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

CIDMS

MODULE 9

Fundamentals of infrastructure procurement & delivery

national treasury
Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

cItIEs SUPPORT PROGRAMME

IUDF
INTEGRATED URBAN DEVELOPMENT FRAMEWORK

NDP 2030

MODULE PURPOSE

The asset management system articulated in **Module 2,** and the asset management processes described in **Modules 3 – 8**, identify lifecycle delivery actions to be actioned to achieve stated asset management objectives. This CIDMS Toolkit advocates robust lifecycle planning as a prerequisite for meeting asset management objectives, to ensure value-for-money infrastructure delivery. Accordingly, cities should prepare asset management plans and a strategic asset management plan which define required capital and operating lifecycle delivery actions over the short, medium and long term in the form of projects and programmes. This module:

1. Describes the infrastructure delivery management system through which capital and operating lifecycle delivery actions are implemented, based on the National Treasury Standard for Infrastructure Procurement and Delivery Management (SIPDM);
2. Presents the control frameworks for infrastructure delivery management and infrastructure procurement;
3. Defines projects and programmes, and provides guidance related to the packaging of these; and
4. Addresses governance arrangements.

WHY

Infrastructure delivery involves the spending of limited public money, aimed at creating value for society. The extent of funding involved and the nature and scale of value impacts on relevant stakeholders, ensures great interest from all stakeholders involved, including taxpayers, government, professional service providers, construction companies and ultimate beneficiaries of infrastructure created. Accordingly, cities need to implement and manage infrastructure procurement and delivery management systems that are effective and efficient, deliver value, and that meet society's requirements for open, transparent and accountable systems.

OUTPUTS OF MODULE 5:

1. adoption of a supply chain management policy that enables the adoption of a city infrastructure procurement and delivery management system.
2. projects and programmes that are packaged for success, and in accordance with the requirements of mSCOA.

KEY RELEVANT NATIONAL REGULATIONS, POLICIES AND STRATEGIES:

- Broad-Based Black Economic Empowerment Act, No. 53 of 2003

- Constitution of the Republic of South Africa, No. 108 of 1996

- Construction Industry Development Board Act, No. 38 of 2000

- Engineering Profession Act, No. 46 of 2000

- Landscape Architectural Profession Act, No. 45 of 2000

- Local Government: Municipal Finance Management Act, No.56 of 2003

- Municipal Systems Act, No. 32 of 2000

- National Archives and Record Services of South Africa Act, No. 43 of 1996

- Occupational Health and Safety Act, No. 85 of 1993

- Preferential Procurement Policy Framework Act, No. 5 of 2000

- Project and Construction Management Professions Act, No. 48 of 2000

- Quantity Surveying Profession Act, No. 49 of 2000

- Standard for Infrastructure Procurement and Delivery Management

- South African Bureau of Standards 10845-1, Construction procurement – Part 1: Processes, methods and procedures

- South African Bureau of Standards 10845-2, Construction procurement – Part 2: Formatting and compilation of procurement documentation

- South African Bureau of Standards 10845-3, Construction procurement – Part 3: Standard conditions of tender

- South African Bureau of Standards 10845-4, Construction procurement – Part 4: Standard conditions for the calling for expressions of interest

- Construction Industry Development Board, Standard for Uniformity in Construction Procurement

CONTENTS

Module 9 *Fundamentals of infrastructure procurement & delivery*

LIST OF
Figures that appear in this toolkit

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

LIST OF

Tables that appear in this toolkit

9.1 INTRODUCTION

The delivery of infrastructure in South African metropolitan spaces is measured in billions of Rand annually. Done effectively, infrastructure transforms neighbourhoods and cities, enables economic growth and improves quality of life.

Infrastructure delivery is by its nature a complex process, and the focus of attention by many stakeholders in society. Despite many successes in the roll-out of infrastructure, the public sector, inclusive of metropolitan municipalities, has been struggling with blocked infrastructure project pipelines that impeded the true growth and development potential of South Africa. Given the stakes involved, several stakeholders have legitimate interests in infrastructure, some of whom include:

- Taxpayers to a large extent fund public infrastructure, and have interests in ensuring prudent expenditure of public monies resulting in value for money;
- Intended and existing beneficiaries of infrastructure services, as it affects their way of life and the economic opportunities available to them;
- Government who uses infrastructure investment as a lever for meeting national policy objectives;
- The built environment professional services community, as the manner of infrastructure procurement affects the scope, quality, cost and timing of services they provide;
- The construction community, which is to a large extent dependent on government infrastructure delivery for their income;
- Various interest groups who require specific outcomes from infrastructure delivery which may extend beyond the production, maintenance, upgrading or renewal of infrastructure, and include
- Requirements for social or economic opportunities, or environmental protection; and
- The funding community who requires assurances on the quality of both the processes applicable to infrastructure procurement and delivery, as well as the quality of the outcomes of these processes.

Evidence of the importance of infrastructure procurement and delivery to stakeholders is all around us, and can be measured in metrics such as investor confidence, fixed capital investment, country risk ratings and economic performance ratings, service delivery protests and the number of legal challenges relating to infrastructure procurement. The funding involved in infrastructure delivery, and the impacts thereof on multiple stakeholders in society, demands the adoption and implementation of a modern, robust government infrastructure procurement and delivery management system that enables excellence, ensures value for money delivery of infrastructure, and which is perceived to be fair, accountable and transparent by all parties.

CIDMS CITIES' INFRASTRUCTURE DELIVERY AND MANAGEMENT SYSTEM

The National Treasury responded to the demands of society and published the Standard for Infrastructure Procurement and Delivery Management (SIPDM) in 2015. The SIPDM is a ground breaking piece of work, introducing several reforms and best practices related to infrastructure procurement and delivery management, based on, amongst others, relevant SANS construction procurement standards. The SIPDM firstly separates the supply chain for public sector infrastructure from that of general goods and services. Importantly, the SIPDM establishes quality as an objective criterion in the evaluation of tenders alongside price and preference, whereas in the past quality or functionality was treated as an initial hurdle before finally considering price and preference. It demands proper project planning and allows for the use of framework contracts as appropriate.

The infrastructure delivery modules of this toolkit, that collectively comprise the "Lifecycle delivery" element of the Cities' asset management system presented in Module 2, are based on the SIPDM. These modules are structured as follows:

Module 9 introduces the SIPDM as a system and describes its key features. It explains the concepts of projects and programmes, and provides guidance for the packaging of these. Module 9 also explains the concepts of stages and gates, and presents the control frameworks for infrastructure procurement and infrastructure delivery.

Module 10 focuses on infrastructure procurement. With reference to the control framework for infrastructure procurement, it describes the procurement processes, key requirements and considerations, and permissible instruments and methods.

Module 11 deals with the processes, requirements, instruments and methods applicable to the delivery of infrastructure. It also presents typical project performance metrics.

9.2 THE STANDARD FOR INFRASTRUCTURE PROCUREMENT AND DELIVERY MANAGEMENT (SIPMD)

9.2.1 What is the SIPDM?

The National Treasury Standard for Infrastructure Procurement and Delivery Management (SIPDM) presents a tailored supply chain management system for infrastructure procurement and delivery, distinct from the procurement of general goods and services. The SIPDM:

Establishes a control framework for the planning, design and execution of infrastructure projects and infrastructure procurement

Applies to the procurement of all infrastructure-related goods, services and works, inclusive of professional services

Institutes requirements for the following aspects of the supply chain management (SCM) system for infrastructure procurement and delivery management – these matters are described in more detail in Section 9.2.2:

- Institutional arrangements
- Demand management
- Acquisition management
- Contract management
- Logistics management
- Disposal management
- Reporting of SCM information
- Regular assessment of SCM performance
- Risk management and internal control
- Minimum requirements for infrastructure procurement

The SIPDM includes the procurement of goods and services necessary for a new facility, as delivered, to be functional and utilised as a functional entity. The SIDPM does not apply to:

- The provision of municipal services by means of external mechanisms referred to in Chapter 8 of the Municipal Systems Act;
- Public-private partnerships;
- The disposal or letting of land;
- Conclusion of any form of land availability agreement;
- The leasing or rental of movable assets; or
- The storage of goods and equipment following their delivery to an organ of state, which are then stored and issued to contractors or employees of that organ of state.

9.3

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

9.2.2   Key aspects of the supply chain system for infrastructure procurement and delivery management

01   INSTITUTIONAL ARRANGEMENTS

Metropolitan municipalities and their municipal entities need to establish a suitable infrastructure procurement and delivery management SCM policy to implement the SIPDM. Such a policy as a minimum needs to:

- Assign responsibilities for approving or accepting deliverables associated with a gate in the control framework or authorising a procurement process or procedure;
- Establish delegations for the awarding of a contract or the issuing of an order; and
- Provide ethical standards for those involved in the procurement and delivery of infrastructure.

Metropolitan municipalities and their municipal entities who delegate or assign responsibilities to another organ of state need to enter into an agency agreement which sets out the terms, conditions, roles and responsibilities regarding infrastructure projects.

02   DEMAND MANAGEMENT

The demand management system needs to be aimed at ensuring that goods and services, or combinations thereof, are delivered at the right price, time and place, and that the quality and quantity of such goods or services satisfy needs. The demand for infrastructure delivery needs to be managed through the strategic asset management plan (SAMP) and the sectoral asset management plans (AMPs) **(see Module 7)**. Identified projects need to be prioritised and budgeted for in the SAMP and AMPs, and, wherever possible, be delivered in accordance with established norms and standards which are designed to generate value for money (see **Module 8** as well as **Section 9.6** for project packaging). Costs need to be proactively managed through the setting and proactive monitoring of control budgets for projects through the project planning, detailed design and site processes.

> " *The demand for infrastructure delivery needs to be managed through the SAMP and the sectoral AMPs..."*

03   ACQUISITION MANAGEMENT

Budget submission for budget approval to advance a project or package relating to the delivery or planned maintenance of infrastructure in a financial year need to be broken down into the stages contained in the control framework for infrastructure delivery management, as indicated in **Table 9.1.** Implementation plans relating to infrastructure capital works need to be developed for each project or package (work which is grouped together for delivery under a single contract or an order) which is to be delivered in a financial year. Financial data needs to be gathered to enable a financial report to be generated at regular intervals.
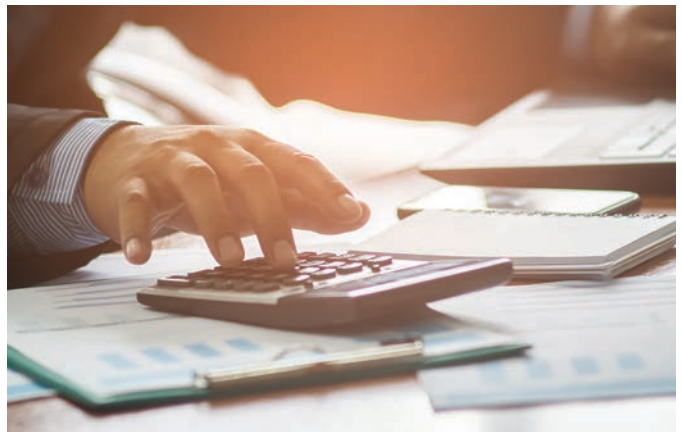
04   CONTRACT MANAGEMENT

The person responsible for the administration of the contract or an order on behalf of the employer needs to act as stated in the contract that is entered into, subject to any constraints that may be imposed by the employer or the employer's SCM policy for infrastructure procurement and delivery management. Such a person is also responsible for providing data for capturing on the contract management system, for providing regular reports on events which impact on time and cost, and for making inputs into the close-out report.

The persons responsible for the administration of a contract or order relating to the provision of new infrastructure, or the rehabilitation, refurbishment or alteration of existing infrastructure, needs to be professionally registered with a built environment council falling under the umbrella of the Council for the Built Environment.

