

TOOLKIT EDITION 1 2018

CITIES' INFRASTRUCTURE
DELIVERY AND
MANAGEMENT SYSTEM

CIDMS



national treasury

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

dtiEs SUPPORT PROGRAMME



IUDF
INTEGRATED URBAN DEVELOPMENT FRAMEWORK



This is the first edition of the Cities Infrastructure Delivery and Management System (CIDMS) Toolkit.

This toolkit was developed by the Cities Support Programme of the National Treasury of South Africa in partnership with the eThekweni Municipality, the City of Johannesburg Metropolitan Municipality and the City of Cape Town, following demand from metropolitan cities for a system to accelerate the delivery of infrastructure and to manage infrastructure portfolios more sustainably.

CIDMS provides a holistic system for the management of infrastructure based on the requirements of SANS 55001: Asset management - Management systems – Requirements, tailored for application in South African metropolitan spaces and specifically in support of the country's spatial transformation agenda. The CIDMS system also incorporates an infrastructure delivery system based on the National Treasury's Standard for Infrastructure Procurement and Delivery Management.

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Cities Infrastructure Delivery Management System Toolkit
Edition 1
2018
ISBN No: ISBN: 978-0-621-46215-9



national treasury

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

clTIES SUPPORT
PROGRAMME



ACKNOWLEDGEMENTS

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CONTENT CONTRIBUTIONS

The content of this Toolkit has been enriched by practical examples of asset management case studies and outputs from the City of Ekurhuleni, the Buffalo City Metropolitan Municipality and Johannesburg Water. Many of the techniques and models presented in this Toolkit has been developed and refined by i @ Consulting over the course of more than a decade of supporting local government to improve asset management practices. These contributions are gratefully acknowledged.

PEER REVIEW

This CIDMS Toolkit was peer reviewed by Roger Byrne (Roger Byrne and Associates) under contract to the World Bank, with support from Chris von Holdt (Aurecon).

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 <p>PLANNING</p>	 <p>DESIGNED</p>	 <p>DELIVERY OF</p>
 <p>SYSTEMS & MECHANISMS</p>	 <p>RESEARCH</p>	 <p>PUBLIC TRANSPORT</p>
 <p>INSUFFICIENT</p>	 <p>POPULATION</p>	 <p>GOVERNMENT</p>
 <p>INDUSTRIALISATION</p>	 <p>SPATIAL</p>	 <p>SERVICE PROVISION</p>
 <p>FUNDING</p>	 <p>PHASES OF DEVELOPMENT</p>	 <p>INVESTMENT</p>

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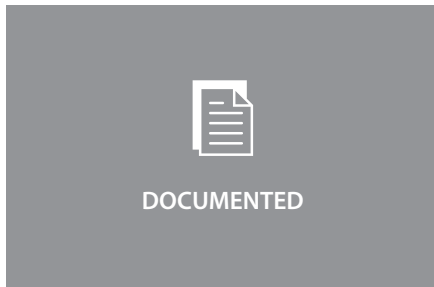
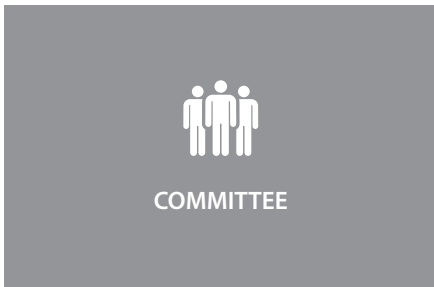
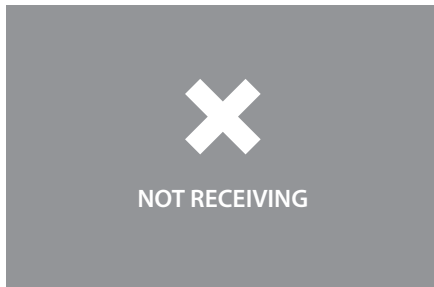
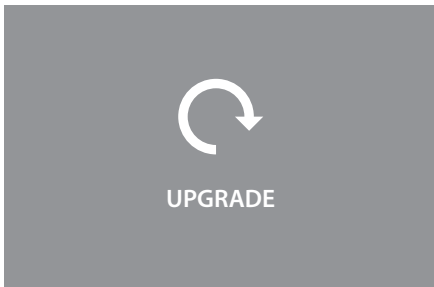
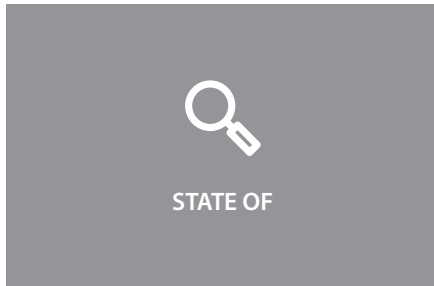
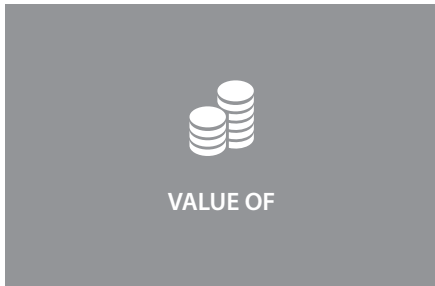
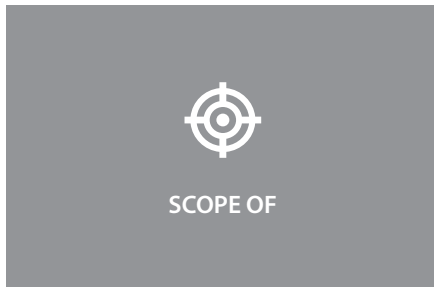
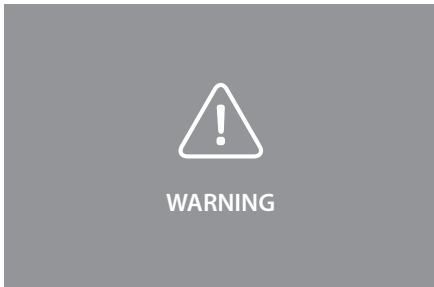
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Module 2 System for the management of assets



