experience exceeds the normal timeframe to registration).
- Internationally qualified and experienced candidates registering in South Africa.
- Recognition of Prior Learning (RPL) candidates.

The AECOM Africa Candidacy Support and Mentoring Programme design provides a careful balance between the 'process and performance' of professional registration and the 'path and passion' to professional personal development. This accelerates the development of well-rounded, confident, capable, and competent young professionals within AECOM.

M4S provides a completely outsourced professional registration support mentoring programme, as well as the full 'managed services solution' for the programme management, facilitation and administration required to support such a complex and multi-regional/multi-office project. This includes managing, monitoring, and maintaining all the compliance and administration requirements for B-BBEE 'Category C' and CETA verification.



Mentors and candidates receive comprehensive training in the specific road to registration dictated by their own professional bodies and all the participants. This includes their line managers who are supported by a 'Professional Registration Mentoring Handbook' developed by M4S. This handbook aligns to their individual registration journey needs and helps to demystify and answer the many predictable and repetitive questions that young graduates and candidates have.

Importantly, as new questions arise through professional body registration process changes, or better ways are found for handling the challenges of limited work exposure, through simulations and inter-group secondment, these solutions are captured and shared within a mobile app-enabled knowledge mentoring solution platform for future reference.

The programme is further enabled via two unique mobile knowledge mentoring applications and analytic dashboards provided exclusively by M4S under an exclusive Africa licence agreement. This mobile technology suite enables and empowers the professional candidacy journey at a truly world-class level. The apps are:

### **KnowledgeMentor™ and Mentoring Head Quarters (MHQ)**

This app ensures constant experiential collaboration and knowledge sharing between candidates and their mentors, as well as peer-to-peer between colleagues and candidates on critical common knowledge themes related to their jobs and project responsibilities, as well as their professional registration needs.



## MentorExcellerator™ and Career Head Quarters (CHQ)

This app ensures every candidate is connected to their own mentors and line manager on a professional body focused journey which allows the candidate to develop career and registration specific goals and competencies, capture critical learning in the moment of exposure through journaling and sharing insights and feedback on their regular presentations on specific professional learning topics. The mobile platforms keep the candidates, mentors, managers and any subject matter experts aligned and monitoring the learning journey as and when appropriate providing critical evidence-based learning analytics for submission and reporting.

These unique technology platforms allow for M4S and AECOM to gather, monitor and report on the rich engagement analytics. These are critical to validating the effective impact and accelerated professional development. The analytics provide a substantial evidence-based validation and portfolio of professional development for the annual CETA grant applications and the B-BBEE verification audits.



Mentors who participate for 12 months at a time are also able to receive a professional mentors designation via M4S through a strategic partnership and accreditation with SABPP and AECOM has produced many committed and professionally registered mentors. Mentors and candidates can also receive CPD points as the programme has been accredited by ECSA (via SAICE), SACQSP (via ASAQS) and SACPCMP.

## Innovation

### Digital Project Delivery (DPD)

AECOM promotes a collaborative working environment underpinned by digital technologies. Our focus is on implementing more efficient methods to design, procure, construct, operate and maintain built assets and infrastructure.

Our cost managers and consultants are fully aligned to standard DPD protocols and procedures. This ensures consistency and successful outcomes in our daily working practices.

Our teams are committed to the development of 5D BIM through a collaborative workflow that aims to improve BIM data quality and facilitate improved digital outcomes.

These include the ongoing development of the following:

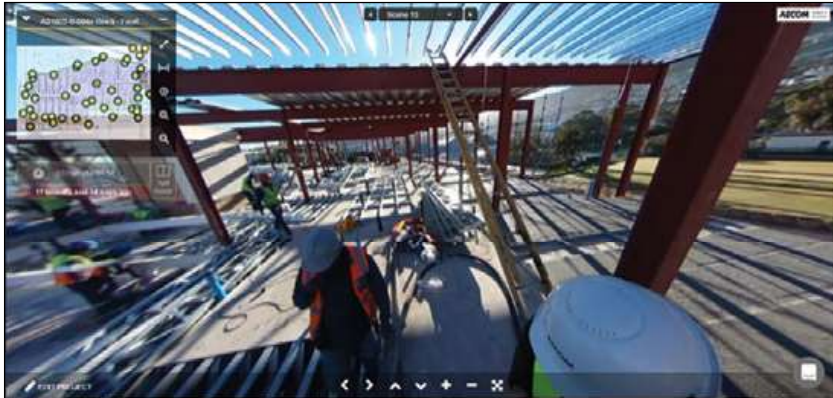
- BIM execution plan
- Design/measurement coordination
- Risk/change management
- E-tendering
- Global collaborative tools
- Construction progress reporting
- 5D BIM
- Mobile connectivity to monitor site progress
- Paperless communications



## Reality Capture

- Visually documenting construction site progress through the use of 360 degree images
- Dedicated micro-site for stakeholder access to an immersive virtual site walk-through:

<https://realitycapture.live/demo/>





# 02 Section

## Our services

### Quantity surveying and cost management

AECOM provides comprehensive cost management services through all six stages of a 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 one

- 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 two

- 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 three**

- 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 four**

- 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 the 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 five**

- 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 six**

- 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 petrochemical 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 above-mentioned sectors.

The mining and engineering cost management team operates throughout Africa using infrastructure support from our major local offices 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 petrochemical 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 will positively impact a project. This includes, accurate and structured estimating, timely and cost-effective procurement, accurate and up-to-date maintenance of costs to completion, the cost management of design changes and the prompt close-out of contracts. The implementation of these financial management principles will thereby deliver maximum shareholder value, as well as significantly influencing project outcomes to benefit all stakeholders.

Our mining and engineering cost management group provides much experience, expertise and independence that contributes to and complements 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.



## **Project controls and support services**

### **Areas of expertise:**

- Scope and change management
- Resource and material management
- Project cost controls and budgeting
- Performance and earned value

Project success is most often measured in terms of cost, schedule, and budget and effective Project Managers oversee these vital elements through 'control'.

Timely and accurate project information empowers the decision making process, ensuring access to the right tools and skills for planning, tracking and reporting project information. AECOM provides project controls and support services with a 'project controls by design' approach.

This concept provides a powerful, cost efficient service that satisfies the unique management and reporting needs of each individual project. Our project controls specialists deliver reliable and accurate information, allowing flexibility and scalability, based on project complexity and needs.

### **Scope management**

AECOM utilises software platforms to apply critical path management techniques to capture and organize the fundamental elements of work scope, task durations, logic ties among tasks, and key milestones.

### **Resource and material management**

By using resource-loaded schedules and activity sequencing to facilitate contractor involvement, this minimizes work conflicts and ensure that resources, equipment, and materials are available and appropriately staged for maximum project efficiency.

## Project cost controls and budgeting

AECOM uses cost-loaded schedules to integrate multiple project cost estimates and resource data to establish a budget, integrated baseline plan, and cost analysis process. This approach transforms static cost data into accurate 'time-phased' spending plans, budgets, cost forecasts, and specialty reports designed to facilitate a realistic project execution plan.

## Performance and earned value measurement

AECOM establishes and facilitates a project delivery process that collects and compares actual project costs against the integrated baseline plan to obtain an objective measure of project scope, schedule, and budget performance to date using earned value methods.



Gibela Rail Transport Consortium  
South Africa

## **Building services cost management**

### **Effective cost management of building services**

Building services such as electrical, air-conditioning, fire protection and electronic installations usually comprise 25-40 per cent of the total construction cost, meaning effective cost management of the building services is essential to ensure the client's budget expectations are met.

The most effective way to ensure that the building services are cost managed in the same way as the rest of the building works is to allocate this responsibility to one consultant—the quantity surveyor—rather than spreading it among the building services design consultants.

Independent financial management and cost control of building services ensures transparency and a dedicated service. This, in turn, allows the building services consultants to focus on their primary design responsibility.

### **Our expertise**

Our building services cost management team has been involved in many major projects over the last 30 years. The team draws upon this experience and 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 (sprinklers)
- Fire detection and evacuation systems
- Electronic systems such as access control, surveillance, and structured cabling
- Lifts and escalators

## Services provided

Working in close conjunction with the appointed mechanical, electrical and fire protection consultants, our building services team provides a comprehensive service that covers all aspects of procurement and cost management throughout all the project stages including:

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



# 03

## Section

## 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 level 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.

For the third year in succession, AECOM has achieved a level one B-BBEE status level.

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

<b>B-BBEE Level Status:</b>	<b>Level 1</b>
<b>Procurement Recognition Level</b>	135%
<b>Black Ownership</b>	30%
<b>Black Women Ownership</b>	22.48%
<b>Black Youth Ownership</b>	20.8%
<b>Scorecard Information:</b>	
• Ownership	21.02 points
• Management Control	16.33 points
• Skills Development	32.69 points
• Enterprise & Supplier Development	27.55 points
• Socio-Economic Development	6 points
<b>Total</b>	<b>103.59 points</b>
<b>Empowering Supplier</b>	YES
<b>Designated Group Supplier</b>	NO
<b>Scorecard</b>	Generic – Amended Construction Sector Charter (1 December 2017)

# 04

## Section

### South African cost data

#### Building cost rate influences

#### 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 and quick method 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 rate/ $m^2$  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/m<sup>2</sup>. This rate, when compared with the rate for a 200m<sup>2</sup> house containing plumbing, carpets, etc., at R7,000/m<sup>2</sup> would seem very expensive. However, the unit cost of the shelter is R36,000 compared with R1.4 million for the house.

Below are some criteria to be considered when determining rates/m<sup>2</sup>.

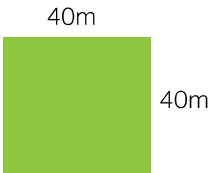
### Specification

Two buildings of the same shape with identical accommodation can have vastly different rates/m<sup>2</sup>. One building may have finishes of a different standard. For example, expensive carpets in lieu of vinyl floor tiles can increase the rate by R150/m<sup>2</sup>.