05 LOGISTICS MANAGEMENT

Appropriate practices and processes need to be established where materials, equipment or plant are issued free of charge to contractors, to minimise:

- Loss or damage to such items until the contractor has received and accepted them; and
- Delays in supply which could result in increases in the contractor's fees for providing the works.

Procurement processes associated with long lead items of plant, equipment and materials may be initiated before the conclusion of Stage 4 (concept and viability or feasibility), provided that no contract is entered into until Stage 4 has been concluded and the budgets are in place to proceed.

06 DISPOSAL MANAGEMENT

A disposal committee needs to decide on how best to undertake disposals relating to the demolition or dismantling of infrastructure or parts thereof, and the disposal of unwanted, redundant or surplus materials, plant and equipment.

07 REPORTING OF SCM INFORMATION

An implementer needs to report to the relevant treasury within one month of the award of a contract or the issuing of an order, all engineering and construction, supply, service and professional service contracts that are awarded, or orders that are issued, above a prescribed threshold. An implementer also needs to prepare an annual report and submit such report to the relevant treasury within two months after the financial year end.

Such a report is required to include:

- A performance report covering specified indicators;
- A progress report focusing on time and cost of all contracts above a prescribed threshold;
- Information on unsolicited proposals; and
- Particulars relating to the cancellation or termination of a contract, the use of the negotiated procedure or confined procedure above a threshold, the evoking of the emergency procedures above a threshold, disputes which are referred to arbitration or a court of law for settlement, and contracts where the total of prices or the time for completion at the time that the contract was concluded or the order issued are exceeded by a prescribed percentage.

08 ASSESSMENT OF SCM PERFORMANCE

An annual performance report needs to be prepared for each portfolio of projects involving infrastructure delivery, which reflects performance over a financial year in relation to expenditure, the efficacy of the tender system, variances between planned and achieved completion of stages, managing price increases and time overruns during the works stage, the time taken to hand over a package following completion, the effectiveness of the control of costs during the execution of a works contract and late payment.

09 RISK MANAGEMENT AND INTERNAL CONTROL

Risk registers need to be established and maintained to enable risk mitigation to be proactively managed at a portfolio, programme, project and contract level. The gates in the control frameworks need, as appropriate, to be applied in making decisions to proceed, using suitable templates which record the approval or acceptance of documents.

9.2.3   Relationship with asset management and budgeting

The SIPDM articulates the SCM system for infrastructure procurement and delivery management. This system does not set requirements for asset management, or for budgeting. The requirements for an asset management system are established in **Modules 2 – 8** in this CIDMS Toolkit, whilst the requirements for budgeting are established in the MFMA, the mSCOA system and circulars issued by the National Treasury in terms of the MFMA. The SIPDM does however establish the forward and backward linkages to these systems.

9.2.4   Institutionalising the supply chain system for infrastructure procurement and delivery management

National Treasury Circular No 77, issued in terms of the Municipal Finance Management Act of 2003 (MFMA), provides guidance to municipalities and municipal entities to establish a suitable supply chain management system for infrastructure delivery. Attached to this circular is a model supply chain management policy for infrastructure procurement and delivery management, issued in terms of the MFMA in support of the Supply Chain Management Regulations as a Treasury guideline, determining a standard for municipal supply chain management policies. This policy is linked to the National Treasury Standard for Infrastructure Procurement and Delivery Management.

9.3 CONTROL FRAMEWORK

9.3.1   Stages, deliverables and controls

The overarching control framework for infrastructure procurement and delivery management is presented in **Figure 9.1** below. This overarching control framework comprises two control frameworks, one for infrastructure procurement, dealt with in greater detail in **Module 10**, and another that governs the process of infrastructure delivery, described in greater detail in **Module 11.** The control framework, whether for infrastructure procurement or delivery management, consists of the following three elements:

01 STAGES

A stage is a collection of logically related activities in the infrastructure delivery cycle which culminate in the completion of a major deliverable.

02 DELIVERABLES

A deliverable is the output of a defined stage, such as a procurement strategy (the deliverable) produced at the end of Stage 2: Strategic resourcing (the stage). End-of-stage deliverables are defined in **Table 9.1.**

03 GATES

A gate is a control point at the end of a process where a decision is required before proceeding to the next process or activity. The gates in the infrastructure procurement and delivery management system are linked to the deliverables defined in **Table 9.1.** It is at these gates that decisions are required before proceeding to the next stages or process. Gates provide the opportunity to confirm conformity with requirements, to proactively manage risks and to enable auditing.

Collectively, then, the stages, deliverables and gates presented in **Figure 9.1** provide work flow processes for portfolio planning, project planning and detailed design and site processes, culminating in asset handover and package completion.

CIDMS CITIES INFRASTRUCTURE DELIVERY AND MANAGEMENT SYSTEM

FIGURE 9.1: *Control framework for infrastructure procurement and delivery management*

Note: *Procurement may take place whenever external resources are required to advance a project or package*

Legend: G1 to G8 are gates
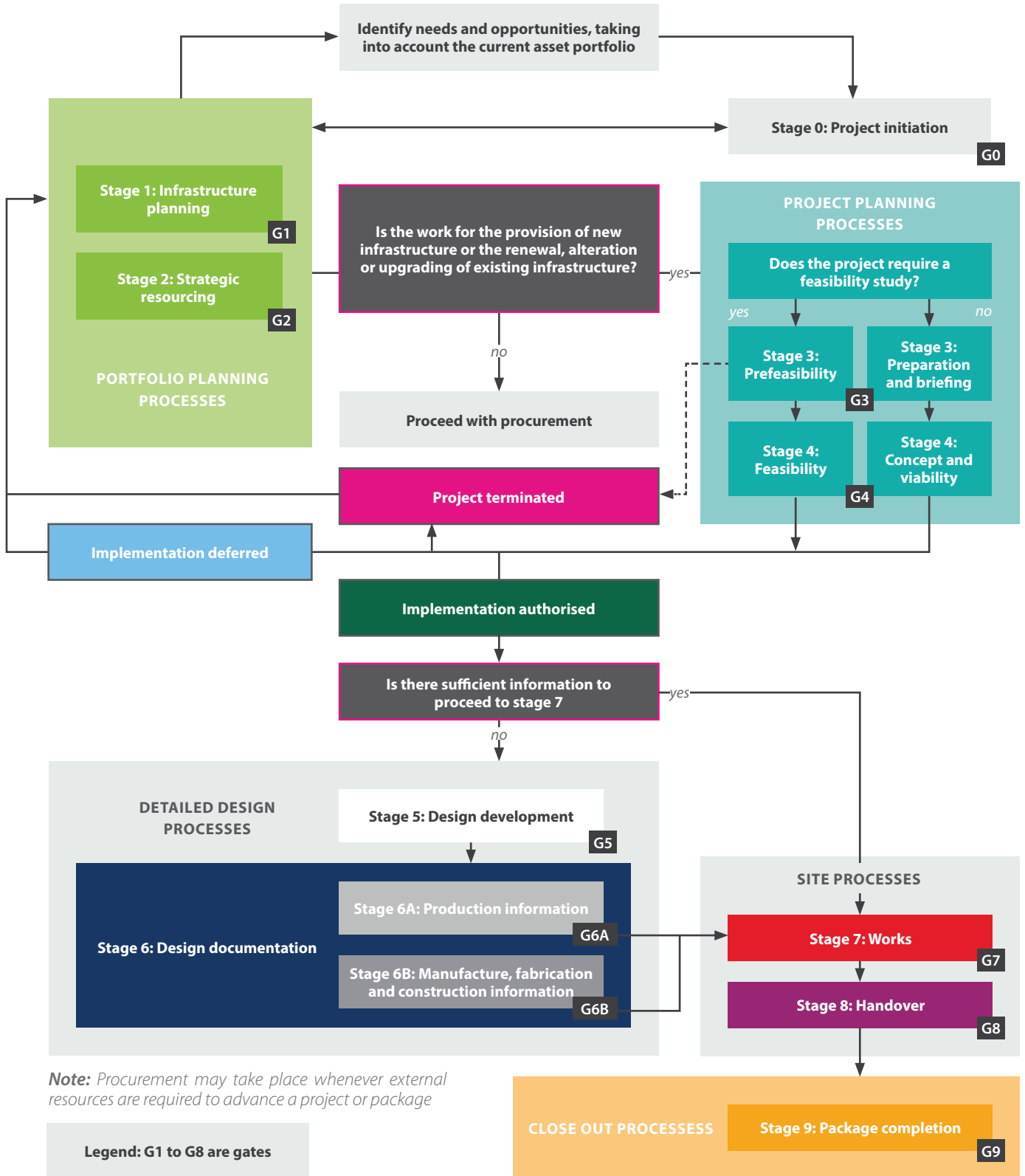
TABLE 9.1: *End-of-stage deliverables*

STAGE		END-OF-STAGE DELIVERABLE
NO	**NAME**	
0	**Project initiation**	An initiation report which outlines the high-level business case together with the estimated project cost and proposed schedule for a single project or a group of projects having a similar high-level scope
1	**Infrastructure planning**	An infrastructure plan which identifies and prioritises projects and packages against a forecasted budget over a period of at least five years
2	**Strategic resourcing**	A delivery and/or procurement strategy which, for a portfolio of projects, identifies the delivery strategy in respect of each project or package and, where needs are met through own procurement system, a procurement strategy
3	**Prefeasibility**	A prefeasibility report which determines whether or not it is worthwhile to proceed to the feasibility stage
	Preparation and briefing	A strategic brief which defines project objectives, needs, acceptance criteria and client priorities and aspirations, and which sets out the basis for the development of the concept report for one or more packages
4	**Feasibility**	A feasibility report which presents sufficient information to determine whether or not the project should be implemented
	Concept and viability	A concept report which establishes the detailed brief, scope, scale form and control budget, and sets out the integrated concept for one or more packages
5	**Design development**	A design development report which develops in detail the approved concept to finalise the design and definition criteria, sets out the integrated developed design, and contains the cost plan and schedule for one or more packages
6	**Design documentation** — **6A Production information**	Production information which provides the detailing, performance definition, specification, sizing and positioning of all systems and components enabling either construction (where the constructor is able to build directly from the information prepared) or the production of manufacturing and installation information for construction
	6B Manufacture, fabrication & construction information	Manufacture, fabrication and construction information produced by or on behalf of the constructor, based on the production information provided for a package which enables manufacture, fabrication or construction to take place
7	**Works**	Completed works which are capable of being occupied or used
8	**Handover**	Works which have been taken over by the user or owner complete with record information
9	**Package completion**	Works with notified defects corrected, final account settled and the close out report issued

9.3.2   General requirements

01   STAGE COMPLETION

A stage shall only be complete when the deliverable has been approved or accepted by the person or persons designated in the institutional arrangements to do so. Activities associated with stages 5 to 9 may be undertaken in parallel or series, provided that each stage is completed in sequence. Decisions to proceed to the next stage shall be made at each gate, and such decisions shall be based on the acceptability or approval of the end-of-stage deliverable.

02   LEVEL OF DETAIL OF END-OF-STAGE DELIVERABLES

The level of detail contained in a deliverable associated with the end of each stage shall be sufficient to enable informed decisions to be made in order to proceed to the next stage. In the case of stages 3 to 6, such detail shall, in addition, be sufficient to form the basis of the scope of work for taking the package forward in terms of the selected contracting strategy.

03   ADDITIONAL GATES

A municipality may, if it deems it necessary, add additional gates to the control framework presented in **Figure 9.1.**

04   INSTANCES IN WHICH STAGES MAY BE OMITTED

Stages 3 to 9 may be omitted when the required work does not involve the provision of new infrastructure or the rehabilitation, refurbishment or alteration of existing infrastructure. Stages 5 and 6 may be omitted if sufficient information to proceed to stage 7 is contained in the stage 4 deliverable.

