TOOLKIT **EDITION 2** 2023

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

MODULE 11

Infrastructure delivery

national treasury
Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

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INTEGRATED URBAN DEVELOPMENT FRAMEWORK

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MODULE PURPOSE

This module describes the infrastructure delivery management framework applicable to municipalities and municipal entities. Specifically, this module:

1. Describes the control framework for infrastructure delivery management, based on the National Treasury Framework for Infrastructure Delivery and Procurement Management (FIDPM); and
2. Provides guidance with respect to the infrastructure delivery management process.

WHY

The infrastructure delivery management system presented in this module ensures:

1. Proper planning and preparation translates into minimal project disruptions and successful outcomes;
2. Constant focus on value creation; and
3. Management of quality.

OUTPUTS OF MODULE 11:

1. A city infrastructure delivery management system.
2. Completed packages in accordance with stated requirements.

KEY RELEVANT NATIONAL REGULATIONS, POLICIES AND STRATEGIES:

1. Broad-Based Black Economic Empowerment Act, No. 53 of 2003
2. Constitution of the Republic of South Africa, No. 108 of 1996
3. Construction Industry Development Board Act, No. 38 of 2000
4. Engineering Profession Act, No. 46 of 2000
5. Landscape Architectural Profession Act, No. 45 of 2000
6. Local Government: Municipal Finance Management Act, No.56 of 2003
7. Municipal Systems Act, No. 32 of 2000
8. National Archives and Record Services of South Africa Act, No. 43 of 1996
9. Occupational Health and Safety Act, No. 85 of 1993
10. Project and Construction Management Professions Act, 2000 (Act No. 48 of 2000
11. Quantity Surveying Profession Act, No. 49 of 2000
12. Framework for Infrastructure Delivery and Procurement Management
13. South African Bureau of Standards, 10845-1, Construction procurement – Part 1: Processes, methods and procedures
14. South African Bureau of Standards, 10845-2, Construction procurement – Part 2: Formatting and compilation of procurement documentation
15. South African Bureau of Standards, 10845-3, Construction procurement – Part 3: Standard conditions of tender
16. South African Bureau of Standards, 10845-4, Construction procurement – Part 4: Standard conditions for the calling for expressions of interest
17. Department of Public Works and the Construction Industry Development Board. National Immovable Asset Maintenance Management Standard. Final Draft. July 2015.

CONTENTS

Module 11 Infrastructure delivery

11.1 INTRODUCTION

The control framework for infrastructure delivery was defined in **Figure 9.1 in Module 9**. The process commences with project initiation (Stage 1), followed by six stages culminating in package completion at stage 5, and handover in stage 6. There are a total of seven stage gates, each with a defined end-of-stage deliverable, described in **Table 9.1.**

This module provides guidance on each of the seven stages of the infrastructure delivery management control framework as defined in the National Treasury Framework for Infrastructure Delivery and Procurement Management (FIDPM). Key principles embedded in this control framework are the need for proper infrastructure planning as a requirement for value creation, stage controls to ensure that informed decisions are made and that risks have been considered and addressed as appropriate.

11.2 STAGE 1: PROJECT INITIATION

In Stage 1 (Project initiation) projects, or groups of projects having a similar high-level scope and that address strategic needs, business risks or opportunities that relate to the municipality's legislated or sanctioned mandate, are appraised for acceptance into firstly sectoral asset management plans and then the city's strategic asset management plan. Such projects or programmes can be identified in the process of preparing asset management plans, or such plans can accept project programme proposals previously identified, or a combination of both.

The project or programme proposal will take the form of an initiation report that 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**
- **Provide the estimated project cost and indicative high-level schedule**

However a project or programme proposal is included in a sectoral asset management plan, it must be appraised using documented, objective decision criteria. Objective decision criteria can include factors such as city strategic objectives, legislative compliance, national, provincial or regional priorities, risk exposure and reduction, financial justification and level of stakeholder support. Guidance on deciding objective decision criteria is provided in **Module 8.** The decision-making criteria, findings, assumptions and recommendations shall be documented in the initiation report.

11.2.1 Prefeasibility

Initiation or Prefeasibility reports developed during this Stage are required on major capital projects or projects:

Prefeasibility and feasibility reports developed during Stages 3 and 4 are required on major capital projects or projects:

- That involve significant capital investment over several years exceeding a threshold value defined in the SIPDM;
- Are not of a process-based, repetitive or fairly standardised nature where the risk of failing to achieve time, cost and quality objectives is relatively high;
- Are not building projects with or without related site works;
- Such reports may furthermore be required when infrastructure has significant staffing and operation costs, and the implications thereof need to be understood before a decision is taken to proceed with an infrastructure project; or when
- The municipality or municipal entity's infrastructure procurement and delivery supply chain management policy requires the production of prefeasibility and feasibility reports during stages 1 and 2 respectively.