### 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. For example:

#### Case A



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

**Case B**

Area	1,600m <sup>2</sup>
Wall length	232m
Wall height	3m
Wall area	696m <sup>2</sup>
Wall floor ratio	696/1,600
Cost of external façade in terms of rate/m <sup>2</sup> of floor area to each rate/m <sup>2</sup> of façade area	43.5%

The rate/m<sup>2</sup> on plan of a façade costing R800/m<sup>2</sup> on elevation in each case is:

**Case A**  $R800 \times 30.0\% = R240/m^2$

**Case B**  $R800 \times 43.5\% = R348/m^2$

A 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 have different floor-to-ceiling heights will have different rates/m<sup>2</sup> 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/m<sup>2</sup> of the building. The cost of a toilet block per square metre 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 commercial and industrial buildings the rate/m<sup>2</sup> will depend greatly on which air-conditioning, security systems, sprinklers, smoke-detection systems, electrical installations, acoustic treatment or other specialised installations are incorporated into the design.

**Construction areas**

The rate/m<sup>2</sup> for a building with large balconies or access corridors included in the construction area cannot be compared with the rate/m<sup>2</sup> for a building without similar low cost areas.

**Internal subdivisions**

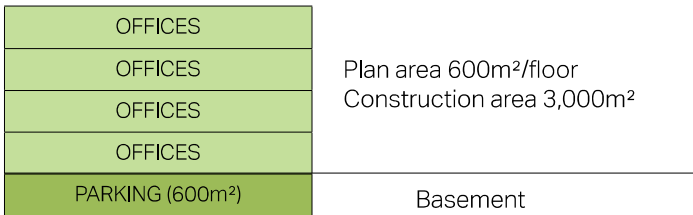
The rate/m<sup>2</sup> for open plan offices should not be compared directly with the rate/m<sup>2</sup> for offices with internal partitions without the relevant adjustments being made. The inclusion of partitions can increase the overall rate/m<sup>2</sup> by up to R300/m<sup>2</sup> of office area.

**Parking**

Should the building contain parking areas, the average rate/m<sup>2</sup> 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 <sup>2</sup> @ R15,000	= R 36,000,000
Parking	600m <sup>2</sup> @ R6,000	= R 3,600,000
<b>Total</b>		<b>R 39,600,000</b>
Average rate/m <sup>2</sup>		R 13,200

## Case B

A building with parking outside of the building area and on grade.

OFFICES	Plan area 600m <sup>2</sup> /floor Construction area 2,400m <sup>2</sup>
OFFICES	
OFFICES	
OFFICES	
	PARKING (600m <sup>2</sup> )

## Cost of building

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

Under Case B, the parking area is not included as part of the construction area for the purpose of calculating the rate/m<sup>2</sup>. Similarly, the rate/m<sup>2</sup> for a supermarket/hypermarket/shopping centre should be qualified as to whether the cost of on-site parking and ancillary site development has been included, a cost which could be in the region of R800/m<sup>2</sup> of construction area.

There are further points that need to be taken into consideration. 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 the building, open-atrium upper volumes, etc.

In conclusion, rates/m<sup>2</sup> 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 2020, and therefore represent the average expected building cost rates for 2020. 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 square metres 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.



31 Degrees East  
South Africa

## Building rates

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

<b>Offices</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Low-rise office park development with standard specification	R 8,500 – R 10,400
Low-rise prestigious office park development	R 10,900 – R 16,200
High-rise tower block with standard specification	R 12,200 – R 16,200
High-rise prestigious tower block	R 16,200 – R 20,400

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

<b>Parking</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Parking on grade, including integral landscaping	R 550 – R 750
Structured parking	R 4,100 – R 4,500
Parking in semi-basement	R 4,500 – R 6,200
Parking in basement	R 4,800 – R 8,500

<b>Retail</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Local convenience centres (Not exceeding 5,000m <sup>2</sup> )	R 8,300 – R 10,900
Neighbourhood centres (5,000 – 12,000m <sup>2</sup> )	R 9,000 – R 11,600
Community centres (12,000 – 25,000m <sup>2</sup> )	R 9,900 – R 12,700
Minor regional centres (25,000 – 50,000m <sup>2</sup> )	R 10,900 – R 13,500
Regional centres (50,000 – 100,000m <sup>2</sup> )	R 11,600 – R 14,000
Super regional centres (exceeding 100,000m <sup>2</sup> )	R 12,200 – R 15,800

*Super regional centres and regional centres are generally inward trading with internal malls, whereas convenience, 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 m<sup>2</sup> (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 4,100 – R 6,200
– Steel frame, brickwork to ceiling, steel cladding above and roof sheeting (heavy-duty)	R 4,800 – R 6,900
– Administration offices, ablution and change room block	R 7,800 – R 10,000
– Cold storage facilities	R 14,600 – R 20,800

**Residential***Rate per site (excl. VAT)*

Site services to low-cost housing stand (250–350m <sup>2</sup> )	R 53,000 – R 85,000
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*Rate per m<sup>2</sup> (excl. VAT)*

RDP housing	R 2,500 – R 2,700
Low-cost housing	R 3,200 – R 5,500
Simple low-rise apartment block	R 7,700 – R 10,700
Duplex townhouse – economic	R 7,700 – R 11,000
Prestige apartment block	R 15,000 – R 22,000



<b>Residential</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
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Private dwelling houses:

– Economic		R 5,900
– Standard		R 7,300
– Middle-class		R 8,800
– Luxury		R 12,300
– Exclusive		R 19,500
– Exceptional ('super luxury')		R 28,500 – R 59,000
<hr/>		
Out buildings	– Standard	R 5,500
	– Luxury	R 7,800

	<i>Rate per no. (excl. VAT)</i>
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Carport (shaded)	– single	R 4,700
	– double	R 9,500
<hr/>		
Carport (covered)	– single	R 7,400
	– double	R 14,500
<hr/>		
Swimming pool		
– Not exceeding 50 kl		R 93,000
– Exceeding 50 kl and not exceeding 100 kl		R 165,000
<hr/>		
Tennis court		
– Standard		R 550,000
– Floodlit		R 680,000

<b>Hotels</b>	<i>Rate per key (excl. VAT)</i>
---------------	---------------------------------

– Budget	R 660,000 – R 1,060,000
– Mid-scale (3-star)	R 1,060,000 – R 1,590,000
– Upper-scale (4-star)	R 1,590,000 – R 2,230,000
– Luxury (5-star)	R 2,230,000 – R 3,180,000

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

<b>Studios</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
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Studios — dancing, art exhibitions, etc.	R 14,600 – R 20,800
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**Conference centres***Rate per m<sup>2</sup> (excl. VAT)*

Conference centre to international standards	R 27,000 – R 34,000
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**Retirement centres***Rate per m<sup>2</sup> (excl. VAT)*

Dwelling houses	
– Middle-class	R 8,700
– Luxury	R 12,200

Apartment block	
– Middle-class	R 8,900
– Luxury	R 13,800

Community centre	
– Middle-class	R 11,700
– Luxury	R 17,100

Frail care	R 13,800
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**Schools***Rate per m<sup>2</sup> (excl. VAT)*

Primary school	R 6,900 – R 8,000
Secondary school	R 8,300 – R 8,800

**Hospitals***Rate per m<sup>2</sup> (excl. VAT)*

District hospital	R 28,500
-------------------	----------

*Hospital rates exclude allowances for furniture, fittings and equipment (FF&E).***Stadiums***Rate per seat (excl. VAT)*

Stadium to PSL standards	R 36,000 – R 55,000
Stadium to FIFA standards	R 83,000 – R 109,000

*Rate per pitch (excl. VAT)*

Stadium pitch to FIFA standards	R 23,500,000 – R 27,500,000
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<b>Prisons</b>	<i>Rate per inmate (excl. VAT)</i>
1,000 inmate prison	R 617,000 – R 656,000
500 inmate prison	R 656,000 – R 735,000
High/maximum security prison	R 980,000 – R 1,300,000

## Infrastructure airport development costs

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

<b>Apron stands (incl. associated infrastructure)</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Code F Stand (85m long x 80m wide = 6,800m <sup>2</sup> )	R 5,400
Code E Stand (80m long x 65m wide = 5,200m <sup>2</sup> )	R 5,700
Code C Stand (56m long x 40m wide = 2,240m <sup>2</sup> )	R 7,200

<b>Taxi lanes (incl. associated infrastructure)</b>	<i>Rate per m (excl. VAT)</i>
Code F taxi lane (101m wide)	R 180,000
Code E taxi lane (85m wide)	R 150,000
Code C taxi lane (49m wide)	R 90,000

<b>Service roads</b>	<i>Rate per m (excl. VAT)</i>
Service road (10m wide)	R 18,000
Dual carriage service road (15m wide)	R 23,000





<b>Taxi ways (incl. associated infrastructure)</b>	<i>Rate per m (excl. VAT)</i>
Code F taxi way (70m wide)	R 130,000

<b>Runways (incl. associated infrastructure)</b>	<i>Rate per m (excl. VAT)</i>
Code F runway (3,885m long x 60m wide = 233,100m <sup>2</sup> )	R 300,000

<b>Parking (excluding bulk earthworks)</b>	<i>Rate per bay (excl. VAT)</i>
Structured parking	R 200,000
Basement parking	R 300,000

<b>Perimeter fencing/security gates</b>	<i>Rate per m (excl. VAT)</i>
Perimeter walls with perimeter intrusion detection (PIDS)	R 9,000

<b>Terminal and other buildings (excl. bulk earthworks, external site and services works)</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Terminal building (excl. terminal building baggage and X-ray)	R 30,500
Pier terminal building (excl. telescopic air bridges, seating and aircraft docking system)	R 32,000

	<i>Rate per unit (excl. VAT)</i>
Telescopic air bridges	R 12,000,000
Aircraft docking system	R 1,750,000



## 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 significantly depending on the orientation, shading, extent and type of glazing, external wall and roof construction.