05   PREFEASIBILITY AND FEASIBILITY REPORTS

Prefeasibility and feasibility reports are required as end-of-stage deliverables for stages 3 and 4 respectively where one or more of the following apply:

1. The major capital project is required for:
   - A major public enterprise where the total project capital expenditure exceeds R1,5 billion; or
   - An organ of state subject to the Public Finance Management Act other than a major public enterprise where the total project capital expenditure exceeds R1,0 billion including VAT, or where the expenditure per year for a minimum of three years exceeds R250 million per annum including VAT;

2. The project is not:
   - A building project with or without related site works; or
   - A process-based, somewhat repetitive or relatively standardised project where the risk of failing to achieve time, cost and quality objectives is relatively low; or

3. The municipality's organ of state's infrastructure procurement and delivery supply chain management policy requires that prefeasibility and feasibility reports be produced during stages 3 and 4 respectively.

Stages 3 and 4 shall be repeated for each package if the acceptance at stage 4 is for the acceptance of a project comprising a number of packages which are to be delivered over time.

06 ANNUAL REVIEW AND UPDATING OF SAMP AND AMPS

The strategic asset management plan (SAMP) and sectoral asset management plans, informed by demand management requirements, initiation reports (stage 0), decisions made during stages 3 and 4 and work in progress in stages 5 to 9, and the procurement strategy (stage 2), shall be reviewed and updated at least once a year.

07 APPROVAL OF THE SAMP, AMPS AND SECURING OF BUDGET

Approval of the SAMP, AMPs and the securing of the necessary budget shall be obtained prior to advancing to stage 3. All subsequent stages shall only be proceeded with if the necessary budget is in place.

08 REQUIREMENTS FOR RECORD KEEPING OF GATE APPROVALS OR ACCEPTANCES

Approvals or acceptances at each gate shall be retained for record purposes for a period of not less than five years of such acceptance or approval in a secured environment, unless otherwise determined in terms of the National Archives and Record Services of South Africa Act.

" Deliverability...the extent to which a project is deemed likely to deliver the expected benefits within the declared cost, time and performance envelope..."

09 GATEWAY REVIEWS FOR MAJOR CAPITAL PROJECTS

The SIPDM requires metropolitan municipalities to conduct gateway reviews of all major capital projects with an estimated capital expenditure above a defined threshold at the end of the stage 4 deliverable, prior to acceptance of such deliverable. The following arrangements shall apply:

1. **Focus of gateway review:** The focus of such a review shall in the first instance be on the quality of the documentation, and thereafter on:
   - deliverability (the extent to which a project is deemed likely to deliver the expected benefits within the declared cost, time and performance envelope);
   - affordability (the extent to which the level of expenditure and financial risk involved in a project can be taken up on, given the organisation's overall financial position, both singly and in the light of its other current and projected commitments); and
   - • value for money.

2. **Composition of gateway review team:** A gateway review team shall comprise not less than three persons who are not involved in the project associated with the works covered by the end of the stage 4 deliverable, and who are familiar with various aspects of the subject matter of the deliverable at the end of the stage under review. Such a team shall be led by a person who has at least six years post- graduate experience in the planning of infrastructure projects and is registered either as a professional engineer in terms of the Engineering Profession Act, a professional quantity surveyor in terms of the Quantity Surveying Profession Act or a professional architect in terms of the Architectural Profession Act. The members of the team shall, as relevant, have expertise in key technical areas, cost estimating, scheduling and implementation of similar projects.

3. **Notifying Treasury:** The National Treasury shall be notified of a proposed gateway review for a major capital project, three weeks prior to the conducting of such a review. Such notification shall be accompanied by a brief outline of the proposed project or package, the names and qualifications of the reviewers and the timeframes for the review. The National Treasury may nominate additional persons to serve on the review team.

4. **Findings of gateway review:** The gateway review team shall base its findings primarily on:
   - the information contained in the end-of-stage deliverables;
   - supplementary documentation, if any, provided by key staff obtained during an interview process; and
   - interviews with key staff members and stakeholders.

5. **Gateway review report:** The gateway review team shall issue a report at the conclusion of a gateway review which indicates the team's assessment of the information at the end of a stage and provides findings or recommendations on areas where further work may be undertaken to improve such information. Aspects in the report shall be flagged as being:
   - code red: team considers the aspect to pose a significant risk to the project or package;
   - code amber: team considers the aspects which indicate a minor risk to the project or package; or
   - code green: team considers the aspect to have been given adequate consideration to the extent that it is unlikely to jeopardise the success of progressing to the next stage, or minor adjustments may be required before proceeding.

The contents of the gateway review report shall be taken into account when accepting the stage 4 deliverable. A stage 4 deliverable shall not be accepted until such time that all code red risks have been addressed in the stage 4 end-of-stage deliverable.

6. **Gateway reviews initiated by the National Treasury:** The National Treasury may at any time institute a gateway review of any of the end-of-stage deliverables associated with the control framework, irrespective of the estimated cost of a project. The focus of such a review shall be determined by the relevant treasury. The implementer of a project shall be notified of the review and its focus at least three weeks prior to the conducting of the review. The following arrangements shall apply:
   - The implementer shall provide a person to lead the review and one other person to serve on the team, both of whom satisfy the requirements of as described under the subsection "Composition of gateway review team" above.
   - The gateway review shall be conducted substantially in accordance with points (4) and (5) above.

9.4 PROJECTS, PROGRAMMES AND PORTFOLIOS

9.4.1   Introduction

As noted in **Module 2,** a city will develop a strategic plan that will also include a spatial vision (its spatial development framework). An organisational analysis, that includes a scan of the internal and external environment, will identify stakeholder requirements that will lead to the formulation of asset management objectives which are articulated in the city's asset management strategy.

These asset management objectives must be supportive of and consistent with city strategic objectives. Risks and opportunities will also be identified and assessed as they relate to achievement of the asset management objectives, and business cases will be developed to mitigate risks as appropriate, and to pursue worthy opportunities. Business cases which are worthy and approved are actioned through projects to ensure that they provide the benefits envisioned in the approved business case. 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)	Confined by a control budget

The SIDPM allows projects to be undertaken independently, or to be organised within:

01 PROGRAMMES

A programme is a 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.

02 PORTFOLIOS

A portfolio is a collection of projects or programmes and other work that are grouped together to facilitate effective management of that work to meet a strategic objective.
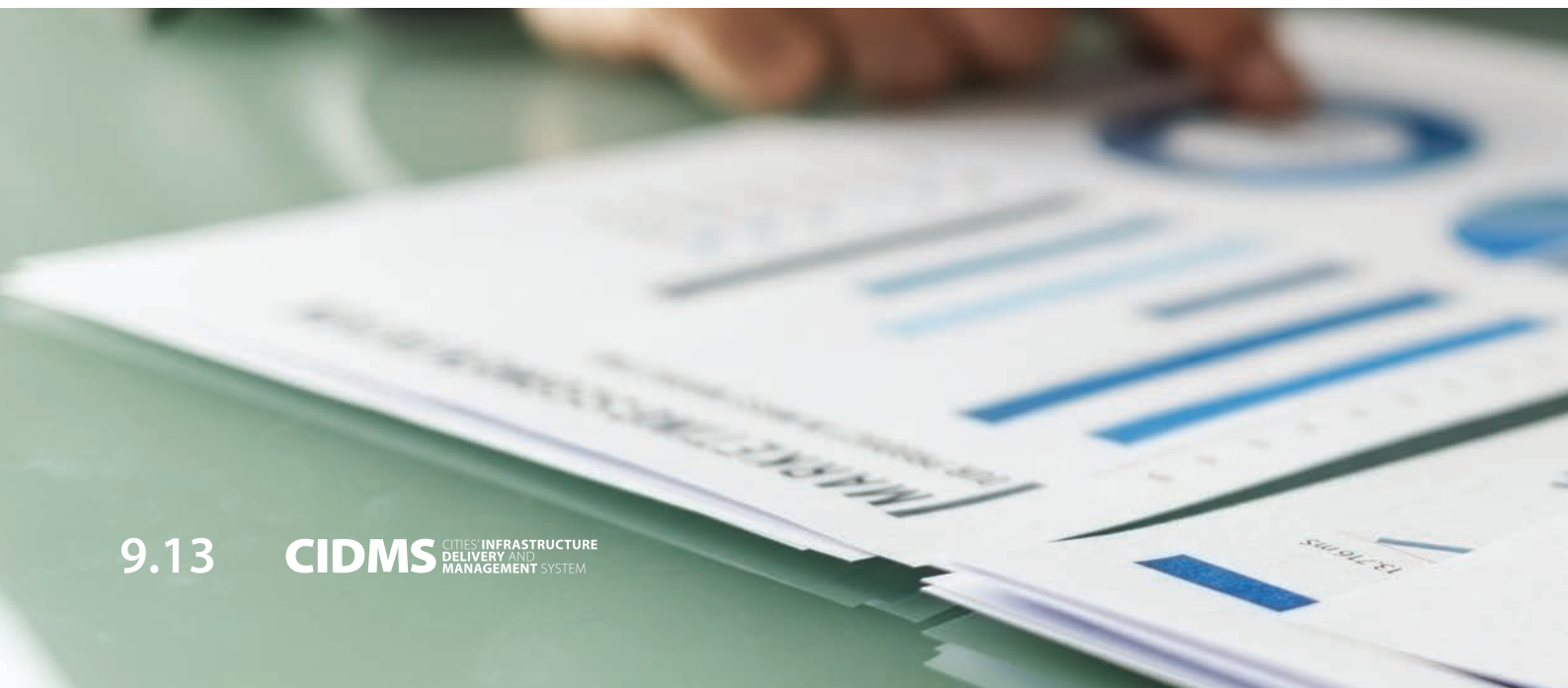
9.4.2 Contribution to organisational goals and asset management objectives

In a complex organisation such as a metropolitan municipality, there is often merit in organising projects into programmes or portfolios, some of which include:

01 AT PROGRAMME LEVEL

By grouping projects together in a programme, cities can make optimum use of scarce management resources in the built environment. Programmes provide opportunities for the grouping of projects with a similar objective, using the same type of resources and possibly even external contractors or service providers, e.g. a pipe replacement programme, roads resurfacing programme, or a mechanical maintenance programme encompassing all mechanical works in a city's water and sanitation asset portfolios. Programmes also provide the mechanism to coordinate and synchronise mutually dependent projects. Finally, programmes create the ability to schedule projects within the programme based on a variety of factors, such as funding constraints, objections or delayed approvals, or delays in infrastructure provision or network connections by another external infrastructure provider (e.g. a water board).

02 AT PORTFOLIO LEVEL

Managing projects and programmes within portfolios allows cities to balance and resolve conflicting demands between programmes and projects, and to align its activities and resources to organisational strategies and asset management objectives. This is done by selecting the appropriate programmes or projects, and prioritising and available resources.

" *...programmes create the ability to schedule projects within the programme based on a variety of factors..."*

9.5 GETTING STARTED

9.5.1   Project initiation

Project initiation is stage 0 in the infrastructure procurement and delivery control framework, and its outcome is an initiation report which articulates the high-level business case together with the estimated project cost and proposed schedule for a single project or a group of projects having a similar high-level scope.

The high-level business case (project proposal) shall address particular strategic needs, business opportunities or address risks which fall within the municipality's legislated or sanctioned mandate. Guidance on identifying and addressing strategic needs, business opportunities and risks is provided in **Section 8.2:** Identify problems or opportunities and develop potential solutions. At this early stage, it is advisable to already commence with packaging the project proposal for success by considering such factors as:

Regulatory requirements or prohibitions, for example not being allowed to undertake construction in an area declared as environmentally sensitive	**Negative externalities that may arise from undertaking the project that will adversely affect sections of society, e.g. increased levels of air pollution**	**The number of people that will positively benefit from implementing the business case**	**The cost and financial benefits/disbenefits to be realised from undertaking the project**

A multi-criteria rapid environmental and social assessment tool for municipal infrastructure projects is included in **Appendix 8.A.** which will assist cities to design attractive business proposals.