Stages 3 (preparation and briefing) and 4 (concept and viability) need to 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.

11.2.2 Strategic brief

The strategic brief shall as necessary:

a. confirm the scope of the package and identify any constraints, including those relating to occupational health and safety;

b. establish the project criteria, including the performance and reliability requirements, design life, service life of components, function, maintenance and replacement requirements, mix of uses, scale, location, quality, value, time, safety, health, environment and sustainability;

c. identify procedures, organisational structure, key constraints, statutory permissions (e.g. environmental, heritage, social, planning, building control), and utility approvals, policies (e.g. environmental, developmental, social, maintenance or facilities management) and strategies to take the package forward;

d. Identify risks that need to be mitigated;

e. identify interfaces between packages as necessary; and

f. establish the control budget for the package, ownership costs and schedule for the package or series of packages.

The prefeasibility study shall as necessary:

Document the owner or user requirements specification	**Shortlist the options that were considered**	**Provide a preliminary design for study options**	**Provide preliminary capital estimate and the proposed schedule**	**Present the study outcomes**

Section 9.6.4 describes the most common statutory permissions and authorisations required for infrastructure projects. Section 5.3 provides guidance on responding to demand, whilst Section 8.2.3 offers guidance on identifying potential asset and non-asset solutions, to be considered in the formulation and evaluation of options

11.2.3 Completion of stage 1

Stage 1 is complete when the prefeasibility report or the strategic brief, as required, is accepted.

11.3 STAGE 2: CONCEPT

Stage 2 builds on the work done in stage 1, and develops a concept report which establishes the detailed brief, scope, scale, form and control budget and that describes the integrated concept for one or more packages. The concept report shall as necessary:

a. document the initial design criteria and design options or the methods and procedures required to maintain the condition of infrastructure for the package;

b. establish the detailed brief, scope, scale, form and cost plan for the package;

c. provide an indicative schedule for documentation and construction or maintenance services associated with the package;

d. contain a site development plan or other suitable schematic layouts of the works;

e. describe the statutory permissions, funding approvals or utility approvals required to proceed with the works associated with the package;

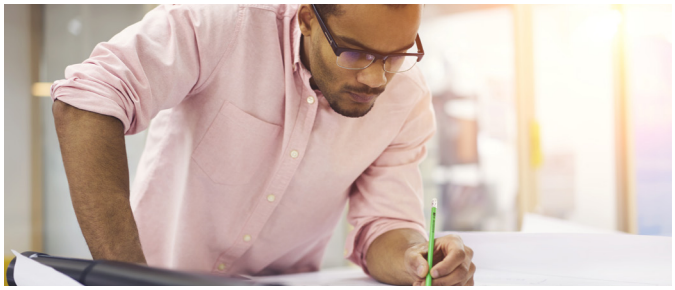
f. include a baseline risk assessment for the package, and a health and safety plan which is required in terms of the requirements of the Construction Regulations issued in terms of the Occupational Health and Safety Act;

g. contain a risk report linked to the need for further surveys, tests, other investigations and consents and approvals, if any, during subsequent stages and identified health, safety and environmental risk;

h. contain an operations and maintenance support plan which establishes the organisational structure required for the operation and maintenance of the works resulting from the package or series of packages over its service life, and the office, stores, furniture, equipment, Information and Communications Technology (ICT), engineering infrastructure and staff training requirements;

i. confirm the financial sustainability of the project; and

j. establish the feasibility of satisfying the strategic brief for the package or series of packages within the control budget established during stage 3 and, if not, motivate a revised control budget.



A feasibility report shall as a minimum provide the following:

a. Details regarding the preparatory work covering:
- a needs and demand analysis with output specifications; and
- an options analysis;

b. A viability evaluation covering:
- a financial analysis; and
- an economic analysis, if necessary;

c. A risk assessment and sensitivity analysis;

d. A professional analysis covering:
- a technology options assessment;
- an environmental impact assessment; and
- a regulatory due diligence;

e. Implementation readiness assessment covering:
- institutional capacity; and
- a procurement plan

11.3.1 Completion of stage 2

Stage 2 is complete when the feasibility report or the concept report, as required, is accepted.

11.4 STAGE 3: DESIGN DEVELOPMENT

11.4.1 From project planning to detailed design

Stage 3, design development, and stage 4, design documentation, comprise detailed design processes during which the solution is developed to such a point that site processes can be actioned thereafter. Detailed design during Stage 3 involves the selection of materials and components. This is often an iterative process of suggesting a component, examining its predicted performance against the brief, and modifying selections if required.

