

A PAPER PREPARED FOR CPA AUSTRALIA ASSET ACCOUNTING AND MANAGEMENT DAY

DEVELOPING ASSET MANAGEMENT PLANS / MANUALS TO IMPROVE RESOURCE ALLOCATION AND MAINTENANCE DECISIONS

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SUMMARY

In order to effectively manage a portfolio of assets to achieve a desired level of service for all customers a clear and implementable plan of attack should be put in place. This plan is referred to as the “Asset Management Plan”. This paper presents the rationale behind putting such a plan together and the recommended approach. This includes establishing levels of service and asset standards, performance measurement against those standards, analysis of options to overcome current and future performance deficiencies and the comparison of total expenditure requirements against available funds or hurdle rates.

1 Objective of Asset Management Activities

The key objective to any business must be to deliver a service to its customers by best utilizing its staff, infrastructure and other assets whilst meeting the corporate objective of ensuring business sustainability and maximizing the stakeholder return. This service requires certain asset standards and is delivered at a cost.

The key stakeholders can be owners and customers. Asset owners are purely providing the facilities (assets) to be used in the process of service delivery. The level of service needs to be set to suit regulatory, legal or other requirements and customer expectations.

The cost of service provision should include the normal recurrent costs plus an appropriate allowance for the consumption (depreciation) of the infrastructure assets, plus an adequate return on this asset stock (eg. Capital use charge).

Because non current assets may be required in service for many years, it is essential that we carry out appropriate maintenance and renewal activities to ensure we are not accumulating unreasonable liability for future users or managers.

A mission statement or key objective appropriate for most asset owners could be:

“To plan, create, acquire, maintain, operate, rehabilitate, replace and dispose of assets in the most cost effective (sustainable) manner required to meet present and future corporate objectives and demands for service levels.”

The key elements of this statement are:

- Most cost effective (sustainable) manner
- For present and future corporate objectives and demands for service levels.

These elements are the basis of Life Cycle Asset Management and are represented by Figure 1.1.

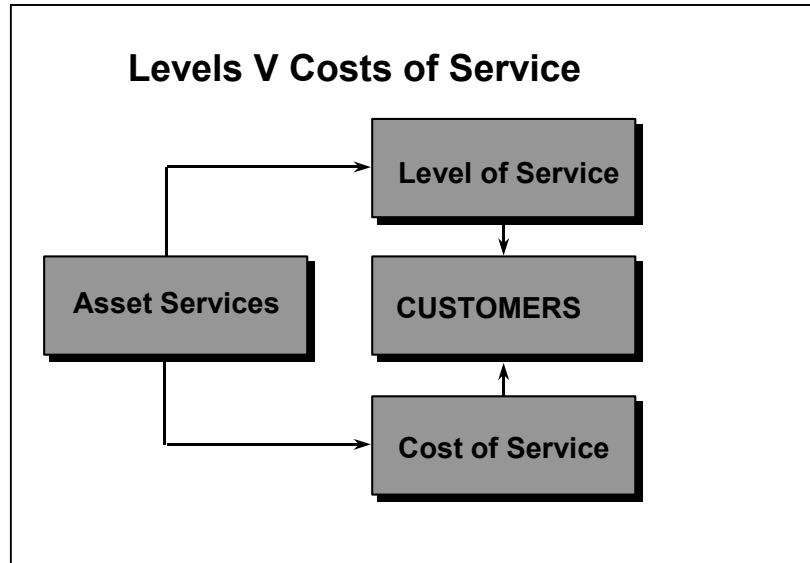


Figure 1.1

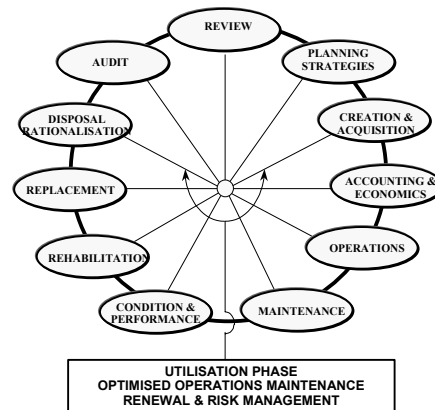
2 Life Cycle Functional Activities

The various activities that make up the full life cycle functions for assets encompass all activities from the identification of a service need, through the planning stages to the actual delivery of the service.

The functional activities of Advanced (life cycle) Asset Management (AAM) are represented in Figure 2.1.