The SIPDM requires that business cases must be considered using objective decision-making criteria to decide and motivate their inclusion into sectoral asset management plans and the strategic asset management plan. Objective decision-making criteria include factors such as those relating to strategic objectives, national, provincial or regional priorities, the level of stakeholder support, legislative compliance, risk considerations and financial justification. **Module 8** provides guidance on establishing such objective decision-making criteria, and presents in **Appendix 8.B** a city-level multi-criteria analysis framework.

The initiation report for a project shall as a minimum:

- provide a project description and high-level scope of work;
- outline key issues and solution options that were interrogated;
- outline options that were evaluated;
- indicate the high-level business case; and
- provide the estimated project cost and indicative high-level schedule.

The decision-making criteria, findings, assumptions and recommendations shall be documented in the initiation report. Stage 0 is complete when the initiation report is accepted.

9.5.2   Asset management plans and the strategic asset management plan

Stage 1 involves infrastructure planning and the SIPDM requires an infrastructure plan as the output of this stage. The infrastructure plan must identify and prioritise projects and packages against a forecasted budget over a period of at least five years. Unlike most provincial and national government departments, municipalities own or control multiple portfolios.

These portfolios can include community facilities, electricity and energy, information and communication systems, investment properties, municipal operational facilities, potable water, roads and stormwater, sanitation and solid waste. Accordingly, the "infrastructure plan" in municipal context is a set of sectoral asset management plans (AMP), each of which is prepared for a particular asset portfolio(s), and a city-wide strategic asset management plan (SAMP). **Module 12** provides guidance on the clustering of asset management plans to address the range of asset portfolios which must be planned for. **Module 7** provides guidance on the purpose, format and content of the AMPs and SAMP, the relationships between these plans, and the process and calender for preparing these plans.

9.6 PROJECT IDENTIFICATION AND PACKAGING

9.6.1 Introduction

As noted in the previous section, the AMPs and SAMP must identify and prioritise projects and packages against a forecasted budget. This also implies that project scheduling must have been done, in order to determine the budget provision per annum. A package is work which is grouped together for delivery under a single contract or an order. This section provides guidance on the following:

- municipal rules for project identification for budgeting and reporting purposes, as per the requirements of the municipal Standard Chart of Accounts (mSCOA);

- identifying and deciding on the scope of projects and programmes, based on their characteristics;

- project and programme packaging; and

- authorisations required and the time frames required to obtain such authorisations which affect scheduling and the time frames involved in the delivery of infrastructure.

9.6.2 mSCOA and project identification

01 WHAT IS MSCOA?

mSCOA provides a national standard for the classification of municipal budget and financial information at a transaction level, to ensure structured, consistent and comparable results in the budgeting, recording and reporting of budget and financial information. This is done by prescribing a standard chart of accounts for municipalities and municipal entities that:

- is aligned to the budget formats and accounting standards prescribed for municipalities and municipal entities and with the standard chart of accounts for national and provincial government; and

- enables uniform information sets to be recorded in terms of national norms and standards across the whole of government, which allows for national policy coordination and reporting, benchmarking and performance measurement in the local government sphere.

> " *mSCOA provides a national standard for the classification of municipal budget and financial information at a transaction level...*"

02 MSCOA SEGMENTS

The mSCOA consists of seven segments, designed to standardise the recording of transactions in a uniform and structured manner for both management and financial reporting purposes. It also enables meaningful comparisons across all municipalities. The individual segments of the mSCOA are:

1. **Project segment**
   This segment distinguishes between capital and operational expenditure and is structured to link all operational and capital expenditure to specific projects, as defined in the IDP.

2. **Function segment**
   This segment distinguishes between core functions and noncore functions to classify transactions according to function or service-delivery objectives.

3. **Item segment**
   At the highest level, this segment supports the reporting done in terms of the budget reporting format and annual financial statements.

4. **Funding segment**
   This segment provides for sources of funding for both operational and capital expenditure to be identified, as expressed in the municipal budget.

5. **Regional segment**
   This segment assigns expenditure to the municipality's lowest relevant geographical region. The focus of this segment is to identify the geographical area which benefits from the expenditure.

6. **Costing segment**
   This segment provides for a classification structure for secondary (indirect) cost elements. It acts as a cost collector to determine the total cost of a service or function, identify productivity inefficiencies and establish the tariffs of municipal services.

7. **Municipal standard classification segment**
   This segment provides for the organisational structure and functionality of an individual municipality. It is not prescribed, but incorporates the structure and functionality as determined by the municipality.

03 MSCOA RULES FOR BUDGETING, RECORDING AND REPORTING ON EXPENDITURE

With packaging, individual projects as identified in the IDP are grouped together to make procurement more efficient. To budget for the package, the individual projects must be grouped together as per the regulations.

- Through the project segment, projects are componentised to identify project expenditure according to function and/or activity.
- With this link to the IDP ALL capital and operational costs, including institutional costs associated with the functioning of the municipality, such as cost for the administration and staff, are grouped into identifiable projects, allowing for planning and budgeting on a project level.
- This provides for a series of project groupings, which can be linked to the IDP, and when aggregated, represent the totality of the municipality's operation and capital expenditure included in the MTREF.
- Considering the overall mSCOA classification framework, a package is made up of various layers of detail, which simplistically can be illustrated as per **Table 9.2.**

It is important to note that the mSCOA project segment only provides for a classification breakdown of capital projects down to an asset group-type level. Examples of assets at group-type level include sewerage treatment works, landfill sites and pump stations. A detailed listing of possible assets at group-type level are included in the asset hierarchy presented in **Module 3**. The municipality's asset register subsystem will provide the platform for the componentisation of capital projects up to the asset component level (e.g. pump or motor), as prescribed in GRAP 17 and in accordance with the asset hierarchy presented in **Module 3.**

mSCOA further requires that maintenance must also be budgeted for as projects and expenditure incurred on maintenance projects recorded and reported on across the segments of mSCOA at the asset type level, e.g. earthworks, civil structures, electrical equipment and mechanical equipment. As is the case with capital projects, the municipality's asset register subsystem will provide details of expenditure up to asset component level.

TABLE 9.2: *Example - breakdown structure of typical project segments within a package*

Package	Project name (as per IDP)	REGIONAL SEGMENT Geographical identifier	FUNDING SEGMENT Project funding	PROJECT SEGMENT Municipal	Type	Expenditure	Asset class	Asset group type	Contractor / internal	FUNCTION SEGMENT Function / department
Upgrading of wastewater system capacity and treatment	New wastewater treatment works - civil and structural	Priority Zone 3b - Quennera	MIG	Capital	Infrastructure New	Upgrade and additions	Sanitation infrastructure	Water treatment works	Contractor	Sewerage treatment
	New wastewater treatment works - electrical and mechanical	Priority Zone 1 - Central	MIG	Capital	Infrastructure New	Upgrade and additions	Sanitation infrastructure	Water treatment works	Contractor	Sewerage treatment
	New wastewater treatment works - earthworks	Priority Zone 2 - West Bank	MIG	Capital	Infrastructure New	Upgrade and additions	Sanitation infrastructure	Water treatment works	Contractor	Sewerage treatment
	New sewer gravity outfall main	Priority Zone 1 - Central	Own revenue	Capital	Infrastructure New	Planned	Sanitation infrastructure	Bulk mains	Contractor	Bulk gravity pipe
	New sewer rising main and pumping station	Priority Zone 2 - West Bank	RBIG	Capital	Infrastructure New	Planned	Sanitation infrastructure	Pump stations	Contractor	Bulk pumping stations

9.6.3   Packaging projects and programmes

Grouping of projects and/or programmes into packages is intended to enhance efficiencies in infrastructure procurement and delivery management processes. The concept of packaging is partly motivated by the fact that the traditional approach has often been to procure a single contractor for a single project under a single contract. While this seems logical at a single project level, it does not exploit the potential efficiencies of grouping a number of works items together, i.e. a package, under a single contract. By grouping these works items together a number of efficiencies may be obtained. Such efficiencies include simplified supply chain management, grouped controls, grouped supervision, grouped reporting, improved delivery efficiency, and improved cost and programme controls.

To implement a package solution requires a strategic approach to infrastructure procurement and delivery. This is because programme managers need to apply their minds early in the planning process to ensure that projects are most appropriately grouped early enough in the process. For example, if the grouping of projects into a single procurement package is only decided after the design is completed, it may be too late to select groups of works items if the design cannot allow for such.

" *...programme managers need to apply their minds early in the planning process..."*
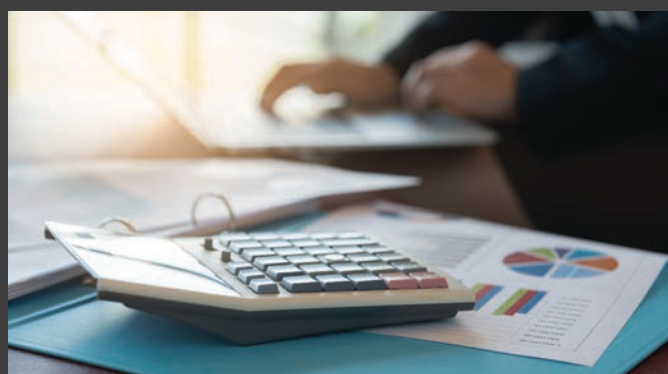
However, common sense still needs to be exercised in ensuring that while a number of works items might be grouped under one package for efficient procurement, this grouping of works items would normally form the scope of a new and larger project. Consequently the normal project management activities to manage this larger project scope of work will still take place. This will include ensuring that there is now only one project manager accountable for the larger scope of work and one set of project management plans to manage the project.

It can therefore be seen that there is great synergy between the concept of grouping projects under a single procurement regime or package, while at the same continuing to apply the good practices of project, programme and portfolio management. In some cases the package could mirror the grouping of projects that form a programme. In others, they could intersect with one another as illustrated by **Figure 9.2**, which shows how packages could intersect with projects and programmes in the following combinations:

TABLE 9.3: *Examples of how packages can overlap with programmes and projects*

SCENARIO NO.	DESCRIPTION OF OVERLAP	EXAMPLE
1	**Package overlaps completely with the programme.**	One contractor to implement all works in the programme. Example: construct the WWTW i.e. civil, structural, mechanical, electrical, earthworks.
2	**Package overlaps with a portion of a programme.**	One contractor to implement works in only a portion of the programme. Example: one contractor to construct the mechanical and electrical works of the new WWTW programme.
3	**Package overlaps across a programme and individual project.**	One contractor to implement works across two programmes and one independent project. Example: One contractor to construct the sewer pumping station (under one programme) and the mechanical works for the new WWTW (under another programme), and the outfall sewer lifting station, which is an individual project. In this case the package will become a programme, and will have multiple programme reporting lines. This is not recommended for general use, and should only be used in very special cases where there is sound reasoning for such. In this example the three projects require specialist knowledge of mechanical works in sewer pumping arrangements.
4	**Package overlaps with a single project.**	One contractor to implement works on only one independent project. Note that this will stay as a single project with normal project management principles applying.
5	**Package overlaps with only certain portions of a group of single projects.**	One contractor to implement only portions of works of a number projects. Example: one contractor employed under one contract only to excavate the trenches for the pipelines to be laid for two projects. This can also create a governance anomaly since each of the project managers of the individual projects lose some contractual control over the contractor employed under the package. Again, in these cases only portions of work should be ring fenced under a package that will have minimal effect on the other individual projects' scheduling.

From **Table 9.3** it is clear that selecting how and what work is grouped under a package is very important. If it is not carefully grouped, anomalies can be introduced in governance. These can create confusion between contracts and leave the project or programme managers in a situation where they are restricted in controlling the work. Consequently here are some guidelines in selecting packages:

- When a number of projects would normally be separate and are regrouped to make contracting easier, they should be ring fenced as a newly scoped, larger project or programme. This should have a single contract or works order and project or programme manager.