Module 2 *System for the management of assets*



USE OF FORECAST



CURRENT



FUTURE

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Module 3 Asset data model and infrastructure profiling



COST OF



PERFORMANCE



CAPACITY



CONDITION

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Module 4 Levels of service and customer profiling

 <p>TYPE OF CUSTOMERS</p>	 <p>AMOUNT OF CUSTOMERS</p>	 <p>LOCATED</p>
 <p>INFRASTRUCTURE</p>	 <p>HOUSEHOLD INCOME PERFORMANCE</p>	 <p>NUMBER OF HOUSEHOLDS</p>
 <p>SERVICES</p>	 <p>LEVELS OF</p>	 <p>STRUCTURING ELEMENTS</p>
 <p>RELIABILITY</p>	 <p>QUALITY</p>	 <p>VALUE</p>
 <p>HEALTH & SAFETY</p>	 <p>RESPONSIVE</p>	 <p>ACCESSIBLE</p>



POPULATION



PLANNING



LOCATION



NEIGHBOURHOOD PARK



DISTRICT PARKS



STRATEGIC PARKS

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Module 5 Future demand




TIP



WARNING



FUTURE



DECLINE



PLANNING




HIGH LEVELS OF




DEVELOPMENT




CREATION OF
INFRASTRUCTURE




SLOW RATES




DATE




SOURCE




COMPLETENESS



GRAPHS



NOT ABLE



CUSTOMERS

Module 5 Future demand



RESOURCE
WATER



URBAN SPRAWL



SPATIAL STRUCTURE



MUNICIPAL
INFRASTRUCTURE



PARKS



SCHOOLS



PROJECTS



COST/REVENUE



LOCATION

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Module 6 Life-cycle strategies and plans



INFRASTRUCTURE




SERVICE




UNDERPERFORMING




NOT ACCEPTABLE
DECOMMISSIONING



COMPONENT



VALUE



CRITICALITY



MAINTENANCE
CONDITION



INVESTMENT



RENEWAL

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Module 7 Asset management plans



FUNDS



RISKS



REPAIRS



DATA



PROGRAMMES



OBJECTIVES

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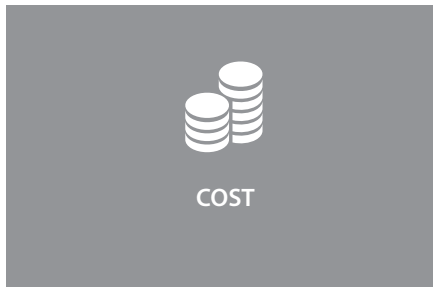
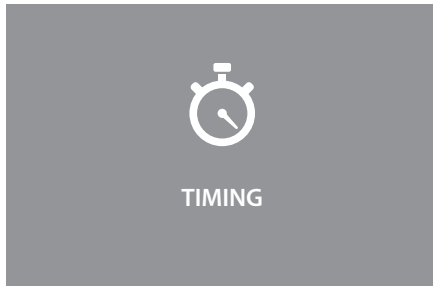
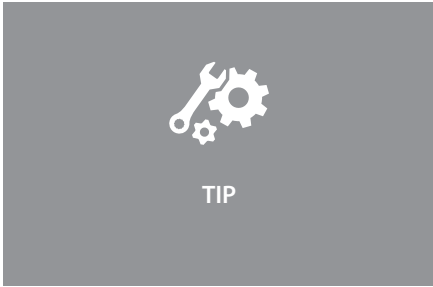
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Module 9 Fundamentals of infrastructure procurement & delivery

 <p>FRAMEWORK / PROCESS</p>	 <p>INFRASTRUCTURE</p>	 <p>PERFORMANCE</p>
 <p>MANAGEMENT</p>	 <p>DELIVERY MANAGEMENT</p>	 <p>SPECIFICATIONS</p>
 <p>RESOURCES</p>	 <p>BUDGET / COST</p>	 <p>ENVIRONMENTAL</p>
 <p>BENEFIT</p>	 <p>WATER TREATMENT</p>	 <p>STRATEGY</p>
 <p>RISK</p>	 <p>GOOD PRACTICES</p>	 <p>STAFF</p>



PLANNING / DESIGN



ELECTRICITY



BUDGET PERFORMANCE



TIMEFRAME



SAFETY



SCOPE



NEGATIVE



TIME

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Module 10 Infrastructure procurement



ESTABLISH




STRATEGY



DOCUMENTATION



EVALUATING



AWARDING



TEAM MEMBERS



REQUIREMENTS



COMMENTS & OPINIONS



PERFORMANCE



HEALTH & SAFETY



CONSTRUCTION

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Module 11 Infrastructure delivery



SCOPE OF WORK



INTERROGATED



EVALUATED | DOCUMENT



COST



GEOGRAPHICAL LOCATION



TIMEFRAMES



INCREASING CAPACITY



CAPABILITIES



FINANCE



MUNICIPAL SERVICES



OUTSOURCED



CONSIDERED | PRIORITIES



TIP



WORKS | INFRASTRUCTURE



COMPLETING

Module 11 Infrastructure delivery



BUSINESS | PPP



OUTCOME



SYSTEMS



PLANNING | DESIGN



DEFECTS



ASSESSMENT



RISK



PERFORMANCE

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Module 12 Enablers



IDENTIFY



PLANS



DEVELOP/SYSTEMS



SERVICE PROVISION



IMPROVEMENT



LEADERSHIP/TEAMS

GLOSSARY

ADJUDICATION

A form of dispute resolution where, unlike other means of resolving disputes involving a third party intermediary, the outcome is a decision by a third party which is binding on the parties in dispute and is final unless and until reviewed by either arbitration or litigation.