The auditing function should cover the whole life cycle process of asset management.

Functional activities of A.A.M.



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Figure 2.1

3 Matching Objectives and Activities (Outputs and Inputs)

We have to match the auditing activities to the outputs or objectives required, ie. The required level of service at the lowest sustainable cost. An understanding of these objectives will enable the organization to provide comprehensive scoping with the appropriate auditing criteria.

The strategic planning process and the asset management undertaken has to ultimately ensure that there is constant demand for the service, which is in turn determined by the level and cost of service.

This relationship is depicted in Figure 3.1 showing the demand and supply elements.

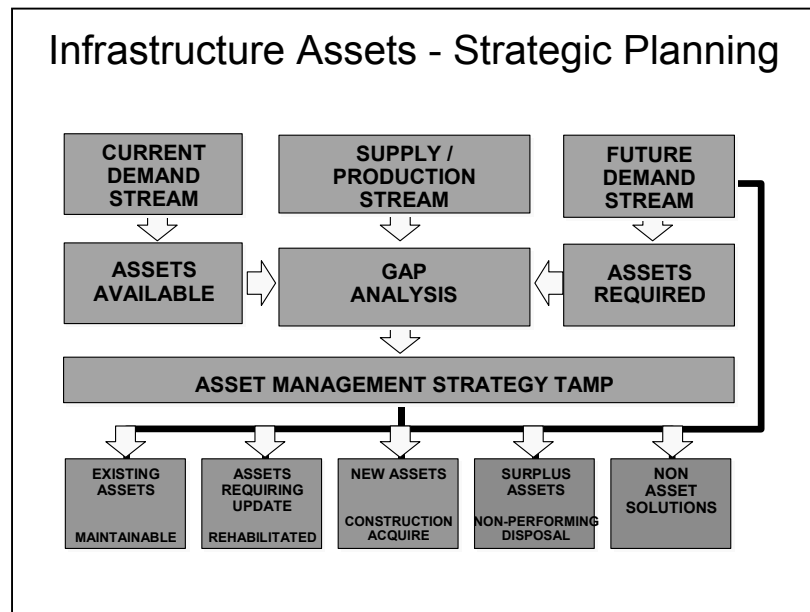


Figure 3.1

3.1 Levels of Service

The level of service consists of measurable outputs including:

- Reliability
- Quality
- Quantity
- Safety / risk

For mature assets the key inputs that impact on the level of service are the planning, maintenance and renewal.

The priority or impact of these inputs will vary for each owner and asset. They will depend on the status of the assets and their key corporate objectives or business viability.

The key performance indicators or quality assurance issues in relation to Level of Service are:

- Clear indicators and standards (policy exists for each service delivery programme).
- Indicators are public knowledge and available to stakeholders and customers.

The most successful organizations have:

- Regular customer surveys and associated analysis.
- An "informed customer group" separate from the elected members and general public.
- An effective feedback system and complaints management process.
- Regular newsletter, public meetings and discussions with special interest groups, describing outcomes of the asset management outcome program etc.

3.2 Full Economic Cost of Service Models

The inputs or activities that impact on the Cost of Service outputs are the full economic life cycle costs of the assets, from strategy planning to renewal or disposal. They involve finance, technical and administrative costs associated with the service delivery. The full economic cost model identified in the NCP-SCARM Study is most suited to infrastructure asset service delivery. This is a cost / charging model, not reporting.

3.2.1 Capital Use Charge or Return

This should be the application of an appropriate WACC for the business multiplied by the Optimized Deprecation Replacement Value (ODRV) of the asset portfolio. The WACC would be a maximum to avoid monopoly taxing, however, organizations can decide to reduce this to 0% for non-profit type operations.

3.2.2 Depreciation – Decline in Service Potential

Infrastructure Asset Depreciation (IAD) is unique because of the ongoing lives of the assets and technology improvements and is best represented by the Average Annual Renewal Annuity (AARA) of the capital investments required to sustain the assets at their required service potential.

3.2.3 Operations

Average annual operating costs.

3.2.4 Maintenance

The long run average maintenance required to achieve the reliability and lives as set in the AARA. This should include major periodic maintenance (MPM) such as overhauls if required.

3.2.5 Administration

Average normal costs.

3.2.6 Externalities

Where applicable, eg. many work distributors buy bulk water from the State. While existing asset, owners have missed the opportunity to reduce the cost of: the original strategy, design and construction and acquisition opportunities intervening with cost effective maintenance or rehabilitation options, they can over come these in the future.