- If works that are grouped under a package are part of a larger project or programme, the works under the package should ideally be ring fenced out of the scope of the larger project or programme. They should then be contracted under a separate contract or works order with a separate project or programme manager.

- Works that also fall under a larger project or programme but are grouped under a package must be chosen very specifically. There should be no chance that the project or programme manager could lose control over that portion of works. Any delays or overruns under the package should also not materially affect the remainder of the works under the manager's control. Consequently works that fall under the package should be isolated from critical path activities.
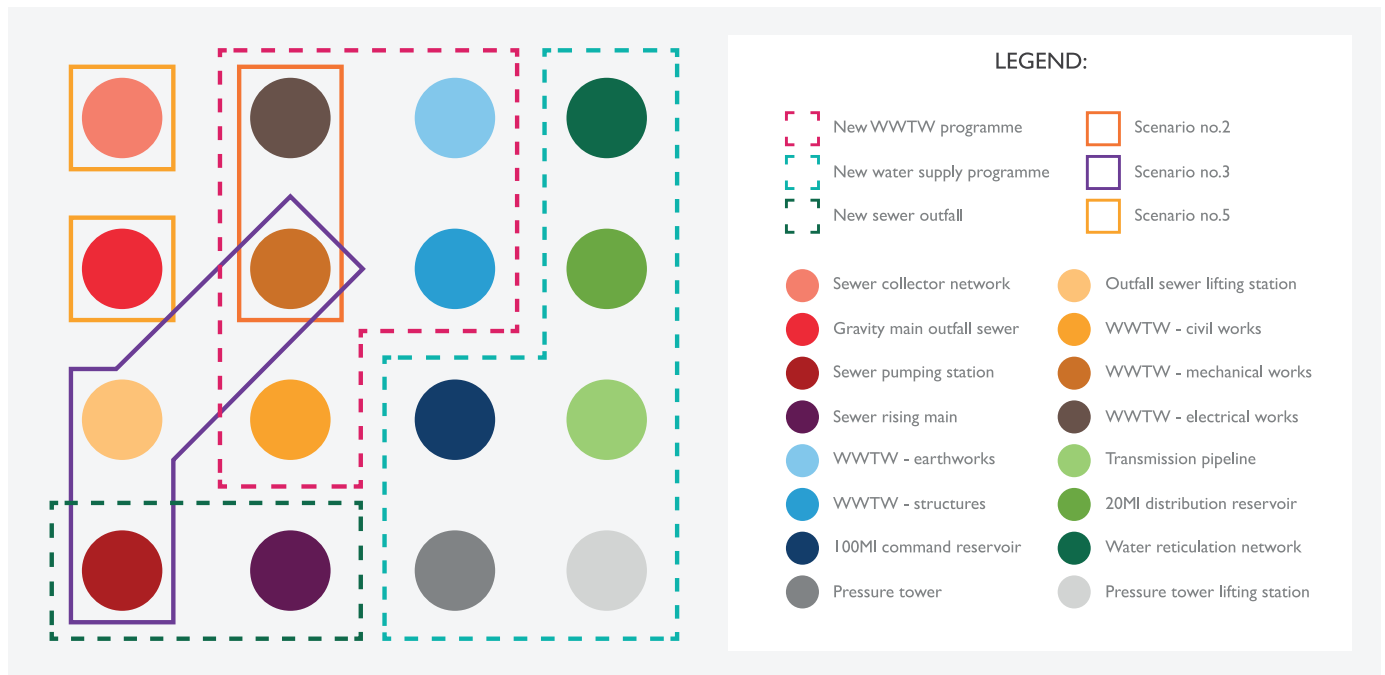
TABLE 9.2: *Packages versus programmes and projects*

- Programme 1 involves the construction of the WWTW extension and refurbishment works, which include civil works, structural works, mechanical and electrical works, earthworks and building works.
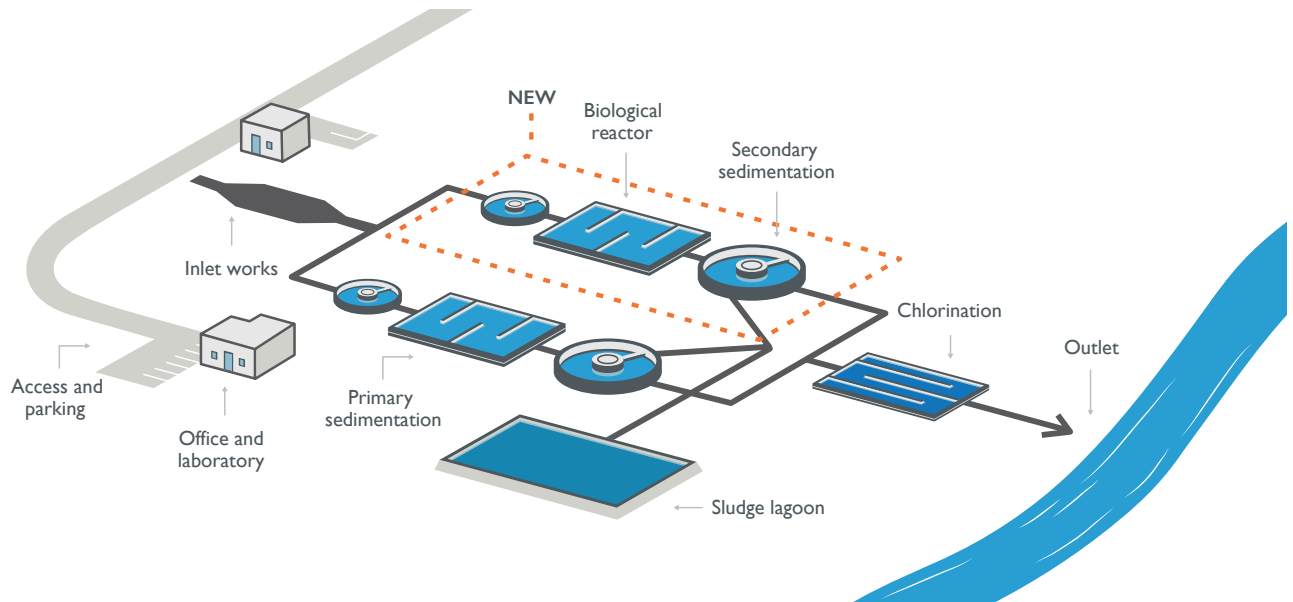
- Programme 2 involves the construction of the refurbishment of the existing sewer pump station and rising main pipeline.

- Programme 3 involves the construction of the new sewer collector network and the new outfall pipeline serving the newly developed area, which includes a new church.

- Programme 4 involves the construction of the new sewer collector network and the new outfall pipeline serving an existing developed area as a result of increased levels of service i.e. water house connections and waterborne sanitation.

FIGURE 9.3: *Programmes overview layout*
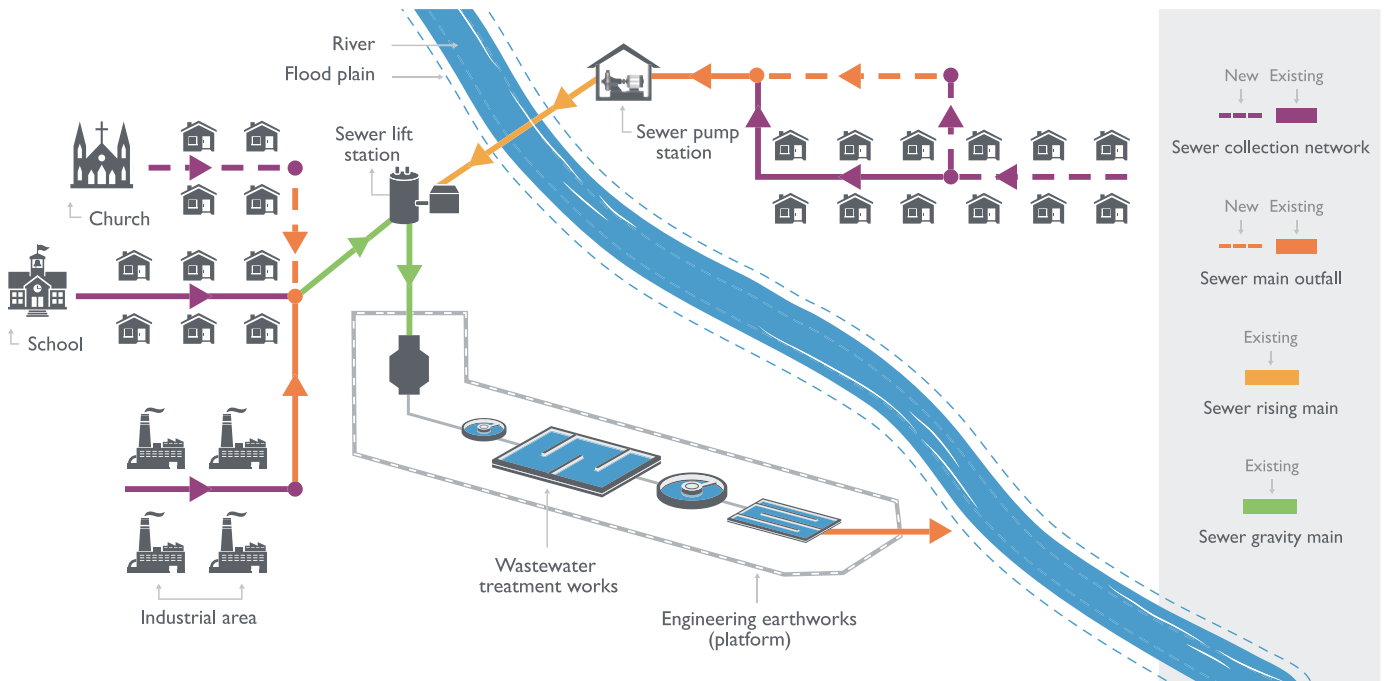
Implementation of the above programmes could potentially be packaged as follows:

TABLE 9.4: *Examples of packages*

PACKAGE NO.	PROJECT	ASSOCIATED PROGRAMME	DESCRIPTION
1	Electrical and mechanical works	1 2	All electrical and mechanical works by a relevant graded registered CIDB contractor
2	Civil and structural works and earthworks	1	Construction by a relevant graded registered CIDB contractor
	Civil and structural works (pipelines, chambers, etc.)	2 3 4	All works excluding excavation, backfill and compaction by a relevant graded registered CIDB contractor
3	Civil works by means of labour-intensive construction methods (e.g. EPWP)	3	Excavation, backfilling and compaction only
4	Building works by means of upcoming contractor involvement	1 2	Construction of new building works i.e. pump house top structures, inlet works housing, office and laboratory
5	Civil works by means of upcoming contractor involvement	1	Construction of new access road (block paving), excavation and shaping of stormwater ditches, headwall construction (brick), fencing, etc.

"Packaging" of projects may be done based on the following project characteristics:

- Location (e.g. projects listed in different programmes, but located in the same town, region or service delivery area)

- Similarity (e.g. project listed by different departments, but of same type – fencing projects for WWTW facilities and road reserve boundaries)

- Technical requirements (e.g. projects that require similar, specific and/or special skills – typical of Scenario no. 3 in **Table 9.3**)

- Existence of current "Framework Agreements" applicable to the type of work to be done (e.g. one contract for all mechanical installations regardless of type of asset portfolio)

- There are benefits to be gained by coordinating multiple projects, which will not be realised if the projects were managed independently (e.g. lessons learnt in a single project can be applied in time to the other projects to prevent similar losses, delays, etc.)

