Maintenance Monitoring and Evaluation Protocol

for immovable assets
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Monitoring and Evaluation Protocol for immovable assets

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MONITORING AND EVALUATION PROTOCOL for immovable assets
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<th>TERM</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset</td>
<td>A resource owned or controlled by an entity as a result of past events and from which future economic benefits or service potential are expected to flow to the entity.</td>
</tr>
<tr>
<td>Asset life</td>
<td>Period from asset creation to asset end-of-life.</td>
</tr>
<tr>
<td>Asset management</td>
<td>The process of decision-making, planning and control over the acquisition, use, safeguarding and disposal of assets to maximise their service delivery potential and benefits, and to minimise their related risks and costs over their entire life.</td>
</tr>
<tr>
<td>Asset management plan</td>
<td>A documented plan developed for the management of one or a portfolio of assets that combines multi-disciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost-effective manner to provide a specified level of service. The plan specifies approaches, programmes, projects, activities, resources, responsibilities and timeframes across the lifecycle of the asset(s) planned for, or over a timeframe appropriate for robust lifecycle planning. A significant component of the plan is a long-term cash flow projection.</td>
</tr>
<tr>
<td>Asset management objectives</td>
<td>Specific outcomes required from the implementation of the asset management framework.</td>
</tr>
<tr>
<td>Asset management strategy</td>
<td>The high level long-term approach to asset management including asset management action plans and objectives for managing the assets.</td>
</tr>
<tr>
<td>Asset management system</td>
<td>A management system for whose function is to establish the asset management policy and asset management objectives, as well as processes and organisational arrangements inclusive of structure, roles and responsibilities to achieve asset management objectives.</td>
</tr>
</tbody>
</table>
| Asset register              | A record of asset information considered worthy of separate identification for both asset accounting and management purposes including inventory, historical, financial, condition and construction, technical and financial information about each.  
  Note: The unit of account in an asset register is a component (see definition of a component).                                                                                                                                         |
<p>| Asset type                  | Grouping of assets having common characteristics that distinguish those assets as a group or class.                                                                                                                                                                                                                                    |
| Audit                       | Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled.                                                                                                                                                                        |
| Capital (financial concept of) | Net assets of an organisation.                                                                                                                                                                                                                                                                                                           |</p>
<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital (physical concept thereof)</td>
<td>The productive capacity of an organisation as measured in depreciated replacement cost.</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>Expenditure used to create new assets, increase the capacity of existing assets beyond their original design capacity or service potential, or to returns the service potential of the asset or expected useful life of the asset to that which it had originally. CAPEX increases the value of capital asset stock.</td>
</tr>
<tr>
<td>Carrying amount</td>
<td>The amount at which an asset is recognised after deducting any accumulated depreciation and accumulated impairment losses.</td>
</tr>
<tr>
<td>Class of assets (GRAP)</td>
<td>Is a grouping of assets of a similar nature or function in an entity’s operations that is shown as a single item for the purpose of disclosure in the financial statements.</td>
</tr>
</tbody>
</table>
| Component (IIMM)                          | A component (Note 1) is a specific part of a complex item (Note 2) that has independent physical or functional identity and specific attributes such as different life expectancy, maintenance and renewal requirements and regimes, risk or criticality.  
  
  Note 1: A component is separately recognised and measured (valued) in the organisation’s asset register as an unique asset record, in accordance with the requirements of GRAP 17 to componentise assets.  
  