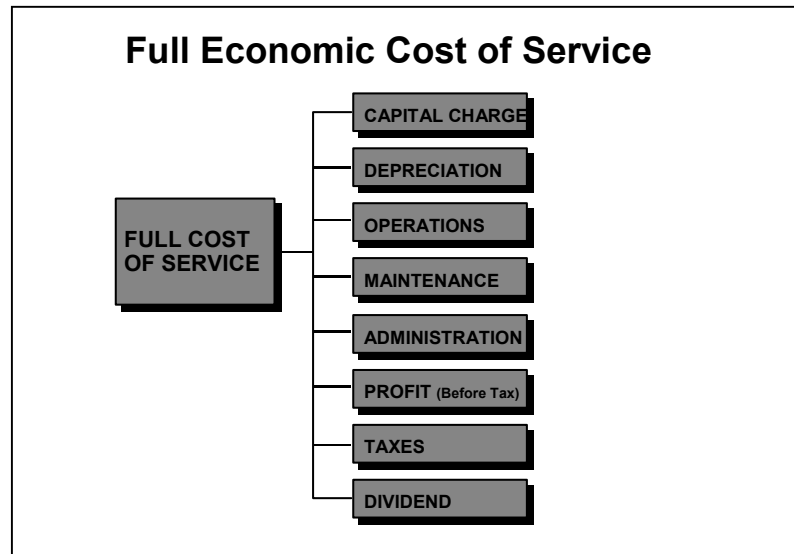


Figure 3.2

4 The Key Activities

To effectively manage the assets within this framework and to properly advise the organization, managers need to know:

- What are the organizations assets.
- What do they consist of (physical details).
- Present replacement and written down value.
- Their condition, backlog maintenance and decay rate.
- Required standard of service.
- Impact of failing to meet the levels of service.
- Impact of new technology.
- Optimal maintenance required to provide the reliability or cost effective life within the business framework.
- Occurrence and timing of rehabilitation or replacement.
- Cost of future maintenance, rehabilitation and replacement programs.
- Program financing and the impact on customers and stakeholders.
- Affects of different levels of funding on level of service provided.

To manage assets effectively, an organization needs to have relevant information systems and data (knowledge). With such data and using the best appropriate practice processes, they should then develop Asset Management Plans.

5 Asset Management Plans

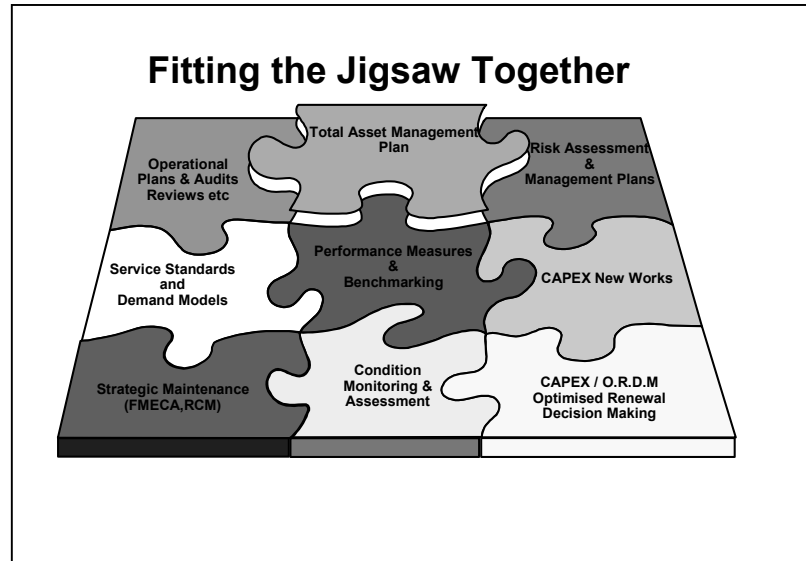


Figure 5.1

When we have completed all the activities listed in Section 4, we can complete the final piece of the jigsaw and develop Asset Management Plans (AMP) of an adequate confidence level. Such plans include:

- Capital investment.
- Operations and maintenance plans.
- Long term sustainability in economic, environmental and social term.
- Levels of service.

AMP's provide organizations with an understanding of their present situation and ability to meet future demands as shown in Figure 5.2.