<b>Electrical installation</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Offices	
– Standard installation	R 700 – R 1,000
– Sophisticated installation	R 1,000 – R 1,300
– UPS, substations, standby generators to office buildings	R 450 – R 650
Residential	R 650 – R 1,000
Shopping centres	R 1,000 – R 1,300
Hotels	R 1,100 – R 1,500
Hospitals	R 1,500 – R 2,100

<b>Electronic installation</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Offices	
– Standard installation	R 400 – R 550
– Sophisticated installation	R 550 – R 800
Residential	R 350 – R 525
Shopping centres	R 800 – R 1,000
Hotels	R 750 – R 1,000
Hospitals	R 800 – R 1,100

*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 m<sup>2</sup> (excl. VAT)*

Sprinkler system, including hydrants and hose reels (excluding void sprinklers)	R 275 – R 375
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**Air-conditioning installation***Rate per m<sup>2</sup> (excl. VAT)*

Ventilation to parking/service areas	R 300 – R 475
--------------------------------------	---------------

## Offices

– Console units	R 800 – R 1,100
– Console/split units	R 950 – R 1,400
– Package units	R 1,275 – R 1,900
– Central plant	R 1,600 – R 2,400

Residential—split units	R 950 – R 1,400
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## Shopping centres

– Split units	R 1,050 – R 1,500
– Package units	R 1,275 – R 1,900
– Evaporative cooling	R 800 – R 1,200

Hotels — public areas	R 1,600 – R 2,400
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Hospitals central plant	R 2,100 – R 3,300
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**Hotels***Rate per key (excl. VAT)*

– Console units	R 20,000 – R 27,500
– Split units	R 27,500 – R 42,000
– Central plant	R 55,000 – R 80,000

Hospitals — operating theatres	R 525,000 – R 850,000
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*For guidance regarding 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'.*



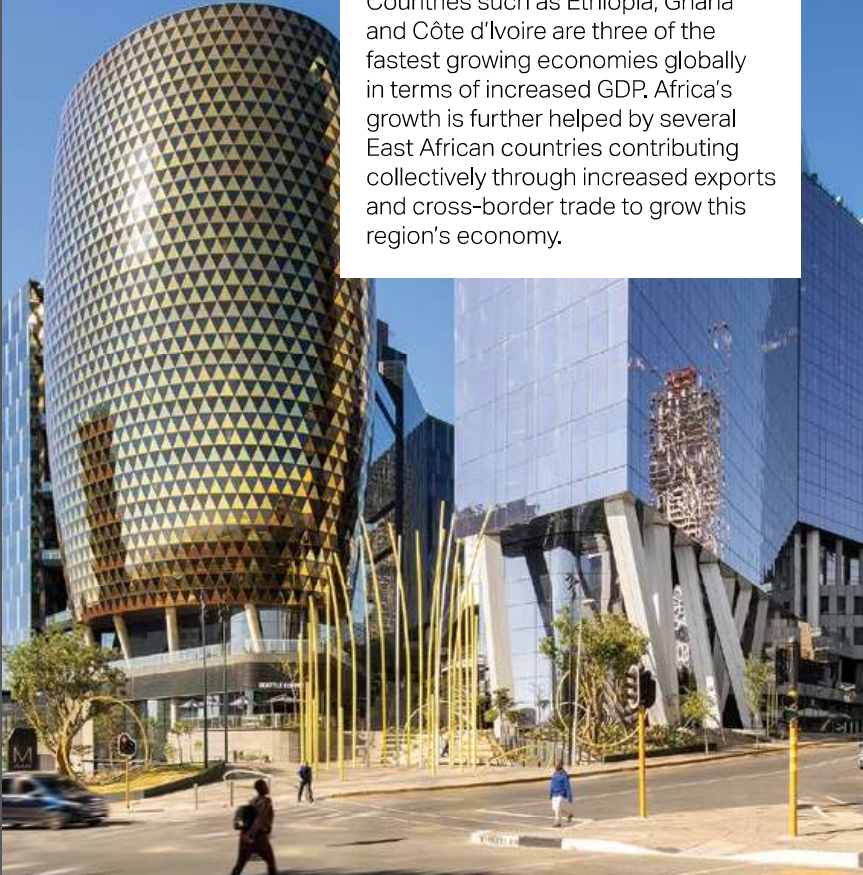
# 05 Section

## Global sentiment and building costs

### Africa outlook 2020

Through the implementation of sound macroeconomic policies, Africa's economies have generally remained resilient. This has enabled the continent to maintain its expected growth in recent years.

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



The Marc, Sandton, 129 Rivonia Road  
South Africa

There is an ever growing need to finance infrastructure on the continent. Several countries are now prioritising this after realising the importance of industrialisation, to not only maintain growth in their economies, but to also diversify through the exportation of goods and services. This has consequently, created 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. Predictions of collective growth are around three to four per cent for 2020/21, with individual countries increasing by as much as seven to eight per cent.

In sub-Saharan Africa, we are seeing steady growth in the infrastructure and construction sectors, as well as in East and West Africa. Of importance in context is the signing of mega gas deals in Mozambique following favourable environmental impact studies and subsequent government approval for parts of Liquefied Natural Gas (LNG) development contracts. The expected results are estimated that it will create thousands of job opportunities, impact significantly on Mozambique's GDP and create collaborative opportunities for neighbouring countries. The Economist, London (November 2019) said:

"To watch: In 2020, Sub-Saharan Africa will be the second-ziippiest-growing region for infrastructure investment (after South Asia). Leading the way is Mozambique."

Direct feedback from our colleagues in Eastern Africa indicated that the impact of the coronavirus slowed down all planning, construction and other related activity. Recovery after the easing of lockdown levels is also slow. They are however confident that productivity will return to normal levels as all participants will become used to a 'new normal pandemic environment'.

Over recent years we have seen several national elections across Africa that have been free and fair, and the transition of leadership has been stable, including 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. This type of investment has been increasing steadily over several years and is a catalyst for 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 2020 and beyond.



## Africa in figures

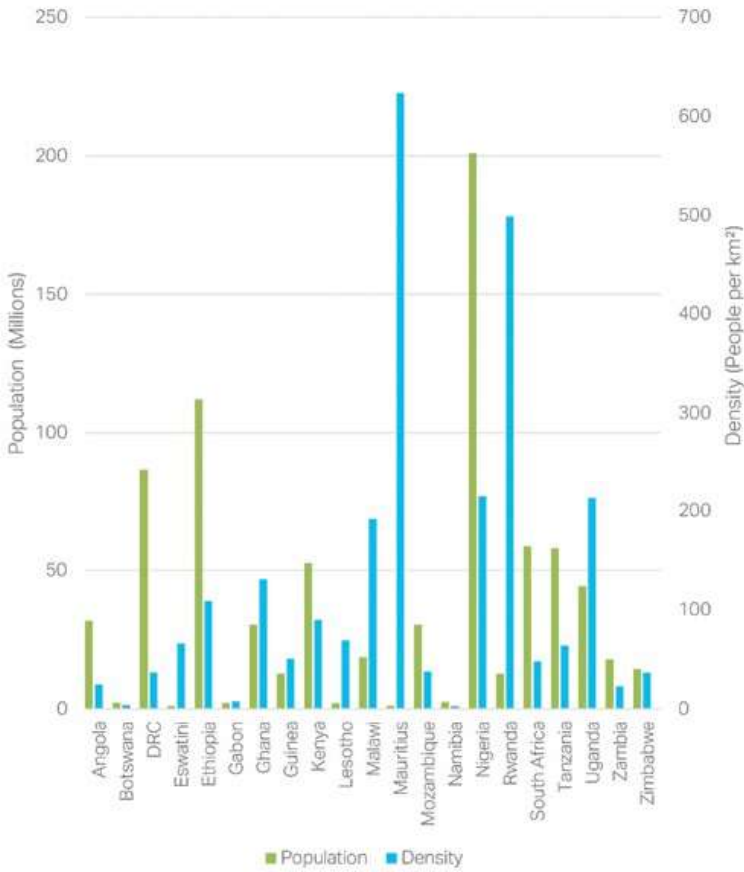
### Area and population

Country	Land area (000km <sup>2</sup> )	Population		
		Millions, 2019 (est)	Average annual % population growth rate, 2000–2019	Density, people per km <sup>2</sup> , 2019
Angola	1,247	31.83	3.2	24.7
Botswana	567	2.30	2.2	4
DRC	2,267	86.79	3.2	37.1
Eswatini	17	1.15	1	66.1
Ethiopia	1,000	112.08	2.6	109
Gabon	258	2.17	2.6	8
Ghana	228	30.42	2.2	131
Guinea	246	12.77	2.8	51
Kenya	569	52.57	2.3	90
Lesotho	30	2.13	0.8	69
Malawi	94	18.63	2.6	192
Mauritius	2	1.27	0.1	623.3
Mozambique	786	30.37	2.9	38
Namibia	823	2.49	1.9	3
Nigeria	911	200.96	2.6	215
Rwanda	25	12.63	2.6	499
South Africa	1,213	58.56	1.4	48
Tanzania	886	58.01	3.0	64
Uganda	201	44.27	3.7	213
Zambia	743	17.86	2.9	23
Zimbabwe	387	14.44	1.4	37