ADVANCE PAYMENT

Sum of money paid to the contractor after the contract is signed but before work starts or goods or services or any combination thereof are supplied.

AFFIRMABLE BUSINESS ENTERPRISE

A business that adheres to statutory labour practices, is a legal entity, is registered with the Receiver of Revenue and is a continuing independent enterprise for profit, owned at least two thirds by one or more PDIs (Previously Disadvantaged Individuals)

AERATION

Aeration (also called aerification) is the process by which air is circulated through, mixed with or dissolved in a liquid or substance. Uses of aeration of liquids include secondary treatment of sewerage or industrial wastewater with aerating mixers/diffusers.

AGGREGATE

A whole formed by combining several different elements or the act of making this whole.

AMALGAMATION RULES

The rule set applied to the results of an investment study when different sets of results are combined in a multicriteria analysis (see multicriteria analysis).

ANALYSIS PERIOD

Time interval used in the financial evaluation of an investment opportunity (number of assessment periods). For the purposes of this toolkit the analysis period in formulae is denoted with an "n".

ASSET

A resource owned or controlled by an entity as a result of past events and from which future economic benefits or service potential is expected to flow to the entity.

ASSET HIERARCHY (IIMM)

A framework for segmenting an asset base into appropriate classifications. The asset hierarchy can be based on asset function, asset type, or a combination of the two.

ASSET LIFE (ISO 55 000)

Period from asset creation to asset end of life.

ASSET MANAGEMENT (LGIAMG)

The process of decision making, planning and control over the acquisition, use, safeguarding and disposal of assets to maximise their service-delivery potential and benefits, and to minimise their related risks and costs over their entire life.

ASSET MANAGEMENT INFORMATION SYSTEM (LGIAMG)

A combination of processes, data and software applied to provide outputs needed to manage assets well.

ASSET MANAGEMENT OBJECTIVES (IIMM)

Specific outcomes required by implementing an asset management system.

ASSET MANAGEMENT PLAN

A documented plan developed to manage one, or a portfolio of, assets. It combines multidisciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost-effective way to provide a specified level of service. The plan specifies approaches, programmes, projects, activities, resources, responsibilities and time frames across the life cycle of the asset(s) planned for, or over a time frame appropriate for robust life-cycle planning.

ASSET MANAGEMENT PRACTICES (IIMM)

The asset management processes and techniques that an entity undertakes, such as demand forecasting, developing and monitoring levels of service and risk management.

ASSET MANAGEMENT STRATEGY (IIMM)

The high-level, long-term approach to asset management including asset management action plans and objectives for managing the assets.

ASSET MANAGEMENT SYSTEM (ISO 55 000)

A management system whose function it is to establish the asset management policy and objectives, as well as processes and organisational arrangements inclusive of structure, roles and responsibilities to achieve asset management objectives.

ASSET REGISTER (LGIAMG)

A record of asset information considered worthy of separate identification for both asset accounting and strategic management purposes including inventory, historical, condition and construction, technical and financial information about each.

Note: The unit of account in an asset register is a component (see definition of a component).

ASSET SYSTEM (ISO 55 000)

Set of assets that interact or are interrelated.

ASSET TYPE (ISO 55 000)

Grouping of assets having common characteristics that distinguish those assets as a group or class.

ATTRIBUTE DATA

Data in tabular format (rows and columns).

AUDIT (ISO 55000)

Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled.

AUTHORISED PERSON

The municipal manager, chief executive or the appropriately delegated authority to award, cancel, amend, extend or transfer a contract or order.

BENEFIT-COST ANALYSIS – COMMUNITY

Discounted cash flow that takes into account the benefits and costs of an investment opportunity to the entity and the community it serves.

BENEFIT-COST ANALYSIS – ORGANISATION

Discounted cash flow that takes into account the benefits and costs of an investment opportunity to the entity only.

BIOLOGICAL NUTRIENT REMOVAL (BNR)

Biological nutrient removal is a process used for nitrogen and phosphorus removal from wastewater before it is discharged into surface or groundwater.

BROWNFIELDS DEVELOPMENT

Development that is restricted by existing fixed structures, often necessitating some extent of demolition prior to starting the intended construction.

CAPACITY (IIMM)

Maximum output that can be produced or delivered using the existing network or infrastructure.

CAPITAL (FINANCIAL CONCEPT OF)

Net assets of an entity.

CAPITAL (PHYSICAL CONCEPT THEREOF)

The productive capacity of an entity as measured by the optimised depreciated replacement cost method.

CAPITAL EXPENDITURE (CAPEX)

Expenditure used to create new assets, increase the capacity of existing assets beyond their original design capacity or service potential, or to return the service potential of the asset or expected useful life of the asset to that which it had originally. CAPEX increases the value of capital asset stock.

CAPITAL UPGRADING

Enhances the service potential of the asset or the economic benefits that can be obtained from use of the asset and may also increase the life of the asset beyond that initially expected.

CASH FLOW

The stream of costs and/or benefits over time resulting from a project investment or ownership of an asset.

CHEMICAL OXYGEN DEMAND (COD)

A chemical oxygen demand test is commonly used to measure indirectly the amount of organic compounds in water. Most applications of COD determine the level of organic pollutants in surface water (e.g. lakes and rivers) or wastewater, making COD a useful measure of water quality.

COMPETENCE (ISO 55 000)

The ability to apply knowledge and skills to achieve intended results.

COMPONENT (IIMM)

A component (Note 1) is a specific part of a complex item (Note 2) that has independent physical or functional identity and specific attributes such as different life expectancy, maintenance and renewal requirements and regimes, risk or criticality.

Note 1: A component is separately recognised and measured (valued) in the organisation's asset register as a unique asset record, in accordance with the requirements of GRAP 17 to componentise assets.

Note 2: A complex item is one that can be disaggregated into significant components. Infrastructure and buildings are considered complex items.

CONDITION (IIMM)

The physical state of the asset.

CONDITION ASSESSMENT OR CONDITION MONITORING (IIMM)

The inspection, assessment, measurement and interpretation of the resultant data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action.