- Projects are of a similar nature and can be linked together to obtain the advantages of repetition (e.g. the construction of block paving collector roads by emerging contractors)

- Projects can be grouped together because of their similar supporting service deliveries, similar governance requirements, common/shared stakeholder or change management policy or similar risk profiles

- Similar planning, procurement or implementation time lines exist (e.g. the construction of carports).
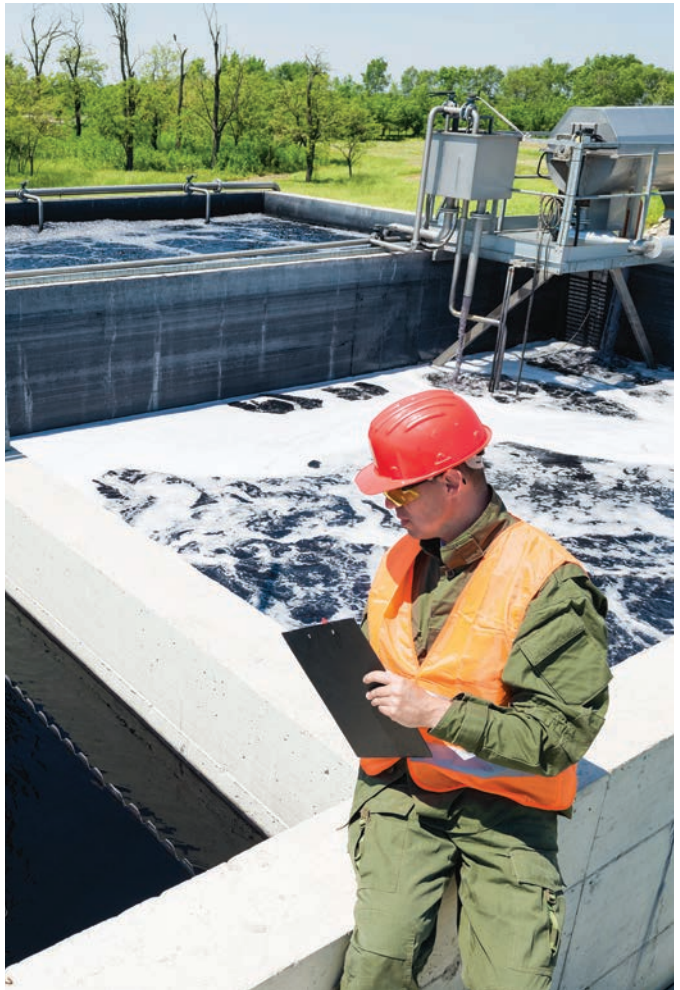
Projects should be implemented independently based on the following project characteristics:

- A project has one or a combination of the following characteristics:
  - high monetary value
  - time and schedule urgency
  - organisational and managerial complexity (significant number of managerial interfaces/ hierarchical layers either within an organisation or project structure/stakeholders to be managed)
  - technical complexity of high level of innovation;
- A project is one of a kind; and/or
- There are little or no benefits to be gained by coordinating multiple projects.

In addition to the typical project characteristics listed above, careful consideration must also be given to other aspects that could potentially influence grouping programmes and projects into a package.

9.6.4   Authorisations

01   INTRODUCTION

Consideration must be given to the necessary authorisations which must be obtained to proceed with the project, for the following reasons:

- In the event that authorisations are not obtained, the project may not proceed, or may need to be redesigned, or other punitive measures may apply.

- The nature and conditions attached to various authorisations may materially impact the design of the project, and affect the scope of the feasibility study to be undertaken.

- Obtaining the required authorisations may be lengthy processes. This requires that time allowances must be made in the project schedule for obtaining authorisation, and the budget should reflect the impact(s) of obtaining authorisations, not only in terms of the cost thereof, but also in delays in proceeding with onward stage work until authorisation has been granted.

When developing business proposals and project plans, the type of authorisations necessary, the costs and time involved in acquiring such, and the impacts on the overall delivery schedule should be considered. The following are some of the common authorisations that a metropolitan municipality may need to obtain, depending on the nature of the project:

02   LAND DEVELOPMENT APPLICATIONS

Land assembly can be defined as 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. Land rights in South Africa are managed through a municipal land use scheme – a planning instrument that allows or restricts certain types of land uses to certain geographic areas. A scheme consists of a spatial depiction of these geographic areas (typically called "zones" or "zonings") as well as a document called "scheme regulations" which sets out all procedures and conditions associated with the use of land in any of these zones.

Every property within a municipality has a set of regulations to control development. These regulations are determined by the zoning of the property. Property zoning is set out in the applicable land use scheme that determines such aspects as possible land use, floor area, coverage, building lines, parking provisions etc. In addition to the zoning regulations,

development is also controlled by conditions of title. These conditions are set out in the title deed of each property, and can restrict the way in which a property may be developed.

Other pieces of legislation which regulate development include the National Building Regulations and Building Standards Act (Act 103 of 1977), public health by-laws and various other municipal by-laws.

Before development can commence, a property needs to have the correct zoning in place. It should allow for the specific type of development on it. The construction of a water treatment plant, for example, requires a zoning that allows for municipal infrastructure. If the current zoning of the property does not allow for this use, it can be amended through the process of a land development application. The regulations to the Spatial Planning and Land Use Management Act of 2013 (SPLUMA) provides the following list of applications:

Category 1 applications involve:

- Establishing a township or extending the boundaries of a township

- Amending an existing scheme or land use scheme by the rezoning of land

- Removing, amending or suspending a restrictive or obsolete condition, servitude or reservation registered against the title of the land

- Amending or cancelling the whole or part of a general plan of a township

- Subdividing and consolidating any land other than a subdivision and consolidation, which is provided for as a Category 2 application

- Closing any public place permanently

- Any consent or approval required in terms of a condition of title, a condition of establishment of a township or condition of an existing scheme or land use scheme

- Any consent or approval provided for in a provincial law.

Category 2 applications involve:

- Subdividing (dividing a piece of land into two or more portions) any land where such a subdivision is expressly provided for in a land use scheme

- Consolidating any land (joining two or more pieces of land into a single entity)

- Simultaneously subdividing and consolidating land

- Seeking the consent of the municipality for any land use purpose or departure or deviation in terms of a land use scheme or existing scheme, which does not constitute a land development application

- Removing, amending or suspending a restrictive title condition relating to the density of residential development on a specific erf where the residential density is regulated by a land use scheme in operation.

> **❝** *...before the land development application will be approved by the municipality."*

The division of functions between an authorised official and a Municipal Planning Tribunal can be made as follows:

- All category 1 applications and all opposed category 2 applications must be referred to the Municipal Planning Tribunal.

- All category 2 applications which are not opposed must be considered and determined by the authorised official Typically, all land development and land use applications are subjected to an administrative phase, a consideration phase and a decision phase, as follows:

- The administrative phase is the phase during which: all public participation notices must be published and responded to; parties must be informed; public participation processes finalised; intergovernmental participation processes finalised; and the application referred to the Municipal Planning Tribunal or authorised official for consideration and decision making.

- The consideration phase is the phase during which the Municipal Planning Tribunal or authorised official must consider the application, whether it be a written or oral proceeding, and undertake investigations, if required.

- The decision phase involves informing the applicant of the outcome of the process.

Applying for certain land uses, or the location of a land use, can also require further authorisations from a different organ of state before the land development application will be approved by the municipality.

03 ENVIRONMENTAL AUTHORISATIONS

Under the National Environmental Management Act (NEMA) (Act 107 of 1998), it is a requirement that certain activities which pose environmental risk call for an environmental authorisation. Listed activities may not start without such an authorisation or, if commenced, must comply with prescribed norms and standards. Specified activities may start in certain identified geographic areas without an authorisation. Examples of such listed activities or land uses include:

The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more

The construction of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following: water catchments, or water treatment works

As a result of recent changes to the NEMA, the environmental assessment process has changed in that all the planning, report writing, etc. needs to take place before an application form is submitted to the national/provincial Department of Environmental Affairs (DEA) office. The DEA has 107 days in total to review the documents and make a decision, counting from the date of receipt of the application.

04 TRANSPORT AUTHORISATIONS - GENERAL

Both the South African National Roads Agency (SANRAL) and a Provincial Department of Transport (e.g. GAUTRANS) are interested and affected parties with regards to development applications, have regulatory powers in relation to development applications, and are included in the circulation of these applications. In general, authorisation from the respective department is required when access to, development or advertising happens within close proximity to their roads.

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

The South African National Roads Agency Limited and National Roads Act No. 7 of 1998 defines a "building restriction area" as the land situated outside an urban area, which is alongside a national road or within a distance of 60 metres from the boundary of the national road, or within a distance of 500 metres from any point of intersection.

The act has the following impacts on development applications:

- **Section 44** of the act excludes any access to, or egress taken from, a national road other than at the entrance/exit facilities specifically provided for that purpose.

- **Section 48** controls the erection of structures and other works on, over or below the surface of national roads or land in a building restriction area. Any approval, if given, may contain conditions.

- In terms of **Section 49**, if any land or portion thereof is situated in a building restriction area, the surveyor general may not approve a survey diagram or general plan of any subdivision or township without the agency's prior written approval. The approval, if given, may contain conditions either:

  - prohibiting the land or a specified portion being subdivided or further subdivided;

  - limiting what the land can be used for;

  - limiting how many buildings or other structures can be put up; and/or

  - prohibiting any structure/item being constructed or established within a specified distance on or below the surface of the land, or a portion of the land concerned.

05 TRANSPORT AUTHORISATIONS: PROVINCIAL ROAD ACTS

These acts regulate access to provincial, main or district roads where the MEC may refuse access or issue an approval for such access subject to whatever conditions he or she may deem appropriate.

This affects development applications in the following manner:

- The MEC must approve or refuse a subdivision application either adjacent to, or within 500 metres of, an intersection with a provincial road. The response to the application must occur within 28 days. The municipality may not approve the application until the lapse of 28 days, or in conflict with, any conditions imposed by the MEC.

- The MEC must approve or refuse an application for a change in land use or a development proposal either adjacent to, or within 500 metres of an intersection with a provincial road. The response to the application must occur within 28 days. The municipality may not approve the application until the lapse of 28 days.

06 WATER USE LICENCES

The National Water Act 36 of 1998 provides for the fundamental reform of the law relating to water sources, with the main focus being the sustainable use of water for the benefit of all. The purpose of this act is to ensure that the nation's water sources are protected, used, developed, conserved, managed and controlled. Chapter 4 of this act requires the registration or licensing of water use under certain conditions. Such a registration or water licence is required for any water services provider, including municipalities. The process involves an application to the Department of Water & Sanitation (DWS).

06 TIME FRAMES ASSOCIATED WITH THE GRANTING OF AUTHORISATIONS

SPLUMA regulations provide the following guidelines for time frames associated with development applications:

- The administrative phase of a development application begins only after a complete land development and land use application is submitted to a municipality. All actions for which the municipality is responsible may not take longer than 12 months.

- The consideration phase may not be longer than three months.

- The decision must be made within 30 days from the last meeting of the Municipal Planning Tribunal or the authorised official.

In the case of a required authorisation, the following regulations apply:

- If an organ of state requested to provide comment on an application does not provide comment in the time frame permitted by the municipality (including any extensions granted), it is deemed that the organ of state has no objection to the application.

- As a result the right applied for in the application may be granted, and the Municipal Planning Tribunal or authorised official may report that non-performance to the executive authority of that organ of state, the Minister and relevant MEC.