Source: World Development Indicators 2019



## Population and density 2019



Source: World Development Indicators 2019

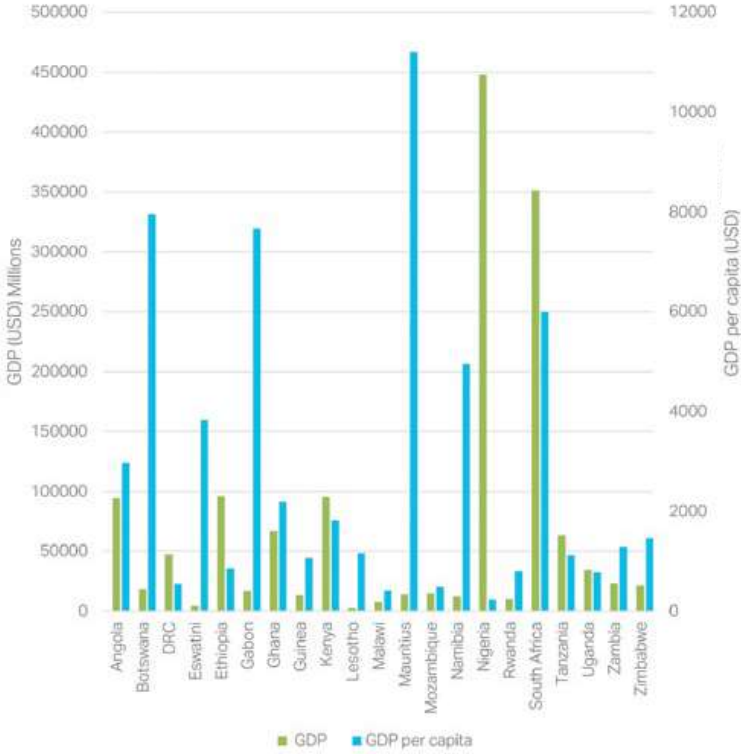
## Gross Domestic Product (At constant 2000 prices)

Country	GDP (USD) millions	GDP growth (annual % since 2000)	GDP per capita (USD)	Gross capital formation (% of GDP)	Inflation, consumer price (annual %)
Angola	94,635	-0.9	2,974	*	17.1
Botswana	18,341	3.0	7,961	33.2	2.8
DRC	47,320	4.4	545	25.3	*
Eswatini	4,405	2.0	3,837	*	*
Ethiopia	96,108	8.3	858	35.2	15.8
Gabon	16,658	3.4	7,667	22.4	2.5
Ghana	66,984	6.5	2,202	26.4	7.2
Guinea	13,590	5.6	1,064	30.6	9.5
Kenya	95,503	5.4	1,817	17.4	*
Lesotho	2,460	1.5	1,158	32.1	5.2
Malawi	7,667	4.4	312	12.3	9.4
Mauritius	14,180	3.6	11,204	20	0.4
Mozambique	14,934	2.2	492	43.9	2.8
Namibia	12,367	-1.1	4,958	12.7	3.7
Nigeria	448,120	2.2	230	*	11.4
Rwanda	10,122	9.4	802	26.1	3.4
South Africa	351,432	0.2	6,001	17.6	4.1
Tanzania	58,001	5.8	1,122	*	3.5
Uganda	27,461	6.5	777	26.5	2.9
Zambia	26,720	1.7	1,291	39.2	9.2
Zimbabwe	31,001	-8.1	1,464	*	*

Source: World Development Indicators 2019

\*Figures not available

# Gross Domestic Product 2019



Source: World Development Indicators 2019

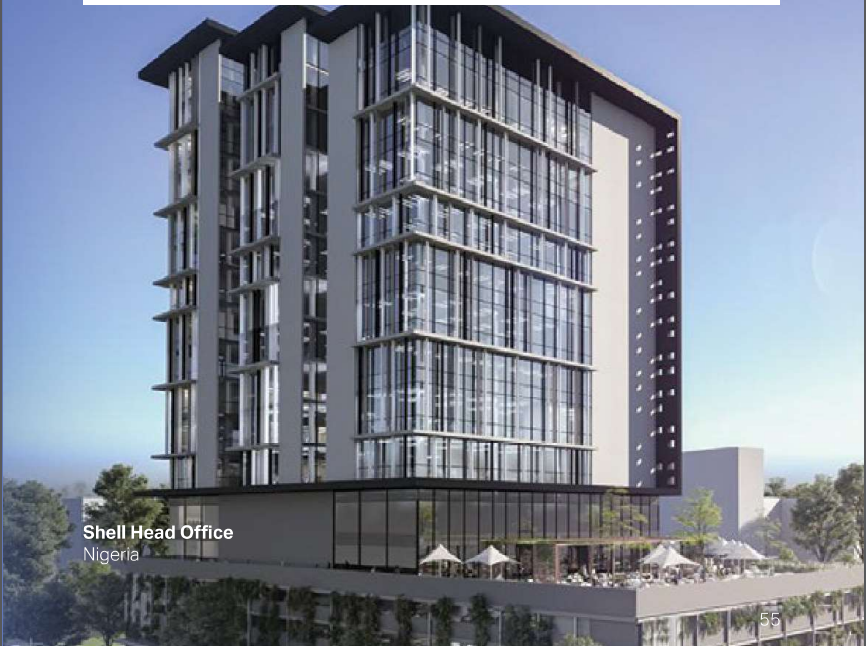
## Africa building costs

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 56), summarises the estimated building costs for different types of buildings in various locations in Africa. Rates are based on costs from 1 July 2020 and provide an indicator for the expected building cost rates during 2020. Exchange rates are based on those from 1 July 2020.

Rates include the cost of appropriate building services, such as air-conditioning and electrical, 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 and should only 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 the normal standards prevailing in each particular region and must be used circumspectly.



Shell Head Office  
Nigeria

Building Type	Botswana Gaborone	Ghana Accra	Kenya Nairobi	Lesotho Maseru	Mozambique Maputo	Namibia Windhoek	Nigeria Lagos	Rwanda Kigali	South Africa Johannesburg	Tanzania Dar es Salaam	Uganda Kampala	Zambia Lusaka
<b>Residential</b>												
Average Multi Unit High Rise	959	1,922	821	1,012	1,193	1,012	2,610	1,289	880	873	890	1,130
Luxury Unit High Rise	1,306	2,267	1,219	1,248	1,326	1,248	3,821	1,720	1,085	1,194	1,426	1,600
Individual Prestige Houses	2,039	2,169	1,496	1,316	1,643	1,316	3,181	1,851	1,144	1,254	1,683	1,940
<b>Commercial/Retail</b>												
Standard Offices High Rise	1,015	1,760	1,109	958	1,148	958	2,610	1,584	833	1,069	1,263	1,100
Prestige Offices High Rise	1,700	2,586	1,923	1,234	1,373	1,234	3,821	2,002	1,073	1,354	2,136	1,970
Major Shopping Centre	1,414	1,449	932	944	1,373	944	3,616	1,469	821	997	1,055	1,520
<b>Industrial</b>												
Light Duty Factory	901	1,035	804	347	788	347	1,446	1,197	302	891	890	550
Heavy Duty Factory	1,386	1,282	1,275	394	1,193	394	1,948	2,113	343	1,432	1,415	600
<b>Hotel</b>												
Mid-scale (3 Star)	143,975	335,184	403,381	89,370	137,250	89,370	357,444	219,001	77,713	151,709	489,873	290,000
Luxury (5 Star)	464,797	470,982	698,160	182,449	247,500	182,449	652,724	523,970	158,651	367,948	819,545	365,000
Resort Style	519,100	590,022	831,142	Not available	490,950	Not available	792,594	700,718	Not available	472,970	893,838	365,000
<b>Other</b>												
Multi Storey Car Park	707	838	532	290	765	290	1,865	905	252	639	612	473
District Hospital	Not available	1,676	1,119	1,923	2,723	1,323	2,606	Not available	1,672	Not available	1,405	950
Primary & Secondary Schools	1,300	1,084	980	529	1,067	529	Not available	Not available	460	Not available	1,115	750
(As at 1 July 2020)	BWP	GHS	KES	LSL	MZN	NAD	NGN	RWF	ZAR	TZS	UGX	ZMW
US\$1 =	11.70	5.67	104.20	17.18	69.42	17.05	361.00	945.54	17.05	2319.00	3682.50	18.30

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 below was made available by AECOM Middle East. Their assistance in this regard is acknowledged with thanks.



**Etihad Towers**  
Abu Dhabi, U.A.E

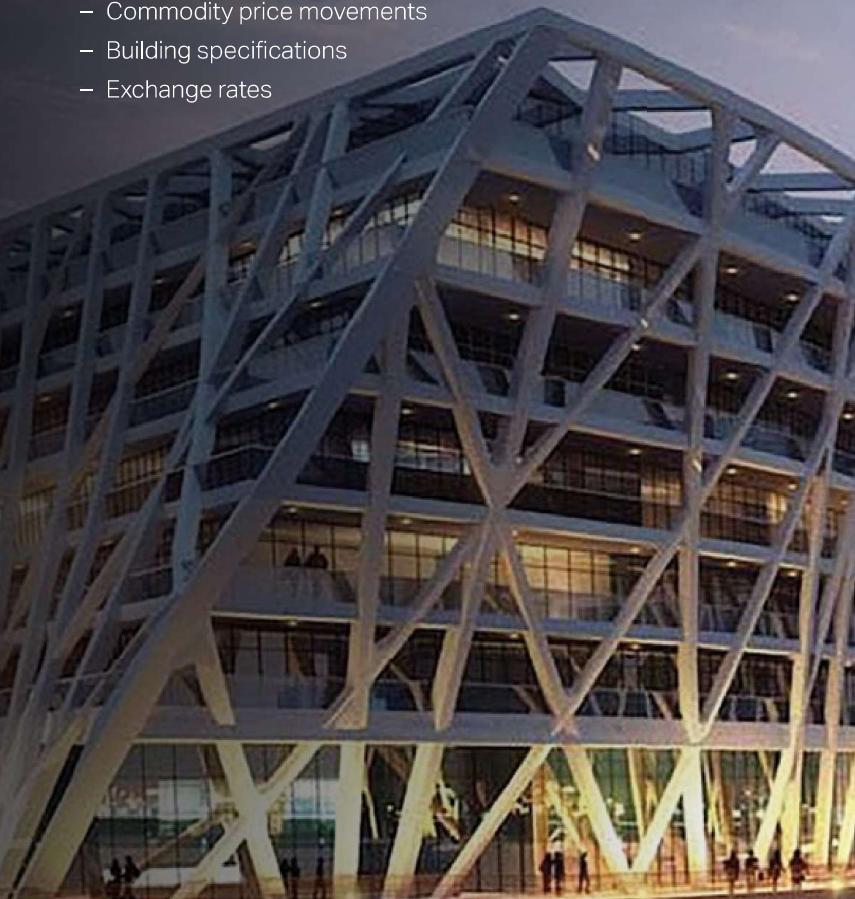


## International building cost comparison

**The international cost data shown is a comparison of local construction costs converted to U.S. dollars to enable comparison.**