CONFORMITY (ISO 55 000)

Fulfilment of a requirement.

CONTROL BUDGET

The amount of money which is allocated or made available to deliver or maintain infrastructure associated with a project or package, including site costs, professional fees, all service and planning charges, applicable taxes, risk allowances and provision for price adjustment for inflation.

CONTRACT MANAGEMENT

Applying the terms and conditions, including the agreed procedures for the administration thereof.

CONTRACTOR

Person or organisations who contract with the employer to provide goods or services or any combination thereof covered by the contract.

CONSTANT PRICE

Price excluding adjustment for inflation.

CONTINUAL IMPROVEMENT (ISO 55 000)

Recurring activity to enhance performance.

CORRECTIVE MAINTENANCE

Maintenance carried out after a failure has occurred and intended to restore an item to a state in which it can perform its required function. Corrective maintenance can be planned or unplanned.

CRITICAL ASSETS (IIMM)

Those assets that are likely to result in a more significant financial, environmental and social cost in terms of their impact on organisational objectives and service delivery.

CURRENT REPLACEMENT COST (IIMM)

The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business, or the minimum it would cost to replace the existing asset with a new modern equivalent asset with the same economic benefits, allowing for any differences in the quantity and quality of output and in operating costs.

CUSTOMER DATABASE

A database of all customers within the municipality. Each line in the database describes some form of geography (a building, land parcel, or a census sub place), each column in the database describes some attribute of the customer.

CUSTOMER PROFILE

A summarised version of the customer database, quantifying the number of customers for a specific geographic area.

DEAL BREAKER

A non-negotiable policy or other requirement (e.g. minimum performance standard or condition level of an asset) that must be adhered to.

DECOMMISSIONING (IIMM)

Actions required to take an asset out of service.

DEFECT

Non-conformity of a part or component of the works to a requirement specified in terms of a contract.

DEFERRED MAINTENANCE

The portion of planned maintenance work necessary to maintain the service potential of an asset that has not been undertaken in the period in which such work was scheduled to be undertaken.

DEMAND MANAGEMENT

The active intervention in the market to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management is based on the notion that as needs are satisfied expectations rise automatically and almost every action taken to satisfy demand will stimulate further demand.

DENSITY

Measurement of the population of a defined urban area, excluding non-urban land uses. Non-urban uses include regional open space, agriculture and water bodies. Density can be measured using any of the following means, depending on the purpose of the measurement:

- **Floor area ratio (FAR)** the total floor area of buildings divided by land area of the lot on which they are built
- **Residential density** the number of dwelling units in a given area
- **Population density** the number of people in a given area
- **Employment density** the number of jobs in a given area
- **Gross density** any density figure for a given area of land that includes uses not necessarily directly relevant to the figure (normally roads, typically accounting for about 20 per cent the land cover of a settlement)
- **Net density** a density figure for a given area of land that excludes land not directly related to the figure.

DEPRECIATED REPLACEMENT COST (IIMM)

The replacement cost of an asset less accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired economic benefits of the asset.

DEPRECIATION (GRAP)

Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life.

DERECOGNITION

To remove a previously recognised financial asset or liability from an entity's balance sheet, especially when it reaches end of life or when it is sold to a third party.

DISAGGREGATE

Break down into separate parts or entities.

DISCOUNTED CASH FLOW

A technique to convert cash flows that occur over time to equivalent amounts at a common point in time. It is the process of finding present values, which is the inverse of compounding interest.

DISCOUNT FACTOR

A rate or factor used to relate present and future money values. Also referred to as the discount rate, hurdle rate, required return, cost of capital or opportunity cost. For the purposes of this Toolkit the discount factor in formulae is denoted with an "r".

DESIGNATED PERSON

A person who assists the appointed municipal manager, chief executive or delegated person to perform his or her functions effectively.

DISPOSAL (IIMM)

Actions necessary to decommission and dispose of assets that are no longer required.

DRY WEATHER FLOW

Flow in a sanitary sewer during periods of dry weather in which the sanitary sewer is under minimum influence of stormwater runoff inflow and groundwater infiltration.

EARLY CONTRACTOR INVOLVEMENT

Early contractor involvement is an approach to contracting that supports improved team performance and planning to deliver value for money.

ECONOMIC LIFE (IIMM)

The period from acquiring the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to the physical life, however obsolescence will often ensure that the economic life is less than the physical life.

EMPLOYER

Organ of state intending to or entering into a contract with a contractor.

ENVIRONMENTAL IMPACT ASSESSMENT

An assessment of the environmental consequences (positive and negative) of a plan, policy, programme, or project prior to the decision to move forward with the proposed action.

EVALUATION COMMITTEE

Committee that evaluates bids received in response to an invitation issued.

EXTERNALITIES

Benefits, costs or actions that have an impact on third parties as a result of the entity's actions or non-action.

FACILITY (IIMM)

A complex comprising many assets (e.g. a hospital, water treatment plant, recreation complex, etc.), which represents a single management unit for financial, operational, maintenance or other purposes.

FAILURE MODES

Ways in which an asset can fail in relation to required levels and standards of service that trigger asset management planning and potentially investment decision making:

- Capacity
- Condition
- Cost of operation
- Performance.

FAILURE MODES, EFFECTS AND CRITICALITY ANALYSIS (IIMM)

A systematic, logical risk-based maintenance approach aimed at maximising the reliability of plant and equipment assets.

FINANCING COSTS

Includes annual interest costs and capital repayments (principle amount) for the investment over the period of the loan.

FRAMEWORK AGREEMENT

An agreement between an organ of state and one or more contractors, the purpose of which is to establish the terms governing orders to be awarded during a given period, in particular with regard to price and, where appropriate, the quantity envisaged.

GATE

A control point at the end of a process where a decision is required before proceeding to the next process or activity.