  Note 2: A complex item is one that can be disaggregated into significant components. Infrastructure and buildings are considered complex items. |
<p>| Condition (IIMM)                          | The physical state of the asset.                                                                                                                             |
| Critical assets (IIMM)                    | Those assets that are likely to result in a more significant financial, environmental and social cost in terms of impact on organisational objectives and service delivery. |
| Current replacement cost (IIMM)           | The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost, to replace the existing asset with a new modern equivalent asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs. |
| Deferred Maintenance                      | The portion of planned maintenance work necessary to maintain the service potential of an asset that has not been undertaken in the period in which such work was scheduled to be undertaken. |
| Depreciable amount (GRAP)                 | The cost of an asset, or other amount substituted for cost, less its residual value.                                                                       |
| Depreciated replacement cost (IIMM)       | The replacement cost of an asset less accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired economic benefits of the asset. |
| Depreciation (GRAP)                       | Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life.                                                        |</p>
<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposal (IIMM)</td>
<td>Actions necessary to decommission and dispose of assets that are no longer required.</td>
</tr>
<tr>
<td>Impairment loss (GRAP)</td>
<td>An impairment loss of a cash-generating asset is the amount by which the carrying amount of an asset exceeds its recoverable amount.</td>
</tr>
<tr>
<td>Incident (ISO 55000)</td>
<td>Unplanned event or occurrence resulting in damage or other loss.</td>
</tr>
<tr>
<td>Level of service (IIMM)</td>
<td>Levels of service statements describe the outputs or objectives an organisation or activity intends to deliver to customers.</td>
</tr>
<tr>
<td>Life (of an asset)</td>
<td>The period over which benefits are derived from the use or availability of an asset.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>All actions, planned and unplanned, intended to ensure that an asset performs a required function to a specific performance standard(s) over its expected useful life by keeping it in as near as practicable to its original condition, including regular recurring activities to keep the asset operating, but specifically excluding renewal. Note: Maintenance also specifically excludes restoring the condition or performance of an asset following a recognised impairment event, which would be classified as either renewal or upgrading, depending on the circumstances.</td>
</tr>
<tr>
<td>Maintenance of capital</td>
<td>Expenditure to ensure that the productive or operating capacity of the asset base is maintained over time. The value vested in capital assets is maintained when the organisation has at least as much capital at the end of the period as it had at the beginning thereof.</td>
</tr>
<tr>
<td>Maintenance expenditure</td>
<td>Recurrent expenditure as required to ensure that the asset achieves its intended useful life. Maintenance is funded through the organisation’s operating budget, and such expenditure is expensed in the organisation’s Statement of Financial Performance.</td>
</tr>
<tr>
<td>Maintenance plan (LGIAMG)</td>
<td>Describes the planned and unplanned maintenance actions for an asset, facility or portfolio of assets, with intended delivery methods and schedules, budget requirements and responsible parties.</td>
</tr>
<tr>
<td>Maintenance objectives (IIMM)</td>
<td>Objectives for what maintenance has to achieve to ensure the assets are in the right condition to meet the needs of the organisation. Maintenance performance measures and targets are the means of assessing whether the maintenance objectives are being met.</td>
</tr>
<tr>
<td>Maintenance standards (LGIAMG)</td>
<td>The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practice, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives.</td>
</tr>
<tr>
<td>Maintenance strategy (IIMM)</td>
<td>Identifies the tactics and tools that will be used to deliver the maintenance plan, as well as defining the maintenance roles and responsibilities.</td>
</tr>
<tr>
<td>TERM</td>
<td>DEFINITION</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Material (GRAP)</td>
<td>Omissions or misstatements of items are material if they could, individually or collectively, influence the decisions or assessments of users made on the basis of the financial statements. Materiality depends on the nature or size of the omission or misstatement judged in the surrounding circumstances. The size of the information item, or a combination of both, could be the determining factor.</td>
</tr>
<tr>
<td>Modern equivalent asset (IIMM)</td>
<td>The most cost-efficient asset currently available that will provide equivalent functionality to the asset that will be replaced (or are currently being valued using the DRC methodology).</td>
</tr>
<tr>
<td>Monitoring (ISO 55000)</td>
<td>Determining the status of a system, a process or an activity.</td>
</tr>
<tr>
<td>Objective (Adjusted from ISO 55000)</td>
<td>Result to be achieved at strategic, tactical or operational level. Objectives can be set in a variety of domains or outcome areas (e.g. economic, social or environmental outcomes), or can relate to elements of the organisation (e.g. corporate or units in the organisation), or can relate to processes, services, products, programmes and projects.</td>
</tr>
<tr>
<td>Obsolescence (Optimised Decision-Making Guidelines)</td>
<td>The asset can no longer be maintained, or suffers a loss in value due to a decrease in the usefulness of the asset, caused by technological change, or changes in people’s behavioural patterns or tastes, or environmental changes.</td>
</tr>
<tr>
<td>Performance (ISO 5 000)</td>
<td>Measurable result of either quantitative or qualitative nature that can relate to the management of activities, processes, products or services, systems or organisations.</td>
</tr>
<tr>
<td>Performance measure (IIMM)</td>
<td>A qualitative or quantitative measure used to measure actual performance against a standard or other target. Performance measures are used to indicate how the organisation is doing in relation to delivering levels of service.</td>
</tr>
<tr>
<td>Performance monitoring (LGIAMG)</td>
<td>Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.</td>
</tr>
<tr>
<td>Policy (Adjusted from ISO 55 000)</td>
<td>Intentions and direction of an entity as formally expressed in a documented statement approved by top management and communicated throughout the entity.</td>
</tr>
<tr>
<td>Preventative maintenance</td>
<td>Maintenance carried out at pre-determined intervals, or corresponding to prescribed criteria, and intended to reduce the probability of failure or the performance degradation of an item. Preventative maintenance is planned or carried out on opportunity.</td>
</tr>
<tr>
<td>Property, plant and equipment (PPE) (GRAP)</td>
<td>Property, plant and equipment are tangible items that: (a) are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and (b) are expected to be used during more than one reporting period.</td>
</tr>
<tr>
<td>Recoverable amount (GRAP)</td>
<td>The higher of an assets fair value less costs to sell and its value in use.</td>
</tr>
<tr>
<td>Remaining useful life (IIMM)</td>
<td>The time remaining until an asset ceases to provide the required service level or economic usefulness.</td>
</tr>
<tr>
<td>TERM</td>
<td>DEFINITION</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Renewal</td>
<td>Expenditure on an existing asset which returns the service potential of the asset or expected useful life of the asset to that which it had originally.</td>
</tr>
<tr>
<td></td>
<td>Note 1: Renewal can include works to replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability.</td>
</tr>
<tr>
<td></td>
<td>Note 2: Expenditure on renewals is funded through the organisation’s capital budget, and such expenditure is recognised in the organisation’s Statement of Financial Position.</td>
</tr>
<tr>
<td>Residual value (GRAP)</td>
<td>Is the estimated amount that an entity would currently obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset was already of the age and in the condition expected at the end of its useful life.</td>
</tr>
<tr>
<td>Routine maintenance (IIMM)</td>
<td>Day to day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative and periodic maintenance.</td>
</tr>
<tr>
<td>Statement of Financial Performance</td>
<td>The Statement of Financial Performance, also known as an income statement, shows the revenue and expenses of an organisation over a period of time.</td>
</tr>
<tr>
<td>Statement of Financial Position</td>
<td>The Statement of Financial Position, also known as the Balance Sheet, presents the financial position of an entity at a given date. The statement comprises three main components, these being assets, liabilities and equity, and gives users of financial statements insight into the financial soundness of an entity in terms of liquidity risk, financial risk, credit risk and business risk.</td>
</tr>
<tr>
<td>Useful life (GRAP)</td>
<td>The useful life of an asset is the period over which an asset is expected to be available for use by an entity or the number of production or similar units expected to be obtained from the asset by an entity.</td>
</tr>
<tr>
<td>Value in use (GRAP)</td>
<td>The present value of the asset’s remaining service potential of a non-cash-generating asset or the present value of the estimated future cash flows expected to be derived from the continuing use of an asset and from its disposal at the end of its useful life of a cash generating asset.</td>
</tr>
</tbody>
</table>
# ACRONYMS