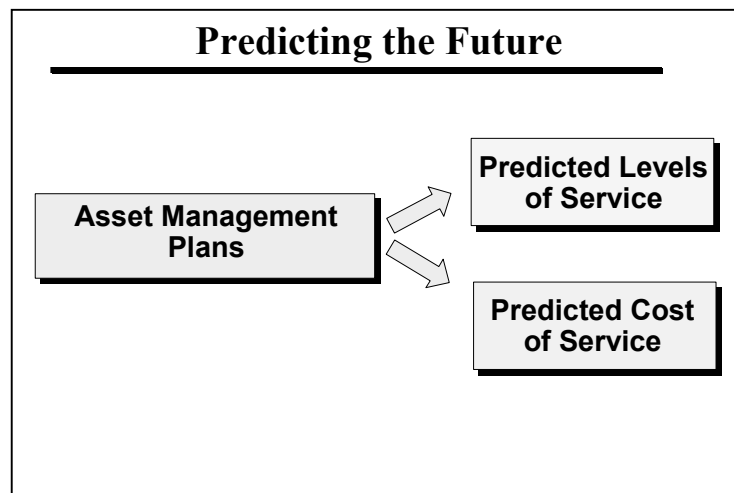


Figure 5.2

AMP's should include:

- 20 year predictive program.
- Future levels of service options and related cost structures.
- Tool for community and stakeholders consultation.

The International Infrastructure Management Manual suggest the following format for AMP's:

- Existing levels / standards of service.
- Current asset condition, performance and service potential.
- Future predicated levels of service.
- Modes of failure including:
 - Growth (decline)
 - Reliability
 - Condition.
- Future capital expenditure progress.
- Operations and maintenance plans to suit the above scenarios.
- Long term (sustainable) funding strategies.

5.1 Asset Management Plan Confidence Levels

The plans need to be produced to the confidence levels necessary for the organization or the value and risk of the investment. It is vital that these plans are viewed with this in mind.

GHD's approach is to rate the quality of each business element that is used to create an asset management plan, combine this with weighting factors for their importance to the overall business and then generate an overall confidence level in the quality of answers being produced by the plan. This has been a valuable tool for assisting clients determine where they best need to invest resources to make these plans achieve a desired quality rating. The following Figure 5.3 illustrates some of the elements considered in the determining of an overall confidence rating.

AMP - Overall Confidence Levels

Varies for Each Business

WOMBAT CITY COUNCIL						
	Quality Element	Process Effectiveness	Data Quality	Element Rating	Benefits Weight	TAMP Conf.Level
1	Existing Standards of Service	95%	95%	95%	4	3.8
2	Knowledge of Assets	80%	80%	80%	12	9.6
3	Current Demands	100%	98%	99%	4	4.0
4	Future Demands /LOS	90%	80%	85%	12	10.2
5	Prediction of Failure Mode	85%	80%	83%	8	6.6
6	Timing of Failure	85%	70%	78%	6	4.7
7	Consequence of Failure	75%	60%	68%	10	6.8
8	Quality of proposed Maintenance Program	75%	60%	68%	15	10.1
9	Appropriateness of Oper. & Maintce. Costs	95%	85%	90%	6	5.4
10	Appropriateness of Renewal Options	80%	80%	80%	4	3.2
11	Appropriateness of New Asset Options	95%	85%	90%	4	3.6
12	Appropriateness of Capital Evaluation Processes	80%	80%	80%	6	4.8
13	Plan & Customer Expectations	85%	85%	85%	5	4.3
14	Ability to Modify Plan	75%	80%	78%	2	1.6
15	Links to Business Goals	85%	80%	83%	2	1.7
	TOTALS				100%	80.1

Figure 5.3

5.2 The Benefits of Asset Management Plans

The key benefits of an asset management plan include:

- Linkage between the service level expectations and the asset needs in order to sustain that service.
- A consolidated statement of current policies, strategies and programmes adopted for the ongoing provision of these services
- An understanding of the present and future demands on the assets

- A current estimate of the long term financial commitments necessary to maintain both the assets and the services they provide
- A current evaluation of business risks associated with the failure of the assets
- An ideal tool for the administration of contracts in relation to operations, maintenance and renewals
- A summary of appropriate strategies to address issues in relation to both the shorter term operations and maintenance and the longer term strategic planning of the assets
- An information source capable of spanning organizational changes and the transfer of responsibilities between successive asset managers
- A clearly established link between business objectives and asset management outputs
- A vehicle to model future costs and asset performance
- A process to identify future work and staff needs.
- A vehicle for introducing discipline and logical processes into all of the AM planning activities.
- A tool to greatly assist the organizations ability to meet goals and objectives in a way that best serves customers.
- A vehicle to communicate to customers and other parties about the organizations asset management activities.