GATEWAY REVIEW

An independent review of the available information at a gate upon which a decision to proceed or not to the next process is based.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Software that provides a means of spatially viewing, searching, manipulating and analysing an electronic database.

GREENFIELDS DEVELOPMENT

Development that is unconstrained by existing fixed structures.

GREEN DROP REPORT

An incentive-based regulation as a means to identify, reward, ensure and encourage excellence in wastewater management.

IMPACT

Impacts are effects that either positively contribute to an outcome or strategic objective, such as increased revenue, or that reduce risks such as environmental disasters, workplace injuries, loss of property, or damage to the reputation or image of the organisation.

IMPAIRMENT

The loss of future economic benefits or service potential of an asset over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation.

IMPAIRMENT LOSS (GRAP)

An impairment loss of a cash-generating asset or a non-cash-generating asset is the amount by which the carrying amount of an asset exceeds its recoverable amount.

INCIDENT (ISO 55 000)

Unplanned event or occurrence resulting in damage or other loss.

INDICATORS (IN MULTICRITERIA ANALYSIS)

The criteria used to measure a broad range (e.g. financial, economic, social and environmental) outcomes of a project in a multicriteria analysis.

INFILL DEVELOPMENT

New construction that “fills in the gaps” in an already urbanised area. This type of development has the potential to use existing infrastructure, increase density, limit urban sprawl and strengthen the existing economy.

INFRASTRUCTURE ASSETS

Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components.

INFRASTRUCTURE DELIVERY

The combination of all planning, technical, administrative and managerial actions associated with the construction, supply, refurbishment, rehabilitation, alteration, maintenance, operation or disposal of infrastructure.

INFRASTRUCTURE PROCUREMENT

The procurement of goods or services including any combination thereof associated with the acquisition, refurbishment, rehabilitation, alteration, maintenance, operation or disposal of infrastructure

INTANGIBLES

A component that is difficult to quantify in a measurable way.

INTEGRATED DEVELOPMENT PLAN

An approach to planning that involves the entire municipality and its citizens in finding the best solutions to achieve good long-term development.

INTERNAL RATE OF RETURN

IRR is the discount rate that equates the present value of net cash inflows with the initial investment in the project, resulting in a $NPV = 0$. The IRR is the true yield of the investment, expressed as a rate of return.

INVENTORIES (GRAP)

Inventories are assets: (a) in the form of materials or supplies to be consumed in the production process; (b) in the form of materials or supplies to be consumed or distributed in the rendering of services; (c) held for sale or distribution in the ordinary course of operations; or (d) in the process of production for sale or distribution.

INVESTMENT COSTS

The initial capital investment plus any intermittent capital expenditure required to achieve the project outcomes.

KEY PERFORMANCE INDICATOR (KPI)

Set of quantifiable measures that an industry uses to gauge or compare performance in terms of meeting strategic and operational goals.

LAND ASSEMBLY

The process of packaging land to the point that it can be used for its intended function. One of the most important steps in this process is ensuring that all necessary land rights are in place before development can commence.

LEVEL OF SERVICE (IIMM)

Levels of service statements describe the outputs or objectives an entity intends to deliver to customers.

LIFE

A measure of the anticipated life of an asset or component, such as time, number of cycles, distance intervals etc. over which benefits are derived from the use or availability of an asset.

LIFE CYCLE (IIMM)

The time interval that commences with the identification of the need for an asset and terminates with the decommissioning of the asset or any liabilities thereafter.

LIFE CYCLE ASSET MANAGEMENT

Encompasses all asset management strategies and practices associated with an asset or group of assets that result in the lowest life cycle cost necessary to achieve stated service requirements within acceptable risk parameters.

LIFE CYCLE COST (IIMM)

The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, renewal and disposal costs.

MAINTENANCE

All actions intended to ensure that an asset performs a required function to a specific performance standard(s) over its expected useful life by keeping it in as near as practicable to its original condition, including regular recurring activities to keep the asset operating, but specifically excluding renewal. Refer to Appendix A for a hierarchy of maintenance type, approach and actions.

Note: Maintenance also specifically excludes restoring the condition or performance of an asset following a recognised impairment event, which would be classified as either renewal or upgrading, depending on the circumstances.

MAINTENANCE OF CAPITAL

Expenditure to ensure that the productive or operating capacity of the asset base is maintained over time. The value vested in capital assets is maintained when the entity has at least as much capital at the end of the period as it had at the beginning thereof.

MAINTENANCE EXPENDITURE

Recurrent expenditure as required to ensure that the asset achieves its intended useful life. Maintenance is funded through the entity's operating budget, and such expenditure is expensed in the entity's Statement of Financial Performance.

MAINTENANCE PLAN

Describes the planned and unplanned maintenance actions for an asset, facility or portfolio of assets, with intended delivery methods and schedules, budget requirements and responsible parties.

MAINTENANCE OBJECTIVES (IIMM)

Objectives for what maintenance has to achieve to ensure the assets are in the right condition to meet the needs of the entity. Maintenance performance measures and targets are the means of assessing whether the maintenance objectives are being met.

MAINTENANCE STANDARDS

The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practice, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives.

MAINTENANCE STRATEGY

Interprets higher-order documents and formulates maintenance objectives and targets, establishes maintenance tactics, and defines maintenance roles and responsibilities.

MAJOR CAPITAL PROJECT

An infrastructure project or a series of interrelated infrastructure projects on a single site having an estimated cost, including those required for new facilities or systems to become fully operational, above a prescribed threshold.

MATERIAL (GRAP)

Omissions or misstatements of items are material if they could, individually or collectively, influence the decisions or assessments of users made on the basis of the financial statements. Materiality depends on the nature or size of the omission or misstatement judged on the surrounding circumstances. The size of the information item, or a combination of both, could be the determining factor.

MEMBRANE BIOREACTOR (MBR)

Membrane bioreactor is the combination of a membrane process like microfiltration or ultrafiltration with a suspended growth bioreactor, and is now widely used for municipal and industrial wastewater treatment.