In terms of the environmental authorisations, on average, the indicative time frames for the various processes are now as follows:

- Basic assessment: six to nine months (depending on the complexity)

- Environmental Impact Assessment (EIA): nine to 16 months (depending on the complexity and scale)

- Maintenance management plans: four to six months

- Environmental assessment amendments (with PPP): seven to nine months

- Environmental assessment amendments (without PPP): four to five months.
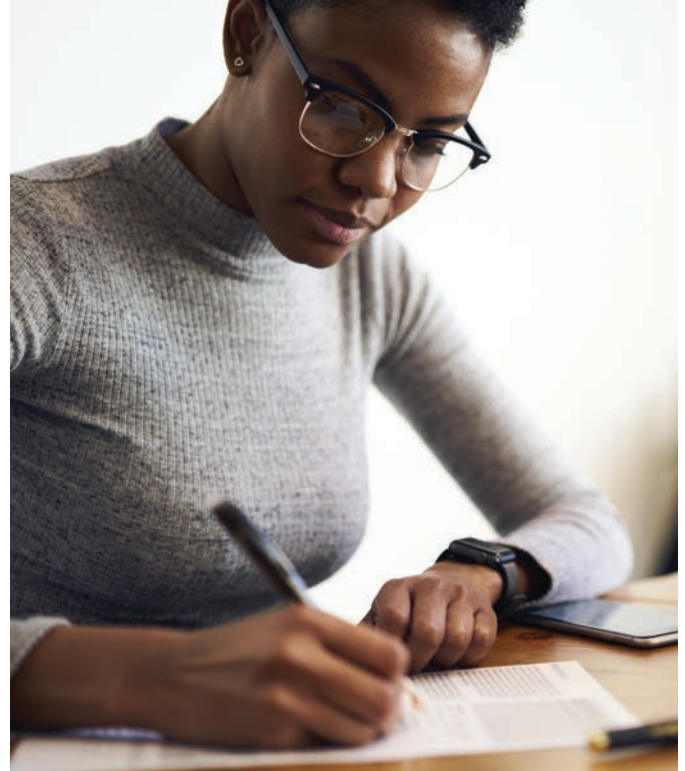
Water Use Licence (WUL) application processes currently don't have legislated time frames. At this stage, a WUL can take anything from two to five years. A general authorisation registration process, on the other hand, is much quicker and depending on the office, can take between six to 12 months for the registration confirmation to be issued.

Eskom applications are problematic at best and no guideline can be provided for effective planning. This is a long-lead activity and it is advisable to submit applications for connections once the programme has been initiated during planning stages.

Wayleave applications for railway and road crossings can also have a substantial impact on the time frame of the delivery schedule if not managed correctly during the construction stage. The wayleave applications can only be made post contractor appointment and can last up to 12 months (especially railway crossings). The project manager should carefully manage the process and ensure the applications are made (and followed up) in a timely manner.

9.7 PROGRAMME AND PROJECT MANAGEMENT GOVERNANCE

9.7.1 Programme governance

Programme management encourages the establishment of a Programme Management Office (PMO) to assist the programme managers to plan, monitor and control programmes. The PMO will enhance the work of the programme manager by providing consistent, timeous and accurate data for each programme. The PMO will thus assist the municipality to achieve the benefits available by implementing the programme management approach.

Programme management, in contrast to project management, is the centralised, coordinated management of a group of projects to achieve the programme's strategic objectives and benefits. The programme management approach should therefore lead to better and quicker responses to project issues, queries, approvals, etc. These benefits will contribute greatly to the efficiency of the management processes and in particular to improved coordination and control of the projects in the programme.

Programme governance is a process that spans the entire programme's life-cycle phases, using phase reviews (of objectives, benefits, deliverables, performance, risks and issues) as the primary governance tool. Phase reviews provide an opportunity to assess the programme in terms of the following strategic and quality related criteria:

A programme and its constituent projects are still aligned with the municipality's priorities, goals and strategy	Expected benefits are in line with the original construction procurement strategy	Level of risk remains acceptable	Prescribed generally accepted good practices are being followed

Establishing a governance framework is one of the most significant efforts required for programme mobilisation. The success of this effort has a direct correlation with the programme's success because governance enables the programme work, addressing such needs as:

- continuous linkage to the municipality's strategic goals and objectives;
- clear and well-understood decision-making authority;
- effective oversight of programme progress and direction, including the capability to identify and execute necessary adjustments in the face of internal/external events and changes; and
- executive control over programme evolution and outcomes.

9.7.2   Governance framework management plans

The establishment of a governance framework is achieved through the creation of management plans which set the rules, procedures and methodologies which dictate the content, format and information to be provided when drafting implementation plans. These plans are required to deliver new infrastructure or to rehabilitate, refurbish or alter existing infrastructure. These governance framework management plans must be aligned with the municipality's strategic objectives and be created by the PMO tasked with/responsible for implementing programmes and projects.

The IDMS requires a PIP to be developed for each programme, which is to be delivered in a financial year. Together with the construction procurement strategy, this culminates in the Programme and Project Management (PPM) system. The management plans govern the formulation of the PIPs to achieve consistency in the approach to managing and monitoring the implementation of programmes/packages. The management plans must be reviewed and updated annually. These plans are as follows:

01 SCOPE MANAGEMENT PLAN

The plan describes how the scope for a programme must be defined, developed, monitored, controlled and verified. The components of the plan may, among others, include a:

- Process for preparing a detailed programme scope statement;
- Process that enables the creation of the Work Breakdown Structure (WBS) from the detailed programme scope statement;
- Process that establishes how the WBS will be maintained and approved;
- Process that specifies how formal acceptance of the completed programme deliverables will be obtained; and a
- Process to control how requests for change to the detailed programme scope statement will be processed.

02 SCHEDULE MANAGEMENT PLAN

The plan establishes the criteria and the activities for developing, monitoring and controlling the schedule for a programme, and must, among other things, establish the following:

- Programme schedule model development – scheduling methodology;
- Level of accuracy – acceptable range for realistic activity duration estimates;
- Units of measure – units used in measurements (staff hours, staff days, kilometres, etc.);
- Organisational procedures links;
- Programme schedule model maintenance – update status and record progress;
- Control thresholds – thresholds for monitoring schedule performance;
- Rules of performance measurement – earned value management (EVM) rules or other physical measurement rules of performance measurement; and
- Reporting formats – formats and frequency of schedule reports.

03 COST MANAGEMENT PLAN

The plan describes how the costs for a programme must be planned, structured and controlled, and must, amongst other things, establish the following:

- Units of measure – each unit used in measurement is defined for each resource;
- Levels of precision and accuracy – the degree to which activity cost estimates will be rounded up or down, and the acceptable range used in determining realistic activity cost estimates;
- Organisational procedures links;
- Control thresholds – thresholds for monitoring cost performance;
- Rules of performance measurement – EVM rules or other physical measurement rules of performance measurement;
- Process descriptions – formats and frequency of schedule reports; and
- Additional details:
- Description of strategic funding choices
- Procedures to account for fluctuations in currency exchange
- Procedures for programme cost recording.

04 RISK MANAGEMENT PLAN

The plan describes how risk management activities for a programme must be structured and performed, and should include, among others, the following:

- Methodology – approaches, methodologies, tools and data sources that must be used to perform risk management;
- Roles and responsibilities – defines the lead, support and risk management team and clarifies their responsibilities;
- Budgeting – estimates funds needed, based on assigned resources, to include in the cost baseline and establishes protocols to apply contingency and management reserves;
- Timing – defines when and how often risk management processes will be performed throughout the programme life cycle; establishes protocols to apply schedule contingency reserves; and establishes risk management activities for inclusion in the programme schedule i.e. time management;
- Risk categories – groups potential causes of risk;
- Definitions of risk probability and impact – defines different levels of risk probability and impact specific to the programme context;
- Probability and impact matrix – grid for mapping the probability of each risk occurrence and its impact on programme objectives; and
- Reporting formats and tracking.

05 QUALITY AND IMPROVEMENT PLAN

The quality plan describes how the municipality's quality policies must be implemented. The improvement plan details the steps for analysing programme management processes to identify activities that enhance their value. This will inform the close-out report in completing Stage 9 of the programme life cycle.

06 COMMUNICATION MANAGEMENT PLAN

The plan describes how programme communications must be planned, structured, monitored and controlled, and contains, among others, the following information:

- Time frame and frequency for the distribution of required information;
- Methods or technologies for communication activities;
- Escalation process identifying time frames and the management chain for escalation of issues which cannot be resolved at a lower level;
- Communication constraints;
- Communications planning – determining the information and communications needs of the stakeholders: who needs what information; when will they need it; and how will it be given to them;
- Information distribution – making required information available to programme stakeholders in a timely manner;
- Performance reporting – collecting and disseminating performance information. This includes status reporting, progress measurement and forecasting; and
- Administrative closure – generating, gathering and disseminating information to formalise phase or programme completion.

07 HUMAN RESOURCE MANAGEMENT PLAN

The plan provides guidance of how programme human resources should be defined, staffed, managed and eventually released. The plan includes, but is not limited, to the following:

- Roles and responsibilities for each programme
- Programme origination charts
- Staffing management plan per programme

08 PROCUREMENT MANAGEMENT PLAN

The plan describes how goods and services must be acquired from outside the municipality. It describes how the procurement processes must be managed from developing procurement documents through to contract closure, and can include among other recommendations, guidance for:

- Types of contracts to be used
- Risk management issues
- Managing multiple suppliers
- Coordinating procurement with other programme aspects such as scheduling
- Handling the long-lead items

Guidance on the preparation of the procurement management plan is provided in **Module 10.**

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

9.7.3   Performance management at the programme level

Outcome indicators at a programme level often differ from impact indicators at a portfolio or strategy level in that they can be derived or rolled up from lower-level project or operational indicators. The PMO thus has a role to design a performance indicator framework for all its projects and subprogrammes to ensure that this can be achieved.

Because of the critical governance role that a PMO fulfils in respect of its projects and the important role that the programme manager plays in providing infrastructure-specific support to strategic-level managers, the programme office tends to be the centre of performance management. It is therefore essential that the programme manager:

- Fully understands all of the concepts contained in municipality's outcomes-based performance model.
- Ensures that the performance management roadmap steps are implemented, these being:
  - Develop performance indicators: takes ownership and designs a cohesive, practical performance management system to be used in the programme and its projects and in upstream reporting. These would be based on appropriate indicators and ask questions such as:
    - What do we want to achieve?
    - How will we know when we have achieved it?
    - What are we going to do to achieve it?
    - Who of us is responsible for what?
    - How do we improve performance?

- Monitor and evaluate programme and project
  - Monitoring involves collecting, analysing and reporting data on inputs, activities, outputs, outcomes and impacts as well as external factors, in a way that supports effective management
  - Evaluation is a time-bound and periodic exercise that seeks to provide credible and useful information to answer specific questions to guide decision making by staff, managers and policy makers.
- Publish performance information in a variety of formats and media as required and appropriate.
- Review and appraise performance of individuals responsible for the programme work as well as the projects and the project work.
- Take management action, where necessary, to address unacceptable variances in support of the management action process.

9.7.4   Typical programme-level indicators

01   OUTCOME INDICATORS

These are the second-level indicators providing performance information with regard to the work performed at project level, rolled up to the programme level. They include:

- Scope outcome indicators relevant to this programme. For example a programme to build laboratories at workshops will have an indicator to say:
  - Percentage (and number) of total laboratory projects completed to date as a percentage of total to be completed across all years of the programme
  - Percentage of laboratory projects completed as a percentage of planned to be completed to date
- Cumulative cost performance indicator for all capital/infrastructure projects under each stand-alone programme.
- Cumulative schedule performance indicator for all projects under each stand-alone programme.
- Other relevant programme performance outcome indicators that can be rolled up across all projects. These indicators can measure management of changes and variations in scope, quality performance or safety performance, for example.

03   FINANCIAL DATA

Financial data must be gathered to enable a financial report to be generated at regular intervals, which:

- Lists the packages completed together with actual expenditure;
- Indicates the following for packages that have advanced beyond the design development stage (concept and viability or feasibility) but have not yet been completed:
  - Budget for the financial year
  - Actual expenditure to date
  - Remaining budget for the year
  - Forecast expenditure for the remainder of the year
  - Forecast over/under expenditure for the year;
- Indicates professional fees associated with a project or package; and
- Enables "actual" versus "planned" expenditure to be compared.