Acronyms relevant to this standard include:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFS</td>
<td>Annual Financial Statements</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Capital Expenditure</td>
</tr>
<tr>
<td>CIDB</td>
<td>Construction Industry Development Board</td>
</tr>
<tr>
<td>CRC</td>
<td>Current Replacement Cost</td>
</tr>
<tr>
<td>DRC</td>
<td>Depreciated Replacement Cost</td>
</tr>
<tr>
<td>FAR</td>
<td>Fixed Asset Register</td>
</tr>
<tr>
<td>GRAP</td>
<td>Generally Recognised Accounting Practice</td>
</tr>
<tr>
<td>NPV</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>OPEX</td>
<td>Operating Expenditure</td>
</tr>
<tr>
<td>PPE</td>
<td>Property, Plant and Equipment</td>
</tr>
<tr>
<td>RUL</td>
<td>Remaining Useful Life</td>
</tr>
<tr>
<td>RV</td>
<td>Residual Value</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

1.1 PURPOSE

This document articulates the protocol for the monitoring and evaluation of the implementation of the National Immovable Asset Maintenance Management Standard (hereafter referred to as the "Standard") for immovable assets under the custodianship of the National and Provincial Departments of Public Works, read together with the following supporting documents:

- National Immovable Asset Maintenance Management Accounting Framework;
- National Immovable Asset Maintenance Management Planning Guideline;
- National Immovable Asset Maintenance Management Competency Framework; and the
- NIMS Contractor Development In The Maintenance Industry.

Notwithstanding this, the principles documented in this protocol are able to be applied to all forms of public sector immovable assets.

Section 10 of the Standard: Management Review, Audit and Assurance indicated that: "The approach to management reviews shall be documented in the asset management strategy and be aligned to the National Immovable Asset Maintenance Management Protocol".

The focus of the monitoring and evaluation protocol is to (1) ensure appropriate asset care through sufficient investment in asset maintenance and renewal, (2) periodically assess the suitability and performance of the maintenance management system and implement improvements as necessary and (3) to introduce the State of Public Works' Asset Report that provides a strategic, national overview on the state of assets, asset care needs, improvements in management practice and institutional capacity, and related topical matters such as the progressive greening of immovable asset portfolios.

1.2 CONTEXT AND NOTES ON USING THE FRAMEWORK

This monitoring and evaluation protocol assumes that the documents referred to in Section 1.1 have been implemented within a broader, integrated set of infrastructure asset management practices structured into a holistic asset management system as defined in ISO 55 001 Asset management – Management systems – Requirements, and its South African counterpart SANS 55 001. Figure 1 provides an overview of the structure, components and relationships between components in a management system for asset management.

A scan was done to consider the extent to which existing budgeting and reporting templates can be bolstered to adequately measure and report on asset care performance. These have however been structured to support the cash basis of accounting, and are not helpful. As a result, it is not possible to link detailed performance measures to particular officials or organisational units, or to specific detailed organisational policies, procedures or instruments.

Section 2 of this document establishes entity-level asset care performance measures. These measures focus on the state of assets and the adequacy of spending on maintenance and renewals, and also measure asset impairment. Some of these measures consider performance in the last concluded financial period, and such performance is reported on in the annual report of the entity. Others are forward looking, and are included or reported on in the entity’s strategic plan and asset management strategy. Section 2 states the purpose of each measure, provides the formula for calculating performance, lists the sources of data used in the calculation, provides a norm for measuring performance and guidance on interpretation of performance results, and describes monitoring and performance arrangements for each asset care performance measure.

Whereas Section 2 focuses on performance relating to assets and their care, Section 3 provides monitoring and reporting arrangements relating to the maintenance management system. It concerns itself with monitoring and evaluation arrangements relating to post-incident evaluation, asset rationalisation and portfolio-level optimisation, management review, audit and assurance, and the adequacy of asset data and knowledge.
Section 4 introduces the State of Public Works’ Asset Report, intended to provide a national strategic overview on the extent, condition, value, consumption and asset care needs of the various asset portfolios under the control of Public Works, per province and nationally. Section 4 states the purpose of this report, its contents and reporting arrangements.
2. ENTITY-LEVEL ASSET CARE PERFORMANCE MEASURES

The following suite of measures assesses the health status of asset portfolios and the adequacy of spending on maintenance and renewal to ensure the ongoing functioning of assets within agreed performance parameters.