Wherever practical and feasible, designs should consider asset maintainability as appropriate given current technologies, costs and relevant legislation, standards and codes of practice. With respect to asset maintainability, the draft National Immovable Asset Maintenance Management Standard requires that entities:

- require of its professional design staff or of professional service providers (e.g. consulting engineers or architects) to design with maintainability in mind; and
- solicit functional requirements and recommendations from maintenance personnel for consideration and inclusion of asset design specifications as appropriate.

The output of stage 3 is a design development report that 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. The design development report translates the concept report into a document that describes what is to be delivered. The report must describe how structures, services or buildings and related site works, systems, subsystems, assemblies and components are to be safely constructed, commissioned, function and maintained.

Outline specifications should be prepared to sufficient detail to understand the operation and maintenance implications of the design and compatibility with existing systems, plant and equipment. The design should fit the budget parameters established. To meet the brief, adjustment of either the budget or the service life requirements may be necessary. Where a specification is adjusted to meet cost constraints, the maintenance and operation implications should also be considered.

Record information describes what has been delivered. Record information is therefore an after-the-fact updated version of the design development report.

11.4.2 Design development report

The design development report shall as necessary:

- develop in detail the accepted concept to finalise the design and definition criteria;
- establish the detailed form, character, function and costings;
- define all components in terms of overall size, typical detail, performance and outline specification;
- describe how infrastructure, or elements or components thereof, are to function, how they are to be safely constructed, how they are to be maintained and how they are to be commissioned; and
- confirm that the package or series of packages can be completed within the control budget or propose a revision to the control budget.

Outline specifications shall be in sufficient detail to enable a view to be taken on the operation and maintenance implications of the design and the compatibility with existing plant and equipment.

11.4.3 Completion of stage 3

Stage 3 is complete when the design development report is accepted.

11.5 STAGE 4: DESIGN DOCUMENTATION

Stage 4, design documentation, can be simplified when seen as two sub-phases as follows:

11.5.1 Stage 4A: Production information

Production information is developed during stage 4A of the design documentation stage. This includes the detailing, performance definition, specification, sizing and positioning of all systems and components, enabling either construction where the contractor is able to build directly from the information prepared or the production of manufacturing and installation information for construction.

11.5.2 Stage 4B: Manufacture, fabrication and construction information

The information generated in stage 4A enables manufacture, fabrication and construction information to be produced during stage 4B by or on behalf of the contractor, based on the production that is information-provided. This information enables manufacture, fabrication or construction to take place.

11.5.3 Completion of stage 4

Stage 4 is complete when the manufacture, fabrication and construction information is accepted as being in accordance with the production information.

11.6 STAGE 5: WORKS

11.6.1 From detailed design processes to site processes

Stage 5 signifies the move from detailed design processes through to site processes. Site processes commence with stage 5: works and end with stage 6: handover.

11.6.2 Typical works' activities

The objective of the works process is to construct or deliver and install the works as per the approved production information (e.g. specifications, etc.). The "start" and "finish" milestones for this stage are usually contractually defined and therefore subject to the form of contract prescribed in the tender documentation. There are three basic milestones commonly associated with constructions works, namely:

Giving access to the site by the client so that the contractor can commence with the works

Completing the works so that the client or intended operator can occupy or use the works

Correcting all defects before the end of the defects liability period.

The following activities are typically undertaken during stage 5 (works) in relation to the works:

- Provide temporary works.
- Provide permanent works in accordance with the contract.
- Manage risks associated with health, safety and the environment on the site.
- Confirm that design intent is met.
- Correct notified defects which prevented the client or end user from using the works and others from doing their work.
- Stage 5 can also include the design, supply and installation of plant which is incorporated into the works.

The contract entered into regulates the responsibilities and behaviour of the parties to the contract, and the person responsible for the administration of the contract on behalf of the municipality or municipal entity shall act as stated in such contract. See **Section 10.5.2** in **Module 10** for requirements related to contract management.

11.6.3 Completion of stage 5

Stage 5 is complete when:

a. completion of the works is certified in accordance with the provisions of the contract; or

b. the goods and associated services are certified as being delivered in accordance with the provisions of the contract.

11.7 STAGE 6: HANDOVER

11.7.1 Commissioning

Commissioning is a collaborative process for planning, delivering and operating works that function as intended. Where the assets created, installed, renewed, upgraded or reconfigured form part of a larger system or network of assets, commissioning procedures need to be scheduled in relation to other services, processes or construction activities. This requires that interdependency requirements are identified and considered as early in the project as possible, as they need to be included in the designer's outputs. Integrated commissioning along the following lines is recommended:

Pre-commissioning checklist

- **Identify all commissionable systems**
- **Establish the commissioning hierarchy, i.e. the priorities and the interrelationships between systems**
- **Compile commissioning documentation, making reference to statutory requirements where applicable**
- **Plan the commissioning and ensure adequate time allocation is made to prepare the recipient organisation.**

Commissioning checklist

- **Ensure that construction is complete and that identified defects have been dealt with**
- **Ensure that all commissionable systems are operational, e.g. that pipelines have been cleaned and infrastructure services connected**
- **Operate the works that are to be commissioned at the identified loading and simulate all eventualities to ensure proper operation**

11.7.2 Training

The handover stage shall include, as appropriate, the training of staff responsible for the operation of the delivered infrastructure. The draft National Immovable Asset Maintenance Management Standard also requires that entities (such as municipalities and municipal entities), require suppliers and contractors to provide maintenance manuals and training, as appropriate, on the maintenance of new immovable assets.