The building costs for the respective asset types are averages based on local specifications. The actual cost of a building will depend on, among other things, unique site conditions, design attributes and applicable tariffs. In addition, the standard for each building varies from region to region, which may have a significant impact on costs. Costs are subject to considerable variations due to factors such as:

- Local market conditions
- Project complexity
- Commodity price movements
- Building specifications
- Exchange rates



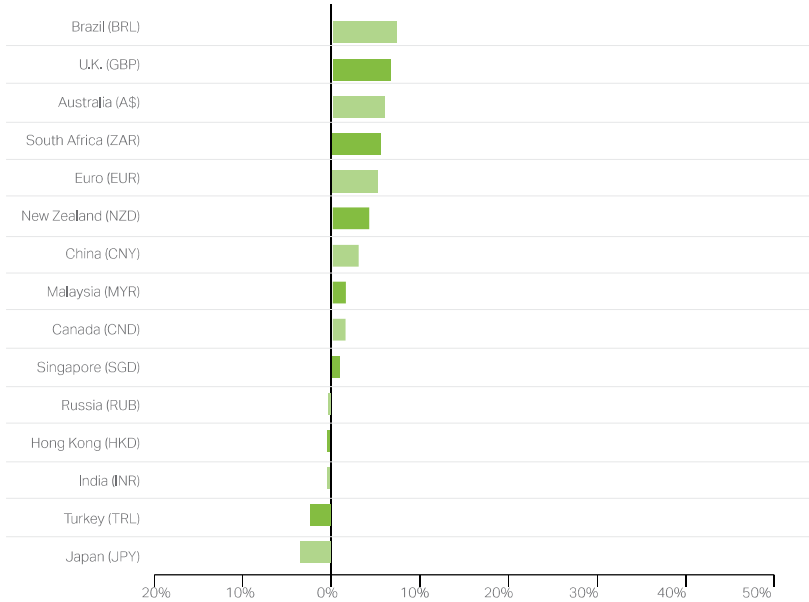
**Edition Hotel, Abu Dhabi, U.A.E.**  
Image courtesy of Bloom Holding



## Exchange rate trends

### Exchange rate trends up to September 2019

Currency movements of the U.S. dollar against major currencies in Q2 2019 compared to Q2 2018.



Source: Bank of England, [www.xe.com](http://www.xe.com)

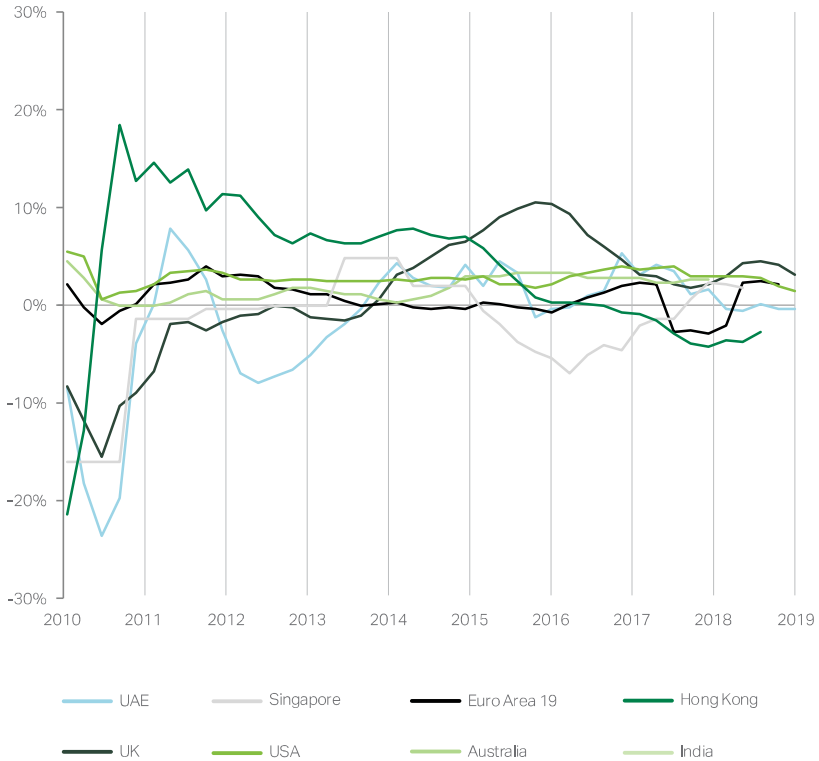
In recent years, exchange rate movements have been significant as diverging economic performance has led to many major currencies experiencing major shifts against the U.S. dollar. Forex rate states a country's economic stability is illustrated by the foreign exchange rate and leading factors can influence fluctuations which are constantly analysed, such as:

- Interest rates
- Country's current account balance
- Government debt
- Political stability: (Brexit, trade uncertainty and shifts, elections)
- Recession
- Commodity markets

Currency depreciation against the U.S. dollar translates into a relative drop in building costs when expressed in U.S. dollar, making these locations/regions relatively cheaper in U.S. dollar terms.

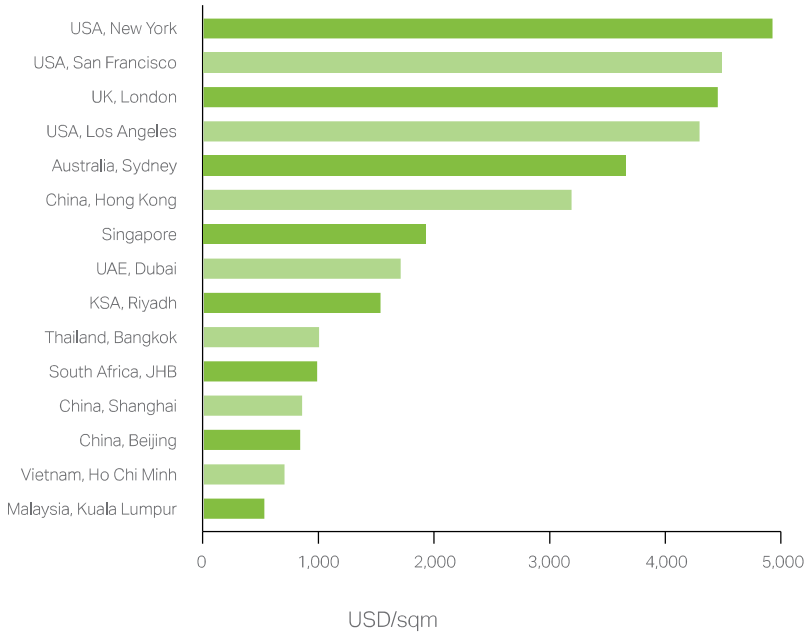
## International construction cost inflation

Quarter year-on-year change (Q1 2009–Q3 2019)



Source: Based on AECOM Indices for U.K., U.A.E.; ENR U.S. Construction Cost Index; Singapore Building Construction Authority, Hong Kong Building Works Tender Price Index, EuroaArea Eurostat Construction Output Index, India CIDC Construction Cost Index, AIQS Building Cost Index

## Average building cost for standard residential high rise



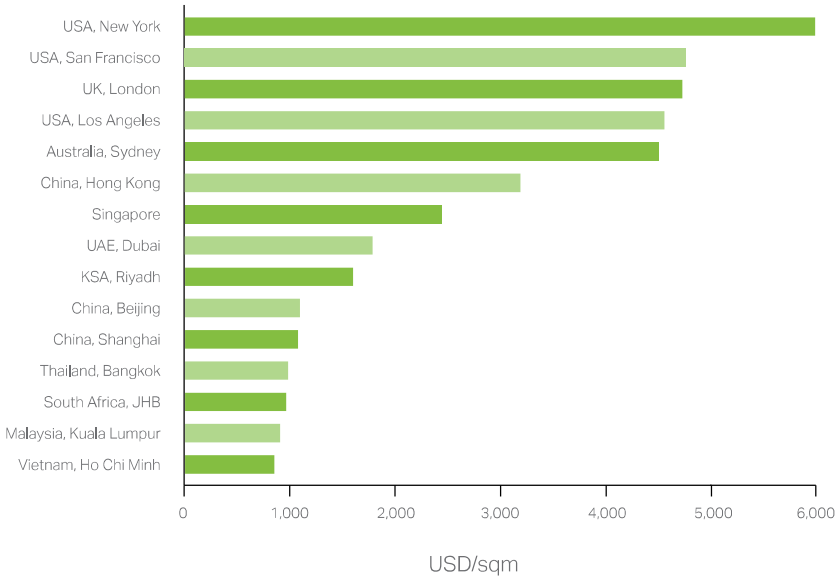
Average building costs (USD /sqm)

Building type	Sydney Australia	Hong Kong China	Beijing China	Shanghai China	Kuala Lumpur Malaysia	Singapore Singapore	Johannesburg South Africa	Bangkok Thailand	Dubai UAE	Los Angeles USA	San Francisco USA	New York USA	London UK	Ho Chi Minh City Vietnam	Riyadh KSA
Average multi unit high rise	3,566	3,300	829	835	544	1,900	979	1,057	1,850	4,100	4,200	4,850	4,166	733	1,650
Luxury unit high rise	4,167	4,600	1,624	1,560	913	3,300	1,246	1,572	2,200	5,200	5,300	6,250	5,841	918	2,100
Individual prestige houses	4,850	6,300	922	920	788	3,100	1,239	1,649	N/A	4,900	5,500	5,850	5,795	658	N/A
(As at 1 April 2018)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP	VND	SAR
US \$1 =	1.40	7.85	6.71	6.71	4.08	1.35	14.17	31.71	3.67	1.00	1.00	1.00	0.76	23197	3.75

Note: Prices exclude land, site works, professional fees, tenant fit out and equipment.  
Rates exclude GST/VAT. Costs based on 1 July 2019. Exchange rates to USD as at 1 April 2019.