METROPOLITAN MUNICIPALITY: A Category A municipality as provided for in section 155 of the Constitution of the Republic of South Africa, 1996.

MODERN EQUIVALENT ASSET (IIMM)

The most cost-efficient asset currently available, which will provide equivalent functionality to the asset that will be replaced (or is currently being valued using the DRC methodology).

MONITORING (ISO 55000)

Determining the status of a system, a process or an activity.

MONOCENTRIC CITY

A city structure with one dominant core, typically the Central Business District (CBD), which is the hub of economic activity and employment in the city.

MULTICRITERIA ANALYSIS

An analysis technique that takes into account a range of qualitative and quantitative criteria reflecting the financial, economic, social and environment characteristics of the investment opportunity.

NET BENEFITS

The sum of annual benefits less annual costs in the year of the project/asset's life.

NET PRESENT VALUE

The value of an asset to the entity in present money terms. It is the net amount of discounted cash inflows arising from the use and subsequent disposal of the asset, after deducting the value of the discounted total cash outflows.

NODE

A centre of activity, economic or otherwise. These often occur at intersections of major corridors, but some just function as the centre of their neighbourhood.

NUMERAIRE (FOR PURPOSES OF OPTIMISED DECISION MAKING AND INVESTMENT ANALYSIS)

The numeraire is the money unit of measure within an abstract macroeconomic model in which there is no actual money, but other forms of utility value or costs.

OBJECTIVE (ADJUSTED FROM ISO 55000)

Result to be achieved at strategic, tactical or operational level. Objectives can be set in a variety of domains or outcome areas (e.g. economic, social or environmental outcomes), or can relate to elements of the entity (e.g. corporate level or units in the entity), or can relate to processes, services, products, programmes and projects.

OBSCOLESCENCE (OPTIMISED DECISION-MAKING GUIDELINES)

The asset can no longer be maintained, or suffers a loss in value due to a decrease in the usefulness of the asset, caused by technological change, or changes in people's behavioural patterns or tastes, or environmental changes.

OPERATING EXPENDITURE

OPEX is recurrent expenditure to provide services. Examples of OPEX include staff costs, administration costs, consumables, maintenance and repairs and feasibility studies.

OPERATION

Combination of all technical, administrative and managerial actions, other than maintenance actions, that results in the item being in use.

OPPORTUNITY COST

The cost of cash flows that could have been earned in the best alternative investment opportunity.

OPTIMISED DECISION MAKING (IIMM)

Two definitions are:

- A formal process to identify and prioritise all potential solutions with consideration of financial viability, social and environmental responsibility and cultural outcomes
- an optimisation process for considering and prioritising all options to rectify existing or potential performance failure of assets. The process encompasses NPV analysis and risk assessment.

ORDER

An instruction to provide goods, services or any combination thereof under a framework agreement

OUTLINE SPECIFICATIONS

Preliminary set of specifications (generated during the early phases of a design process) on which detailed specifications are based.

PACKAGE

Work which is grouped together for delivery under a single contract or an order.

PERFORMANCE (ISO 55 000)

Measurable result of either a quantitative or qualitative nature that can relate to the management of activities, processes, products or services, systems or entities.

PERFORMANCE MEASURE (IIMM)

A qualitative or quantitative measure used to measure actual performance against a standard or other target. Performance measures are used to indicate how the entity is doing in relation to delivering levels of service.

PERFORMANCE MONITORING

Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.

POLICY

Intentions and direction of an entity as formally expressed in a documented statement approved by top management and communicated throughout the entity.

POLYCENTRIC CITY

A city structure that typically has a weak, diffused core, and several competing primary nodes. Employment opportunities in a polycentric city are dispersed.

PORTFOLIO

To be read in context, as follows:

- Asset portfolio: a grouping of assets to deliver a range of services associated with a particular function. Examples of asset portfolios include water and sanitation, roads and stormwater, electricity distribution, solid waste, information and communications technology, social amenities and investment properties.
- In relation to infrastructure procurement and delivery management: a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet a strategic objective.

PREDICTIVE ACTION (ISO 55 000)

Action to monitor the condition of an asset and predict the need for preventative or corrective action. Also referred to as condition monitoring or performance monitoring.

PREVENTATIVE ACTION (ISO 55 000)

Action to eliminate the cause of a potential nonconformity or other undesirable potential situation.

PREVENTATIVE MAINTENANCE

Maintenance carried out at predetermined intervals, or corresponding to prescribed criteria, and intended to reduce the probability of failure or the performance degradation of an item. Preventative maintenance is planned or carried out on opportunity.

PROCESS (ISO 55 000)

Set of interrelated or interacting activities, which transform inputs into outputs.

PROCUREMENT DOCUMENT

Documentation used to initiate or conclude (or both) a contract or the issuing of an order.

PROCUREMENT DOCUMENTATION COMMITTEE

A committee that compiles procurement documentation as per the services specifications.

PROCUREMENT STRATEGY Selected packaging, contracting, pricing and targeting strategy and procurement procedure for a particular procurement.

PROFESSIONAL SERVICE PROVIDER (PSP)

Any person or body corporate who provides on a fiduciary basis, labour and knowledge based expertise which is applied within reasonable skill, care and diligence to the municipality, and is, appointed by the municipality to undertake an assignment for the provision of professional services.

PROGRAMME

The grouping of a set of related projects in order to deliver outcomes and benefits related to strategic objectives which would not have been achieved had the projects been managed independently.

PROJECT

A project can be defined as:

- an unique set of coordinated and controlled processes and activities;
- undertaken to achieve a specific objective(s) according to specifications;
- within a defined timeframe (start and end dates);
- that consume resources (e.g. funds, labour, materials and equipment); and
- is confined by a control budget.

PROPERTY, PLANT AND EQUIPMENT (PPE) (GRAP)

Property, plant and equipment are tangible items that: (a) are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and (b) are expected to be used during more than one reporting period.