2.1 ASSET CONSUMPTION RATIO AND ASSET PORTFOLIO HEALTH GRADE

2.1.1 PURPOSE OF THIS RATIO

The asset consumption ratio measures the extent of consumption (accumulated wear and tear) of an asset portfolio, which is indicative of the overall health and ability of the asset portfolio to continue to provide service delivery and/or economic benefits, and the extent of asset renewal required.

2.1.2 FORMULA AND SOURCE DATA

The asset consumption ratio is calculated as follows:

\[
\text{Asset Consumption Ratio} = \left( \frac{\text{DRC} - \text{RV}}{\text{CRC} - \text{RV}} \right) \times 100
\]

Data on depreciated replacement cost (DRC), current replacement cost (CRC) and residual value (RV) are sourced from the entity’s asset register.

2.1.3 NORM AND INTERPRETATION

There is no one single norm for all asset portfolios that indicates the point beyond which an asset portfolio requires significant investment in renewal. That “point” is instead determined by the performance standards adopted in the entity’s asset management strategy for each asset portfolio and, where appropriate, for asset sub-group types and critical assets. However, performance standards will in general range between 60% - 40% of CRC, depending on the nature and criticality of assets. In instances where specific performance standards have not been specified for individual asset portfolios, the norm of 50% should apply. The following table provides a general indication of how to interpret the outcome of the asset consumption ratio.

### TABLE 1: GENERAL INTERPRETATION OF ASSET CONSUMPTION RATIO

<table>
<thead>
<tr>
<th>GRADE</th>
<th>DESCRIPTION</th>
<th>(DRC-RV)/(CRC-RV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very good</td>
<td>65% or more</td>
</tr>
<tr>
<td>2</td>
<td>Good</td>
<td>52.3% to 65%</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
<td>46.7% to 52.3%</td>
</tr>
<tr>
<td>4</td>
<td>Poor</td>
<td>40% to 46.7%</td>
</tr>
<tr>
<td>5</td>
<td>Very poor</td>
<td>40% or less</td>
</tr>
</tbody>
</table>

In some conditions the asset consumption ratio masks an emerging renewals backlog (consider scenario 2 and scenario 4a) in the figure below). This especially tends to happen during periods of high levels of investment in new asset creation. Entities should therefore also report on the portfolio health grade as per Table 1 above.
Interpretation of asset portfolio health grades:

- **Scenario 1 (very good):** Overall, the asset portfolio is in very good condition. This situation tends to manifest in instances where initially there was limited demand or limited investment into the asset portfolio, with major expansion in the asset portfolio in recent times, which accounts for the high percentage of assets in very good condition and good condition. This situation can also exist when the nature of assets are critical, and cared for to a high standard (e.g. for operating theatres).

- **Scenario 2 (Good):** This represents a scenario where the entity’s investment programme is skewed towards the creation of new assets, with little investment in renewals. The high levels of investment in new asset creation masks an emerging renewals backlog.

- **Scenario 2a (Good):** This represents the typical condition profile of a well-managed asset portfolio with a relatively small percentage of assets rated as critical, under conditions of financial constraints. The largest share of replacement value of assets are found in the condition range "Good" to "Poor". The renewals backlog, represented by assets in "Very poor" condition, requires attention but is in proportion to the overall asset portfolio, and manageable. Investment in new asset creation does not receive priority over investment in renewals.

- **Scenario 3 (Fair):** The overall condition of the asset portfolio becomes a matter of concern. Relatively high levels of investment in new asset creation takes precedence over investment in renewals.

- **Scenario 4 (Poor):** This scenario presents the case of an aging and neglected asset portfolio. Renewals are under-funded, and there is little asset creation activity. Urgent attention is required to avoid large scale asset and service failures.

- **Scenario 4a (Poor):** This situation commonly occurs at the end of life of first generation assets constructed at scale and over a relatively short space of time, coupled with a recent and sustained programme of new asset creation. This scenario is indicative of the inability to care for large and expanding asset portfolios. Urgent, multi-year structured renewal programmes are required to avoid systemic asset and service failures. In such a situation a structured renewals
programme alone is not sufficient – an optimised asset lifecycle plan is required that also considers portfolio optimisation (addressing over-design, redundancy etc.)

- **Scenario 5 (Very poor):** Asset portfolios are beyond the point where they are functionally fit for service, and service delivery collapse is imminent.

### 2.1.4 REPORTING ARRANGEMENTS

**Provincial departments of Public Works**

1. The asset consumption ratio and portfolio health grade shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period).
2. The asset consumption ratio and portfolio health grade shall be recorded in the entity’s strategic plan, and results updated and compared with the previous version of the plan whenever such plan is updated.

**National Department of Public Works**

1. The asset consumption ratio and portfolio health grade of asset portfolios under the control of the Department shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period).
2. The asset consumption ratio and portfolio health grade of asset portfolios under the control of the Department shall be recorded in the entity’s strategic plan, and results updated and compared with the previous version of the plan whenever such plan is updated.