Source: AECOM

## Average building cost for standard office high rise



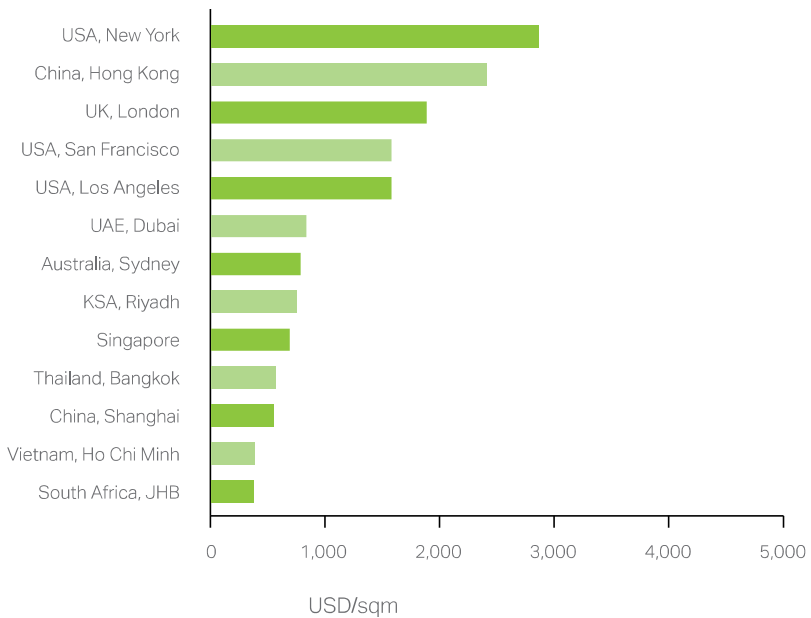
Average building costs (USD/sqm)

Building type	Sydney Australia	Hong Kong China	Beijing China	Shanghai China	Kuala Lumpur Malaysia	Singapore Singapore	Johannesburg South Africa	Bangkok Thailand	Dubai UAE	Los Angeles USA	San Francisco USA	New York USA	London UK	Ho Chi Minh City Vietnam	Riyadh KSA
Average standard offices high rise	4,439	3,150	1,071	1,055	875	2,400	944	954	1,850	4,500	4,700	6,000	4,659	834	1,575
Prestige offices high rise	5,191	3,950	1,527	1,600	1,338	3,100	1,215	1,134	2,200	4,870	5,000	6,500	5,759	1,265	1,900
Major shopping center (CBD)	3,730	4,600	1,320	1,532	1,425	3,400	930	905	1,700	3,700	4,000	4,300	5,078	860	1,425
(As at 1 April 2018)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP	VND	SAR
US \$1 =	1.40	7.85	6.71	6.71	4.08	1.35	14.17	31.71	3.67	1.00	1.00	1.00	0.76	23197	3.75

Note: Prices exclude land, site works, professional fees, tenant fit out and equipment. Rates exclude GST/VAT. Costs based on 1 July 2019. Exchange rates to USD as at 1 April 2019.

Source: AECOM

## Average building cost for light duty factory



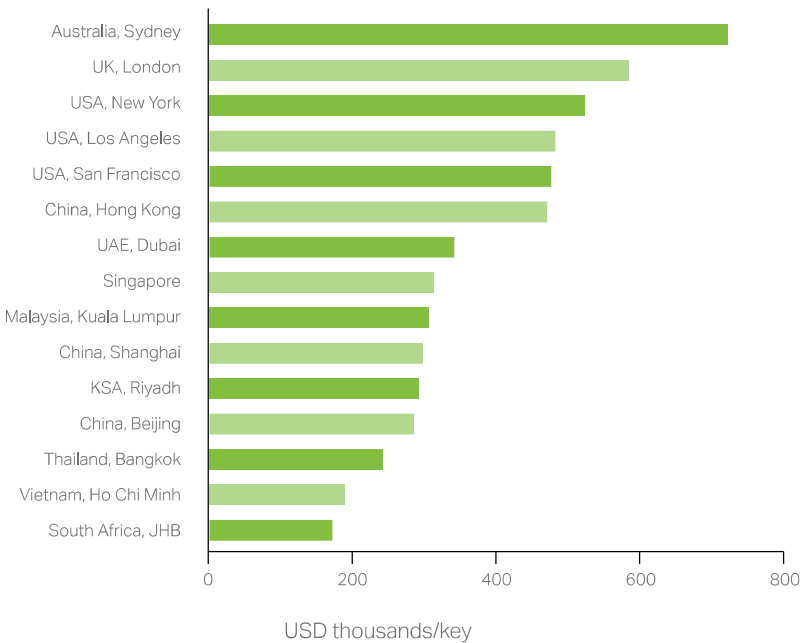
Average building costs (USD/sqm)

Building type	Sydney Australia	Hong Kong China	Beijing China	Shanghai China	Kuala Lumpur Malaysia	Singapore Singapore	Johannesburg South Africa	Bangkok Thailand	Dubai UAE	Los Angeles USA	San Francisco USA	New York USA	London UK	Ho Chi Minh City Vietnam	Riyadh KSA
Light duty factory	792	2,450	N/A	550	525	700	341	567	850	1,600	1,600	2,900	1,910	361	750
Heavy duty factory	997	N/A	N/A	N/A	575	900	592	902	1,000	2,000	2,100	3,800	3,277	4,646	900
Multi-storey car park	1,024	1,700	N/A	N/A	345	700	285	593	675	1,400	1,680	1,500	936	364	N/A
District hospital	6,386	5,800	N/A	1,530	1,025	2,900	1,894	N/A	2,700	6,890	7,500	8,900	4,706	N/A	1,530
Primary & secondary schools	2,623	2,800	N/A	N/A	375	N/A	521	N/A	1,525	4,500	4,800	4,800	3,015	N/A	N/A
(As at 1 April 2019)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP	VND	SAR
US\$1 =	1.40	7.85	6.71	6.71	4.08	1.35	14.17	31.71	3.67	1.00	1.00	1.00	0.76	2391724	3.75

Note: Prices exclude land, site works, professional fees, tenant fit out and equipment.  
Rates exclude GST/VAT. Costs based on 1 July 2019. Exchange rates to USD as at 1 April 2019.

Source: AECOM

## Average building cost for a five-star luxury hotel



Average building costs (US\$/key)

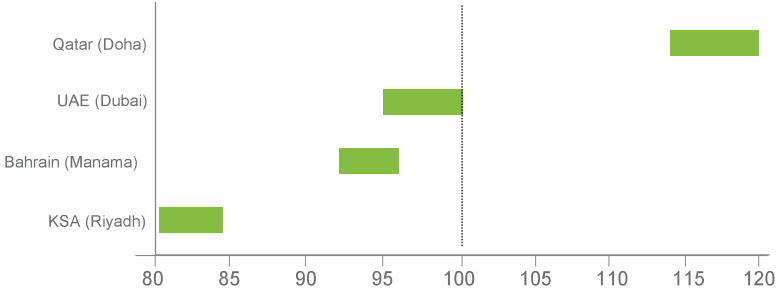
Building type	Sydney Australia	Hong Kong China	Beijing China	Shanghai China	Kuala Lumpur Malaysia	Singapore Singapore	Johannesburg South Africa	Bangkok Thailand	Dubai UAE	Los Angeles USA	San Francisco USA	New York USA	London UK	Ho Chi Minh City Vietnam	Riyadh KSA
5 star luxury	736,336	480,000	292,330	304,500	310,000	321,400	179,577	250,000	350,000	493,000	485,000	535,000	596,169	195,051	300,000
3 star budget	362,020	225,000	N/A	N/A	166,900	57,100	57,042	6,500	90,000	85,000	85,000	89,000	96,316	N/A	80,000
Resort style	N/A	N/A	483,115	N/A	281,300	214,300	N/A	300,000	650,000	308,000	304,000	304,000	366,068	231,333	N/A
(As at 1 April 2019)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP	VND	SAR
US \$1 =	1,30	7,85	6,71	6,71	4,08	1,35	14,17	31,71	3,67	1,00	1,00	1,00	0,76	22,786	3,75

Note: Prices exclude land, site works, professional fees, tenant fitout and equipment.  
Rates exclude GST/VAT. Hotel rates include FF&E. Costs based on 1 July 2019.  
Exchange rates to USD as at 1 April 2019.

Source: AECOM

## Middle East relative cost of construction

Relative cost of construction are based on typical build costs in USD. Influence of foreign exchange fluctuations, unique site conditions, design attributes and applicable tariffs must be considered when comparing actual projects. Relative costs are based on an average across all sectors.



Note: Relative cost of construction are based on typical build costs in USD. High and low cost factors for each building type have been calculated relative to the U.A.E. (Dubai), where average costs equal 100. The relative cost bars plotted in the chart represent the average high and low cost factor for each country, based on the costs of the buildings included in the sample (excluding commercial fit-outs).