5.3 *Elements of an asset management plan*

5.3.1 Introduction

- Background – purpose of plan, relationship to other plans, assets included in the plan, key stakeholders, organisational structure
- Goals and Objectives – reasons and justification for asset ownership, links to organisation vision, mission, goals and objectives.
- Plan framework – key elements of the plan

5.3.2 Levels of Service

- Customer research and expectations
- Strategic and Corporate Goals
- Legislative, Regulatory or other Legal Requirements
- Current Levels of Service – and its relationship to the asset standards
- Desired Level of Service – if different from the current level of service and how gap will be closed.

5.3.3 Future Demand

- Demand forecast – factors influencing, projected growth or decline, changing customer expectations and impact on utilisation.
- Changes in Technology – changing methods of service delivery and resulting obsolescence
- Demand Management Plan – including non asset solutions and summary of new (growth) works planned.

5.3.4 Lifecycle Management Plan

- Background Data – asset physical parameters, capacity and performance, condition, valuation and historical information.

- Routine Maintenance Plan – including overview of maintenance plan trends, costs and procedures, the standards and specifications applied, risks associated with alternative standards and summary of future costs and funding strategy (note maintenance task listing not needed)
- Renewal / Replacement Plan – includes renewals plan, residual lives and decision making process, strategic standards for renewed asset and summary of future costs and funding strategy
- Creation / Acquisition / Augmentation Plan – includes new assets selection criteria, standards, future costs and funding strategy
- Disposal Plan – includes forecast of proposed disposals, timing and costs / cashflow from sale
- Operational Plan – covers procedures and practices for operation of asset to required service in a safe and cost effective manner. (Often covered as a separate document)

5.3.5 Financial Summary

- 10 year expenditure forecast - by year for each service group and divided into maintenance, operations, new, renewal and disposal categories
- Funding strategy - to provide the required expenditure and any smoothing plans or budget rationalisation plans.
- Valuation forecast – for asset revaluations programme and predicted depreciation expenses and written down values
- A 10 year summary showing the organisation will be financially viable over that period.
- If required a strategic look at longer term expenditure requirements.(eg. 30 years)
- Key assumptions in financial forecast

5.3.6 Asset Management Practices

- Outline of decision making processes employed to arrive at asset management plan outcomes. Includes:
 - Accounting / financial systems
 - Asset management systems
 - Information flow requirements and process
 - Standards and guidelines governing.

5.3.7 Plan Improvement and Monitoring

- Performance measures – AM systems, AM plans
- Assumptions made
- Improvement programme – includes tasks, timing and costs to increase confidence level to desired levels.
- Monitoring and review process for plan implementation, performance measurements and external, internal audits.

5.3.8 References

5.3.9 Appendices

6 Managing Corporate Issues

The diversity of many businesses makes it very difficult for the business to effectively manage their entire infrastructure asset portfolio.

By using AMP's as a key output for the business units, organizations can then better assess the relative confidence levels of the current and predicted budgets. This then allows better evaluation of demands for capex and opex as shown in the municipal organization example in Figure 6.1.