PUBLIC PRIVATE PARTNERSHIP (PPP)

A commercial transaction between an organ of state and a private party in terms of which the private party:

- performs an institutional function on behalf of the organ of state or acquires the use of state property for its own commercial purposes; and
- assumes substantial financial, technical and operational risks in connection with the performance of the institutional function or use of state property; and
- receives a benefit for performing the institutional function or from utilising the state property, either by way of:
 - consideration to be paid by the organ of state which derives from a revenue fund or, where an organ of state is a national government business enterprise or a provincial government business enterprise, from the revenues of such institution; or
 - charges or fees to be collected by the private party from users or customers of a service provided to them; or
 - a combination of such consideration and such charges or fees.

QUALITY

Totality of features and characteristics of a product or service that bear on the ability of the product or service to satisfy stated or implied needs.

RELATIONAL DATABASE MANAGEMENT SYSTEM

A relational database management system (RDBMS) is a database management system (DBMS) that is based on the relational model.

RELIABILITY-CENTRED MAINTENANCE (IIMM)

A process for optimising maintenance based on the reliability characteristics of the asset.

REMAINING USEFUL LIFE (IIMM)

The time remaining until an asset ceases to provide the required service level or economic usefulness.

RENEWAL

Expenditure on an existing asset that returns the service potential of the asset or expected useful life of the asset to that which it had originally.

Note 1: Renewal can include works to replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability.

Note 2: Expenditure on renewals is funded through the entity's capital budget, and such expenditure is recognised in the entity's Statement of Financial Position.

REPAIR

Physical action taken to restore the required function of a faulty item.

REPLACEMENT CASH FLOW DECISION

Cash flows to be determined for the replacement of an existing asset, where the investment analyst must find the incremental cash outflows and inflows that will result from the replacement.

RESIDUAL VALUE

The estimated value of an asset at the end of its useful life, or the value that remains at the end of the analysis period where the asset useful life exceeds the analysis period. The residual value is considered as a benefit (cash inflow) in the final year of the analysis period.

RETENTION SUM

Sum retained for a certain period to offset costs which may arise from the contractor's failure to comply fully with the contract.

RISK (IIMM)

The effect of uncertainty on objectives. Risk events are events that may compromise the delivery of the entity's strategic objectives.

RISK CONTROLS (IIMM)

Measures to manage or mitigate identified risks.

RISK EXPOSURE (IIMM)

The level of risk to which an entity is exposed. Risk exposure is a function of the probability of an occurrence times the impact of that occurrence.

RISK MANAGEMENT (IIMM)

The application of a formal process that identifies the exposure of an entity to service performance risk and determines appropriate responses.

RISK REGISTER (IIMM)

A record of information that stipulates risks identified, the levels of risk exposure before and after implementation of risk controls, and details of appointed risk owners as a minimum.

ROUTINE MAINTENANCE (IIMM)

Day-to-day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative and periodic maintenance.

SENSITIVITY ANALYSIS

Testing of the variations in the outcome of an evaluation by altering the values of key factors about which there may be uncertainty.

SETTLING TANK

Separation equipment normally part of a process that involves separating solids from liquid. When treating wastewater, filtered liquid is held in a settling tank where suspended particles are allowed to settle to the bottom of the tank and the clarified liquid is allowed to flow through.

SERVICE DELIVERY AGREEMENT

An agreement between two or more organs of state setting out the terms and conditions and roles and responsibilities regarding infrastructure delivery which promotes and facilitates inter-institutional relations and the principles of participation, cooperation and coordination.

SMALL MEDIUM MICRO ENTERPRISE

A business in which one or more of the following apply:

- fewer than 5 full-time employees
- an annual turnover of R150 000
- assets (excluding property) of R100 000

SPATIAL DEVELOPMENT FRAMEWORK

A spatial development framework (SDF) is the principal strategic planning instrument, which guides and informs all planning and development, and all decisions with regard to planning, management and development in the municipality.

SPATIAL PLANNING

Spatial planning is a process of place shaping and delivery. It is about the management of space and development in order to create better places, responding to the needs of society, the economy and the environment. Spatial planning systems are the methods used by the public sector to influence the distribution of people and activities in spaces of various scales. Discrete professional disciplines, which involve spatial planning include land use, urban, regional, transport and environmental planning.

STAGE

A collection of logically related activities in the infrastructure delivery cycle that culminates in the completion of a major deliverable.

STATEMENT OF FINANCIAL PERFORMANCE

The Statement of Financial Performance, also known as an income statement, shows the revenue and expenses of an entity over a period of time.

STATEMENT OF FINANCIAL POSITION

The Statement of Financial Position, also known as the balance sheet, presents the financial position of an entity at a given date. The statement comprises three main components, these being assets, liabilities and equity, and gives users of financial statements insight into the financial soundness of an entity in terms of liquidity risk, financial risk, credit risk and business risk.

STATUTORY PERMISSION

Any relevant approval, consent or permission in terms of any legislation required to plan and deliver the infrastructure.

SUNK COSTS

Cash outlays already made (past expenditures) that therefore have no effect on the cash flows relevant to the current investment decision. As a result sunk costs should be excluded from a project's incremental cash flows in a replacement cash flow investment decision.

TARGET CONTRACT

A cost reimbursement contract in which a preliminary target cost is estimated and on completion of the work the difference between the target cost and the actual cost is apportioned between the parties to the contract on an agreed basis.

TENDER COMMITTEE

A committee who adjudicate the recommendation of the evaluation committee.

UNPLANNED MAINTENANCE (IIMM)

Corrective work required in the short term to restore an asset to working condition so that it can continue to deliver the required service or to maintain its level of security and integrity.

UPGRADING

The replacement of an asset or addition/ replacement of an asset component, which materially improves the original service potential of the asset.

USEFUL LIFE (GRAP)

The useful life of an asset is the period over which an asset is expected to be available for use by an entity or the number of production or similar units expected to be obtained from the asset by an entity.