# 06 Section

## International prestigious office rental comparison

Region	Country	City	USD/m <sup>2</sup> per annum
Africa			
	Algeria	Algiers	324
	Angola	Luanda	660
	Botswana	Gaborone	148
	Cameroon	Yaoundé	360
	N'Djamena	Chad	324
	Cote D'Ivoire	Abijan	330
	Democratic Republic of Congo	Kinshasa	360
	Egypt	Cairo	360
	Ethiopia	Addis Ababa	204
	Kenya	Nairobi	180
	Madagascar	Antananarivo	132
	Malawi	Lilongwe	132
	Mali	Bamako	240
	Mauritania	Nouakchott	192
	Mauritius	Port Louis	264
	Morocco	Casablanca	240
	Mozambique	Maputo	360
	Namibia	Windhoek	162
	Nigeria	Abuja	396
		Lagos	804
	Rwanda	Kigali	192
	Senegal	Dakar	240
	South Africa	Cape Town	185
		Durban	190
		Johannesburg	205
		Port Elizabeth	130
		Pretoria	175
		Tanzania	Dar Es Salaam
	Tunisia	Tunis	144
	Uganda	Kampala	168
	Zambia	Lusaka	228
	Zimbabwe	Harare	108
Asia			
	China	Beijing	984
		Guangzhou	430
		Hong Kong	1836

## International prestigious office rental comparison

Region	Country	City	USD/m <sup>2</sup> per annum
		Shanghai	740
	India	Bangalore	178
		Chennai	136
		Mumbai	437
		New Delhi	252
	Indonesia	Jakarta	186
	Japan	Tokyo	952
	Malaysia	Kuala Lumpur	130
	Philippines	Manila	264
	South Korea	Seoul	474
	Singapore	Singapore	796
	Thailand	Bangkok	285
<b>Australasia</b>			
	Australia	Adelaide	115
		Brisbane	176
		Melbourne	254
		Perth	171
		Sydney	516
	New Zealand	Auckland	317
		Christchurch	270
		Wellington	238
<b>Europe</b>			
	Austria	Vienna	346
	Belgium	Brussels	352
	Czech Republic	Prague	306
	Denmark	Copenhagen	336
	England	Aberdeen	457
		Birmingham	514
		Bristol	549
		Cardiff	394
		Leeds	479
		London (City)	1,021
		London (West End)	1,619
		London (Docklands)	739
		Manchester	563
		Sheffield	366
	France	Paris	957
	Germany	Berlin	506

## International prestigious office rental comparison

Region	Country	City	USD/m <sup>2</sup> per annum
		Frankfurt	576
		Hamburg	386
		Munich	516
	Greece	Athens	238
	Hungary	Budapest	333
	Ireland	Dublin	732
	Italy	Rome	530
		Milan	666
	Luxembourg	Luxembourg	679
	Netherlands	Amsterdam	513
	Norway	Oslo	582
	Poland	Warsaw	326
	Portugal	Lisbon	249
	Romania	Bucharest	240
	Russia	Moscow	776
		St Petersburg	362
	Scotland	Edinburgh	514
		Glasgow	479
	Spain	Barcelona	370
		Madrid	413
	Sweden	Stockholm	796
	Switzerland	Geneva	715
		Zurich	899
<b>Middle East</b>			
	Bahrain	Manama	280
	Lebanon	Beirut	402
	Oman	Muscat	159
	Qatar	Doha	543
	Saudi Arabia	Jeddah	277
		Riyadh	389
		Makkah	155
	Turkey	Istanbul	244
	United Arab Emirates	Dubai (Central Dubai)	623
		Dubai (New Dubai)	381
		Dubai (Old Dubai)	377
		Abu Dhabi	469

## International prestigious office rental comparison

Region	Country	City	USD/m <sup>2</sup> per annum
North America			
	Canada	Montreal	346
		Toronto	674
		Vancouver	465
	USA	Atlanta	321
		Austin	556
		Baltimore	274
		Boston	496
		Chicago	482
		Houston	337
		Los Angeles	483
		Miami	465
		New York (Manhattan)	917
		Philadelphia	380
		Richmond	237
		Salt Lake City	268
		San Francisco	986
		Seattle	486
		Washington DC	636
South America			
	Argentina	Buenos Aires	368
	Brazil	Sao Paulo	282
		Rio de Janeiro	269
	Bolivia	Santa Cruz de la Sierra	193
	Chile	Santiago	268
	Columbia	Bogota	241
	Mexico	Guadalajara	239
		Mexico City	299
	Paraguay	Asuncion	188
	Peru	Lima	194
	Uruguay	Montevideo	338

Rates are applicable as of 1 January 2020 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.

# 07 Section

## 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 purpose 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, the average rate and the year-on-year rate. The average rate has 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.



Shell Ultracity Estcourt  
South Africa

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. The average of these is then calculated and then quoted as the average annual increase for that 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 may be a significant difference in the two rates in question. For example, in 2015 the year-on-year rate (January 2015 to January 2016) of the building cost inflation in South Africa was only -0.6 per cent, while the average annual rate (comparing monthly indices) was 4.0 per cent.

## **Calculation of estimated escalation of construction contracts**

### **Pre-contract**

Construction cost changes are on an ongoing basis for various reasons. Provision should therefore be made for changes in tender prices during 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 per cent of the contract amount to be subject to escalation adjustment with the remaining 15 per cent fixed. Furthermore, a factor must be introduced to take account of the cash flow payments during the construction period and 0.6 is often 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. After this, it is then calculated 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), is 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	
2015	100.0		100.0		1.00
2016	99.4	-0.6%	102.9	+2.9%	0.97
2017	107.7	+8.3%	111.4	+8.3%	0.97
2018	116.0	+7.8%	117.7	+5.6%	0.99
2019	121.0	+4.3%	122.2	+3.8%	0.99
2020	128.4	+6.1%	126.6	+3.6%	1.01
2021	143.4	+11.7%	133.6	+5.6%	1.07
2022	153.1	+6.7%	140.9	+5.4%	1.09
2023	164.4	+7.4%	148.5	+5.4%	1.11
2024	173.9	+5.8%	155.7	+4.9%	1.12

*The average annual increases indicated by the BER 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.*

*This forecast is based on information provided by the Bureau for Economic Research, Stellenbosch University.*

## Tender climate

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

When the TMI (see graph on page 77) 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. This indicates 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.

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

This tendency is also apparent on the cost indices graph (see page 76). When the two lines (CPAP and BER) converge, i.e. CPAP is decreasing and BER is increasing, you should negotiate. When the two lines diverge, i.e. CPAP is increasing and BER is decreasing, proceed to tender instead.

Base dates: To allow for the comparison of indices, a factor has been introduced resulting in an equal base for both BER and CPAP indices (i.e. January 2015 = 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. Often the unit costs of these projects are significantly higher than originally anticipated. 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 per cent) should be added.

Awareness must be made of the effect that VAT has on cash flow over a period of time. This will vary according to the payment period of the individual vendor. However, in all cases, it will add to the capital cost of the project to the extent of interest on outstanding VAT for the VAT cycle of the vendor.



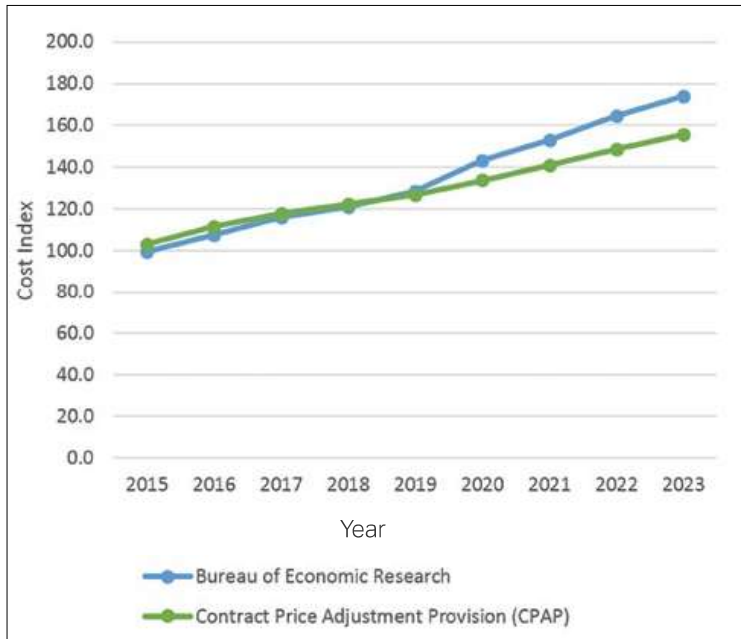
**Exxaro Headquarters**  
South Africa

## Graphs: BER and CPAP

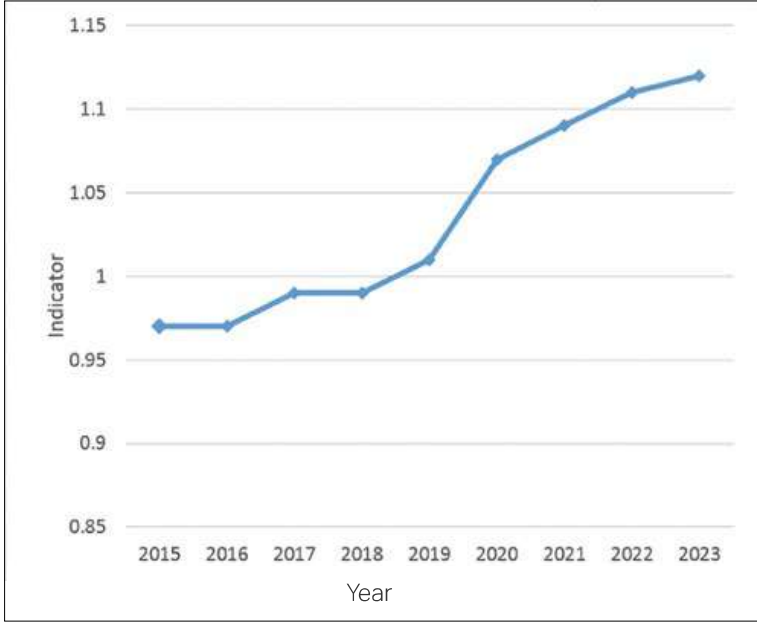
### January to January building cost percentage change