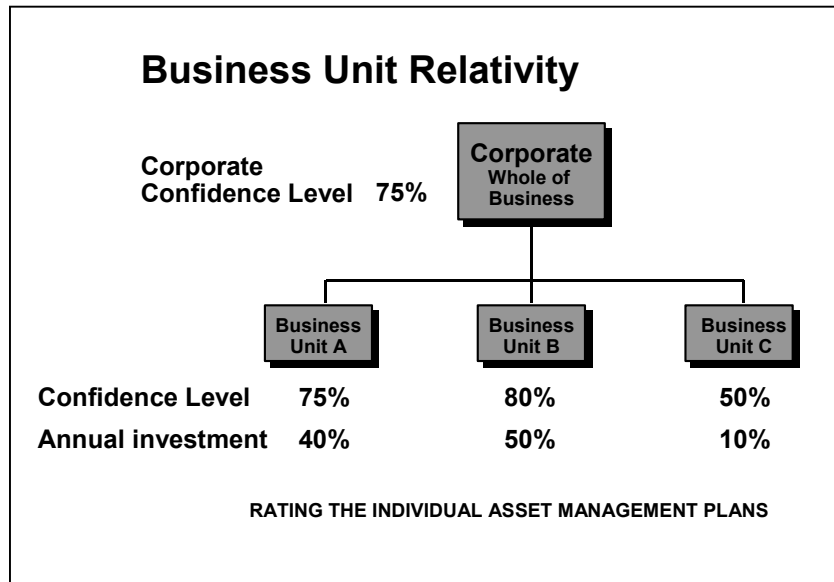


Figure 6.1

Using this quality or confidence level / approach, the organization can set appropriate key performance indicators for itself and the business units. They can also tie these into necessary “improvement programs” so that improvements are driven by the benefit they represent to the organization, eg. a lift in confidence levels.

7 Improvement Programmes

Asset management is a business activity that requires continuous improvements. The key to any successful asset management programme is the method that the organization uses to implement improvements or changes.

The success factors for new improvements are that they are:

- Properly identified.
- Implemented in achievable portions (let the system and practices evolve).
- Based on clear understanding of the processes involved.
- Properly monitored, reviewed and audited.
- Have the full commitment of the entire organization.

To ensure continuous improvement programs (CIP's) are properly structured, it is vital that a thorough needs analysis is undertaken and an appropriate improvement strategy is developed.

CIP's need to be reviewed at a maximum interval of 5 years, while individual activities should be subjected to additional continuous improvement.

The main objectives of CIP's is to identify cost reduction opportunities, achieve savings and improve business performance. Every asset owner will move through this process to determine their individual program.

The process is shown schematically in Figure 7.1.

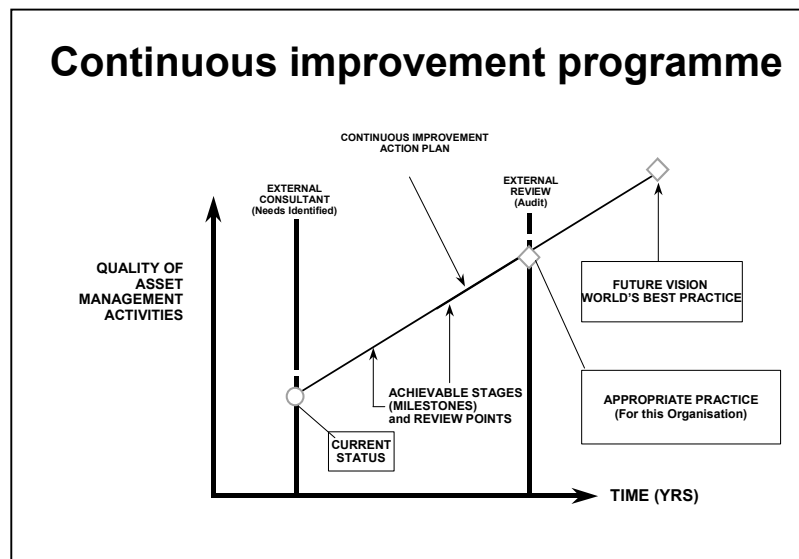


Figure 7.1

8 Asset Audit and Management Review

The objective of auditing is to ensure the effective development, implementation and operation of asset management plans.

Auditing provides an ongoing assessment of how the organization is performing with regard to its approach to the management of its infrastructure and other assets. The audit and review functions also include a critical look at: the current levels of service provided by the asset stock and the areas of improvement in owning and operating the assets.

Although independent business units may have delegated, responsibility for the assets within their area of service, they must accept that they operate within the strategic framework of the whole organization. The executive management of the whole organization as a whole and the Board of Directors are the delegated owners and hold custodial responsibilities for these assets. In such organizations, it is important to ensure that each business unit approaches the issue of asset management in an appropriate manner as part of the whole. This needs to be done without stifling the individual initiative and creativity of the business units.

The audit should be structured to identify:

- The current status of asset management.
- Appropriate service level required by the business units and assets.
- The gap, and the priority or criticality of the gap.
- The improvement program:
 - Tasks required.
 - Costs.
 - Benefits.
 - Timetable.

This is shown in Figure 8.1.