### 2.2 ASSET SUSTAINABILITY RATIO

#### 2.2.1 PURPOSE OF THIS RATIO

The asset sustainability ratio determines the extent to which an entity replaces the asset value consumed during a period of review in order to maintain service delivery capabilities. It is a measure of the extent to which the entity maintains the value of its capital stock or productive capacity.

#### 2.2.2 FORMULA AND SOURCE DATA

The asset sustainability ratio is calculated as follows:

\[
\text{Repairs and maintenance} \times 100
\]  
\[
\text{CRC of immovable assets}
\]

Data on the annual depreciation expense is sourced from the Statement of Financial Performance. Sourcing data on capital renewal and replacement expenditure is more tricky. It requires tracking of budgeted expenditure through the transaction process, and pulling data from the general ledger. A counter-check is to sum the value of assets derecognised for renewal and replacement purposes in the financial period.

#### 2.2.3 NORM AND INTERPRETATION

The norm is 100% under conditions where the demand for the service remains constant, or is growing. The outcome of this ratio can be interpreted as follows:
ratio < 100%
If the investment in renewal of assets does not at least equal the consumption of those assets, the entity is likely to experience future reduced service delivery capacity, breakdown in assets and significant increase in repairs and maintenance expenditure. The following are possible reasons for a ratio of less than 100%:

• The demand for the service is decreasing, and the entity is deliberately scaling down or phasing out operations – there is limited or no need to invest in asset renewal.
• Forced asset sweating due to financial constraints.
• Detailed plans for maintenance and renewal were not in place that may include (1) insufficient budget requests, (2) lack of detailed implementation plans or (3) a combination of both.
• Insufficient implementation capacity.
• Inefficient planning or management resulting in renewals work not being implemented in full during the period in question.
• Some renewals were deliberately deferred to coincide with a larger renewal or upgrading programme.
• Other reasons e.g. a large renewals contract was awarded to contractor x, and this appointment is disputed in court by contractor y.

ratio > 100%
If more than 100% is spent it could indicate that:

• The entity is addressing a renewal backlog following a period of asset sweating.
• Actual renewals expenditure was higher than estimated expenditure as a result of (1) outdated estimates, (2) sudden and/or unexpected inflation or (3) a combination of these factors.

2.2.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

The asset sustainability ratio shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period).

National Department of Public Works

The asset sustainability ratio(s) for asset portfolio(s) under the control of the Department shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period).

2.3 ASSET RENEWAL FUNDING RATIO

2.3.1 PURPOSE OF THIS RATIO

The asset renewal funding ratio measures the extent to which asset renewal is accommodated in the long term financial plan, as identified in the asset management plan. Whereas the asset sustainability measures past renewal activity, the asset renewal funding ratio provides management with a view on future renewal needs, and planned expenditure in relation to future needs.

2.3.2 FORMULA AND SOURCE DATA

The asset renewal funding ratio is calculated as follows:

\[
\text{NPV of planned capital renewals over 10 years} \times 100 = \text{NPV of required capital expenditure over 10 years}
\]

Data on required capital renewal and planned capital expenditure is sourced from the asset management plan(s).
2.3.3 NORM AND INTERPRETATION

The norm is between 90% - 100%. If the target is not materially achieved on an ongoing basis, then a mounting renewals backlog is sure to mount, and adverse impacts on service delivery are likely. Moreover, sustained performance below target over time across the public works’ asset portfolios will require future investments in renewals of a magnitude that will likely create national fiscal challenges.

2.3.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

The asset renewal funding ratio shall be recorded in the entity’s strategic plan. The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

National Department of Public Works

The asset renewal funding ratio shall be recorded in the entity’s strategic plan. The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

2.4 THE GREEN RENEWALS AGENDA RATIO

2.4.1 PURPOSE OF THIS RATIO

The National Immovable Asset Maintenance Standard supports the objective of environmental sustainability as expressed in:

• the National Environmental Management Act;
• the Energy Efficiency Strategy of the Republic of South Africa;
• the National Climate Change Response Paper; and
• the Green Building Policy (draft).

The need for asset renewal offers the opportunity for sustained, incremental greening of asset portfolios through green component and technology replacement. The green renewals agenda ratio provides information on the size of the renewals programme and the percentage of planned expenditure on this programme earmarked for green renewals.

2.4.2 FORMULA AND SOURCE DATA

The green renewals agenda ratio is calculated as follows:

\[
\frac{\text{NPV of planned green renewal expenditure over 10 years}}{\text{NPV of required renewal expenditure over 10 years}} \times 100
\]

The asset management plan(s) provides data on planned green renewal expenditure and required renewal expenditure.

2.4.3 NORM AND INTERPRETATION

No norm exists for this ratio. In developing the asset management strategy and asset management plans, asset planners should assess the scope and feasibility of green renewals, taking into account policy, available green materials and technologies, lifecycle costs, implementation capacity and the outcomes of asset lifecycle plans, and establish an appropriate norm for each asset portfolio.
2.4.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

The green renewals agenda ratio shall be recorded in the entity’s strategic plan and its asset management strategy. The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

National Department of Public Works

The green renewals agenda ratio shall be recorded in the entity’s strategic plan and its asset management strategy. The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

2.5 REPAIRS AND MAINTENANCE AS A PERCENTAGE OF CRC

2.5.1 PURPOSE OF THIS RATIO

This ratio has two applications. Applied to budgeting, it gives an indication of the adequacy of budgeted expenditure for repairs and maintenance of assets. Applied to actual expenditure, it tests whether the entity spent adequately on repairs and maintenance.