### January building cost indices



## Tender market indicator BER deflated by CPAP



—◆— Tender Market Indicator

*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 73.*

# 08 Section

## Method for measuring rentable areas

### SAPOA methods

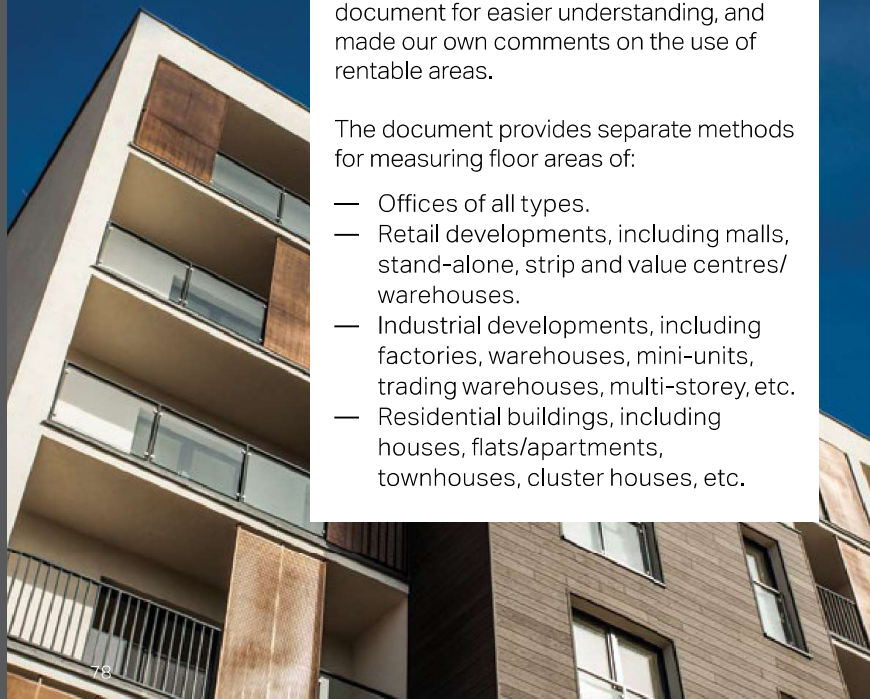
In the past, many landlords and developers have derived methods for calculating the rentable areas of buildings.

The most common method is recommended by SAPOA, entitled '*Method for Measuring Floor Areas in Buildings*', *Second Edition* (effective from 7 November 2007). This replaces the previous SAPOA recommendation in '*Method for Measuring Floor Areas in Commercial and Industrial Buildings*' (updated August 1991). However, it must be noted 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, below we have abbreviated and simplified the definitions contained in the document for easier understanding, and made our own comments on the use of rentable areas.

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, trading warehouses, multi-storey, etc.
- Residential buildings, including houses, flats/apartments, townhouses, cluster houses, etc.



For all office 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 the common and supplementary area, as determined at each level. Unless otherwise indicated, the unit of measurement is square metres (m<sup>2</sup>).

## **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 the atria are included, and all openings on other levels to form the 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.

The intended use is determined by the revenue-producing area of a building. This comprises the rentable area, supplementary area and parking. It is also used by those analysing the economic potential of a building.

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

The rentable area comprises usable area, plus common area.

The rentable area excludes the supplementary area. This may produce additional revenue.

### **Usable area**

The usable area is the area capable of exclusive occupation by the tenant. This includes 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.

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

## Common area

The common area is an area that the tenant has access to and/or use of. It is still considered 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 areas that comprise 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 the primary common area, giving access to multiple tenancies. Accordingly, this may vary over the life of a multiple tenancy building.

## Supplementary area

The supplementary area is any additional revenue-producing component that falls outside of the defined rentable area. Supplementary areas need not be weatherproof. For example, it comprises storerooms, balconies, terraces, patios, access/service passages, 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**

An entrance foyer is a portion of remote common area, including associated adjacent rooms and lobby. Lift area, 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 their enclosing walls, exceeding 0,5m<sup>2</sup> 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 78). 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 practical measurement of most building types. However, certain building types such as hotels, leisure and sport centres, petrol stations, hospitals, law courts, and retirement villages may only utilise the underlying principles of this method.

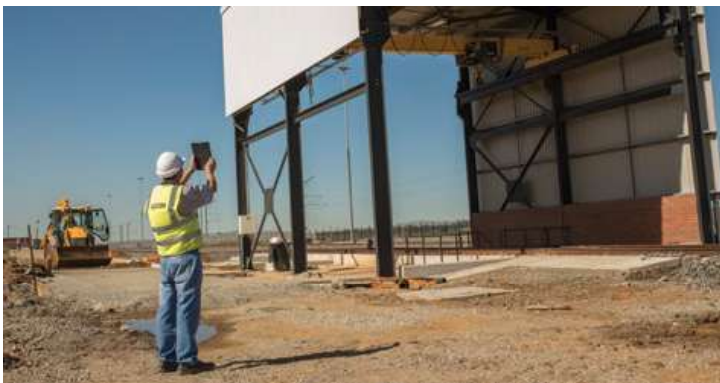
### In general

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 permission to use extracts from this publication.



# 09

## Section

### 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 the development's operation. The return is expressed as a percentage per annum of the anticipated capital investment.

Escalation in both construction cost and cost of capital are both considered 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 determines 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 the 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 upon 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
<b>Net cash flow</b>		
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 per cent annual escalation in rental is 19.50 per cent.

The terminal value is subjective. In this example, it 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 per cent.

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 per cent.

As a rule of thumb, 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). Providing 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.

In the given example, the initial return is 10.50 per cent, the escalation rate is 9.00 per cent, and the approximate IRR is the sum of the two, i.e. 19.50 per cent.

*Where Green Star South Africa ratings are a requirement, cash flow analyses over longer periods of time 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 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, would be given a specified return for a particular development.

The formula is determined as follows:

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)
Therefore x	=	$\frac{\text{Net Annual Income} - y}{\text{Return}}$
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 per cent 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	= $\frac{\text{Net Annual Income} - y}{\text{Return}}$
	= $\frac{\text{R6,000,000} - \text{R47,365,000}}{0.10}$
	= R12,635,000
Therefore land value is R12,635,000 discounted at 10.5% p.a. over 15 months = R11,087,204 (say) R 11 million	

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

# 10 Section

## Africa office locations

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#### Westdene, Bloemfontein

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#### Accra, Ghana

T +233 575 444 554

#### Gaborone, Botswana

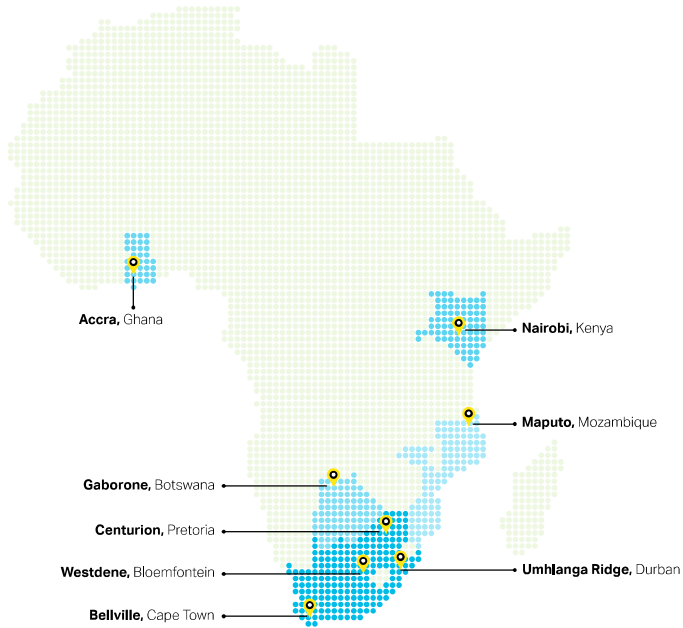
T +267 39 007 11

#### Maputo, Mozambique

T +258 21 498 797

#### Nairobi, Kenya

M +254 710 165 575





# 11 Section



## Background

The Bureau for Economic Research (BER) is one of the oldest economic research institutes in South Africa. It was established in 1944 and is part of the Faculty of Economics and Management Sciences (EMS) at Stellenbosch University. Over the years, the BER has built a local and international reputation for independent, objective and authoritative economic research and forecasting.

## Primary activities

The BER primarily focuses on the South African macro-economy and selected economic sectors. It monitors and forecasts macroeconomic and sector trends, as well as identifying and analysing local and international factors that affect South African businesses.

The organisation has built up and continues to expand its business tendency surveys and macroeconomic forecasting capabilities. Both are used for analysing and projecting South African macroeconomic trends. The BER uses a variety of internationally accepted methodologies and econometric models for the generation and analysis of the data, as well as techniques developed specifically for the unique South African environment.

The BER also compiles the **BER Building Cost Index** and produces the quarterly report on building costs.

## The BER Building Cost Index (BCI)

The BER Building Cost Index (BCI) is compiled from information collected quarterly by a standard questionnaire from the same group of quantity surveyors. These quantity surveyors supply information on the scope of the project, some amounts and the tariffs (rates) of a number of items from the bills of quantities of accepted tenders.

The index is compiled by analysing the current price movements of 22 representative cost components that are common to all buildings relative to the prevailing base prices. Data for most items from the categories of the 'Standard System of Measuring Building Work' are collected. A weight is accorded to each item based on considerations, such as basic design criteria. In order to ensure comparability, certain adjustments in the calculation process are made.

The research can be accessed by subscribing to the BER building cost information service for a nominal annual fee. Members of the Association of South African Quantity Surveyors (ASAQS) are entitled to a 20 per cent discount when registering via the ASAQS membership portal.

Subscribers will have access to a quarterly report consisting of:

- The historical BER BCI, along with a five-year forecast (pre-tender escalation).
- A five-year forecast of the Contract Price Adjustment Index (Haylett index) for workgroups 180 and 181 (post-tender escalation).
- The rates of the 22 representative items on which the BER BCI is based on.

For more information visit their site at [www.ber.ac.za](http://www.ber.ac.za) or email Craig Lemboe at [cjl@sun.ac.za](mailto:cjl@sun.ac.za)

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