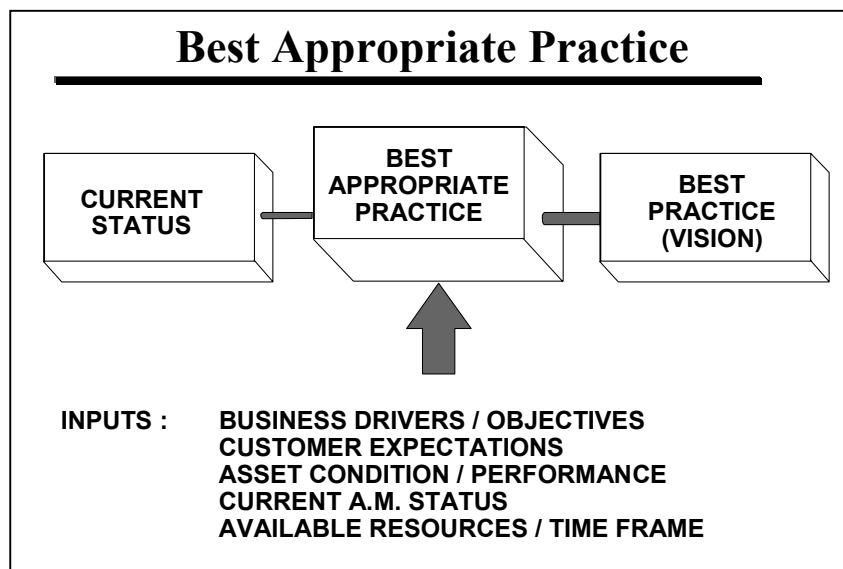


Figure 8.1

These audits should be carried out to cover:

- A horizontal view across the organization through its business units.
- A vertical view from corporate down to the workforce through the business unit.

The key elements involved in the effective and efficient management of assets, and therefore the items requiring audit are:

- Life Cycle Asset Management Processes and Practices - The necessary processes, analyses and evaluation techniques needed for life cycle asset management and the outputs required.
- Data and Knowledge Adequate reliable data for use in the process to produce the required outputs and knowledge.
- Information (Support) Systems The appropriate information (support) systems needed to store and manipulate the data required for the management processes and practices.
- Commercial Tactics The method used to carry out the work, ie. contestable contracted or in-house and the way this is initiated, approved and controlled.
- Organisational Issues -The structure, roles and responsibilities of the organization that support asset management activity.

8.1 Audit Principles / Philosophies

Audits should be carried out on all key asset management programmes and asset types. It is vital to ensure that the audit is:

- a) Logically structured and is repeatable so as to enable a future review to monitor the progress (or decline) that has occurred.
- b) Carried out with a view to encouraging improvement, not blaming past performance (no fault approach).
- c) Structured in such a way as to identify the greatest benefits for the organization from a total "business" sense.
- d) Completed by a suitably qualified auditor specializing in this area of practice.

With GHD completing the auditing our quality assurance process allows us to assess and improve clients asset management as part of a "partnership".

With GHD providing the expertise and experience and the client providing the knowledge of their business assets can result in the gap analysis as shown in Figure 8.2.

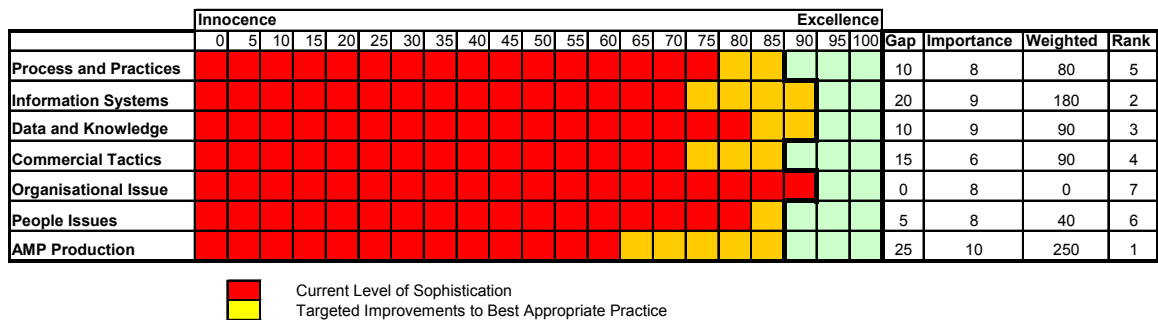


Figure 8.2

The audit should tie the gaps identified to the business drivers or benefits identified by the current and required confidence levels. The results will include a set of improvement projects for all key weaknesses that will enhance the quality of activities in these individual areas as shown in Figure 8.3.