02   INPUT, ACTIVITY AND OUTPUT INDICATORS (APPLICABLE TO WORK PERFORMED AT THE PROGRAMME LEVEL)

In addition to the outcome-level indicators discussed above, there are also work outputs to be performed by the programme managers and their staff. The performance of this work is again measured with output indicators. Typically these output indicators would be items such as:

| Percentage of staff available as a percentage of planned staff (input indicator) | Percentage of issues elevated to programme level for management action closed (activity indicator) | Cost performance indicator of professional service provider (PSP) appointed to provide support at this level (input indicator) | Budget performance indicator of the programme unit's own budget (activity indicator) |

## 9.7.5   Project performance indicators

01   DIMENSIONS OF PROJECT PERFORMANCE

The following dimensions of project performance should be monitored, evaluated and reported on:

Scope	Cost and budget	Time and schedule	Quality and safety	Risks and issues
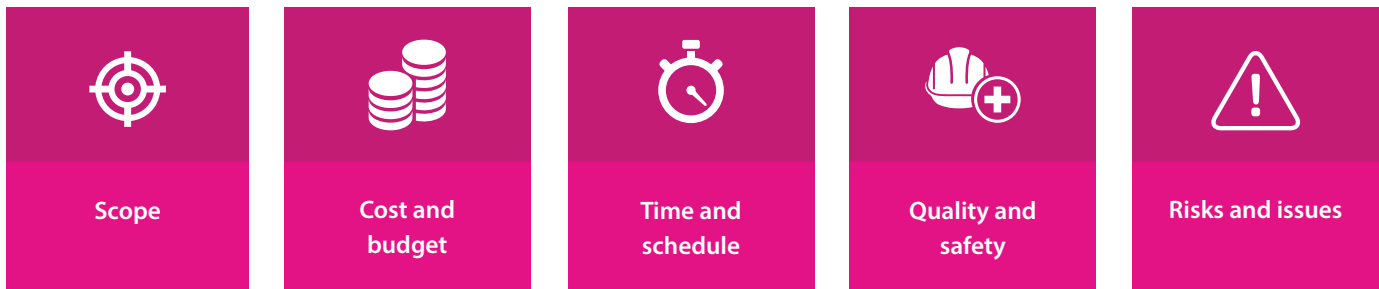
02   EARNED VALUE MANAGEMENT (EVM)

Earned value management is a commonly used method of project-performance measurement. It is a composite indicator measuring performance in relation to project scope, schedule, and costs. The key concepts of EVM are summarised below (PMBOK, 2013).

- EVM is a methodology which combines scope, schedule, and resource measurements to assess project performance and progress. It is commonly used to measure performance of projects. This technique requires the formation of an integrated baseline using three key dimensions or parameters, namely planned value (PV), earned value (EV) and actual costs (AC). The total PV for the project is also known as the budget at completion (BAC).
- VM implementation involves project metrics such as:
  - PV – planned value is measured in units of currency and is determined by work planned to be completed and budgeted cost for this planned amount of work.
  - EV – earned value is the measure of actual work performed and the budgeted cost of this work performed.
  - AC – actual cost, is self-explanatory, it is the actual expense incurred.
- Two variances are defined and measured, namely schedule variances (SV= EV-PV) and cost variances (CV=EV-AC):
  - SV – schedule variance is the variance in planned value of work scheduled and earned value of work performed.
  - CV – cost variance is the difference between earned value and actual cost.
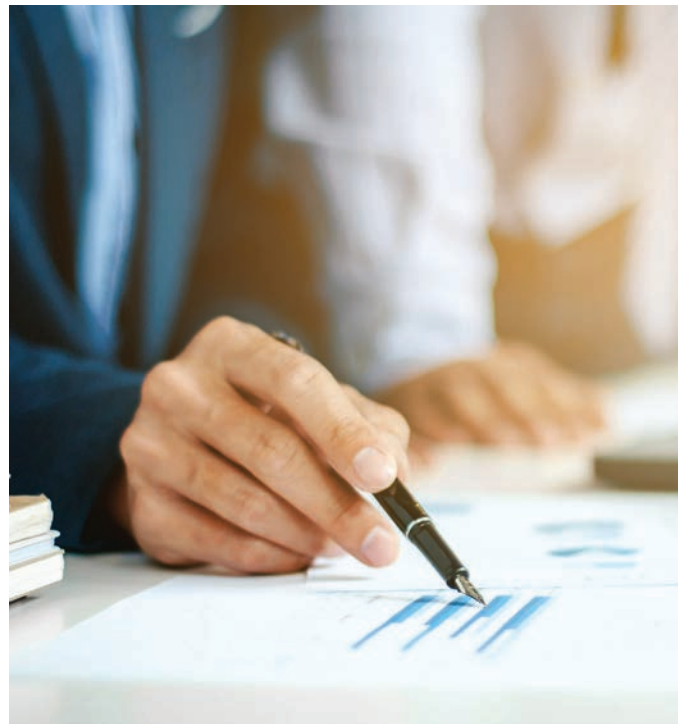
- Schedule variance – keeping a project on schedule is not only important from a time standpoint but also to avoid future cost overages. Schedule variance analysis shows the project manager whether the project is on schedule and, if not, how far it has fallen behind schedule.
- Cost variance – cost variance analysis compares the budgeted costs of the project to the actual costs of the project by line item. This can quickly tell a project manager the portion of the project budget that is over the original estimated amount.

03 COST VERSUS BUDGET

A project budget is a controlled document defining the approved estimated project cost and, once approved, can only be changed through a formal budget-change process. Actual costs can vary from the approved estimates contained in the budgets. A cost performance index (CPI) is a measure of the value of work completed compared to the actual cost and measures the cost efficiency of work performed. For EVM two efficiency indicators are used, namely schedule performance index (SPIEV/ PV) and cost performance index (CPI=EV/AC).

- CPI is cost performance index and a measure of 1 or higher means that project is optimally performing with respect to cost.

- SPI is schedule performance index and a measure of 1 or higher means that project is on track with respect to schedule and has a good chance of being delivered on time. However, a score lesser than 1 is an indicator that corrective actions must be taken. This is true for both SPI and CPI.

The estimated cost at completion (EAC) is an estimated cost with forecasts updated as the project is being carried out. It uses new cost information reflecting current risks, potential claims,cost of scope and time overruns and so forth. It is a key indicator to determine whether the budget is sufficient.

The estimate to completion (ETC) is an estimate of the costs required to complete the remaining balance of work. The ETC is something that can and should be worked out as quickly and as early in the process and/or life cycle of the project as possible. This is the most effective way to help the team budget. However, if the estimate is done early and needs to be modified at some point, this can be done once or, if needed, even more than once during the life cycle of the specific project in question.

Variance at completion (VAC) is a key performance indicator which shows the difference between the starting project budget (total budgeted cost) and the forecasted project budget when the project is complete (EAC). If the value of VAC is negative, the project may go over budget when it is complete. If the value of VAC is positive, the project may be under budget when it is complete. VAC is one more KPI that helps forecast how the project will look when it is complete.

04 PROJECT LEVEL INDICATORS

Project level indicators can furthermore be refined into input, activity and output indicators, as follows:

Typical input indicators

- Cost variance and cost performance index indicators are examples of very useful input indicators.

- Indicators measuring human resource level variances are input indicators.

Typical activity indicators

- Schedule variance and schedule performance indices are activity indicators.

- Production indicators are activity indicators not output indicators.

- Productivity indicators are activity indicators. Again it is the variance one would be interested in, e.g. 1200 m trenching per day achieved versus 1000m/day planned tells the full story.

- Comparing cumulative with periodic indicators is valuable to confirm a contractor's claim of acceleration, for example.

- Quality performance indicators are activity indicators and measuring, for example, the number of noncompliance reports issued by the site engineer or architect is a good indication of how much trouble lies ahead.

- Indicators measuring metadata from the issues log provides useful early warning, especially the ratio of closed versus open issues.

Typical output indicators

- Progress towards completion of major project deliverables is a useful output indicator, for example length of road completed in km or as a percentage of totals.

- In addition to the obvious scope outputs, such as classrooms complete, it is necessary to measure project management outputs as well such as close-out reports, as-built drawings, final certificates etc.

TABLE 9.5: *Summary – performance management formulae*

INDICATOR	FORMULA	DESCRIPTION
Budget at completion (BAC)	$\sum$ *All activity budgets*	Total PV for the project
Actual cost (AC)	$\sum$ *All incurred costs*	Actual expense incurred
Percentage complete (PC)	$PC = \dfrac{EV}{BAC}$	Percentage complete
Planned value (PV)	$PV = Planned \% \times BAC$	Budgeted cost for the planned amount of work
Earned value (EV)	$EV = PC \times BAC$	Measure of actual work performed and the budgeted cost of this work performed
Cost variance (CV)	$CV = EV - AC$	Difference between earned value and actual cost
Cost performance index (CPI) (>1 = good)	$CPI = \dfrac{EV}{AC}$	Measure of the cost efficiency of budgeted resources, expressed as a ratio of earned value to actual cost
Schedule variance (SV)	$SV = EV - PV$	Variance in PV of work scheduled and EV of work performed
Schedule performance indicator (SPI) (>1 = good)	$SPI = \dfrac{EV}{PV}$	Measure of schedule efficiency expressed as the ratio of earned value to planned value
Estimate at completion (EAC) (original estimate was flawed)	$EAC = AC + bottom\ up\ ETC$	Key indicator to determine whether the budget is sufficient
Estimate to completion (ETC)	$ETC = EAC - AC$	Estimate of the costs required to complete the remaining balance of work

9.8 CONCLUSION

The Standard for Infrastructure Procurement and Delivery Management (SIPDM) regulates public sector infrastructure procurement and delivery processes. This Standard separates infrastructure procurement from the procurement of general goods and services, and furthermore modernises and standardises infrastructure procurement and delivery management processes, whilst emphasising value for money outcomes.

The SIPDM also prescribes control frameworks for infrastructure procurement and delivery management, comprising logical stages, end-of-stage gates where defined deliverables are required and decisions need to be made prior to proceeding to the next stage. This module outlines the overarching control framework. **Module 10** focuses on the infrastructure procurement control framework in greater detail, and provides guidance on the development of deliverables and allowable methods. **Module 11** focuses on infrastructure delivery processes.

Whilst focussing on infrastructure procurement and delivery management, the SIPDM features forward and backward linkages to a municipality's asset management and budgeting processes. This requires that asset management plans and the strategic asset management plan described in **Module 7**, assess, prioritise and include capital and operating programmes and projects in mSCOA format for approval. Prioritisation should be done using objective decision criteria, guidance for which has been provided in **Module 8.**

This **Module 9** also provides guidance on projects, programmes and portfolios, including matters related to identification, packaging, governance and performance management.

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

REFERENCES

Construction Industry Development Board. 2010. *Toolkit Delivery Management Guidelines, Practice Guide 2 – Construction Procurement Strategy System.* Available at: http://www.cidb.org.za/Pages/default.aspx (accessed on: 18 August 2015).

Govender, J. & Watermeyer, R. 2000. *Potential Procurement Strategies for Construction Industry Development in the SADC region.* Gaborone: International Conference on Construction Industry Development, November.

National Treasury. October 2015. Standard for Infrastructure Procurement and Delivery Management. First Edition. October 2015.

Watermeyer, R. 2012. *A systems approach to the effective delivery of infrastructure.* Johannesburg: South African Institute Civil Engineers, May.

Watermeyer, R., Nevin, G. & Langenhoven, K. 2012. *The supply chain management system for the delivery and maintenance of infrastructure by organs of state.* Johannesburg: South African Institute Civil Engineers, July.

CITIES' **INFRASTRUCTURE**
DELIVERY AND
MANAGEMENT SYSTEM

CIDMS