2.5.2 FORMULA AND SOURCE DATA

The repairs and maintenance as a percentage of CRC ratio is calculated as follows:

\[
\text{Repairs and maintenance} = \frac{\text{CRC of immovable assets}}{\text{CRC of immovable assets}} \times 100
\]

The current replacement cost (CRC) of immovable assets can be obtained from the asset register. When the formula is applied for planning purposes, the amount for repairs and maintenance can be sourced from the asset management plan(s) or from the operating budget. When applied to assess actual expenditure, data on repairs and maintenance can be sourced from the Statement of Financial Performance.

2.5.3 NORM AND INTERPRETATION

Provisional norms are between 1.8% - 2.2% for civil structures, and up to 4.5% per annum for electrical infrastructure. These norms should be reviewed once the current replacement costs of all asset portfolios have been established on a consistent basis, performance standards have been developed, asset lifecycle strategies developed and costed, and asset management plans prepared. Possible reasons for specific outcomes include:

Repairs and maintenance expenditure exceeds the norm:

- An increasing expenditure trend may be indicative of high asset-usage levels.
- The entity has a deteriorating asset base requiring high levels of major reactive maintenance.
- Renewals expenditure is incorrectly classified as repairs and maintenance expenditure, thus incorrectly bloating reported repairs and maintenance expenditure.
- New assets are purchased and incorrectly classified as repairs and maintenance expenditure, also incorrectly bloating reported repairs and maintenance expenditure.
- There are high levels of inefficiency in the maintenance management function.
- Amounts calculated for either/or repairs and maintenance or CRC are incorrect.
- Norms established for this ratio requires review and possible calibration.
Repairs and maintenance expenditure below the norm:

- A ratio below the norm indicates that insufficient monies are being spent on repairs and maintenance to the extent that it could increase impairment of useful assets.
- If an increasing expenditure trend suddenly drops to lower levels without an increase in the fixed asset value, this may be indicative of challenges in spending patterns. This may be the result of lack of planning, funding constraints or delivery capacity.

2.5.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

The repairs and maintenance ratio shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

National Department of Public Works

The repairs and maintenance ratio shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

2.6 DEFERRED MAINTENANCE

2.6.1 PURPOSE OF THIS METRIC

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

2.6.2 FORMULA AND SOURCE DATA

Deferred maintenance is calculated as follows:

\[
\text{Value of planned maintenance for the financial period} - \text{Actual expenditure on maintenance} \\
\text{Value of planned maintenance for the financial period}
\]

Data on planned maintenance can be sourced from the asset management plan(s), and data on actual expenditure on maintenance and repairs from the Statement of Financial Performance.

2.6.3 NORM AND INTERPRETATION

The norm is 8% or less, which equates to one (1) month of delayed expenditure on repairs and maintenance, assuming an equal spread of maintenance expenditure across the year. Spending below this level is indicative of inefficiencies in the planning regime, funding constraints or delivery capacity. Sustained levels of deferred maintenance may lead to asset impairment.

2.6.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

Deferred maintenance shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.
National Department of Public Works

Deferred maintenance ratio shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

2.7 % OF PPE AND INTANGIBLE ASSETS IMPAIRED

2.7.1 PURPOSE OF THIS RATIO

An impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount. This can happen as a result of many factors, such as sustained poor care of assets, damage caused by operator error, structural failure due to poor design and/or construction, vandalism, damage caused by natural events such as flooding, or as a result of obsolescence – this is not an extensive list. This ratio measures the value of assets impaired compared to the carrying value of property, plant and equipment (PPE) and intangible assets for a financial period.

2.7.2 FORMULA AND SOURCE DATA

This ratio is calculated as follows:

\[
\frac{\text{Impairment on PPE and Intangible assets}}{\text{Carrying value of PPE and Intangible assets}} \times 100
\]

Data on the carrying value of PPE and intangible assets can be sourced from either the asset register or from the Statement of Financial Position, and data on impairment can be sourced from the asset register.

2.7.3 NORM AND INTERPRETATION

The generally accepted norm is 0%. This is however a target, not necessarily reflective of reality. Where no impairment losses are reported, it may be necessary to review impairment testing practices.

2.7.4 REPORTING ARRANGEMENTS

Provincial departments of Public Works

Impairment losses shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

National Department of Public Works

Impairment losses shall be recorded in the entity’s annual report, and results shall be recorded on a comparative basis (results for the financial period concluded compared with the results of the preceding financial period). The ratio shall be calculated for each notable asset portfolio, and for the group of asset portfolios under the control of the Department.