VALUATION

Estimated asset value, which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels or market value for life cycle costing.

VALUE FOR MONEY

The optimal use of resources to achieve intended outcomes.

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

WACC is the combination of cost of debt capital, being the interest rates for borrowing short-term and long-term debt, and the opportunity cost of capital for equity, which is the risk-free interest rate for equity funds on deposit.

WET WEATHER FLOW

Dry weather flow combined with groundwater infiltration and/ or stormwater runoff inflow in a sanitary sewer.

ACRONYMS

The following acronyms appear in this manual

AADD	Annual average daily demand	FIDIC	International Federation of Consulting Engineers
ABE	Affirmable business enterprise	FMECA	Failure modes, effects and criticality analysis
AC	Actual cost	FY	Financial year
AFS	Annual financial statements	FYTD	Financial year to date
AM	Asset management	GCC	SAICE General Conditions of Contract for Construction Works
AMP	Asset management plan	GDP	Gross domestic product
AR	Asset register	GDS	Growth and development strategy
BAC	Budget at completion	GFMAM	Global Forum for Maintenance and Asset Management
BCA	Benefit-cost analysis	GFS	Government financial statistics
BNR	Biological nutrient removal	GIS	Geographic information system
CAPEX	Capital expenditure	GL	General ledger
CBD	Central business district	GRAP	Generally recognised accounting practice
CCTV	Closed circuit television camera	GVA	Gross value add
CG	Condition grade	HA	Hectare
CIDB	Construction Industry Development Board	IAM	Infrastructure asset management
CIIP	City integrated infrastructure plan	IAMP	Infrastructure asset management (also see AMP)
CIPDP	City infrastructure programme delivery plan	IAS	International Accounting Standards
CO₂	Carbon dioxide	ICDG	Integrated Cities Development Grant
COD	Chemical oxygen demand	ICE	Institution of Civil Engineers
CPI	Cost performance index	ICT	Information and communication technology
CPS	Construction procurement strategy	IDMS	Infrastructure delivery management system
CRC	Current replacement cost	IDP	Integrated development plan
CSIR	Council for Scientific and Industrial Research	IIMM	International Infrastructure Management Manual
CV	Cost variance	IRR	Internal rate of return
DCF	Discounted cash flow	ISO	International Standards Organisation
DEA	Department of Environmental Affairs	IT	Information technology
DORA	Division of Revenue Act	JBCC	Joint Building Contracts Committee
DPRN	Depreciation	Kℓ	Kilolitre
DRC	Depreciated replacement cost	KM	Kilometre
DRDLR	Department of Rural Development and Land Reform	KWH	Kilowatt per hour
DU	Dwelling unit	KPI	Key performance indicators
DWF	Dry weather flow	LED	Local economic development
DWS	Department of Water and Sanitation	LGIAMG	Local Government Infrastructure Asset Management Guidelines
EAC	Estimate at completion	LOS	Level of service
ECC	NEC3 Engineering and Construction Contract	M²	Square metre
ECI	Early contractor involvement	MBR	Membrane bioreactor
ECSA	Engineering Council of South Africa	MCA	Multi-criteria analysis
ECSC	NEC3 Engineering and Construction Short Contract	MEA	Modern equivalent asset
EIA	Environmental impact assessment	MFMA	Municipal Finance Management Act, No. 56 of 2003
EPWP	Expanded Public Works Programme	MIG	Municipal Infrastructure Grant
ETC	Estimate to completion	MSCOA	Municipal standard chart of accounts
EUL	Expected useful life	MTREF	Medium-Term Revenue and Expenditure Framework
EV	Earned value		
EVM	Earned value management		
FAR	Financial asset register		

MVA	Megavolt-Ampere (unit of electrical power)	SPI	Schedule performance indicator
MWA	JBCC Minor Works Agreement	SV	Schedule variance
NEMA	National Environmental Management Act, No. 107 of 1998	TSC	NEC3 Term Service Contract
NDG	Neighbourhood Development Grant	TSSC	NEC3 Term Service Short Contract
NDP	National Development Plan - 2030	UFW	Unaccounted for water
NEC	New Engineering Contract	V	Volt (unit of electrical potential)
NT	National Treasury	VAC	Variance at completion
O&M	Operations and maintenance	VAR	Valuation asset register
OPEX	Operating expenditure	VIP	Ventilated improved pit toilet
PBA	JBCC Principal Building Agreement	WACC	Weighted average cost of capital
PC	Percentage complete	WBS	Work breakdown structure
PV	Planned value A metric used in project management performance measurement Present value Relates to the time value of money in investment appraisal	WSP	Water service provider
PPE	Property, plant and equipment	WTW	Water treatment works
PPP	Public private partnership	WWF	Wet weather flow
PSC	NEC3 Professional Services Contract	WWTW	Waste-water treatment works
PSI	Public service industries		
PSP	Professional service provider		
PSSC	NEC3 Professional Services Short Contract		
PST	Primary settling tank		
QA	Quality assurance		
R	Rand		
RCM	Reliability-centred maintenance		
RDBMS	Relational database management system		
ROA	Return on assets		
RUL	Remaining useful life		
RV	Residual value		
SAICE	South African Institute of Civil Engineering		
SANRAL	South African National Roads Agency		
SANS	South African National Standard		
SC	NEC3 Supply Contract		
SCM	Supply chain management		
SCOA	Standard Chart of Accounts		
SDBIP	Service delivery and budget improvement plan		
SDF	Spatial development framework		
SG	Surveyor General		
SIPDP	Sector infrastructure programme delivery plan		
SSC	NEC3 Supply Short Contract		
SST	Secondary settling tank		
SLA	Service level agreement		
SMME	Small medium micro enterprise		
SPLUMA	Spatial Planning and Land Use Management Act No. 16 of 2013		
SPSC	CIDB Standard Professional Service Contract		

CITIES' **INFRASTRUCTURE**
DELIVERY AND
MANAGEMENT SYSTEM **CIDMS**