11.7.3 Safeguarding of works

It must be stressed that there is a difference between achieving completion of the works in accordance with the provisions of the contract and the handing over of the works to the owner, end user or those responsible for the operation and maintenance of the works. Upon completion, or soon thereafter, risks associated with loss of or wear or damage to the works are no longer borne by the contractor. It may therefore be necessary to make arrangements to secure and safeguard the works from the time that the contractor's liabilities cease until the time that the works are handed over.

11.7.4 Record information

The objectives of record information include the following:

1. Provide those responsible for the operation, maintenance and management of the asset(s) with sufficient information to effectively understand, budget, operate, care for, maintain and monitor the performance of the asset. More specifically, to:
   - understand how the designers intended the works, systems, subsystems, assemblies and components to function;
   - effectively operate, care for and maintain the works, systems, subsystems, assemblies and components to function;
   - check, test or replace systems, subsystems, assemblies or components to ensure the satisfactory performance of works, systems, subsystems, assemblies and components over time;
   - develop routine and scheduled maintenance plans;
   - determine stock levels for components and assemblies that need to be regularly replaced; and
   - budget for the operation and maintenance of the works, systems, subsystems and components over time.
2. Provide information pertaining to the planning and design of the works to inform refurbishments, alterations, modifications, renovations and additions that may be required from time to time.
3. To accurately locate the asset(s), measure its extent and value, and capture associated information such as asset attribute information in the asset register (see **Module 3** for asset data requirements).

The record information shall as relevant:

- accurately document the condition of the completed works associated with a package;
- accurately document the works as constructed or completed;
- contain information on the care and servicing requirements for the works or a portion thereof;
- contain information or instructions on the use of plant and equipment;
- confirm the performance requirements of the design development report and production information;
- contain certificates confirming compliance with legislation, statutory permissions and the like; and
- contain guarantees that extend beyond the defects liability period provided for in the package.

11.7.5 Updating of the asset register

It is the project manager's responsibility to provide the finance department with all necessary information, data and supporting documentation to update the asset register. It should include all details relating to the completed works as required by the city's approved asset management policy and procedures. Depending on internal arrangements, the project manager may also need to provide asset documentation and data to asset custodian departments, e.g. water treatment works as-built drawings and O&M manuals are handed to the water and sanitation department.

GRAP 17: Property, Plant and Equipment, requires that assets must be recognised (taken up in the asset register) when they become available for use. In practice, assets or parts of the works may become available for use prior to completion of stage 7 (close out). Whenever this happens, whether the asset(s) is used or not, those responsible for the maintenance and updating of the asset register should be notified.

11.7.6 Completion of stage 6

Stage 6 is completed when the owner or end user accepts liability for the works.

11.8 STAGE 7: CLOSE OUT

11.8.1 Close out report

The close out report for the package shall outline what was achieved in terms of at least the following:

The performance parameters outlined should be defined in Stage 2	**Unit costs of completed work or major components thereof**	**Key performance indicators relating to developmental objectives**

The close out report shall make suggestions for improvements on future packages of a similar nature. Such a report should also comment on the performance of the contractor and, if relevant, include building tuning or similar reports.

11.8.2 Completion of stage 7

Stage 7 is complete when, as relevant, defects certificates or certificates of final completion are issued in terms of the contract, the final amount due to the contractor in terms of the contract is certified and the close out report is accepted.

11.9 CONCLUSION

The FIDPM provides a logical framework for infrastructure delivery management. This framework provides both a "roadmap" for infrastructure delivery as a high-level process, and a control framework to ensure that value for money is delivered in a timely manner. The process commences with project initiation (stage 1) and terminates at conclusion of stage 7 (package completion and close out). These stages are sequentially grouped into portfolio planning processes, project planning processes, detailed design processes, site processes and close out processes. Specific steps and activities within these processes and stages may depend on the nature of the project itself and the form of contract selected.

Processes within infrastructure delivery may, depending on the nature, complexity and availability of information, be iterative in nature. There are also strong linkages with the asset management system (e.g. asset management plans as part of portfolio planning in stage 1 and 2, and updating of the asset register in stage 7), the infrastructure procurement framework and the municipality or municipal entity's financial system.

REFERENCES

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