2.8 SUMMARY OF ASSET CARE PERFORMANCE MEASURES AND THE RELATIONSHIP BETWEEN THESE MEASURES

2.8.1 SUMMARY OF MEASURES

Following is a summary of the asset care measures described in this section:
### TABLE 2: SUMMARY OF ASSET CARE MEASURES

<table>
<thead>
<tr>
<th>RATIO</th>
<th>PURPOSE</th>
<th>FORMULA</th>
<th>NORM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSET HEALTH CHECK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset consumption ratio</td>
<td>Measures the state of the asset portfolio and risk of a deteriorating asset portfolio for service delivery</td>
<td>[ \frac{DRC - RV}{CRC - RV} \times 100 ]</td>
<td>40% - 60%, depending on performance standards adopted for each asset portfolio. Where condition is not tied to performance, the norm of 50% &gt; applies.</td>
</tr>
<tr>
<td>Asset portfolio health grade</td>
<td></td>
<td>See Table 1</td>
<td></td>
</tr>
<tr>
<td><strong>MAINTENANCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repairs and maintenance as a % of CRC</td>
<td>Measures the adequacy of repairs and maintenance provisions.</td>
<td>[ \frac{Repairs and maintenance}{CRC of immovable assets} \times 100 ]</td>
<td>1.8% - 2.2% for civil structures and up to 4.5% for electrical infrastructure, depending on portfolio composition and performance standards.</td>
</tr>
<tr>
<td>Deferred maintenance</td>
<td>Quantifies the portion of planned maintenance work necessary to maintain the service potential of an asset that has not been undertaken in the period in which such work was scheduled to be undertaken.</td>
<td>Value of planned maintenance for the FY - Actual spending on maintenance Value of planned maintenance for the FY</td>
<td>8% or less</td>
</tr>
<tr>
<td><strong>ASSET IMPAIRMENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of PPE and intangible assets impaired</td>
<td>Determines the significance of assets impaired and reduction of future benefits of the utilisation of assets.</td>
<td>[ \frac{NPV of planned green renewal expenditure over 10 years}{NPV of required renewal expenditure over 10 years} \times 100 ]</td>
<td>0%</td>
</tr>
<tr>
<td><strong>RENEWAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset sustainability ratio</td>
<td>Establishes the extent to which an entity replaces the assets used during a period of review to maintain service delivery capabilities.</td>
<td>[ \frac{Capital renewal and replacement expenditure}{Depreciation expense} \times 100 ]</td>
<td>100% while demand for the service remains constant, or is growing</td>
</tr>
</tbody>
</table>
### Monitoring and Evaluation Protocol for Immovable Assets

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Purpose</th>
<th>Formula</th>
<th>Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset renewal funding ratio</td>
<td>Measures the extent to which asset renewal is accommodated in the long term financial plan</td>
<td>$\frac{\text{NPV of planned capital renewals over 10 years}}{\text{NPV of required capital expenditure over 10 years}} \times 100$</td>
<td>90% - 100%</td>
</tr>
<tr>
<td>Green renewals agenda ratio</td>
<td>Provides information on the size of the renewals programme and the percentage of planned expenditure on this programme earmarked for green renewals.</td>
<td>$\frac{\text{NPV of planned green renewal expenditure over 10 years}}{\text{NPV of required renewal expenditure over 10 years}} \times 100$</td>
<td>As per approved asset management plan</td>
</tr>
</tbody>
</table>

#### 2.8.2 How the System Works

Figure 3 below summarises all asset care measures and notes the instruments in which they are reported. The asset health check measures serve as barometers for the overall health check of asset portfolios. Asset portfolios predominantly in very good or good health will mostly only require maintenance, whereas those with portfolio health grades ranging from fair to very poor will mostly require increasingly intensive renewal programmes. The set of maintenance measures indicate what level of maintenance is necessary, and measure the extent to which maintenance is funded. Planned maintenance not spent will over time likely result in impairment of assets that in turn will require renewal of assets – though impairment could also result from other causes such as Acts of God and vandalism. A suite of renewal measures are provided that also recognise the opportunity to use renewals funding to increasingly, and over time, retrofit immovable assets to be more energy and water efficient.
ASSET HEALTH CHECK
- Asset consumption ratio
- Asset portfolio health grade

MAINTENANCE
- Repairs & maintenance as a % of CRC
- Asset portfolio health grade

IMPAIRMENT
- % of PPE and intangible assets impaired

RENEWAL
- Asset sustainability ratio
- Asset renewal funding ratio
- The green renewals agenda ratio

Assess past performance with lagging measures
Towards the future with leading measures

Lagging measures are recorded in the entity’s annual report, and leading measures are typically included in the entity’s strategic plan, asset management strategy and its asset management plans.
3. MAINTENANCE MANAGEMENT SYSTEM MONITORING AND REPORTING ARRANGEMENTS

The previous sections stipulated monitoring and reporting arrangements on the care of assets. This section provides monitoring and reporting arrangements for the maintenance management system.

3.1 POST-INCIDENT EVALUATION

The National Immovable Asset Maintenance Management Standard defines an “incident” as an “unplanned event or occurrence resulting in damage or other loss”. Clause 7.2 of the Standard requires evaluation of incidences and, where appropriate, improvement and updating of the entity’s responses and standard procedures. The following arrangements will apply:

a. Any incident breaching the materiality limit of the entity should be brought to the attention of the Accounting Officer, together with particulars on the cause(s) and impact(s) of the incident, whether the documented approach has been followed, the effectiveness of the documented approach in dealing with the event, and proposed improvements in documented standard responses and procedures.

b. Incidents of a particular cause that collectively breach or have the potential to breach the materiality limit of the entity should be brought to the attention of the Accounting Officer, together with particulars on the cause(s) and impact(s) of the incident, whether the documented approach has been followed, the effectiveness of the documented approach in dealing with the event, and proposed improvements in documented standard responses and procedures.

c. All other incidents should be dealt with at the appropriate level of organisational authority, following the procedures established in Clause 7.2 of the Standard.