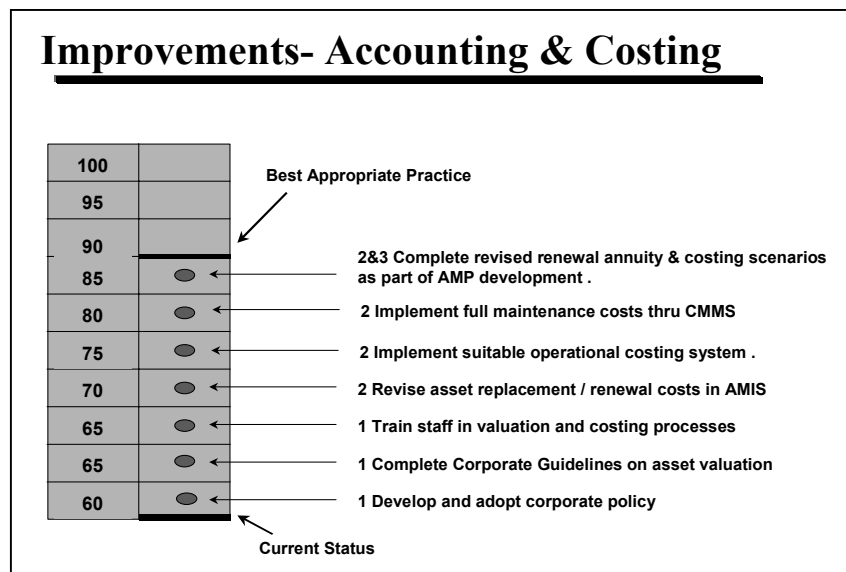


Figure 8.3

9 Summary / Conclusions

This paper is intended to present an overview of the issues, principles and processes involved in adopting an appropriate level (best appropriate practice) in the area of asset management and the importance of auditing these activities. Any activity undertaken in the field of Asset Management must be benefit driven. If there is no benefit in what is done then why do it? For organizations that have followed this path, they now have a fully integrated approach to their asset management program that enables them to:

- understand their current position;
- vary to suit new challenges, customer and stakeholder requirements; and
- link corporate goals with workforce actions as shown in Figure 9.1.

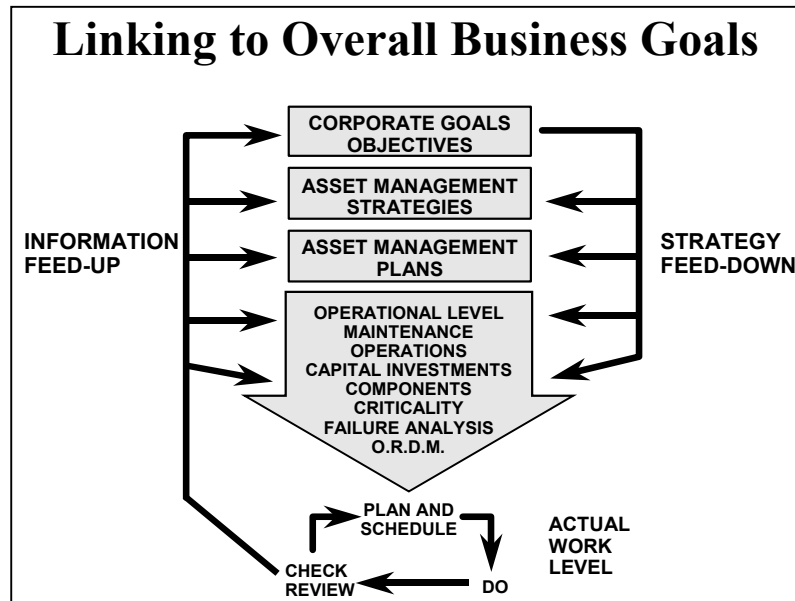


Figure 9.1

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Key Words

Asset management plans, service delivery, best practice, life cycle costs.

Author Biography

Ross McPherson is GHD's Australasian Manager for Asset Management. Ross has been with GHD for some 10 years and in that time has consulted to a multitude of municipalities, state government bodies and private industry clients. His knowledge of managing and maintaining assets covers a wide range and includes but is not limited to all municipal asset types, irrigation assets, ports assets, building assets, water and wastewater assets. Ross' experience covers all aspects of life cycle asset management and specialises in long-lived assets.

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