3.2 ASSET RATIONALISATION AND PORTFOLIO-LEVEL OPTIMISATION

An asset rationalisation scan and portfolio-level optimisation plan shall be prepared periodically, but at intervals not exceeding three (3) years, and findings and recommendations presented to the Accounting Officer. Clause 9 of the Standard provides details on the focus and scope of the study.

3.3 MANAGEMENT REVIEW, AUDIT AND ASSURANCE

Clause 10 of the Standard describes the purpose and scope of management reviews and audits. The following arrangements apply:

a. Management reviews should be conducted at regular intervals of no longer than three (3) years, or more often as instructed by the Accounting Officer.

b. Findings and recommendations emanating from the management review should be reported to the Accounting Officer.

3.4 ASSET DATA AND KNOWLEDGE ADEQUACY AND IMPROVEMENT PLAN

Clause 11.1 of the Standard specifies asset data and knowledge needs and conventions, and Clause 11.2 states the requirements for assessing asset data and knowledge. The following arrangements apply:

a. The entity should at regular intervals not exceeding three (3) years take stock of its asset data and knowledge, and

b. Where appropriate, develop a data improvement plan.

The outcomes of the asset data and knowledge scan, and improvement plan should be submitted to a committee comprising the head of asset management of the department, the Chief Finance Officer and the Chief Information Officer.
4. STATE OF PUBLIC WORKS’ ASSET REPORT

4.1 PURPOSE

It has become common practice in recent years, in multiple sectors, to publish a state of affairs report periodically, often annually. Examples of these include the State of the Nation, State of Energy, State of the Environment, and State of City Finances. In local government reports have been published the past few years providing valuable information on matters such as the current and depreciation replacement cost of infrastructure by sector (e.g. water, sanitation, electricity and roads), accumulated depreciation, renewal needs, maintenance needs and spending patterns.

The state of Public Works asset portfolios affects many aspects of service delivery across the national and provincial spheres of government, and some of these portfolios, such as clinics and libraries, also impact on local government. It is also necessary for a wide range of stakeholders to be aware of, reflect and positively contribute towards the prioritisation of limited public funding in cases of greatest renewals needs, whether in particular spatial locations, to particular asset portfolios, or some combination of these. This however requires a composite view on the full scope of funding challenges, both now and in the future.

The State of Public Works’ Asset Report will provide a holistic, strategic view on the extent, value and condition of public works’ assets, by portfolio, province and nationally, and will provide insight into asset care funding needs (maintenance and renewals), now and over the next decade.

4.2 CONTENT OF THE STATE OF PUBLIC WORKS’ ASSET REPORT

It is envisioned that the State of Public Works’ Asset Report shall provide information on at least the following items:

a. a description of public works’ asset portfolios by type;
b. the current and depreciated replacement costs of individual asset portfolios, by province and nationally;
c. asset portfolio level condition profiles, by province and nationally;
d. maintenance funding needs by asset portfolio, per province and nationally, together with details on adequacy of current funding, deferred maintenance and probable future needs (over the next 10 years);
e. renewal funding needs by asset portfolio, per province and nationally, together with details on adequacy of current funding, backlog renewals and probable future needs (over the next 10 years);
f. composite asset care funding needs (maintenance and renewal) over the next 10 years, by asset portfolio, per province and nationally;
g. progress towards the greening of immovable asset portfolios through a structured programme of green renewals;
h. details of major planned expansions in Public Works’ asset portfolios;
i. jobs created through maintenance and renewal activities;
j. development of the capacity of the maintenance industry; and
k. any other relevant and topical matters in the year of publication.

4.3 REPORTING ARRANGEMENTS

The following monitoring and reporting arrangements shall apply:

a. The Accounting Officer of the National Department of Public Works will allocate responsibility for the compilation of The State of Public Works’ Asset Report to the Head of the appropriate branch within the Department.
b. The State of Public Works’ Asset Report should be compiled and published at frequencies as directed by the Accounting Officer of the National Department of Public Works, and the Head of the branch nominated by the Accounting Officer to be responsible for the compilation and publication of this report will ensure that sufficient budget provision is made to enable the compilation, editing, graphics treatment, printing and launch of the publication.
c. The Accounting Officer of the National Department of Public Works will, having considered advice from the nominated official responsible for the publication, decide on stakeholders to whom the publication should be submitted to, the nature of the launch and the communications programme surrounding it.
MAINTENANCE MONITORING AND EVALUATION PROTOCOL

This publication is brought to you by The Department of Public Works and The Construction Industry Development Board (cidb). This book is number three in the following series:

1. Maintenance Management Standard
2. Maintenance Accounting Framework
3. Maintenance Monitoring and Evaluation Protocol
4. Maintenance Planning Guidelines
5. Maintenance Competency Framework
6. Contractor Development in the Maintenance Industry